

seab  **2016**
symposium on euroasian biodiversity

Dear Colleagues,

It is great pleasure that we invite you to the 2nd Symposium on EuroAsian Biodiversity (SEAB2016) which will be held from May 23rd to 27th, 2016 at Kilikya Palace Resort Hotel in Antalya, TURKEY.

Symposium will include invited talks, plenary talks given by selected pioneers of biodiversity, panel discussions, meet-the-expert platforms and oral/poster presentations. The sessions will focus on the most recent scientific findings in the area of Biodiversity and its related issues. By providing a highly interactive platform, this symposium will seek the views and creative ideas on novel approaches in biodiversity research and its other field applications.

In addition to top-notch and diverse scientific program being offered, we encourage delegates to enjoy one of the most known Turkish Riviera, Antalya with its famous ruins of ancient civilizations and sights of astonishing natural beauty with social and cultural events.

We look forward to your participation in the 3rd International Symposium on EuroAsian Biodiversity.

Best Regards,

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INVITED SPEAKERS



Axel HOCHKIRCH

Universität Trier, Germany

***Speech Title: Engaging in Biodiversity Conservation:
How IUCN helps to preserve our natural heritage***

The global loss of biodiversity is a major challenge of the Anthropocene. This has been recognized not only by scientists, but also by politicians, who agreed upon the Aichi biodiversity targets during the Nagoya Conference of the Parties to the Convention on Biological Diversity (CBD). These Aichi targets are a milestone in global conservation efforts. They include for example the target to preserve 17% of the terrestrial and inland water and 10% of the coastal and marine areas as well managed protected areas (target 11) or to halt the loss of biodiversity by 2020 (target 12). The International Union for the Conservation of Nature (IUCN) is the oldest, largest and most influential global environmental organization. As an observer to the United Nations General Assembly, the IUCN shaped most of our modern environmental conventions (including CITES, CBD etc.). The Commissions within the IUCN are expert networks, who volunteer to improve the work of the IUCN, including input to the IUCN flagship knowledge products, such as the IUCN Red List of Threatened Species, the Key Biodiversity Areas or the Global Invasive Species Database. Here, I outline how experts can engage in the IUCN to help preserving our natural heritage.

INVITED SPEAKERS



Chandrakant B. SALUNKHE

Shivaji University, INDIA

Speech Title: Botanical Gardens of the World : as Centers of Biodiversity Conservation in Anthropocene

Botanical gardens are the unique and distinctive kind of scientific and cultural institutions. They have made major botanical and horticultural contributions to our societies. The world's first botanical garden was created in Padua, Italy in 1545. This garden is the original of all botanical gardens throughout the world and represents the birth of science and understanding of the relationship between nature and culture. There are currently around 3,000 botanical gardens and arboreta in existence in 180 countries around the world. Royal botanical Garden, Kew, UK; Oxford botanical garden, Oxford; HortusBotanicus, Leiden, The Netherlands; Bogor botanical garden, Bogor, Indonesia; South China botanical garden, Guangzhou, China and many other have played an important role in biodiversity conservation. Garden tourism is increasing largely in the last 10 to 15 years. Botanical gardens with their valuable diverse natural resources display will play a vital role in tourism within the context of sustainable tourism expansion. Singapore Botanic Gardens and Gardens by the Bay are the major contributors to the Singaporean economy. NongNooch Tropical Botanical Garden near Pattaya is the most attractive tourist destination in Thailand. Botanical gardens are effective with networks at national, regional and international levels. Over the centuries, botanical gardens have learned to adapt to advances and changing circumstances. After a long period the emphasis changed during the past 25-30 years and the conservation of biodiversity became a primary concern for most of the gardens. Today's botanical gardens are more complex organizations than garden of last century. New botanical gardens are being established throughout the world often as botanical resource centers. About half of all botanic gardens in existence today have been established in the last 50 years. In recent years botanical gardens have begun to influence and shape international agenda including United Nations Sustainable Development Goals (SDGs) for achieving more sustainable future by 2020. Botanical gardens will greatly help in reconnecting peoples with nature, raising awareness of biodiversity conservation, societal benefits, and as sustainable tools for improving physical and mental health. Establishment of botanical gardens with native plants instead of parks with exotics are needed in future urban planning and designs as a priority agenda. Enjoying 'botanical holiday' with amazing plant diversity in botanical gardens will be an effective remedy as nature based solution for problems associated with urbanization and climate change in Anthropocene.

INVITED SPEAKERS



Kani IŞIK

Akdeniz University, TURKEY

Speech Title: Biodiversity Loss: The Past, the Present and the Future

Biodiversity is briefly defined as the variability of life on Earth. It includes genetic variation within species, species variation among organisms, habitat variation within ecosystems, and process variation among organisms and their habitats. Extinction is the permanent loss of biodiversity along with genetic information and unique DNA codes, which, once lost, can never be assembled again. Extinction is the most serious and irreparable part of environmental damage on Earth. Evidences indicate that Earth Biota witnessed many extinction episodes of different scales during the geological periods. Five of those were the major, mass extinctions. The most dramatic extinction appeared about 250 million years ago, at the end of Permian period, when the loss was about 95% at the species level. In the current period, the sixth extinction episode has been in process, beginning around 30,000 years ago. The first five extinction processes took place due to various natural (geological, astronomical...) reasons. However, the sixth mass extinction episode, which is the most unusual and unprecedented one, has been caused by one of the formidable a relatively new species ever existed on Earth: Homo sapiens. A typical cause of mass extinctions is rapid environmental changes. Within the last few centuries, the human species has been adding various chemicals (gas, liquid, solid) and nuclear wastes on our environment. Most of these materials are completely new on Earth, and no organisms have been evolved to assimilate and convert them into beneficial forms. Consequently, most organisms (including man) and their habitats have been critically endangered by such chemicals and nuclear materials. As a result, we are in the midst of the sixth mass extinction crisis on Earth today. Fortunately, there have been influential voices to slow down such destiny. In addition to the first international voice that initially rose by UN in Biological Diversity Convention in Rio in 1992, there have been various other voices throughout the human history. Symbolized by Six Great Vessels, these voices include Noah's Ark, Darwin's Beagle, Captain Cousteau's Calypso, Greenpeace Ship (Rainbow Warrior), BIOSPHERE 2 (Spaceship), and finally Spaceship EARTH (Ecosystem) (Biyosfer-1). Each of these Great Ships has given humanity some constructive messages (either spiritual or physical) on our dedicated voyage on the conservation of biological diversity on Earth.

INVITED SPEAKERS



Nadir ERBİLGİN

University of Alberta, CANADA

Speech Title: Functional characterization of insect and microbial biodiversity in response to disturbances in complex forest ecosystems

During the last century, disturbances have caused significant changes at the below and above ground biodiversity of terrestrial ecosystems across the globe. How these changes affect some biological processes such as interspecies interactions are not clear. In my presentation, I will provide two case studies explaining how disturbance-influenced changes affect biological interactions in complex forestry settings. In one example, we investigated how prescribed fires affect the population dynamics of mountain pine beetle (*Dendroctonus ponderosae*) and its competitors and natural enemies in lodgepole pine (*Pinus contorta*) forests in western Canada. We found that although endemic-level beetle populations preferentially colonized fire-injured pine trees after prescribed fire, colonization rates decreased consistently over a 4-year period. To understand the mechanisms behind this pattern, we surveyed subcortical insect communities (predators, parasitoids, and competitors) for 3 consecutive years in burned forest stands and found that both competitors and predators drove the mountain pine beetle population to nearly extinction level. In the second example, we used a recent mountain pine beetle outbreak in lodgepole pine forests of western Canada to test whether the effects of tree mortality altered the richness and composition of belowground ectomycorrhizal fungal communities. We found that the richness of ectomycorrhizal fungi declined and the overall composition of soil fungi was altered by beetle-induced tree mortality. Likewise, beetle outbreak reduced above (community composition of epigeous sporocarps) and belowground (hyphal abundance) occurrences of ectomycorrhizal fungi. Interestingly, stand mortality caused by prior beetle attacks of mature pines have cascading effects on seedling secondary chemistry, growth, and survival. Seedlings grown with fungi collected from beetle-killed stands had lower monoterpene concentrations and fewer monoterpene compounds present compared with seedlings grown with fungi collected from undisturbed stands. Seedling survival in the field was lower in beetle-killed than in undisturbed stands.

INVITED SPEAKERS



Namik RASHYDOV

Institute of Cell Biology and Genetic Engineering, UKRAINE

Speech Title: Aspects of plant biodiversity in condition of adverse environmental in the Chernobyl alienation zone

The focus our investigation is on a role of the small dose chronic radiation due to plant biodiversity processes because it is a common adverse environmental toxicology factor. Some of the territories have naturally increased level of radiation as areas of native radioecological anomalies, but others were polluted as a result of nuclear weapon testing, nuclear waste leakage, and nuclear power plants disasters, such as Chernobyl and Fukushima. Eventually, the large areas have been contaminated with radioactivity isotopes. Plants were exposed to chronic radiation at radionuclides contaminated sites have characteristic such biodiversity processes: decrease seed yield and changing prolonged flowering term, early senescence. Plant response to ionizing radiation is characterized primarily by damage of molecular structures and reactive oxygen species (ROS) induces premature differentiation of the floral meristem and dynamic response of the metabolic pathways. The genes expression change during sensitive phases of plant ontogenesis, as well as flowering, senescence, DNA repair and transcription, folding protein synthesis, etc. are the main networks biodiversity under influence chronic irradiation. Our recent data demonstrated that chronic ionizing radiation affects gene expression that caused considerable adjustments in protein synthesis. Experiments with soybean and flax plants in Chernobyl alienated zone have revealed changes in expression of genes involved in signal systems, protein synthesis, protein folding, and de novo synthesis of proteins related to stress response. The research is aimed to study expression of genes involved in flowering, DNA repair, folding protein synthesis during plant adaptation to chronic ionizing irradiation. As sedentary organisms plants cannot escape the adverse environmental effects. Therefore, to protect themselves from harmful environmental effects and adverse factors and to adapt to the changing environment plants have developed plant transgeneration plastic regulatory systems. Transcription is the initial and likely the major step in gene expression regulation that occurs through interaction and binding of regulatory molecules (elements, factors) of RNA or protein nature with certain DNA elements of genome. Epigenetic modifications play also very important role in gene expression regulation. We were study the cupin protein superfamily that is involved in plant responses to chronic irradiation at Chernobyl alienated zone. The expression of cupin proteins can be activated, for instance, during floral induction, embryogenesis under influence stress factors such as high temperature, salt, heavy metal and chronic irradiation. The studying of seed developmental profiles of several cupin proteins in soybean and flax from Chernobyl experimental fields confirmed the preliminary observations that some cupin proteins in seeds from radio-contaminated areas are altering in abundance through several generations of the plants. We use a combination of genomic and proteomic approaches to assess plant metabolic networks, which should help us better understand main principles of plant biodiversity under influence of chronic low dose ionizing radiation in the Chernobyl alienated zone.

INVITED SPEAKERS



Nazim MAMEDOV

University of Massachusetts, USA

Speech Title: Man and Medicinal Plants

The association of humans with plants obviously originated with the beginning of life on earth when plants provided the oxygen, food, forage, shelter, and medicine needed for higher life forms. Overtime and with the beginning of societies, humans learned to recognize and categorize plant materials suited for use in meeting the necessities of life. Of these necessities, the use of plants and plant extracts for healing can be traced to the earliest of myths, traditions, and writings used to codify those plant materials that could ease pain and treat diseases. The evolution of these plant-based medicine systems, primarily created by using plants within a local area, produced the well known traditional medicine systems, the Ayurvedic and Unani of the Indian subcontinent, the Chinese and Tibetan in other parts of Asia, the Native American of North America, the Amazonian of South America, and several local systems within Africa. While conventional medicine has become common in Western nations, approximately 70-80 percent of the primary health care throughout the world remains based on plant materials.

INVITED SPEAKERS



Wade Cutting SHERBROOKE

American Museum of Natural History, USA

Speech Title: **Diverse Responses by Horned Lizards During Encounters with Various Categories of Predators: Survival Value of Mental Categorization of Differing Threats**

Predator-prey interactions reliant on visual signals are ancient. They have evolved to incorporate multiple attack stages and corresponding escape strategies at each stage. Using field and enclosure studies, I have tried to understand visually-mediated, mental categorizations of anti-predator responses by horned lizards to a diversity of reptilian, avian, and mammalian predators that employ different predatory attack and capture skills. My studies focus on two species, Texas Horned Lizards and Round-tailed Horned Lizards, which differ in size (large and small) and methods of camouflage (background matching and object mimicry). I have tried to piece together horned lizard defensive actions throughout sequential events of predator-prey interactions — from encounter to ingestion. In early stages of events the lizards utilize components of camouflage, apparently with a wide spectrum of predators, whereas in later stages it becomes clear from their responses that they discriminate distinct categories of predators and selectively utilize different survival-appropriate defense tactics with different categories of vertebrate predators – Grasshopper Mice, Leopard Lizards, Roadrunners, Texas Diamond-backed Rattlesnakes, Coachwhip Snakes, Kit foxes, Coyotes, Bobcats.

EXHIBITIONS

EXHIBITION I: FLORISTIC DIVERSITY OF ANATOLIA



Exhibition owner: Prof. Dr. Atilla OCAK (Eskisehir Osmangazi University, Turkiye)

EXHIBITION II: SILENT INHABITS OF FRESHWATER



Exhibition owner: Prof. Dr. Naime ARSLAN (Eskisehir Osmangazi University, Turkiye)
& Erkan BALK (ESGAM)

EXHIBITION III: GARDENS AND FLOWERS OF ISTANBUL



Exhibition owner: Ali Nihat GÖKYİĞİT Foundation (ANG) and Nezahat Gökyiğit Botanical Garden

POSTER PRESENTATION GUIDE

Posters will be on display in the Poster Area. This year we will have three full day poster sessions. Each poster session is divided into two time slots, as follows:

Afternoons:

Tuesday: First Group: 10:30 to 12:15, Second Group: 14:30-16:30

Wednesday: First Group: 10:30 to 12:15, Second Group: 14:30-16:30

Thursday: First Group: 10:30 to 12:15, Second Group: 14:30-16:30

Authors must be present during BOTH TIME SLOTS. Posters must be posted in exact time, and they must be removed after time ended.

Poster Size and Instructions

- One poster board is allocated to each presentation. The recommended poster size is 90 cm high by 70 cm wide.
- Posters must be mounted using tapes/pins provided by the organizing committee.
- Please note that there will be two poster sessions for exact day, therefore two posters will use the same board in the day, one in the morning and one in the afternoon. For this reason, be considerate and remove your poster in the designated time after your session is over, to allow enough time to the next authors to place their posters.
- Each poster presenter is required to defend his/her poster during the respective poster session slot for the paper to be included in the conference proceedings.
- The title of your poster paper should be done in block letters which are AT LEAST 36-72 punto.
- All text must be easily readable from a distance of 1 to 2 meters. Make the lettering at least 1 cm high, smaller lettering will not be legible from a distance of 1 to 2 meters.
- All graphs and charts should be AT LEAST 15 X 20 cm or larger.
- It is a good idea to sequentially number your materials in the poster. This will indicate to the viewer a logical progression through your Poster Paper Presentation.
- Provide an introduction (outline) and a summary or conclusion for your Poster Paper Presentation.
- Prepare your Poster Paper Presentation carefully so that it can be used as the basis to explain and answer questions from the viewers.
- It is helpful to have copies of the written version of your paper available for those viewers who may want to study specifics of your work in more detail.

ORAL PRESENTATION GUIDE

Observing Your Allotted Time

- The total time allotted to each speaker is 15 minutes. You should plan to speak for 10 minutes and leave 5 minutes for questions.
- Invited speakers have twice this time, 60 minutes in total, and they should plan to speak for about 50 min, leaving 10 min. for questions.
- There is NO EXCUSE for using more than your allotted time. Rehearse your presentation several times; projecting slides and doing anything else you would otherwise expect to do at the meeting.
- It is a discourtesy to your audience, the Session Chair and the other speakers to exceed your allotted time.
- The Session Chairs are instructed to adhere to the printed schedule for the session. With parallel sessions this is critical to the overall success of the conference.

GENERAL INFORMATION**Main Venue**

Kilikya Palace Hotel, Göynük,
Antalya-TÜRKİYE

Symposium Rooms

Oral presentations: Salon Atlantis,
Salon Grazie and Salon Alesia, Poster
presentations: Building B

Language

English is the predominant language in symposium.

**Currency and Banks**

The Turkish Lira (code: TRL) is the currency of Turkey. It is subdivided into 100 kuruş.

Insurance

The meeting coordinators cannot accept any liability for personal injuries, loss or damage to properties belonging to participants, either during or as a result of the symposium. Participants are encouraged to take out their own personal travel insurance.

Name Badges and Materials

Name badges and meeting materials will be provided on-site at the registration desk. All participants are kindly requested to wear their name badge during all meeting functions and social events.

Shopping

Most shops and department stores are open from 09.00 – 20.00 (09 am – 8 pm) Monday through Thursday, 10.00 – 21.00 (10 am – 9 pm) Friday to Saturday, 11.00 – 19.00 (11 am – 6 pm) on Sunday. Major credit cards are widely accepted.

Weather

The climate in Antalya during this time is variable with temperatures between 25-30°C.

Time

Indianapolis is currently on Eastern Daylight Time, 2 hours front on Greenwich Mean Time (GMT).

Power

In Antalya the standard voltage is 220 V. The standard frequency is 50 Hz. The power sockets that are used are of type C / F.

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10 ⁰⁰ - 12 ⁰⁰	Opening Ceremony		
12 ⁰⁰ - 13 ⁰⁰	Lunch		
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14 ¹⁵ - 14 ³⁰	Study of biodiversity of perspective ornamental plants for creating compositions in Absheron Tofik MAMMADOV	Effects of Fertilizer Pollution in Aquatic Habitats on Metamorphosis Process and Welfare of Frog Tadpoles Handan KARAOĞLU	Freshwater Fish Biodiversity of Muğla Province (Turkey): A Review Daniela GIANNETTO
14 ³⁰ - 14 ⁴⁵	Floristic Biodiversity of City Hatay (Turkey) Atilla OCAK	Antioxidative Defence Mechanisms in Tomato (<i>Lycopersicon esculentum</i> L.) Plants Sprayed with Different Pesticides and Boron compounds Köksal KÜÇÜKAKYÜZ	Mitochondrial DNA Variation in Mediterranean fruit fly (<i>Ceratitis capitata</i>) Populations Güven GÖKDERE
14 ⁴⁵ - 15 ⁰⁰	Gardens and Flowers of Istanbul Mesut KIRMACI	Protective Role of Taurin and Curcumin on Bisphenol A Induced Toxicity in Rat Blood Hatice BAŞ	A test on barcoding power of two molecular markers: the utility of COI and ITS2 in insect Mahir BUDAĞ
15 ⁰⁰ - 15 ¹⁵	Determination of Inter Species Genetic Variation of the Endemic Species; <i>Phlomis physocalyx</i> , <i>Phlomis omissitillora</i> and their hybrids Gökhan SEZER	Role of Proline on Boron Stress Tolerance Mechanisms in <i>Arabidopsis thaliana</i> Aykut SAĞLAM	The Utility of Compensatory Base Changes (CBCs) of ITS2 in Species Delimitation: A Case Study in Svmnhvta (Hymenoptera: Insecta) Murat GÜLER
15 ¹⁵ - 15 ³⁰	Determination of genetic differences and similarity of banana accessions sampled from Turkey based on directed amplification of minisatellite DNA (DAMD) PCR Markers Hasan PINAR	Characterization of High Level of Deoxyvalenol Producer <i>Fusarium graminearum</i> and <i>F. culmorum</i> Isolates from Turkey Emre YÖRÜK	Investigations of Physical and Chemical Properties of Eber Lake (Turkey) Murat BARLAS
15 ³⁰ - 15 ⁴⁵	Bioecological features of the wetland vegetation of Kura-Araks lowland of Azerbaijan Kamala ASADOVA	Genetic structuring and diversification of <i>Bombus lapidarius</i> (Linnaeus, 1758) (Bombinae: Apidae): the role of Anatolia as a glacial refugium Burcu TEMEL	The Influence of Leaf Litter on the Distribution of Aquatic Oligochaetes in Tunca River (Edirne/Turkey) Melek ZEYBEK
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16 ⁰⁰ - 16 ¹⁵	ISSR-PCR Optimisation for Genus <i>Rubus</i> Subsection <i>Glandulosi</i> (Rosaceae) Gülçin İŞİK	Contributions to larger Basidiomycota of Turkey from Yuvaçık (Izmit) basin İlğaz AKATA	Zooplankton Distribution and Diversity in the Izmir Bay Efe ULUTÜRK
16 ¹⁵ - 16 ³⁰	Relation of Gypsiferous and Marl Soils with Vegetation in Eskişehir (Turkey) Derviş ÖZTÜRK	Chitin Content and Some Physicochemical Properties of <i>Cicadas</i> (Hemiptera: Cicadoidea) Abbas MOL	Scorpion (Scorpiones) Fauna of Turkey: Biodiversity and Endemism Ersen Aydın YAĞMUR
16 ³⁰ - 16 ⁴⁵	An Important Eurasian genus: <i>Scutellaria</i> L. Ersin MİNARECİ	Biodiversities of Carabidae, Elateridae and Cerambycidae Families in 3 Forest Type in Andırın (Kahramanmaraş-Turkey) Bülent LAZ	Statistical Analysis of Numerical Dispersion of Raphignathoidea (Acari: Prostigmata) from the Aegean coast of Turkey Mustafa AKYOL
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17 ⁴⁵ - 18 ⁰⁰	Cytological and Biochemical Analysis of Regenerated Plants of Cabbage (<i>Brassica oleracea</i> L.), obtained from the Reproductive Organs in vitro R.N. KIRAKOSYAN	Features of sustainable criteria for environmental conditions of <i>Pinus</i> L. genus introduced in Absheron H.H. ASADOV	Preliminary Results on Checklist Revision of Chironomids for Türkiye Gürçay Kıvanç AKYILDIZ
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24.05.2016			
09 ³⁰ - 10 ³⁰	(Salon Atlantis Hall) Invited Speaker: Chandrakant B. SALUNKHE (INDIA) Botanical Gardens of the World: as Centers of Biodiversity Conservation in Anthropocene		
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10 ⁴⁵ - 11 ⁰⁰	A Fair Rural Tourism Practice: Eco-agro Tourism and Voluntary Exchange (TaTuTa) Esen ORUÇ	The Histopathological Effects of Lambda-cyhalothrin on Gills of <i>Oreochromis niloticus</i> Pelin UĞURLU	Comparison of Variation in Forewings of <i>Ammophila heydeni</i> (Hymenoptera) from Different Localities of Turkey by Geometric Morphometric Analysis Yaşar GÖLMEZ
11 ⁰⁰ - 11 ¹⁵	Plant Diversity and Ecotourism on Tunceli Metin ARMAĞAN	Viral Diversity of Pine Processionary Moth, <i>Thaumetopoea pityocampa</i> Zihni DEMİRBAĞ	Chromosomal Diversity in the Jewel-Beetle Species (Coleoptera, Buprestidae) and Its Taxonomic Significance: A Review Yavuz KOÇAK
11 ¹⁵ - 11 ³⁰	Changes of Some Morphological Characteristics of Nature Grown Carob (<i>Ceratonia siliqua</i> L.) Leaves Hakan KELEŞ	The changes of Biochemical Markers in a Fish Species <i>Gambusia holbrooki</i> After Exposure to Acetamidiprid-Based Insecticide Özlem DEMİRCİ	Turkish Aphid Diversity with New Additions From Eastern Part of Turkey Özhan ŞENOL
11 ³⁰ - 11 ⁴⁵	Current checklist of the bryophytes of Rize, Turkey Gökhan ABAY	Heavy Metal Concentrations in <i>Squalius fellowesii</i> (Günther, 1868) inhabiting Tersakan Stream Bülent YORULMAZ	A Contribution to the knowledge of family Dytiscidae (Coleoptera: Adepfaga) of Bingöl Province (Eastern Anatolia, Turkey) Medeni AYKUT
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12 ¹⁵ - 12 ³⁰	The Research of Morphophysiological Changes in Wheat Genotypes from the Influence of Drought Stress Factors Tamraz TAMRAZOV	Diversity of genus <i>Galanthus</i> in Georgia Elza MAKARADZE	Exotic Marine Macrophytes Species in the Gulf of Antalya, Turkey (Levantine Sea) Emine Şükran OKUDAN ASLAN
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13 ³⁰ - 14 ³⁰	(Salon Atlantis Hall) Invited Speaker: Axel HOCHKIRCH (GERMANY) Engaging in Biodiversity Conservation: How IUCN helps to preserve our natural heritage		
14 ³⁰ - 14 ⁴⁵	Coffee break		
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Chairs:	Chandrakant SALUNKHE - Tofik MAMMADOV	Belgin GÖÇMEN TAŞKIN - Gökhan ABAY	Nusret AYYILDIZ - Raşit URHAN
14 ⁴⁵ - 15 ⁰⁰	Anticancer Activity and Phenolic Profile of <i>Ganoderma resinaceum</i> Boud. Selçuk KÜÇÜKAYDIN	Marine Protected Areas networks in the eastern Mediterranean for the conservation of biodiversity and for the restoration of fishery resources Paraskevi K. KARACHLE	Predatory Mammal Species of Osmaniye Province (Mammalia: Carnivora) from Turkey Atilla ARSLAN
15 ⁰⁰ - 15 ¹⁵	Pollen morphology of <i>Cheirolepis</i> (Boiss.) O. Hoffm. section of <i>Centaurea</i> L. (Asteraceae) in Turkey Burcu YILMAZ ÇITAK	The Determination Genetic Diversity and Differentiation of <i>Psephellus aucherianus</i> complex based on sequence variation of matK (chloroplast DNA) Meryem BOZKURT	A Light Microscopy Study on Larval Integument Cycle of Lepidoptera Sadettin ÜNSAL
15 ¹⁵ - 15 ³⁰	Anatomical Responses of <i>Salicornia prostrata</i> (Amaranthaceae) to Salinity Stress Adnan AKÇİN	Preliminary Research on Distribution and Genetic Diversity of <i>Buxus sempervirens</i> in Euxine Sub-Flora Region of Turkey Necmi AKSOY	Enlarging the Knowledge on the Distribution and Hosts of <i>Sympiesis lucida</i> Storozheva, 1981 (Hymenoptera: Eulophidae) Yasemin GÜLER
15 ³⁰ - 15 ⁴⁵	Wild food plants traditionally consumed in the city of Mersin, Turkey Seyid Ahmet SARGIN	DNA Barcoding of Herbarium Specimens of <i>Buxus sempervirens</i> and <i>B. balearica</i> Banu AVCIOĞLU	Assessment of Locating Ecological Passages on Roads for Protecting Wildlife Biodiversity Sercan GÜLCİ
15 ⁴⁵ - 16 ⁰⁰	An Updated Overview of Genus <i>Reseda</i> (Resedaceae) in Turkey Emre ÇILDEN	Anti-Helminth properties of some plants in Azerbaijan: A survey on Ethnobotanical Materials Sayyara İBADULLAYEVA	Biodiversity of Superfamily Raphignathoidea (Acari: Prostigmata) in Turkey Mustafa AKYOL
16 ⁰⁰ - 16 ¹⁵	Coffee break		
Chairs:	Serap MUTUN - Ersin MİNARECİ	Naime ARSLAN - Füsün AKGÜL	Hasan KALYONCU - Ali SALUR
16 ¹⁵ - 16 ³⁰	Theoretically investigation of the physical and chemical properties of some flavonols İzzet KARA	Population Structure and Patterns of Geographic Differentiation of Olive Fly, <i>Bactrocera oleae</i> Vatan TAŞKIN	Morphology Larvae of Neuropteran (Neuroptera:Insecta) Disturbed in Mardin, Batman and Diyarbakır Provinces of Turkey Sadreddin TUSUN
16 ³⁰ - 16 ⁴⁵	Genetic variation in <i>Phoenix theophrasti</i> populations in Turkey and relations of the species with other palm species revealed by SRAP markers Belgin GÖÇMEN TAŞKIN	Different ways to increase polymorphism decorative characteristics <i>Linum grandiflorum</i> Desf. Irina LYAPINA	Evaluation on the Peripheral Blood Cell Morphology of <i>Cyprinus carpio</i> Linnaeus, 1758 Muhammet GAFFAROĞLU
16 ⁴⁵ - 17 ⁰⁰	Research of heat resistance of Azerbaijan rare trees and shrubs in Absheron condition Elman İSGENDER	Potential of Dangerous and Poisonous Plants West Java in Agriculture and Medicine Harni Mutia SARA	Why Specimens of <i>Pseudophoxinus ninae</i> and <i>Pseudophoxinus maeandricus</i> (Teleostei, Cyprinidae) Could Not Found? Muradiye KARASU AYATA
17 ⁰⁰ - 17 ¹⁵	Fito-Ameliorative Measures on Protection of Biodiversity in Shahdagh National Park Arzu MUSTAFAYEV	Perspectives of using <i>Triticum monococcum</i> in wheat breeding programs Polina Ya. TRETAKOVA	Study and Collection Onion (<i>Allium cepa</i> L.) Germplasm Nesrin HUSEYİNZEDE
17 ³⁰ - 21 ⁰⁰	Dinner at Botanik Restaurant-Ulupınar/Kemer		

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25.05.2016			
09 ³⁰ - 10 ³⁰	(Salon Atlantis Hall) Invited Speaker: Nadir ERBİLGİN (CANADA) Functional characterization of insect and microbial biodiversity in response to disturbances in complex forest ecosystems		
10 ³⁰ - 10 ⁴⁵	Coffee break		
Rooms	Atlantis Hall	Grazie Hall	Alesia Hall
Chairs:	Esra MARTİN - Ferhat CELEP	Yakup KASKA - Emine Ş. OKUDAN	Taryel TALİBOV - Osman TUGAY
10 ⁴⁵ - 11 ⁰⁰	Studying the acclimatization and agricultural peculiarities of early species of tangerine introduced from Ianan in condition of Adıara Rezo Kh. JABNIDZE	Seasonal Dynamics of Insecticide Resistance, Multiple Resistance, and Morphometric Variation in Field Populations of <i>Culex pipiens</i> Vatan TAŞKIN	Crustacean ectoparasite Fauna Linked to Seasonal changes and Host Fish Size of fishes in Lake Dam Kunduzlar, Asia Minor Mehmet Oğuz ÖZTÜRK
11 ⁰⁰ - 11 ¹⁵	Assessment of fruit and some biochemical characteristics of almond genotypes selected from natural populations of Kayseri province Aydin UZUN	Effect of Some Pesticides Mixture on Biochemical Biomarkers Özlem DEMİRCİ	Systematic studies on zeronid mites (Acari, Zeronidae) in Inner Aegean Region of Turkey - III Elif Hilal DURAN
11 ¹⁵ - 11 ³⁰	The Ultrastructural of Achene Surface in the Genus <i>Cyanus</i> Mill. (Asteraceae) Emrah ŞİRİN	Nesting Biology of Loggerhead Turtles on Dalyan Beach; Results from 2015 Nesting Season Yakup KASKA	Glance at Pelagic Birds of Didim (Aydın, Turkey) with a new record Cemil Ozan AKBULUT
11 ³⁰ - 11 ⁴⁵	Effects of Salinity on Anatomical Characters of <i>Suaeda prostrata</i> subsp. <i>prostrata</i> (Amaranthaceae) Adnan AKÇİN	Plant Richness of the Genus <i>Asragalus</i> in Kahramanmaraş / Turkey Alper UZUN	Altitude and Habitat Preferences of Zeronid Mites (Acari: Zeronidae) in Kırklareli Province Mehmet KARACA
11 ⁴⁵ - 12 ⁰⁰	Floristic Features of <i>Pinus pinea</i> L. Forests in the north-west Region of Turkey (Yalova) Ömer VAROL	Evaluation of Garlic Chive (<i>Allium tuberosum</i> Rottler ex Spreng) Plants Regenerated from Whole Flower Bud Cultures Arzu KASKA	May Southern Turkey be a Contact Zone of migratory European (<i>Hirundo rustica rustica</i>) and sedentary East-Mediterranean (<i>Hirundo rustica transitiva</i>) barn swallows? Hakan KARAARDIÇ
12 ⁰⁰ - 12 ¹⁵	A Phytosociological Investigation on the Macchie Vegetation of Bodrum (Muğla) Peninsula Hediye AKTAŞ AYTEPE	Survey of Two Amphibian Pathogens (<i>Batrachochytrium dendrobatidis</i> , Ranavirus) on the Collections of Endemic Tavas Frog, (<i>Rana tavasensis</i>) in Zoological Museum of PAU, Turkey Pınar AGYAR	<i>In vitro</i> Antibacterial Activity of <i>Arisarum vulgare</i> Plant Extract against Some Fish Pathogens Zeynep SAYIN
12 ¹⁵ - 12 ³⁰	Flora biodiversity of the ravines of the Kapaz mountain U.V.BAYRAMOVA	Characterization of Olive Temperature Induced Lipocalin (TIL) Gene Faysal YILMAZ	Limnological Monitoring Project of the Trophic Structure in Lake Eğirdir Meral APAYDIN YAĞCI
12 ³⁰ - 13 ³⁰	Lunch		
13 ³⁰ - 14 ³⁰	(Salon Atlantis Hall) Invited Speaker: Nazim MAMEDOV (USA) Secondary Metabolites and Biodiversity		
14 ³⁰ - 14 ⁴⁵	Coffee break		
Rooms	Atlantis Hall	Grazie Hall	Alesia Hall
Chairs:	Ali Ramazan ALAN - Kamuran AKTAŞ	Tuna UYSAL - Deniz İNNAL	Deniz ŞİRİN - Mustafa YAVUZ
14 ⁴⁵ - 15 ⁰⁰	The phenolic compounds and fatty acids compositions of <i>Plagiommium affine</i> (Blandow ex Funck) T. I. Kop. extracts Duygu GÜNEŞ	Molecular Analysis of "on year" and "off year" in olive: Exploiting Genetic Diversity to Explore Solutions for Periodicity Ekrem DÜNDAR	Migration route and strategies in a highly aerial migrant, the Alpine Swift (<i>Tachymarpis melba</i>) revealed by light-level geolocators Hakan KARAARDIÇ
15 ⁰⁰ - 15 ¹⁵	The Plant Biodiversity of Ballica Cave Nature Park and Surrounding Area Hakan Mete DOĞAN	Determination of Lipolytic Enzyme Activity of Two Halophilic Archaea Isolated from Raw Hide Sadi Turgut BİLGİ	Biodiversity of Forensically Important Insects (Arthropoda: Hexapoda) of Cappadocia Region Aysel KEKİLİOĞLU
15 ¹⁵ - 15 ³⁰	DNA Barcoding of Some Medicinal and Aromatic Plants Banu AVCIOĞLU	Purification and Characterization of α -Amylase from <i>Bacillus subtilis</i> Veysi ORTAKAYA	Species Composition of Macrozoobenthos in Kargı Stream (Antalya/Turkey) Melek ZEYBEK
15 ³⁰ - 15 ⁴⁵	Doubled haploid (DH) Turkish Onion (<i>Allium cepa</i> L.) Lines Fevziye CELEBI TOPRAK	spa Typing of <i>Staphylococcus aureus</i> isolated from bovine mastitis in Konya Province Emine ARSLAN	The Benthic Macroinvertebrate Fauna of Eşen River Bülent YORULMAZ
15 ⁴⁵ - 16 ⁰⁰	Propagation and Preservation of <i>Hypericum perforatum</i> L. Ali Ramazan ALAN	The Studies of Cyanobacterial Composition in Karahayıt/Denizli Emine ÇELİKOĞLU	Morphological and Molecular Identification of Cyanobacteria Isolated from River Basin of Ergene (Thrace, Turkey) Fusun ARGÜL
16 ⁰⁰ - 16 ¹⁵	Coffee break		
Chairs:	Fevziye Ç. TOPRAK - Yeşim KARA	Evren CABI - Elsad GURBANOV	Nana JABNIDZE - Ekrem DÜNDAR
16 ¹⁵ - 16 ³⁰	Clonal Propagation Protocol for Aronia (<i>Aronia melanocarpa</i>) Fevziye CELEBI TOPRAK	Monitoring of the Fish and Amphibian Bacterial Pathogens (<i>Flavobacterium</i> spp and <i>Aeromonas hydrophila</i>) using Environmental DNA methods in Turkish Lakes Region Uğur Cengiz ERİŞİMİŞ	Screening of Antioxidant and Anticholinesterase Activities of various extracts from two Truffle: <i>Terfezia leptoderma</i> and <i>Tuber brumale</i> Gülen TEL-ÇAYAN
16 ³⁰ - 16 ⁴⁵	Ploidy Reduction Techniques for Tetraploid Alliums Ali Ramazan ALAN	Expression of an Olive Metallothionein in E. coli BL21(DE3) exerts tolerance through bioaccumulation of heavy metals Faysal YILMAZ	The Status of Some Mammals Populations in Yedigöller Wildlife Reserve Areas Serdar GÖZÜTOK
16 ⁴⁵ - 17 ⁰⁰	<i>In vitro</i> Multiplication of Turkish <i>Vitex agnus-castus</i> L. Materials Yeşim KARA	Long-term responses of beetle communities in a post-fire successional gradient in <i>Pinus brutia</i> forest Burcin Yenisey KAYNAŞ	Mammalian Faunal Diversity of the Area of Wind Power Plant in Soma (Manisa) District Pınar ÇAM
17 ¹⁵ - 17 ³⁰	Effect of plants growth regulation on Agastache species in vitro Oxana B. POLIVANOVA	Bioclimatic tolerances of <i>Quercus robur</i> L. (pedunculata oak) subspecies in Turkey Hatice YILMAZ	Catch Composition of Lessepsian Fish by Purse Seine Fishery in the Mediterranean Coast of Turkey Mevlut GURLEK
17 ³⁰ - 17 ⁴⁵	A new method of obtaining medicinal resources based on herbal naphthoquinone and ether oils Aga SHIKHIYEV	Investigation of antimicrobial effects of essential oil that obtained from <i>Vitex agnus-castus</i> plant. Kerem KILIÇ	A Preliminary Study on Zooplankton Species in Some of the Dam Lakes, Ponds and Streams in Anatolia (Konya, Burdur, Isparta, Denizli, Sivas/Turkey) Meral APAYDIN YAĞCI
17 ⁴⁵ - 18 ⁰⁰	Introduction in vitro <i>Dracocephalum moldavica</i> L. seeds Anastasia V. SOSINA	Determination of Phenolic Compounds of Chaste berry seeds (<i>Vitex agnus-castus</i> L.) Grown in Denizli (Karahayıt) Begüm PARLAK	The genetic structure of Mediterranean fruit fly (<i>Ceratitis capitata</i>) populations in Turkey Abuzer GÜLER

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26.05.2016			
09 ³⁰ - 10 ³⁰	(Salon Atlantis Hall) Invited Speaker: Kani İŞİK (TURKEY) Biodiversity Loss: The Past, the Present and the Future		
10 ³⁰ - 10 ⁴⁵	Coffee break		
Rooms:	Atlantis Hall	Grazie Hall	Alesia Hall
Chairs:	Kani İŞİK - Lev ZAVODVIK	İzzet KARA- Aşlı Öztürk KİRAZ	Tuncay DİRMENCI - Ali Nafiz EKİZ
10 ⁴⁵ - 11 ⁰⁰	The Endemic Plants of Osmaniye (Turkey) Province Osman TUGAY	Total Phenolic, Flavonoids, Tannin Contents and Antioxidant Properties of <i>Pleurotus ostreatus</i> Cultivated on Different Wastes and Sawdust Ceyhan KILIÇ	Morphological and Molecular Identification of Chlorophyta Members Isolated from River Basin of Erzene (Thrace, Turkey) Fusun ARGÜL
11 ⁰⁰ - 11 ¹⁵	Plant Diversity of Nevşehir (Central Anatolia) Province Deniz ULUKUŞ	Relationships Between Some Soil Properties and Height Growth of Oriental Beech (<i>Fagus orientalis</i> Lipsky) in Plantation Areas in Different Sites Eşengül KENÇ	The Relationships Between Epilithic Algae and Environmental Variables: A study in Kovada Lake and Kovada Channel (Isparta/TURKEY) N. Lerzan ÇİÇEK
11 ¹⁵ - 11 ³⁰	The relationship between <i>Oenanthe pimpinelloides</i> and <i>Oenanthe silaifolia</i> (Apiaceae) and their distribution in Turkey Ebru DOĞAN GÜNER	The immediate effects of fire on surface-dwelling arthropod communities in <i>Pinus brutia</i> forests of southwestern Anatolia Burçin Yenisey KAYNAŞ	Present distribution of the Pipefishes (Actinopterygii: Syngnathidae) in River Estuaries and Lagoon Lakes of Mediterranean Coast of Turkey Deniz İNNAL
11 ³⁰ - 11 ⁴⁵	Plant Diversity of Kayseri Province (TURKEY) Ahmet AKSOY	<i>Rhodiola rosea</i> L. (Roseroot) in vitro culture Olga ZUDOVA	The Biological Activities of Potassium Metaborate; a Boron Compound Belong to the National Wealth of Mineral Diversity in Turkey Tuba BAYGAR
11 ⁴⁵ - 12 ⁰⁰	Analyzing Diversity of <i>Cirsium</i> (Asteraceae, Cardueae) Taxa Spatially to Determine Genotype-Environment Interaction Fatma AYDINOĞLU	Investigation Of Antibiotic Susceptibility of Extreme Halophilic Archaea Isolated From Salted Raw Hide Sadi Turgut BİLGİ	The Effect on β -Catenin Gene Expression of Grape Seed Extract in Experimental Diabetic Rats Eliğ GÜLBAHÇE MUTLU
12 ⁰⁰ - 12 ¹⁵	Re-evaluated Conservation Status of <i>Poa</i> L. In Turkey: The Mediterranean and the Aegean Geographical Regions Evren CABI	Investigation of Bacterial Diversity and Assessment of Bioremediation Potential for an Industrial Wastewater Treatment Plant Nilgun POYRAZ	The Radical Scavenging Activity of <i>Pistacia terebinthus</i> gall Nesrin HAŞİMİ
12 ¹⁵ - 12 ³⁰	In vitro culture of <i>Lavandula angustifolia</i> Mill. Mariia BELOVA	Life Indicators of Plants in Areas of Ganja-Gazakh Region Exposed to Erosion Natiga ISMAYILZADE	Comparative analysis of hemagglutinin gene from equine influenza viruses isolated on the territory of the Republic of Kazakhstan in 2007 and 2012 Yerbol BURASHEV
12 ³⁰ - 13 ³⁰	Lunch		
13 ³⁰ - 14 ³⁰	(Salon Atlantis Hall) Invited Speaker: Namik RASHYDOV (UKRAINE) Aspects of plant biodiversity in condition of adverse environmental in the Chernobyl alienation zone		
14 ³⁰ - 14 ⁴⁵	Coffee break		
Chairs:	Atlantis Hall	Grazie Hall	Alesia Hall
		Sayyara İBADULLAYEVA - Öznur E. AKŞİN	Fusun AKŞİT - Hakan Mete DOĞAN
14 ⁴⁵ - 15 ⁰⁰		Optimization of extraction of quercetin from green tea by using Response Surface Methodology Gülşen YILMAZ	Comparison of Leaf Beetle (Coleoptera: Chrysomelidae) Diversity of Turkey and Neighboring Countries with Respect to Species Numbers and Endemicity Ali Nafiz EKİZ
15 ⁰⁰ - 15 ¹⁵		Screening of quercetin content of <i>Rosmarinus officinalis</i> with response surface methodology Merve KAS	Notes on the two rare Idaea Treitschke species in the fauna of Turkey (Lepidoptera, Geometridae) Erdem SEVEN
15 ¹⁵ - 15 ³⁰		Examination of gallic acid content of <i>Prunus laurocerasus</i> Kubra POTUK	Length-weight, length-length relationships and morphometry of Lessepsian Pomadasys stridens (Actinopterygii: Haemulidae) from Antalya Gulf-Turkey Deniz İNNAL
15 ³⁰ - 15 ⁴⁵		Analysis of gallic acid content of microwave extracts of <i>Capsicum annuum</i> Murat YILDIRIM	Antimicrobial Activity on the Skin Secretions of four Anuran Species from Turkey Eliğ KORCAN
15 ⁴⁵ - 16 ⁰⁰		Examination of gallic acid of <i>Cinnamomum zeylanicum</i> with microwave- assisted extraction by response surface methodology Emirhan HESAP	Restoring Overgrazed and Semi-Dry Grassland in Southern Turkey With Forage Crops Gülcan DEMİROĞLU TOPÇU
16 ⁰⁰ - 16 ¹⁵	Coffee break		
Chairs:		Daniela GIANNETTO - Arzu ÇİĞ	Zihni DEMİRBAĞ - İsmail DEMİR
16 ¹⁵ - 16 ³⁰		Bacterial Biodiversity of Aydın and Trabzon Provinces' Industrial Soils Bahadır TÖRÜN	Investigation of the Effects of Safflower Biodiesel Blends with Eurodiesel Fuel on Engine Exhaust Emissions in Common-Rail Diesel Engine A.Engin ÖZÇELİK
16 ³⁰ - 16 ⁴⁵		Student Teachers' Misconceptions About Biodiversity Fusun AKSİT	Rain-Harvesting Agamid Lizards of Anatolia Melodi YENMİŞ
16 ⁴⁵ - 17 ⁰⁰		Analyzing of total flavonoid from <i>Rosmarinus officinalis</i> with Response Surface Methodology Kubra OZGUN	A comparative phenolic composition analysis of truffles from Turkey Gülşen TEL-ÇAYAN
17 ¹⁵ - 17 ³⁰		Student Teachers' Perception of Biodiversity: A Case Study From Sultan Marshes Natural Park Selahattin AKSİT	Fatty Acid Composition of <i>Lactarius volemus</i> and <i>Morchella elata</i> Mahfuz ELMASTAŞ
17 ³⁰ - 17 ⁴⁵		The Investigation of the Treatment of Potatoes Processing Wastewater by Hybrid Constructed Wetland Systems Gamze Dogdu OKÇU	Screening of Antioxidant Activity of Selected Seaweeds Collected from Morocco Zain ULLAH
17 ⁴⁵ - 18 ⁰⁰		Species and Chromosome Number Diversity of Seyhan and Ceyhan River Systems Sevgi UNAL	The presence of <i>Trichoderma</i> and <i>Gliocladium</i> species in various features of soil in Turkey Mehmet Hadi AYDIN
21 ⁰⁰ - 00 ⁰⁰	Gala Cocktail		

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27.05.2016			
Rooms	Atlantis Hall	Grazie Hall	Alesia Hall
Chairs:	Bolatkhan ZYADAN - Halil BIYIK	Aysun ÖZKAN - Yeşim Y. MENDİ	Parashkevi KARACHLE - Tamer AKAR
09 ⁰⁰ - 09 ¹⁵	In vitro culture of <i>Salvia sclarea</i> L. Mariia KIM	Recycling and Level of Consumer Awareness in Environmental Issues and Attitudes (Case of Denizli Province) Eda PAÇ	Antioxidant capacity and antimicrobial activity against food related microorganisms of <i>Origanum vulgare</i> L. subsp. <i>gracile</i> (C.Koch) Ietswaart essential oil Rukiye BORAN
09 ¹⁵ - 09 ³⁰	Ethnobotanical Study on the Useful Plants of Çat (Çamlıhemşin/Rize) Valley and Environs, Kaçkar Mountains National Park, Rize, Turkey Hüseyin BAYKAL	The Knowledge Level of Early Childhood Teacher Candidates about Biodiversity Asiye PARLAK RAKAP	Exploiting Genetic Sources from Alkali Lakes – isolation of alkaliphilic bacteria from soda lakes in Turkey and their utilization for production of CGTase Barçın KARAKAŞ
09 ¹⁵ - 09 ³⁰	Micropropagation and Cryopreservation of Some <i>Cyclamen</i> Species Naturally Grown and Endemic to Turkey Yeşim Yalçın MENDİ	Environmental Awareness and Attitudes of Agriculture Faculty Students (Gaziosmanpaşa University Sample) Kürşat AYDIN	Evaluating the Industrial Waste Products of Orange; a Natural Preservative on Shrimp Melanosis Taçnur BAYGAR
09 ³⁰ - 09 ⁴⁵	Alpine Plant Biodiversity of Turkey Seyran Palabaş UZUN	Women's Attitudes and Purchase Intention of Eco-friendly Products: A Case from Turkey Meral UZUNOZ	The Clonal Variability of the Growth Parameters for Poplars and Willows in Field and Laboratory Conditions Natalia KUTSOKON
09 ⁴⁵ - 10 ⁰⁰	Ascomycota Biodiversity of Gaziantep Province (Turkey) Abdullah KAYA	Curve-Fitting Modelling for the Estimation of Silver Adsorption onto Biosorbent Kemal ÖZKAN	
10 ⁰⁰ - 10 ¹⁵	Coffee break		
Chairs:	Galina DYAMURSHAYEVA - Seyran P. UZUN	Kemal ÖZKAN - Sibel YİĞİTARSLAN	Abdullah KAYA - Hüseyin BAYKAL
10 ¹⁵ - 10 ³⁰	Chemical and Biological Evaluation of Some <i>Abyssum</i> L. Taxa Distributed in the Aegean Region, Turkey Cennet ÖZAY	Palladium adsorption from waste printed circuit board onto modified orange peel Aysun ÖZKAN	The antioxidant, antimicrobial, antibiofilm activities and quorum sensing inhibition potential of <i>Silybum marianum</i> (L.) Gaertner growing wild in Muğla, Turkey Tuba BAYGAR
10 ³⁰ - 10 ⁴⁵	In vitro propagation, Cryopreservation and Synthetic Seed Production in Some <i>Crocus</i> Species Yeşim Yalçın MENDİ	The multiple-parameter approach for determination of total flavonoid in turmeric (<i>Curcuma longa</i> L.) Demet DEMİREL	Tyrosinase, acetyl- and butyryl-cholinesterase inhibitory activity of <i>Bifurcaria bifurcata</i> , <i>Cystoseira compressa</i> and <i>Cystoseira stricta</i> collected from Morocco Zain ULLAH
10 ⁴⁵ - 11 ⁰⁰	Bryophytes of Jeyranchol Plateau (Azerbaijan) T.P. GASIMOV	Optimization of quercetin extraction from <i>Syzygium aromaticum</i> Husein SHARIF	Estimating Higher Heating Values of Some Lignocellulosics from Turkey Using Their Ultimate Analysis Data Füreye Elif ÖZBEK
11 ⁰⁰ - 11 ¹⁵	The Sub-endemics of the Specially Protected Natural Areas of the North East of the Minor Caucasus A.A. BAYRAMOVA	Leaching of quercetin from <i>Plantago lanceolata</i> Batuhan ALKAYA	Estimation Anthropotolerance of Rare Geophytes Growing on the Agricultural Soils Lala DADASHOVA
11 ¹⁵ - 11 ³⁰	Dangerous and Poisonous Plants in West Java Harni MUTIA	Tolerant Elements in Structural Features of Conifers (Pinidae) in Azerbaiian Zaur HUMBATOV	
11 ³⁰ - 12 ³⁰	Closing Ceremony		
12 ³⁰ - 13 ³⁰	Lunch		
13 ³⁰ - 18 ³⁰	EXPO2016 Visit -registered symposium participants only-		

	Date / Time	POSTER TITLE
101	24.05.2016 10:30 - 12:30	New Nucleopolyhedroviruses from <i>Malacosoma</i> spp. (Lepidoptera: Lasiocampidae) in Turkey: Isolation, characterization, phylogeny, and virulence <u>İsmail DEMİR</u> , Remziye NALÇACIOĞLU, Zihni DEMİRBAĞ
102	24.05.2016 10:30 - 12:30	Fungal Pathogens of the Pine Processionary Moth, <i>Thaumetopoea pityocampa</i> (Lepidoptera: Thaumetopoeidae) in Turkey <u>İsmail DEMİR</u> , Zihni DEMİRBAĞ, Ali SEVİM
103	24.05.2016 10:30 - 12:30	New Entomopathogenic Nematodes in the Eastern Black Sea Region of Turkey: Isolation, characterization, phylogeny, and virulence <u>İsmail DEMİR</u> , Zihni DEMİRBAĞ, Zeynep ERBAŞ
104	24.05.2016 10:30 - 12:30	The biological diversity of the coastal vegetation of the north-eastern part of the Smaller Caucasus <u>Z.M. İSMAYİLOVA</u> , G.M. QULIYEVA
105	24.05.2016 10:30 - 12:30	Prevention of Toxic Rat Liver Damage by Natural Compounds: Cranberry Flavonoids and Melatonin E.A. LAPSHINA, T.N. BUDKO, V.I.KONDAKOV, A.M. KHOKHA, <u>L. B. ZAVODNIK</u>
106	24.05.2016 10:30 - 12:30	Population and microbiological studies of the oil of <i>Artemisia dracunculus</i> L. species in Azerbaijan flora <u>Z.A. MAMMADOVA</u> , A.P. ZAMANOVA, R.H. KHALILOV, G.M. SHADLINSKAYA
107	24.05.2016 10:30 - 12:30	Fungal diversity associated to the Winter moth <u>Miranda TSERODZE</u>
108	24.05.2016 10:30 - 12:30	Biodiversity in cereal fields of Constantine high plains (north-east, Algeria) <u>Mohamed FENNI</u>
109	24.05.2016 10:30 - 12:30	Physicochemical properties, bioactive components, antioxidant and antimicrobial potential of some selected honeys from different provinces of Turkey <u>Omer ERTURK</u> , Sefine KALIN, Melek COL AYVAZ
110	24.05.2016 10:30 - 12:30	The Importance of Plant Diversity in Turkey <u>Tuğba Bayrak ÖZBUCAK</u> , Öznur ERGEN AKÇİN
111	24.05.2016 10:30 - 12:30	Plants considered as non-wood products in Forests Around Eskisehir <u>Gülçin İŞİK</u> , Ersin YÜCEL
112	24.05.2016 10:30 - 12:30	Determination of phenolic compounds of <i>Nigella sativa</i> by ultrasonic extraction <u>Batuhan DOLOĞLU</u> , Sibel YIGITARSLAN
113	24.05.2016 10:30 - 12:30	Regulation of Microclonal Reproduction According to the Nutrient Medium Components of <i>in vitro</i> Culture of <i>Staphylea colchica</i> <u>Nino MANVELIDZE</u> , Nana ZARNADZE, Sofiko MANJGALADZE, Ciala BOLKVAZDE, Ketevan DOLIDZE
114	24.05.2016 10:30 - 12:30	Preservation of Caucasian persimmon (<i>Diospyros lotus</i>) in gene pool of Lankaran-Astara region of Azerbaijan <u>M.B.HUSEYNOV</u> , R.Z.SHAMMADOV, Z.A.MAMMADOVA
115	24.05.2016 10:30 - 12:30	Bio-Ecological and Modern Features of Eastern-Asia Introducements in Azerbaijan Climate Condition <u>Z.H.ABBASOVA</u> , E.Kh.SALAHOVA, F.N.RUSTAMOVA, K.G.AGALARLI
116	24.05.2016 10:30 - 12:30	Gallic Acid Determination of <i>Plantago lanceolata</i> with Ultrasonic Extraction by Response Surface Methodology <u>Gizem EMNİYET</u> , Sibel YIGITARSLAN
117	24.05.2016 10:30 - 12:30	Traditionally Used Wild Plants in Azerbaijan: In An Example of Tovuz-Gazakh Regions <u>Vafa ABBASOVA</u> , Mahila SHAHMURADOVA, Sayyara IBADULLAYEVA
118	24.05.2016 10:30 - 12:30	Influence of Erosion Process on Vegetation Cover in Shamkir-Yevlakh (Azerbaijan) District Narmin SADİGOVA, <u>Gasimzade TUBUKHANİM</u>
119	24.05.2016 10:30 - 12:30	Study Results of Some Spicy Plants Belonging To Apiaceae Lindl. Family in the Flora of Azerbaijan <u>AKHUNDOVA S.T.</u> , RAFİYEVA S.R, ASGAROVA N.A, IBADULLAYEVA S.J.
121	24.05.2016 10:30 - 12:30	Antimicrobial Features of Essential Oils of Some Species in <i>Apiaceae</i> Family <u>ZULFUGAROVA P.V.</u> , GASIMOV H.Z.
122	24.05.2016 10:30 - 12:30	Insect species damaging on medicinal plants in Ajaria <u>JABNIDZE N.</u> , JABNIDZE G.
123	24.05.2016 10:30 - 12:30	Aspect of Stable and Safe Development of Farmers <u>Nato JABNIDZE</u> , Giorgi JABNIDZE
124	24.05.2016 10:30 - 12:30	Global Warnings and Agro-Ecological Problems of Georgia's Subtropical Agriculture <u>Rezo JABNIDZE</u>
125	24.05.2016 10:30 - 12:30	Impact of Global Warming on the Forage Crops in Georgia <u>Suliko BERIDZE</u>
126	24.05.2016 10:30 - 12:30	Scientific and Practical Fundamentals of Hairless Liquorice Cultivation (<i>Glycyrrhiza glabra</i>) <u>R.M.NURİYEV</u> , A.GASİMOVA
127	24.05.2016 10:30 - 12:30	Desert Fitocenosis of the Absheron Peninsula <u>Kamala K. ASADOVA</u>
128	24.05.2016 10:30 - 12:30	Biodiversity of the Genus of <i>Crataegus</i> L. (<i>Rosaceae</i> Juss.) in Flora of Nakhchivan Autonomous Republic (Azerbaijan) <u>Tariyel TALİBOV</u> , Anvar İBRAHİMÖV

129	24.05.2016 10:30 - 12:30	The induction of callusogenesis and morphogenesis of <i>Staphylea colchicain</i> to in vitro culture <u>Nino MANVELIDZE</u> , Nana ZARNADZE, Natela VARSHANIDZE, Inga DIASAMIDZE, Sophio MANJGALADZE, Tsciala BOLKVADZE
130	24.05.2016 10:30 - 12:30	Endemic Plant diversity of Adjara protected areas, Georgia <u>Inga DIASAMIDZE</u> , Gia BOLKVADZE, Jana CHITANAVA, Nazi TURMANIDZE
131	24.05.2016 10:30 - 12:30	ICP-OES analysis of a series of metals (Namely: Mg, Co, Pb, Cr, Ni, Fe, Cu, Zn and Cd) in black and green olive samples from Aydın, Turkey <u>Serdal ÖĞÜT</u>
132	24.05.2016 10:30 - 12:30	The Measurement of Pesticide Residues and Paraoxonase Enzyme Activity in Blood of Workers Agriculturing Apples and Cherries <u>Serdal ÖĞÜT</u> , Erdoğan KÜÇÜKÖNER, Fatih GÜLTEKİN
133	24.05.2016 10:30 - 12:30	The Development and The Growth Features of Sprouts of <i>Malus orientalis</i> Uglitzk. Species introduced in Absheron <u>Ceyran NAJAFOVA</u> , Aynur ARABZADE, Aygun HUSEYNOVA
134	24.05.2016 10:30 - 12:30	Evaluation of coenopopulations of the species of <i>Vicia sativa</i> L., <i>V.croceae</i> Desf., <i>V.alpestris</i> Stev. and <i>V.sepium</i> L. <u>Zulfiyya MAMMADOVA</u> , Elshad GURBANOV
135	24.05.2016 10:30 - 12:30	On the Orthoptera (Insecta) Fauna of the Derik, Kiziltepe and Mazıdağı Mountain (Mardin, Turkey) <u>Abdullah DOĞAN</u> , <u>Ali SATAR</u> , Musafa İLÇİN
136	24.05.2016 10:30 - 12:30	Investigation of the Pomegranate Flowers (<i>Punica granatum</i>) Effects on Blood Sugar Level of Diabetic Rats <u>Yeşim KARA</u> , Kerem KILIÇ, Begüm PARLAK
137	24.05.2016 10:30 - 12:30	The Effects of Water Hardness on Lead (Pb) Uptake in Fish (<i>Oreochromis niloticus</i>) gill Tissues <u>Ahmet Turan ALADAĞ</u> , Hikmet Y. ÇOĞUN ² , Ferit KARGIN
138	24.05.2016 10:30 - 12:30	The Effects of Nitrilotriacetic acid (NTA) on Plasma Enzymes (ALT and AST) of <i>Oreochromis niloticus</i> in Acute Lead Exposure Hikmet Y. ÇOĞUN, <u>Ahmet Turan ALADAĞ</u> , Özge TEMİZ, Ferit KARGIN
139	24.05.2016 10:30 - 12:30	Nitrogen and Phosphorus Resorption Proficiency of Different Lianas on the Same Host Plant <u>Ahmet DOĞAN</u> , Erkan YALÇIN, Abdullah Furkan TOY
140	24.05.2016 10:30 - 12:30	Caves as Subterranean Habitats of the Striped Hyena (<i>Hyaena hyaena</i> L.) in Izmir, Western Anatolia <u>Ismet Ceyhan YILDIRIM</u>
141	24.05.2016 10:30 - 12:30	Investigation of dye removal potential of manganese oxide coated alunite (MOC-alunite) <u>Sibel TUNALI AKAR</u> , Sevcin ASLAN, Tamer AKAR
142	24.05.2016 10:30 - 12:30	Environmentally-friendly composite for the biosorption of AR1 dye <u>Sibel TUNALI AKAR</u> , Elif SAN, Tamer AKAR
143	24.05.2016 10:30 - 12:30	Optimization by Box-Behnken Experimental Design for the Biosorption of Reactive Violet 1 on <i>Pisum sativum</i> Tamer AKAR, <u>Serpil TURKYILMAZ</u> , Sema CELİK, Sibel TUNALI AKAR
144	24.05.2016 10:30 - 12:30	Taxonomical contributions to Turkish <i>Vincetoxicum</i> Wolf (Apocynaceae: Asclepiadoideae) taxa based on fruit characteristics <u>Seher GÜVEN</u> , Serdar MAKBUL, Kamil COŞKUNÇELEBİ
145	24.05.2016 10:30 - 12:30	Fruit Characteristics of Turkish <i>Epilobium</i> L. (Onagraceae) taxa <u>Seda OKUR</u> , Kamil COŞKUNÇELEBİ, Serdar MAKBUL, Seher GÜVEN
146	24.05.2016 10:30 - 12:30	Biodiversity of Insects of Wetlands of Region of Setif (North-east of Algeria) <u>M. BOUNECHADA</u> , D. MOUHOUBI
147	24.05.2016 10:30 - 12:30	Histopathological Changes in the Liver of <i>Anabas testudineus</i> Exposed to Cypermethrin <u>Elif İpek SATAR</u> , Babu VELMURUGAN, Senthil KUMAAR
148	24.05.2016 10:30 - 12:30	Microalgae - potential raw material for biodiesel fuel production <u>Violeta MAKAREVICIENE</u> , Milda GUMBYTE, Virginija SKORUPSKAITE
149	24.05.2016 10:30 - 12:30	Phylogenetic relationships between species of <i>Anatololacerta</i> (Squamata, Lacertidae) and taxonomical reconstruction considering molecular markers, with description of the new genetically lineages <u>Kamil CANDAN</u> , Çetin ILGAZ, Yusuf KUMLUTAŞ, Salih Hakan DURMUŞ, Özgür GÜÇLÜ, Nurettin BEŞER, Tolga KANKILIÇ
150	24.05.2016 10:30 - 12:30	Genetic lineages and diversification of <i>Phoenicolacerta laevis</i> (Gray, 1838) (Squamata, Lacertidae) in southern Turkey <u>Kamil CANDAN</u> , Çetin ILGAZ, Yusuf KUMLUTAŞ, Salih Hakan DURMUŞ, Nurettin BEŞER, Elif YILDIRIM
151	24.05.2016 10:30 - 12:30	The herpetofaunic diversity of Turkey: Taxonomy, distribution and conservation status of the species <u>Çetin ILGAZ</u> , Yusuf KUMLUTAŞ, <u>Kamil CANDAN</u>
152	24.05.2016 10:30 - 12:30	Helminth fauna of Lebanon lizard, <i>Phoenicolacerta laevis</i> (Gray, 1838) (Sauria: Lacertidae) from southern Turkey Sezen BİRLİK, Hikmet Sami YILDIRIMHAN, Nurhan SÜMER, Yusuf KUMLUTAŞ, Çetin ILGAZ, Salih Hakan DURMUŞ, <u>Kamil CANDAN</u>

153	24.05.2016 10:30 - 12:30	Life history of <i>Iranolacerta brandtii</i> (De Filippi, 1863) (Squamata, Lacertidae) in a high population from eastern Anatolia Serkan GÜL, Çetin ILGAZ, Yusuf KUMLUTAŞ, Kamil CANDAN
154	24.05.2016 10:30 - 12:30	Genetic Diversity of <i>Rhododendron</i> spp. in Turkey İsmail Tuğberk KAYA, Bahadır ALTUN, Tuğba YÜCEL, Sevil SAĞLAM, Hatice GÜMÜŞ, Özgür EMİNAGAOĞLU, Hüseyin ÇELİK, Müge TÜRET
155	24.05.2016 10:30 - 12:30	Anthocerotophyta and Marchantiophyta Flora of Ordu Province (Turkey) Turan ÖZDEMİR, Nevzat BATAN, Gökhan ABAY
156	24.05.2016 10:30 - 12:30	Bryophyta (Musci) Flora of Ordu Province (Turkey) Turan ÖZDEMİR, Nevzat BATAN, Gökhan ABAY
157	24.05.2016 10:30 - 12:30	Bryophyte Flora of Burdur Province (Turkey) Nevzat BATAN, Turan ÖZDEMİR, Gökhan ABAY
158	24.05.2016 10:30 - 12:30	<i>Dicranella crista</i> (Hedw.) Schimp. new to Turkey Nevzat BATAN, Turan ÖZDEMİR, Gökhan ABAY
159	24.05.2016 10:30 - 12:30	Medicinal and Food Weeds in Hazelnut Orchards in Ordu-Turkey Mihriban GEBECE Onur KOLOREN
160	24.05.2016 10:30 - 12:30	Preventive Effect of Lycopene on Furan Induced Oxidative Damage in Diabetic Rat Heart Gencay SARAÇOĞLU, Dilek PANDIR, Hatice BAS
161	24.05.2016 10:30 - 12:30	Using Synthetic Seed Technic for Efficient <i>in vitro</i> propagation of <i>Thymus vulgaris</i> L. Ergun KAYA, Muammer CEYLAN
162	24.05.2016 10:30 - 12:30	Cryopreservation of <i>Thymus vulgaris</i> L. shoot tips via droplet vitrification technique and Confirmation of Genetic stability using ISSR markers Ergun KAYA, Muammer CEYLAN
163	24.05.2016 10:30 - 12:30	Antioxidant Activity of Endemic <i>Ajuga reptans</i> Kit Tan. Nesrin HAŞİMİ, Veysel TOLAN, Ufuk KOLAK
164	24.05.2016 10:30 - 12:30	The diversity of chemical composition of the lipophilic extracts from Endemic <i>Abies cilicica</i> subsp. <i>isaurica</i> and <i>Abies nordmanniana</i> subsp. <i>equi-trojani</i> Ayşe Sahin YAGLIOĞLU, Muhammet Şamil YAGLIOĞLU, Murat TEMİRTÜRK, Duygu GÜNEŞ, Emic SARAY, İbrahim DEMİRTAS
165	24.05.2016 10:30 - 12:30	Phytochemical Studies of the Hexane Extracts of <i>Abies nordmanniana</i> subsp. <i>bornmuelleriana</i> and <i>Abies nordmanniana</i> subsp. <i>nordmanniana</i> needles Ayşe Sahin YAGLIOĞLU, Muhammet Samil YAGLIOĞLU, Murat TEMİRTÜRK, Duygu GÜNEŞ, Emic SARAY, İbrahim DEMİRTAS
166	24.05.2016 10:30 - 12:30	<i>Cyclamen pseudibericum</i> Extracts Inhibit Invasion ability of A549 NSCLC Cells Hakan AKÇA, Ege Rıza KARAGÜR, Ramazan MAMMADOV
167	24.05.2016 10:30 - 12:30	The Histopathological Effects of Atrazine on Gills of <i>Oreochromis niloticus</i> Pelin UĞURLU, Elif İpek SATAR, Tanık ÇİÇEK, Yeter KAN KOÇ
168	24.05.2016 10:30 - 12:30	A Study of morphological, palynological, anatomical and ecological on <i>Malope malacoides</i> in Turkey Seçil TAN, Kemal YILDIZ
169	24.05.2016 10:30 - 12:30	Cultural Characteristics of <i>Psathyrella</i> Species Hemen Gul ERASLAN, Perihan GULER
170	24.05.2016 10:30 - 12:30	Cultural Characteristics of <i>Pleurotus</i> Species İlim BAGCI, Perihan GULER, Ayten CELEBİ KESKİN
171	24.05.2016 10:30 - 12:30	Cultural Characteristics of <i>Phellinus</i> Species Dicle ERDOĞDU, Perihan GULER
172	24.05.2016 10:30 - 12:30	Cultural Characteristics of <i>Agrocybe</i> Species Müge KARABOGAZ, Perihan GULER
173	24.05.2016 10:30 - 12:30	Pollen, fruit and seed morphology of <i>Bornmuellera glabrescens</i> (Boiss. & Balansa) Cullen & T.R. Dudley from Turkey Burcu GÖNEN, Hüseyin DURAL, Burcu YILMAZ ÇITAK
174	24.05.2016 14:30 - 16:30	Flora of Sedir Island Olcay CEYLAN, Güven GÖRK
175	24.05.2016 14:30 - 16:30	Micromorphological Properties of Turkish Endemic <i>Marrubium trachyticum</i> (Lamiaceae) Burcu CAMİLİ, Tülay AYTAŞ AKÇİN
176	24.05.2016 14:30 - 16:30	The Leaf Anatomy and Micromorphology of <i>Marrubium cephalanthum</i> (Lamiaceae), Endemic to Turkey Burcu CAMİLİ, Tülay AYTAŞ AKÇİN
177	24.05.2016 14:30 - 16:30	The Phytochemical Analysis Endemic <i>Dianthus ancyrensis</i> Hausskn. & Bornm. Extracts and Their Anticancer Activities Ayşe Sahin YAGLIOĞLU, İlknur SAHİN, Murat TEMİRTÜRK, Duygu GÜNEŞ, Emic SARAY
178	24.05.2016 14:30 - 16:30	Investigation of the secondary metabolites and anticancer activity of Endemic <i>Dianthus balansae</i> Boiss. Extracts Ayşe Sahin YAGLIOĞLU, İlknur SAHİN, Murat TEMİRTÜRK, Duygu GÜNEŞ, Emic SARAY
179	24.05.2016 14:30 - 16:30	Phytochemical Analysis of Endemic <i>Dianthus zederbaueri</i> Vierh. Extracts and Their Anticancer Activities against HeLa and C6 cells Ayşe Sahin YAGLIOĞLU, İlknur SAHİN, Murat TEMİRTÜRK, Duygu GÜNEŞ, Emic SARAY
180	24.05.2016 14:30 - 16:30	The HPLC/TOF-MS Analysis of Endemic <i>Astragalus sigmoideus</i> Bunge extracts Ayşe Sahin YAGLIOĞLU, Emic SARAY, Murat TEMİRTÜRK, Duygu GÜNEŞ, İbrahim DEMİRTAS
181	24.05.2016 14:30 - 16:30	Identification and characterisation of phenolic compounds extracted from Endemic <i>Astragalus xylobasis</i> Freyn et Bornm. var. <i>angustus</i> (Freyn et Sint.) Freyn et Bornm. Ayşe Sahin YAGLIOĞLU, Emic SARAY, Murat TEMİRTÜRK, Duygu GÜNEŞ, İbrahim DEMİRTAS

182	24.05.2016 14:30 - 16:30	The Bioassay-guided Isolation of Secondary Metabolites of Endemic <i>Astragalus leucothrix</i> Freyn & Bornm. Ayşe Sahin YAGLIOĞLU, Duygu GÜNES, Murat TEMİRTÜRK, Emic SARAY, İbrahim DEMİRTAS
183	24.05.2016 14:30 - 16:30	DNA Barcoding of Sea Cucumber Species <i>Holothuria tubulosa</i>, <i>Synapta reciprocans</i> and <i>Holothuria sanctori</i> in Gökova Bay (Muğla, Turkey) Ali TURKER, Ercüment GENÇ, Emre KESKİN, Sevan AĞDAMAR, Esra Mine ÜNAL, Daniela GIANNETTO
184	24.05.2016 14:30 - 16:30	Use of DNA Barcoding methods to study Sea Sponges Species Biodiversity in Gökova Bay (Muğla, Turkey) Ali TURKER, Ercüment GENÇ, Emre KESKİN, Sevan AĞDAMAR, Esra Mine ÜNAL, Daniela GIANNETTO
185	24.05.2016 14:30 - 16:30	A morphological, palynological and ecological study of the <i>Glaucium cappadocicum</i> Boiss. in Turkey Fatma MUNGAN, Kemal YILDIZ, Murat KILIÇ
186	24.05.2016 14:30 - 16:30	A New <i>Elaphomyces</i> Nees Record for the Macromycota of Turkey Yasin UZUN, Abdullah KAYA, Semiha YAKAR
187	24.05.2016 14:30 - 16:30	Gas Chromatography-Mass Spectrometry Analysis and Antimicrobial and Antioxidant Activities of Some Orchids (<i>Orchidaceae</i>) Growing in Turkey Ömer ERTÜRK, Melek COL AYVAZ, Elif CİL
188	24.05.2016 14:30 - 16:30	Biotechnology for Conservation of Plant Biodiversity Yonca SURGUN, Betül BÜRÜN
189	24.05.2016 14:30 - 16:30	Multi-parameter optimization of extraction of total flavonoids in <i>Capsicum annum</i> L. Bilgesu SAHİN, Sibel YIGITARSLAN
190	24.05.2016 14:30 - 16:30	Vegetable green crops interaction with <i>Pseudomonas</i> sp. in vitro OVOD A.A., GODOVA G.V., KALASHNIKOVA E.A.
191	24.05.2016 14:30 - 16:30	Determination of Weed Species in Kiwifruit Orchards in Ordu-Turkey Hikmet YONAT, Onur KOLOREN
192	24.05.2016 14:30 - 16:30	Helminth Parasites of <i>Myotisdaubentonii</i> (Vespertilionidae: Chiroptera) from Turkey, with DNA Sequencing of Helminths Nuclear LsrDNA Nurhan SÜMER, Hikmet Sami YILDIRIMHAN, Sezen BİRLİK
193	24.05.2016 14:30 - 16:30	Morphological and molecular diversity of wild fruit <i>Cerasus prostrata</i> (Lab.) Ser. genotypes collected from natural sites of Central Anatolia, Turkey Aydin UZUN, Mehmet YAMAN, Hasan PINAR, Batuhan Durmus GOK, Isa GAZEL, Kadir Ugurtan YILMAZ
194	24.05.2016 14:30 - 16:30	Sambac jasmine cultivation and the bioecological features in covered condition in Absheron AsifMEHRALIYEV, Elmira SAFAROVA
195	24.05.2016 14:30 - 16:30	S-genotype profiles of Some Foreign and Turkish Apricot Genotypes Kadir Ugurtan YILMAZ, Busra BAŞBUG, Kahraman GURCAN
196	24.05.2016 14:30 - 16:30	Pollen and fruit micromorphology <i>Lecokia cretica</i> (Apiaceae) from Turkey Mustafa CELİK, Ahmet DURAN, Özlem ÇETİN
197	24.05.2016 14:30 - 16:30	An Investigation on Endemic <i>Delphinium davisii</i> Munz (Ranunculaceae) Ersin MİNARECİ, Canan ÖZDEMİR
198	24.05.2016 14:30 - 16:30	Indicator values of <i>Notonecta viridis</i> (Hemiptera: Notonectidae) and Chironomid species along Van Lake coastline Halil DİLMEN, Mehmet Salih ÖZGÖKÇE
199	24.05.2016 14:30 - 16:30	Assessment of the oxidative stress in the livers and the neurochemicals in the brains of mice subject to intraperitoneal injection of aspartame (ASP) within their neonatal period Ayşen Cetin KARDESLER, Yagmur OZYILMAZ, Eyup BASKALE
200	24.05.2016 14:30 - 16:30	The secondary metabolite profiles of <i>Hylocium splendens</i> (Hedw.) Schimp. Extracts Ayşe Sahin YAGLIOĞLU, Serhat URSAVAS, Murat TEMİRTÜRK, Muhammet OREN
201	24.05.2016 14:30 - 16:30	The Extraction and Analysis of Phenolic and Lipophilic Compounds of <i>Anomodon viticulosus</i> (Hedw.) Hook. & Taylor Ayşe Sahin YAGLIOĞLU, Serhat URSAVAS, Muhammet OREN, Murat TEMİRTÜRK
202	24.05.2016 14:30 - 16:30	The Phytochemical Analysis of <i>Thamnobryum alopecurum</i> (Hedw.) Nieuwl. ex Gangulee Ayşe Sahin YAGLIOĞLU, Serhat URSAVAS, Murat TEMİRTÜRK, Muhammet OREN
203	24.05.2016 14:30 - 16:30	The secondary metabolites of <i>Alleniella complanata</i> (Hedw.) S. Olsson, Enroth & D. Quandt extracts Ayşe Sahin YAGLIOĞLU, Serhat URSAVAS, Emic SARAY, Muhammet OREN
204	24.05.2016 14:30 - 16:30	Analysis of the Fatty Acids and Phenolic Compounds in <i>Abietinella abietina</i> (Hedw.) M. Fleisch Ayşe Sahin YAGLIOĞLU, Serhat URSAVAS, Muhammet OREN
205	24.05.2016 14:30 - 16:30	Critical Endangered <i>Scutellaria brevibracteata</i> subsp. <i>pannosula</i> (Rech. f.) Greuter & Burdet (Lamiaceae) Okan KOCABAŞ, Canan ÖZDEMİR
206	24.05.2016 14:30 - 16:30	An Anatomical Investigations on <i>Valeriana sisymbriifolia</i> Vahl (Caprifoliaceae) Esra KAYACAN, Canan ÖZDEMİR
207	24.05.2016 14:30 - 16:30	An Anatomical Investigations <i>Aethionema iberideum</i> (Boiss.) Boiss. (Brassicaceae) Tuğçe PELİK, Kamuran AKTAŞ, Yurdanur AKYOL, Esra KAYACAN, Sinem POYRAZ
208	24.05.2016 14:30 - 16:30	A Comparative Anatomical Study of <i>Puschkinia scilloides</i> Adams and <i>Puschkinia bilgineri</i> Yıldırım in Turkey Kadriye YETİSEN, Hasan YILDIRIM, Canan ÖZDEMİR
209	24.05.2016 14:30 - 16:30	A Comparative Anatomical Study of <i>Scilla</i> (Scilloideae) Section <i>Chionodoxa</i> (Boiss.) and <i>Scilla bifolia</i> in Turkey Hasan YILDIRIM, Kadriye YETİSEN, Canan ÖZDEMİR
210	24.05.2016 14:30 - 16:30	Non-Triglobitic Species <i>Trechus asiaticus</i> Jeannel, 1927 (Carabidae: Coleoptera) Records from 3 Different Caves in Eskişehir, Turkey E. Ceren FİDAN, D. Ümit ŞİRİN, Hakan ÇALIŞKAN
211	24.05.2016 14:30 - 16:30	Effect of Nitric Oxide on the Leaf Anatomy of Two Wheat Genotypes Under Salinity Stress Yurdanur AKYOL, Okan KOCABAŞ, Mehmet HAMURCU, Ali ÖZDEMİR, Esra KAYACAN, Canan ÖZDEMİR

212	24.05.2016 14:30 - 16:30	Effect of Nitric Oxide on the Leaf Anatomy of Bread Wheat Species Under Drought Stress <u>Sinem POYRAZ</u> , Yurdanur AKYOL, Mehmet HAMURCU, Ali ÖZDEMİR, Okan KOCABAŞ, Canan ÖZDEMİR
213	24.05.2016 14:30 - 16:30	Investigation of Silver Nitrate (AgNO₃) and Gibberellic Acid (GA₃) Effect on <i>in vitro</i> regeneration of <i>Thymus vulgaris</i> L. Shoot Tips Ergun KAYA, Muammer CEYLAN
214	24.05.2016 14:30 - 16:30	Morphological, micromorphological, and palynological investigation on the genus <i>Physospermum</i> (Apiaceae) from Turkey Özlem CETİN, Ahmet DURAN, Mustafa ÇELİK
215	24.05.2016 14:30 - 16:30	The Anatomical Investigation on <i>Bupleurum lophocarpum</i> Boiss. & Bal. Hakkı DEMİRELMA & Fatime Tuba AKALIN
216	24.05.2016 14:30 - 16:30	Relationships among Turkish <i>Epilobium</i> (Onagraceae) Taxa Based on the nrDNA ITS Sequences Data Suzan KUNDAKCI, Serdar MAKBUL, Kamil COŞKUNÇELEBI, Mutlu GÜLTEPE
217	24.05.2016 14:30 - 16:30	A palynological, fruit and seed micromorphological investigation on <i>Silene tunicoides</i> Boiss. from Turkey Büşra DARICI, Hüseyin DURAL, Burcu YILMAZ CİTAK
218	24.05.2016 14:30 - 16:30	Pollination system of <i>Jasione supina</i> subsp. <i>supina</i> (Campanulaceae) Volkan EROĞLU, Serdar Gökhan ŞENOL, Özcan SEÇMEN
219	24.05.2016 14:30 - 16:30	The study of the sistematical structure and species diversity of medicinal plant in subalpic zone of south Colchis Medea BERIDZE, Eteri JAKELI, Nato ZOSIDZE, Natela VARSHANIDZE
220	24.05.2016 14:30 - 16:30	A New Hybrid of <i>Origanum</i> L.: <i>O. × Dumanii</i> Dirmenci, Arabacı & Yazıcı Tuncay DIRMENCI, Türker YAZICI, Turan ARABACI, Sevcan ÇELENK, Taner ÖZCAN, Ekrem DÜNDAR
221	24.05.2016 14:30 - 16:30	Occurrence of <i>Tylocephalus</i> Infection Linked to Seasons, Host Fish Size And Sex From Lake Dam Kunduzlar, Turkey Mehmet Oğuz ÖZTÜRK
222	24.05.2016 14:30 - 16:30	<i>Argulus foliaceus</i> Infestation of Tench, <i>Tinca tinca</i> in Lake Dam Çatiören, Turkey Mehmet Oğuz ÖZTÜRK
223	24.05.2016 14:30 - 16:30	<i>Tetraodon monentoron</i> infestation of Pike (<i>Esox Lucius</i> L.) from Lake Eber, Turkey Mehmet Oğuz ÖZTÜRK
224	24.05.2016 14:30 - 16:30	Antioxidant Activities and Essential Oil Composition of <i>Marrubium heterodon</i> (Benth.) Boiss. & Balansa from Turkey Turan ARABACI, Mehmet Sina İÇEN and Tuncay DIRMENCI
225	24.05.2016 14:30 - 16:30	A New Hybrid of <i>Origanum</i> L.: <i>O. × bilgilitii</i> Dirmenci, Yazıcı & Arabacı Tuncay DIRMENCI, Türker YAZICI, Turan ARABACI, Sevcan ÇELENK, Taner ÖZCAN, Ekrem DÜNDAR
226	24.05.2016 14:30 - 16:30	Occurrence of two Endoparasite Infestation of Tench, <i>Tinca tinca</i> in Lake Dam Çatiören, Turkey Mehmet Oğuz ÖZTÜRK
227	24.05.2016 14:30 - 16:30	Nutlet micromorphology of Turkish <i>Origanum</i> (Lamiaceae) and its systematic implications Gülşay ECEVİT-GENÇ, Tuncay DIRMENCI, Turan ARABACI, Ekrem AKÇİCEK
228	24.05.2016 14:30 - 16:30	Cyanobacterial toxins during blooms of Bilikol Lake, Kazakhstan Kenzhegul BOLATKHAN, Nurziya ARMUKHANOVA, Bolatkhon ZAYADAN, Asemgul SADVAKASOVA
229	24.05.2016 14:30 - 16:30	SSR Fingerprinting of Apple Varieties, Growing in Kazakhstan Madina OMASHEVA, Alexander POZHARSKIY, Akerke MAULENBAY, Natalya RYABUSHKINA, Nurbol GALIAPAROV
230	24.05.2016 14:30 - 16:30	The Analysis of Physicochemical Properties and Cyanobacterial Morphotypes of Kozyaka and Hamidiye Meral YILMAZ CANKILIÇ, Umur ÇELİKOĞLU
231	24.05.2016 14:30 - 16:30	Observations on the Vegetation of Kızıldağ, Masa and Yılanlı Mountains (Muğla) : A Preliminary Study Yeliz DEĞERLİ, Ömer VAROL
232	24.05.2016 14:30 - 16:30	A new record of <i>Pontobdella muricata</i> (Annelida, Hirudinea, Piscicolidae) from Iskenderun Bay, northeastern Mediterranean Alper YANAR, Argun Akif ÖZAK, Nuri BAŞUSTA
233	24.05.2016 14:30 - 16:30	Endemic Plants of the Bozburun Peninsula Kenan AKBAŞ, Ömer VAROL
234	24.05.2016 14:30 - 16:30	Antioxidant Activities and Chemical Composition of Leaf and Bulb Extracts from the Endemic <i>Hyacinthella lineata</i> Steudel in Anatolia Çiğdem AYDIN, Ramazan MAMMADOV
235	24.05.2016 14:30 - 16:30	Determination of Reducing Power and Minimum Inhibitory Concentration of <i>Crocus alata</i> Extracts Dariya SATYBALDIYEVA, Ramazan MAMMADOV, Valentina MURSALIYEVA, Bolatkhon ZAYADAN
236	24.05.2016 14:30 - 16:30	Investigation of <i>Blastocystis</i> spp. in sea water samples collected from Sinop Province by Polymerase chain reaction Zeynep KOLÖREN, Berivan Başak GÜLABI
237	24.05.2016 14:30 - 16:30	Population Distribution Patterns of Invasive Alien Plant <i>Eichhornia crassipes</i> in Asi River, Turkey Muhip HILOOĞLU, Emel SÖZEN
238	24.05.2016 14:30 - 16:30	Monumental Trees in Ordu Vicinity Öznur ERGEN AKCİN, Tuğba ÖZBUCAK, Şenay SÜNGÜ
239	24.05.2016 14:30 - 16:30	Taxonomic Investigations on Liacarid Mites (Acari, Oribatida, Liacaridae) of the Harşit Valley (Turkey) Perihan AĞCAKAYA, Nusret AYYILDIZ
240	24.05.2016 14:30 - 16:30	Comparative study of the antioxidant and reactive oxygen species scavenging properties in the extracts of <i>Salvia russelli</i> and <i>Salvia candidissima</i> Emre KOÇ, Ferda CANDAN

241	24.05.2016 14:30 - 16:30	Antioxidant and Antihemolytic Activities of methanol extracts of <i>Salvia euphratica</i> Emre KOÇ, Ferda CANDAN
242	24.05.2016 14:30 - 16:30	Molecular Analysis of the Olive Putative Universal Stress Protein A Gene (<i>OeUspa</i>) Tuğba AKYÜZ, Ekrem DÜNDAR
243	24.05.2016 14:30 - 16:30	Molecular Analysis of a Putative Lipoxygenase Gene (<i>OeLOX</i>) from Olive Tuğba AKYÜZ, Ekrem DÜNDAR
244	24.05.2016 14:30 - 16:30	Antioxidant activities of the extracts from different parts of two <i>Salvia</i> species Hilal Saruhan FİDAN, Abduselam ERTAŞ, Mehmet BOĞA, Mustafa Abdullah YILMAZ, Sevgi İRTEGÜN, Mehmet FIRAT, İsmail Yener, Hamdi TEMEL, Gülaçtı TOPÇU
245	24.05.2016 14:30 - 16:30	New and Known Records of Oribatid Mites (Acari) from the Yedigöller National Park (Bolu,Turkey) Ayşe TOLUK, Abdulkadir TAŞDEMİR, Sedat PER, Nusret AYYILDIZ
247	24.05.2016 14:30 - 16:30	Bioinformatic Analysis, Polymorphism and Allele Diversity of an Oleocanthal Related Secologanin Synthase from Olive Mevlüt KOCAK, Ekrem DÜNDAR, Ayhan DAĞDELEN
248	24.05.2016 14:30 - 16:30	Molecular Characterization and Biodiversity Analysis of an Acyl CoA Binding Protein from Olive Ekrem DÜNDAR, Büşra BAŞ
249	25.05.2016 10:30 - 12:30	Determination Of the Chemical Composition and Antioxidant Activities of Different Solvent Extracts from <i>Cyclamen coum</i> Çiğdem AYDIN, Ramazan MAMMADOV
250	25.05.2016 10:30 - 12:30	The Second Record of <i>Stigmaeus uzunolukensis</i> Özçelik and Doğan (Acari: Stigmaeidae) from Turkey Sibel DİL KARA OĞLU, Salih DOĞAN, Orhan ERMAN, Sevgi SEVSAY, Sezai ADİL
251	25.05.2016 10:30 - 12:30	A Phytosociological Investigation on the Phrygana Vegetation of Bodrum (Muğla) Peninsula Hediye AKTAŞ AYTEPE, Ömer VAROL
252	25.05.2016 10:30 - 12:30	Effects Of Red Clover Extract On Sex Reversal And Gonadal Development In The African Catfish <i>Clarias Gariepinus</i> (Burchell, 1822) Funda TURAN, İhsan AKYURT, Şehriban CEK
253	25.05.2016 10:30 - 12:30	The Effects of Soy Extract on Sex Reversal and Growth Performance in the Rainbow trout (<i>Oncorhynchus mykiss</i>, Walbaum, 1792) Funda TURAN, Kıymet Damla YİĞİTARSLAN
254	25.05.2016 10:30 - 12:30	<i>In vitro</i> multiplication and essential oil accumulation of <i>Thymus leucotrichus</i> Hal. Tuba BEKİRCAN, Mustafa CÜCE, Ahmet YAŞAR, Atalay SÖKMEN
255	25.05.2016 10:30 - 12:30	Antimicrobial and cytotoxic properties of both micropropagated and naturally growing plantlets of <i>Crepis stajanovii</i> GEORG. Mustafa CÜCE, Tuba BEKİRCAN, Atalay SÖKMEN, Ashihan ŞENGELEN, Evren ÖNAY UÇAR and Ali Osman KILIÇ
256	25.05.2016 10:30 - 12:30	On the occurrence of juveniles and egg capsule of <i>Scylliorhinus canicula</i> from North-eastern Mediterranean Sea Ebru İfakat OZCAN, Nuri BASUSTA
257	25.05.2016 10:30 - 12:30	DNA Barcoding and Detection of the <i>Wolbachia</i> Infections in the <i>Culex</i> Species Collected from Aegean Region of Turkey Burçin MORÇİÇEK, Belgin GÖÇMEN TAŞKIN, Ersin DOĞAÇ, Taylan DOĞAROĞLU, Vatan TASKIN
258	25.05.2016 10:30 - 12:30	Karyological study in <i>Amphoricarpos praedictus</i> (Asteraceae) Esra MARTİN, Bekir DOĞAN, Ahmet DURAN, Ayşe KAPLAN, Meryem ŞEKER
259	25.05.2016 10:30 - 12:30	Elemental Composition of <i>Plantago holostium</i> Scop. (Plantaginaceae) Naturally Growing Around the Abandoned Tungsten Mine Work Hülya ARSLAN, Gürcan GÜLER YÜZ, Hawa KIAZOLU, Ümran Seven ERDEMİR
260	25.05.2016 10:30 - 12:30	Germination responses to GA3 and short-time chilling of Endemic <i>Onosma velutinum</i> Boiss. (Boraginaceae) Gürcan GÜLER YÜZ, Hülya ARSLAN, Serap KIRMIZI
261	25.05.2016 10:30 - 12:30	Antimicrobial Activity of Essential Oils from Four <i>Ferula</i> L. Species Growing in Kazakhstan Against Methicillin-Resistant <i>Staphylococcus aureus</i> Gulzhakhan UTEGENOVA, Svetlana KUSHNARENKO, Igor SCHEPETKIN, Liliya KIRPOTINA, Kyler PALLISTER, Jovanka VOYICH, Gulmira OZEK, Temel OZEK, Karime ABIDKULOVA, Mark QUINN
262	25.05.2016 10:30 - 12:30	Chemical Composition, Anti-Alzheimer, Anti-Microbial and Antioxidant Activity of <i>Stachys sivasica</i> Kit Tan & Yıldız Hasibe YILMAZ, Ekrem AKÇİCEK, Ahmet Ceyhan GÖREN, Turgut KILIÇ, Özal GÜNER
263	25.05.2016 10:30 - 12:30	Amphibian, Reptile and Mammal Diversity of the Sölöz Dam and Its Surroundings (İzmit, Bursa) Pınar CAM
264	25.05.2016 10:30 - 12:30	Total Phenolic Content and Antioxidant Capacity in Some Representatives of the Tribe Anthemideae (Asteraceae) from Turkey Nesrin COLAK, Huseyin INCEER, Sema HAYIRLIOĞLU-AYAZ, Faik Ahmet AYAZ
265	25.05.2016 10:30 - 12:30	Phenolics and Antioxidant Capacity of Erzincan Black Grape (<i>Vitis vinifera</i> 'Karaerik') Nesrin COLAK, Aynur KURT, Faik Ahmet AYAZ, Erdal AKPINAR
266	25.05.2016 10:30 - 12:30	Biodiversity of <i>Bacillus thuringiensis</i> Isolates from different habitats in Turkey Burcu POYRAZ, Müjgan OKTAY, Mehlika ALPER, Hatice GÜNEŞ
267	25.05.2016 10:30 - 12:30	Evaluation of phylogenetic relationships in the lichen-forming ascomycete <i>Xanthoria parietina</i> (L) Th. Fr. species with a cosmopolitan distribution Mithat GÜLLÜ, Fatma ÖZTÜRK KÜP, Mehmet Gökhan HALICI

268	25.05.2016 10:30 - 12:30	Phylogenetic relationships of <i>Sarcogyne magnispora</i> Knudsen & Halıcı with the other members of the genus <u>Mithat GÜLLÜ & Mehmet Gökhan HALICI</u>
269	25.05.2016 10:30 - 12:30	Examination with ITS (rDNA) Gene Region as well as Morphological and Anatomical Methods of Some Lichenized Fungi in Erciyes Mount <u>Mehmet Ünsal BARAK & Mehmet Gökhan HALICI</u>
270	25.05.2016 10:30 - 12:30	Description of Novel Microsporidium from Elm Leaf Beetle, <i>Xanthogaleruca luteola</i> Müller (Coleoptera: Chrysomelidae) <u>Cağrı BEKİRCAN, Onur TOSUN, Hilal BAKI</u>
271	25.05.2016 10:30 - 12:30	Diversity of Rhizobacteria Cotton Growing Regions of Harran Plain, Şanlıurfa, Turkey <u>Nazlı KOŞAR, Çiğdem KÜÇÜK, Cenap CEVHERİ</u>
272	25.05.2016 10:30 - 12:30	Effects of Land Use on Some Soil Microbiological Properties <u>Çiğdem KÜÇÜK, Cenap CEVHERİ</u>
273	25.05.2016 10:30 - 12:30	The Rhizosphere Microbiological Properties of Pasture Soils and Plant Distribution in Şanlıurfa; Turkey <u>Cenap CEVHERİ, Çiğdem KÜÇÜK</u>
274	25.05.2016 10:30 - 12:30	Determination of Effects of Different Organic Fertilizers with Humic Acid and Humic acid-free on Microelement and Heavy Metal Contents on Barley <u>Fatih ÇİÇ, Ferit SÖNMEZ, Murat ERMAN</u>
275	25.05.2016 10:30 - 12:30	Effects of Nickel Contamination on Nutrient Contents of Daffodil (<i>Narcissus poeticus</i> L. c.v. "Ice Folies") <u>Arzu ÇİÇ, Füsün GÜLSER, Tuğba Hasibe GÖKKAYA, Gülçinay BAŞDOĞAN</u>
276	25.05.2016 10:30 - 12:30	The Assessment of consuming <i>Macrolepiota procera</i> (Scop.) Singer Mushroom for Human Health <u>Hasan AKGÜL, Deniz ALTUNTAŞ, Mustafa SEVİNDİK, İlgaz AKATA, Celal BAL, Muhittin DOĞAN</u>
277	25.05.2016 10:30 - 12:30	Dynamic Flow Mode Decolorization Performance of Neurospora sitophila-Zea mays silk tissue biomass system for a Reactive Dye <u>Tamer AKAR, Sema CELİK</u>
278	25.05.2016 10:30 - 12:30	Evaluation of the the possible interactions between synthetic dye and surface modified biosorbent <u>Tamer AKAR, Esra OZKARA, Sema CELİK, Serpil TURKYILMAZ, Sibel Tunali AKAR</u>
279	25.05.2016 10:30 - 12:30	Nickel Biosorption Conditions of a Macro Fungus <i>Lactarius salmonicolor</i> <u>Tamer AKAR, Sema CELİK, Asli Gorgulu ARI, Sibel Tunali AKAR</u>
280	25.05.2016 10:30 - 12:30	Removal of Pb²⁺ ions from contaminated solutions by microbial composite: Combined action of a soilborne fungus <i>Mucor plumbeus</i> and Alunite matrix <u>Tamer AKAR, Sema CELİK, Asli Gorgulu Ari, Sibel TUNALI AKAR</u>
281	25.05.2016 10:30 - 12:30	Studies on Antioxidant Properties and Polyphenol Composition of the Different Solvent Extracts of <i>Sternbergia clusiana</i> <u>Cigdem AYDIN</u>
282	25.05.2016 10:30 - 12:30	Accumulation Copper (Cu) in the <i>Halimione portulacoides</i> (L.) Aellen and <i>Suaeda prostrata</i> subsp. <i>prostrata</i> Pall. Plants, Spreading in Ayvalık Saltern (Balıkesir-TURKEY) <u>Murat KILIÇ, Güngör AY, Fatma KOÇBAŞ, Fatma MÜNGAN</u>
283	25.05.2016 10:30 - 12:30	Identification of genetic diversity of <i>Rammeihippus turcicus</i> (Orthoptera: Acrididae: Gomphocerinae) within the framework of detection of National Genetic Resources <u>Deniz ŞİRİN, Levent CAN, Gürkan AKYILDIZ, Abbas MOL, Mehmet Sait TAYLAN</u>
284	25.05.2016 10:30 - 12:30	Gomphocerinae (Orthoptera: Acrididae) fauna of the European part of Turkey <u>Deniz ŞİRİN, Mehmet Sait TAYLAN, Abbas MOL</u>
285	25.05.2016 10:30 - 12:30	Differential Role of Cave Temperature and Humidity in Distribution of Cave Crickets in Anatolia <u>Mehmet Sait TAYLAN, Nadim YILMAZER, Deniz ŞİRİN</u>
286	25.05.2016 10:30 - 12:30	The effect of ancient central lake system to speciation of the genus <i>Dolicophoda</i> (Orthoptera) in Anatolia <u>Mehmet Sait TAYLAN, Deniz ŞİRİN</u>
287	25.05.2016 10:30 - 12:30	Bacterial Populations of Meke Lake in Turkey <u>Miyesser AYCAN, Mehmet Burçin MUTLU</u>
288	25.05.2016 10:30 - 12:30	The study of gene transfer from rapeseed genetically modified varieties in the field <u>Kabyl ZHAMBAKIN, Malika SHAMEKOVA, Aigul EDİLOVA, Nazira KASSENOVA, Dmitriy VOLKOV</u>
289	25.05.2016 10:30 - 12:30	Socio-Economical Status of Cage Trout Farming Companies and their Problems and Recommendation For Solutions <u>Yasemin BİRCAN YILDIRIM, Pınar DEMİR ATASEVEN</u>
290	25.05.2016 10:30 - 12:30	Biosorption, Preconcentration, and Determination of Cd (II) Ion, Using Amberlite XAD-16 Resin Modified with <i>Anoxybacillus caldiproteolyticus</i> and <i>Geobacillus stearothermophilus</i> through FAAS <u>Barış ENEZ, Sema AGÜLOĞLU FİNCAN, Elif VARHAN ORAL, Berrin ZİYADANOĞULLARI</u>
291	25.05.2016 10:30 - 12:30	Orchids of Tosya District (Kastamonu, Turkey) <u>Gamze TUTTU, Gökhan ABAY, Şinasi YILDIRIMLI</u>
292	25.05.2016 10:30 - 12:30	Isolation, Purification and Characterization of Thermostable α-Amylase from Thermophilic <i>Anoxybacillus flavithermus</i> <u>Sema AGÜLOĞLU FİNCAN, Barış ENEZ, Veysi ORTAKAYA</u>
293	25.05.2016 10:30 - 12:30	Antibiotic Resistance in Aquaculture <u>Yasemin BİRCAN YILDIRIM, Naci KARASU</u>

294	25.05.2016 10:30 - 12:30	A New Species of <i>Origanum</i> L.: <i>Origanum ayliniae</i> Dirmenci, Akçiçek & Yazıcı Tuncay DIRMENCI, Ekrem AKÇIÇEK, Türker YAZICI, Taner ÖZCAN, Sevcan ÇELENK, Ekrem DÜNDAR
295	25.05.2016 10:30 - 12:30	A New Hybrid of <i>Origanum</i> L.: <i>Origanum</i> × <i>adae</i> Dirmenci, Yazıcı & Akçiçek Tuncay DIRMENCI, Türker YAZICI, Ekrem AKÇIÇEK, Taner ÖZCAN, Sevcan ÇELENK, Ekrem DÜNDAR
296	25.05.2016 10:30 - 12:30	Fauna of Darkling Beetles (Tenebrionidae: Coleoptera) of Davraz Mountain (Isparta) Didem KORKMAZ, Ali GÖK
297	25.05.2016 10:30 - 12:30	<i>In vitro</i> antioxidant, biofilm and quorum sensing inhibitory activity of <i>Sonchus oleraceus</i> L. Ozgur CEYLAN, Rukiye BORAN, Tuba BAYGAR, Aysel UGUR, Nurdan SARAC, Hatice KARAKUS
298	25.05.2016 10:30 - 12:30	Mutagenic, antimutagenic and antioxidant activity of <i>Hypericum perforatum</i> L. ethanol extract Nurdan SARAC, Rukiye BORAN, Tuba BAYGAR, Ozgur CEYLAN, Aysel UGUR, Suleyman BERBERLER
299	25.05.2016 10:30 - 12:30	Abundance and habitat preferences of Dolichopodidae (Diptera) in three provinces (Afyonkarahisar, Kütahya and Uşak) Alper TONGUÇ, Murat BARLAS
300	25.05.2016 10:30 - 12:30	Seasonal flight period of long legged flies (Dolichopodidae, Diptera) species in the inner western Anatolia region Alper TONGUÇ, Murat BARLAS
301	25.05.2016 10:30 - 12:30	The Dolichopodidae (Diptera) fauna of inner western Anatolia (Turkey) Alper TONGUÇ, Murat BARLAS
302	25.05.2016 10:30 - 12:30	Primary School Students' Recognition and Conscious Usage Levels of Mushrooms İsmail ŞEN, Oğuz ÖZDEMİR, Hakan ALLI
303	25.05.2016 10:30 - 12:30	Determination of the Oxidative Status and Heavy Metal Content of <i>Fomitopsis pinicola</i> (Sw.) P. Karst. Hasan AKGÜL, Hakan ALLI, Mustafa SEVİNDİK, İlğaz AKATA, Celal BAL
304	25.05.2016 10:30 - 12:30	Morphological and molecular evidence for new record <i>Discina apiculata</i> , from Turkey Halil GÜNGÖR, Hakan ALLI, Mehmet Halil SOLAK
305	25.05.2016 10:30 - 12:30	The Spread of Chinese Sleeper (<i>Perccottus glenii</i> Dybowski, 1877) in Ukraine Yuliya KUTSOKON
306	25.05.2016 10:30 - 12:30	Microorganisms caused to rotting of grape root infected by phylloxera in Tovuz region condition Haji SHIKHLINSKI, Naila MAMMADOVA
307	25.05.2016 10:30 - 12:30	Phytopathologic estimation of cotton intra- and interspecific hybrids resistance to fungi <i>Verticillium dahliae</i> Klebahn Naila MAMMADOVA, Haji SHIKHLINSKI
308	25.05.2016 10:30 - 12:30	Two new species of the genus <i>Cobitis</i> Linnaeus (Teleostei: Cobitidae) from Turkey Füsün ERKAKAN, Filiz ÖZDEMİR
309	25.05.2016 10:30 - 12:30	An Unnoted Check-List and Distribution of Nemacheilidae of Turkey Filiz ÖZDEMİR, Füsün ERKAKAN
310	25.05.2016 10:30 - 12:30	An Unidentified Organism from Intertidal Sediments of Saros Bay, Aegean Sea (Turkey) Esra Elif AYDIN DEDE, Won Je LEE
311	25.05.2016 10:30 - 12:30	Heterotrophic Flagellate Diversity of One Brackish and Three Hypersaline Lakes of Turkey Esra Elif AYDIN DEDE, Won Je LEE, Ali İsmet DEMİRSOY
312	25.05.2016 10:30 - 12:30	Identification of novel SNPs and 10 bp deletion of ovine DGAT1 gene Ozge OZMEN, and Selim KUL
313	25.05.2016 10:30 - 12:30	Effects of low temperature on the fatty acid compositions of adult of <i>Acanthoscelidesobtectus</i> (Say) (Coleoptera: Chrysomelidae) Leyla KALYONCU, Hüseyin ÇETİN
314	25.05.2016 10:30 - 12:30	Wild ornamental spring grasses in the North-East part of Azerbaijan Parvin N. AGHAYEVA
315	25.05.2016 10:30 - 12:30	The Assessment of Air Pollution in During 2013 and 2014 in Tokat Province Ömer İŞILDAK
316	25.05.2016 10:30 - 12:30	Diversity of Marine Red Algal Tribe Ceramieae (Ceramiales, Rhodophyta) in the Sea of Marmara (Turkey) Murat ÇAKIR, Ergün TAŞKIN
317	25.05.2016 10:30 - 12:30	Relationships of <i>Tragopogon</i> L. (Lactuceae, Asteraceae) taxa inferred from Morphological Data Mutlu GÜLTEPE, Kamil COŞKUNÇELEBİ, Serdar MAKBUL
318	25.05.2016 10:30 - 12:30	Deep Marine Algal Flora in Princes Islands (Istanbul, Sea of Marmara, Turkey) Ergün TAŞKIN, Murat ÇAKIR, Barış AKÇALI
319	25.05.2016 10:30 - 12:30	Almond (<i>Amygdalus</i> Species) Genetic Resource Studies in Siirt Province (Turkey) Halit Seyfettin ATLI
320	25.05.2016 10:30 - 12:30	Adaptation Study of Medium and Late Blooming Almond Varieties for Gaziantep (Turkey) Ecological Condition Halit Seyfettin ATLI
321	25.05.2016 10:30 - 12:30	A New Species of <i>Micromeria</i> Benth. (Lamiaceae): <i>Micromeria aybalae</i> H. Duman & Dirmenci Hayri DUMAN, Tuncay DIRMENCI
322	25.05.2016 10:30 - 12:30	Morphological, Anatomical, Ecological Features of <i>Pilularia minuta</i> and Its Distribution in Turkey Serdar Gökhan ŞENOL, Erdinç OĞUR, Duygu BOZYEL, Nazlı Bahar PELİT, Göksele Erdem ARSLAN

323	25.05.2016 14:30 - 16:30	Distribution of <i>Phoenix theophrasti</i> and Problematic Gökçöy-Muğla Population in Turkey Serdar Gökhan ŞENOL, Nazlı Bahar PELİT, Duygu BOZYEL
324	25.05.2016 14:30 - 16:30	Effects of Lead Contamination on Nutrient Contents of Hyacinth (<i>Hyacinthus orientalis</i> L. c.v. "Blue Star") Füsun GÜLSER, Arzu ÇIĞ, Tuğba Hasibe GÖKKAYA
325	25.05.2016 14:30 - 16:30	Determination of genetic structure in natural house fly (<i>Musca domestica</i> L.) populations from Turkey Ersin DOĞAÇ
326	25.05.2016 14:30 - 16:30	Morphological and anatomical studies on <i>Conium maculatum</i> (Apiaceae) from Turkey Ahmet DURAN, Mustafa ÇELİK, Özlem ÇETİN
327	25.05.2016 14:30 - 16:30	Genetic Analyses of <i>Limonia nubeculosa</i>, Meigen1804 Museum Samples using Mitochondrial DNA COI Sequence Analyses Gürkan NACAR, Okan ÖZGÜL, Ersin DOĞAÇ, Raşan İvgin TUNCA, Hasan KOÇ
328	25.05.2016 14:30 - 16:30	Distribution and ecological requirements of mollusc fauna in Takaz Greek (Malatya, Turkey) Serap KOŞAL ŞAHİN, Melek ZEYBEK
329	25.05.2016 14:30 - 16:30	Conserved DNA Derived Polymorphism Based Genotyping in <i>Fusarium graminearum</i> Elif Sedef DEVELİ, Emre YÖRÜK
330	25.05.2016 14:30 - 16:30	Monitoring and Conservation of Soft-Shell Nile Turtle (<i>Trionyx triunguis</i>) in Muğla, Turkey Çisem SEZGİN, Yakup KASKA
331	25.05.2016 14:30 - 16:30	Mycelium Growth and Genetic Relationship of some <i>Stereum hirsutum</i> strains collected from different areas in Aegean and Marmara regions of Turkey Ebru BALCI, Hakan ALLI, Bekir ÇÖL
332	25.05.2016 14:30 - 16:30	Genetic diversity of <i>Schizophyllum commune</i> strains collected from seven different locations in Turkey Ebru BALCI, Hakan ALLI, Bekir ÇÖL
333	25.05.2016 14:30 - 16:30	Determination of Genetic Relationship of some Orobanche species collected from different locations in Muğla province Gökçe HAS, Bekir ÇÖL, Saliha KARABIYIK, Taner KAYNAR, Yonca SURGUN, Betül BÜRÜN
334	25.05.2016 14:30 - 16:30	Molecular analysis of some <i>Inocybe</i> species collected from Kütahya province Gökçe HAS, Ezgin BÖLÜK, İsmail ŞEN, Hakan ALLI, Bekir ÇÖL
335	25.05.2016 14:30 - 16:30	Molecular Analysis of <i>Gymnopus ocior</i> and <i>Gymnopus dryophilus</i> collected from Muğla and Kütahya in the Aegan region of Turkey Dilek AKKANAT, Ebru BALCI, Ezgin BÖLÜK, İsmail ŞEN, Hakan ALLI, Bekir ÇÖL
336	25.05.2016 14:30 - 16:30	General characteristics of <i>Curtobacterium</i> sp. and isolation of a <i>Curtobacterium flaccumfaciens</i>-like isolate from soil in Turkey Seda KANLIKAYA, Gökçe HAS, Bekir ÇÖL
337	25.05.2016 14:30 - 16:30	Ecological analysis of <i>Juniperus</i> species in Azerbaijan Afag RZAEVA
338	25.05.2016 14:30 - 16:30	Molecular Systematic Properties of <i>Rhododendron</i> L. (Ericaceae) Taxa Distributed in the Borders of Kaçkar National Park (Rize) Fatih S. BERİS, Elvan OFLUOĞLU, Esmâ AKYILDIZ, Vagif ATAMOV
339	25.05.2016 14:30 - 16:30	Comparative assessment of phenolic and flavonoid contents of some <i>Citrus</i> peels and their antioxidant capacity İbrahim Halil GEÇİBESLER
340	25.05.2016 14:30 - 16:30	Contact toxicity of <i>Stachys byzantina</i> C. Koch against <i>Sitophilus granarius</i> İbrahim Halil GEÇİBESLER
341	25.05.2016 14:30 - 16:30	Total phenol content and antioxidant activity of methanolic extracts from different parts of Turkish oriental hackberry (<i>Celtis tournefortii</i> Lam.) İbrahim Halil GEÇİBESLER
342	25.05.2016 14:30 - 16:30	Genetic Effects of Fish Stocking and Aquaculture Activities on Natural Stocks Funda TURAN, Cemal TURAN
343	25.05.2016 14:30 - 16:30	Climate Change and Biodiversity Effects in Turkey Seas Cemal TURAN, Deniz ERGÜDEN, Mevlüt, GURLEK
344	25.05.2016 14:30 - 16:30	Morphometric differences among different streams of brown trout <i>Salmo trutta</i> from the Abant Region Cemal TURAN, Deniz YAĞLIOĞLU, Funda TURAN
345	25.05.2016 14:30 - 16:30	Population Structuring and Migration Pathway of Atlantic bonito <i>Sarda sarda</i> in Turkish Marine waters Cemal TURAN
346	25.05.2016 14:30 - 16:30	Microsatellite Genetic Differences between Wild and Hatchery Populations of Turbot, <i>Scophthalmus maximus</i> Cemal TURAN, Deniz YAĞLIOĞLU, Mevlüt GÜRLEK, Deniz ERGÜDEN, Funda TURAN, Yılmaz EMRE, Serpil KARAN, Servet A. DOĞDU, Ali UYAN
347	25.05.2016 14:30 - 16:30	On the distribution and ecology of an endemic geometrid moth (Lepidoptera) Erdem SEVEN
348	25.05.2016 14:30 - 16:30	Endemic Plants of The Phrygia Valley Okan SEZER, Derviş ÖZTÜRK, Atıla OCAK

349	25.05.2016 14:30 - 16:30	Citric acid modified <i>Thuja orientalis</i> (T. orientalis): Batch studies for the biosorption of Basic Blue 9 from aqueous solutions Sibel TUNALI AKAR, Yasemin YETİMOĞLU BALK, Okan TUNA, Tamer AKAR
350	25.05.2016 14:30 - 16:30	Determination of Water Quality Using Benthic Macroinvertebrates and Physicochemical Parameters of Nilufer Stream Mustafa DURAN, Gürçay Kıvanç AKYILDIZ, Serdar POLAT, Recep BAKIR
351	25.05.2016 14:30 - 16:30	Poisonous Macrofungi from Tekke (Elmalı-Antalya) District Sinan AKTAŞ, Abdurrahman KAR, Sinan ALKAN
352	25.05.2016 14:30 - 16:30	Assessment of Water Quality Using Benthic Macroinvertebrates and Physicochemical Parameters of Orhaneli Stream in Turkey Mustafa DURAN, Gürçay Kıvanç AKYILDIZ, Serdar POLAT, Recep BAKIR
353	25.05.2016 14:30 - 16:30	Monitoring Water Quality Using Benthic Macroinvertebrates and Physicochemical Parameters of Simav Stream Mustafa DURAN, Gürçay Kıvanç AKYILDIZ, Serdar POLAT, Recep BAKIR
354	25.05.2016 14:30 - 16:30	Antimicrobial Effects of Plants on Pathogens of Rainbow Trout (<i>Oncorhynchus mykiss</i>) Zeynep SAYIN, Gülşen ULUKÖY
355	25.05.2016 14:30 - 16:30	A study of Orchid Species (Orchidaceae) Distributed in the Black Sea Region Gülcan ŞENEL, Mustafa Kemal AKBULUT, Şenay SÜNGÜ ŞEKER, Öznur ERGEN AKÇİN
356	25.05.2016 14:30 - 16:30	Species Diversity of Ground Beetles (Coleoptera: Carabidae) in Different Habitat Types of Kovada Lake National Park (Isparta) İrem YAMAN, Ali GÖK
357	25.05.2016 14:30 - 16:30	Microsatellite Genetic Variation and Population Differentiation of <i>Ceratitis capitata</i> in Turkey Ersin DOĞAÇ, Abuzer GÜLER, Vatan TAŞKIN, Belgin GÖÇMEN TAŞKIN
358	25.05.2016 14:30 - 16:30	Synthesis and Characterisation of Symmetrical Porphyrazines Bearing Calixarene Moieties Functionalized With "Click" Reactions Nilgün KABAY, Yasemin BAYĞU, Yaşar GÖK
359	25.05.2016 14:30 - 16:30	Occurrence of juveniles and egg capsules of <i>Dipturus oxyrinchus</i> from North-eastern Mediterranean Sea Nuri BAŞUSTA, Asiye BAŞUSTA
360	25.05.2016 14:30 - 16:30	Effects of <i>Tricholoma caligatum</i> extract on mRNA expressions of cell cycle control and apoptosis related genes in A549 human lung cancer cells Mücahit SEÇME, Yavuz DODURGA, Gülseren BAĞCI, Kutret GEZER, Oğuzhan KAYGUSUZ
361	25.05.2016 14:30 - 16:30	Lizard Care in Captivity: <i>Stellagama stellio</i> Sample Melodi YENMİŞ, Dinçer AYAZ
362	25.05.2016 14:30 - 16:30	Revalidation of <i>Stachys glechomifolia</i> Nábělek (Lamiaceae, sect. <i>Fragilicaulis</i>) Özal GÜNER, Ekrem AKÇIÇEK
363	25.05.2016 14:30 - 16:30	Distribution and Threat Category of Endemic <i>Jurinea alpigena</i> (Asteraceae) in Turkey Bekir DOĞAN
364	25.05.2016 14:30 - 16:30	Determination of Chemical Composition and Antimicrobial Activity of <i>Vitex agnus castus</i> L. Fruits Essential Oils grown under Aydın Ecological Conditions Emre SEVİNDİK, Çiğdem YAMANER, Muavviz AYVAZ, Betül TİN, Emin TOPRAK, Ayhan DAĞDELEN
365	25.05.2016 14:30 - 16:30	Distribution and Threat Category of Endemic <i>Klasea kotschyi</i> (Asteraceae) in Turkey Bekir DOĞAN, Ahmet DURAN
366	25.05.2016 14:30 - 16:30	Determination of the Chemical Composition and Antimicrobial Activity of the Essential oils of Some Labiatae Species Grown Under Aydın Ecological Conditions Emre SEVİNDİK, Çiğdem YAMANER, Muavviz AYVAZ, Cemal KURTOĞLU, Hüseyin UYSALMurat Kemal AVCI, Ayhan DAĞDELEN
367	25.05.2016 14:30 - 16:30	Amphibian, Reptile and Mammal Diversity of the Selimiye Dam and Its Surroundings (Yenişehir, Bursa) Pınar ÇAM
368	25.05.2016 14:30 - 16:30	Molecular Characterisation of <i>Blastocystis</i> spp. in water samples collected from Yesilirmak River and Tersakan Stream Zeynep KOLÖREN
369	25.05.2016 14:30 - 16:30	ISSR Fingerprinting of Some Turkish <i>Petrorhagia</i> (Caryophyllaceae) Taxa Muhip HİLOOĞLU, İlham ERÖZ POYRAZ, İsmail POYRAZ, Ebru ATAŞLAR, Emel SÖZEN
370	25.05.2016 14:30 - 16:30	ISSR-PCR Optimisation for Endemic <i>Teucrium leucophyllum</i> Montbret & Aucher ex Benth. (Lamiaceae) Muhip HİLOOĞLU, Emel SÖZEN, Ali KANDEMİR
371	25.05.2016 14:30 - 16:30	Newly Discovered Deutonymph of <i>Eupalopsellus rostridius</i> Summers (Acari: Eupalopsellidae) from Turkey Sibel DİLKARAOĞLU, Salih DOĞAN, Orhan ERMAN, Sevgi SEVSAY, Sezai ADİL
372	25.05.2016 14:30 - 16:30	Phytoplankton Communities and Ecological Status of a Small Glacial Lake in the Giresun Mountains (NE-Turkey) Beyhan TAŞ
373	25.05.2016 14:30 - 16:30	Chemical Composition and Activity of <i>Origanum solymicum</i> Büşra ÇABAŞ, Tuncay DİRMENÇİ, Sema ÇARIKÇI, Turgut KILIÇ, Ekrem AKÇIÇEK
374	25.05.2016 14:30 - 16:30	Chemical Composition of <i>Origanum vulgare</i> subsp. <i>vulgare</i> with Bioactivity Merve ÖNCÜ, Tuncay DİRMENÇİ, Sema ÇARIKÇI, Turgut KILIÇ, Turan ARABACI
375	25.05.2016 14:30 - 16:30	Some Geophyte Plants from Ordu Öznur ERGEN AKÇİN, Tuğba ÖZBUCAK

376	25.05.2016 14:30 - 16:30	Some Wild Edible Plants from Ordu <u>Öznur ERGEN AKÇIN</u> , Tuğba ÖZBUCAK, Gülcan ŞENEL
377	25.05.2016 14:30 - 16:30	Chemical Composition, Anti-Alzheimer, Anti-Microbial and Antioxidant Activity of <i>Stachys palustris</i> L. Hasibe YILMAZ, <u>Ekrem AKÇİÇEK</u> , Ahmet Ceyhan GÖREN, Turgut KILIÇ, Tuncay DİRMENCİ
378	25.05.2016 14:30 - 16:30	Comparison of DNA extraction methods from two oribatid mites species (Acari: Oribatida) from Turkey Nuri ERCAN, <u>Sedat PER</u> , Kübra Denli, Fahriye ERCAN
379	25.05.2016 14:30 - 16:30	Chemical Composition, Antioxidant and Anticholinesterase Inhibition Activity of Various Extracts of <i>Thymus cariensis</i> Hub- Mor. Jalas <u>Selçuk KÜÇÜKAYDIN</u> , Mehmet Emin DURU, Gülsen TEL ÇAYAN, Mehmet Ali ÖZLER
380	25.05.2016 14:30 - 16:30	Radical Scavenging Activity and Antibacterial Effect of Three <i>Cyclamen</i> L. Tuber Extracts on Some Fish Pathogens Ramazan MAMMADOV, Zeynep SAYIN, Cennet ÖZAY, <u>Gülşen ULUKÖY</u>
381	25.05.2016 14:30 - 16:30	Antioxidant activity of <i>Ebenus laquroides</i> Boiss var. <i>Laquroides</i> Meryem ORAKCI, Ferda CANDAN, <u>Emre KOÇ</u>
382	25.05.2016 14:30 - 16:30	<i>Stachys benthamiana</i> Boiss. (Lamiaceae); A new record for flora of Turkey <u>Özal GÜNER</u> , Ekrem AKÇİÇEK, Tuncay DİRMENCİ
383	25.05.2016 14:30 - 16:30	Total phenolic-flavonoid content and anticholinesterase activities of the <i>Salvia siirtica</i> and <i>Salvia kurdica</i> from East Anatolia Hilal Saruhan FİDAN, Abdulselam ERTAŞ, Mehmet BOĞA, Mehmet FIRAT, Ufuk KOLAK
384	25.05.2016 14:30 - 16:30	A Preliminary Study of the <i>Lyristes</i> Horvath, 1926 (Hemiptera: Cicadoidea) Species for Anatolia, Turkey <u>Abbas MOL</u> , Deniz ŞİRİN, Mehmet Sait TAYLAN
385	25.05.2016 14:30 - 16:30	Some Oribatid Mites (Acari) from the Harşit Valley (Turkey) <u>Nusret AYYILDIZ</u> , Ayşe TOLUK, Abdulkadir TAŞDEMİR, Mehmet TAŞKIRAN, Büşra ARIK
386	25.05.2016 14:30 - 16:30	New Records of Oribatid Mites (Acari) from Yozgat and Sakarya Provinces (Turkey) <u>Sedat PER</u> , Ayşe TOLUK, Kübra DENLİ, Nusret AYYILDIZ
387	25.05.2016 14:30 - 16:30	Intron Analysis and Expression Pattern of <i>IF4E</i> gene from Olive <u>Sümeyye ALTUNOK</u> and Ekrem DÜNDAR
388	25.05.2016 14:30 - 16:30	Isolation and Characterisation of Blade On Petiole 1 (BOP1) Gene from Olive <u>Büşra ÇELİKKAYA</u> , Ekrem DÜNDAR
389	25.05.2016 14:30 - 16:30	Isolation and Diversity Analysis of Olive <i>APETALA3</i> Gene <u>Çağla İlay CAMOĞULLARI</u> , Ekrem DÜNDAR
390	25.05.2016 14:30 - 16:30	Bioinformatic and Allele Diversity Analyses of Olive Putative Polygalacturonase (OeQRT2) Gene <u>Ebru GÖKTÜRK</u> , Ekrem DÜNDAR
391	25.05.2016 14:30 - 16:30	Bioinformatic Analysis, Polymorphism and Allele Diversity of Olive Putative Connexin Gene <u>Sümeyye ALTUNOK</u> , Ekrem DÜNDAR
392	25.05.2016 14:30 - 16:30	Bioinformatic Analysis and Allele Diversity of putative Olive PISTILLATA Gene <u>Hena DİZMEN</u> , Ekrem DÜNDAR
393	25.05.2016 14:30 - 16:30	Identification, Molecular Characterization and Allele Diversity of Late Embryogenesis Abundant (LEA) Protein from Olive <u>Münevver NURCİN</u> , Ekrem DÜNDAR
394	25.05.2016 14:30 - 16:30	Chemical profile of two <i>Salvia</i> species by using LC-MS/MS Mustafa Abdullah YILMAZ, <u>Hilal Saruhan FİDAN</u> , Abdulselam ERTAŞ, Mehmet BOĞA, Mehmet FIRAT, Hamdi TEMEL
395	25.05.2016 14:30 - 16:30	Breeding for New Pepper Lines (<i>Capsicum annum</i> L.) with Improved Nutraceutical Value <u>Semih ALAN</u> , Ali Ramazan ALAN, and Fevziye CELEBI TOPRAK
396	25.05.2016 14:30 - 16:30	Sustainable Energy for Survival of Biosecure Environment <u>Aysel KEKİLLİOĞLU</u> , H. Kübra KEKİLLİOĞLU
397	25.05.2016 14:30 - 16:30	Clean Environment: Current Status and Future of Sustainable Development <u>Fevziye CELEBI TOPRAK</u> , İzzet KARA, Ali Ramazan ALAN, Yesim KARA, Selçuk TOPRAK
398	26.05.2016 10:30 - 12:30	Systematic significance of anatomy and trichome morphology in <i>Lamium</i> L. (Lamiaceae; Lamiaceae) <u>Zeynep ATALAY</u> , Ferhat CELEP, Musa DOĞAN
399	26.05.2016 10:30 - 12:30	Sequence Related Amplified Polymorphism and Elongation Factor 1-α Based Genotyping in <i>Fusarium graminearum</i> Species Complex <u>İşıl Melis ZÜMRÜT</u> , Berna TUNALI, Bayram KANSU, Gülşen UZ, Emre YÖRÜK, Bahram SHARIFNABI, Fatih ÖLMEZ, Ayşegül SARIKAYA
400	26.05.2016 10:30 - 12:30	Ecological Status of Marine Waters of Turkish Black Sea Assessed by the Ecological Evaluation Index (EEI) Method <u>Ergün TAŞKIN</u> , Ersin MİNARECİ, <u>Orkide MİNARECİ</u>
401	26.05.2016 10:30 - 12:30	<i>In vitro</i> and <i>in vivo</i> antibacterial activity of some herbal extracts and nano silver on rice-isolated <i>Xanthomonas oryzae</i> pv <i>oryzae</i> <u>NGUYEN T.H.</u> , <u>VU T.Q.</u> , <u>DANG H.T.</u> , <u>KALASHNIKOVA E.A.</u>
402	26.05.2016 10:30 - 12:30	Three New <i>Russula</i> Records from Turkey <u>Ömer Faruk ÇOLAK</u> , Oğuzhan KAYGUSUZ, M. Halil SOLAK, Mustafa İŞİLOĞLU
403	26.05.2016 10:30 - 12:30	Rare Records for Turkish Mycota with Based on Morphological and Molecular Evidence <u>Ömer Faruk ÇOLAK</u> , Oğuzhan KAYGUSUZ, Emre SEVİNDİK, Kutret GEZER, Gamze Betül BAYUK

404	26.05.2016 10:30 - 12:30	Two new records for Turkish <i>Agaricales</i> <u>Kutret GEZER</u> , Oğuzhan KAYGUSUZ, Ömer Faruk ÇOLAK, Emre SEVİNDİK, Gamze Betül BAYUK, Uğur SOYLU
405	26.05.2016 10:30 - 12:30	Three New Additions to Turkish <i>Helotiales</i> <u>Kutret GEZER</u> , Ömer Faruk ÇOLAK, Oğuzhan KAYGUSUZ, Emre SEVİNDİK, Gamze Betül BAYUK, Uğur SOYLU
406	26.05.2016 10:30 - 12:30	Phytophagous and Entomophagous Insects Fauna of Wheat in Diyarbakir <u>Adil TONGA</u> , Ahmet BAYRAM
407	26.05.2016 10:30 - 12:30	Two New Generic Records of <i>Entoloma</i> Based on Morphological and Molecular Data for Mycobiota of Turkey <u>Oğuzhan KAYGUSUZ</u> , Kutret GEZER, Emre SEVİNDİK, Ömer Faruk ÇOLAK, Gamze Betül BAYUK
408	26.05.2016 10:30 - 12:30	Combined Effect of Salt Concentration and Temperature on Morphological Characters of Microfungi <u>Orkun KAYIS</u> , Rasime DEMİREL, Semra ILHAN and Emine İRDEM
409	26.05.2016 10:30 - 12:30	Genotypic Diversity of Holstein Bulls used as studs in Turkey <u>İlke ÜNLÜSOY</u> , Özge ÖZMEN
410	26.05.2016 10:30 - 12:30	Occurrence and infection dynamics of <i>Eustrongylides</i> sp. (Nematoda: Dioctophymatoidea) in four endemic <i>Aphanius</i> (Cyprinodontidae) species from Turkey <u>Deniz İNNAL</u> , Mahir YILDIRIM, Salim Serkan GÜÇLÜ, Mehmet Can ÜNAL, Buğrahan DOĞANLIL
411	26.05.2016 10:30 - 12:30	Evaluation of Chemical Composition and Antimicrobial Activity of Genus <i>Dittrichia</i> L. (Asteraceae) Essential Oils Emre SEVİNDİK, Cigdem YAMANER, <u>Muavviz AYYAZ</u> , Hüseyin UYSAL, Murat Kemal AVCI
412	26.05.2016 10:30 - 12:30	Investigation of Antioxidative and Anticancer Potentials of Two <i>Cyclamen</i> L. taxa from Turkey Ege Rıza KARAGÜR, Cennet ÖZAY, Hakan AKÇA, <u>Ramazan MAMMADOV</u>
413	26.05.2016 10:30 - 12:30	Biodiversity of Bacteria Isolated from Different Soils <u>Fatma YAMAN</u> , Betül AKTAŞ, Mustapha TOURAY, Esin POYRAZOĞLU ÇOBAN, H. Halil BIYIK
414	26.05.2016 10:30 - 12:30	Larvicidal activity of <i>Cyclamen hederifolium</i> extracts against the larvae of <i>Culex pipiens</i> <u>Murat TURAN</u> , Hüseyin ÇETİN, Ramazan MAMMADOV
415	26.05.2016 10:30 - 12:30	Biodiversity of PHB Producing Bacteria from Fruit Garden Soils in Aydın Providence <u>Mehmet Ali YÖRÜKÇE</u> , Betül AKTAŞ, Yusuf GEROĞLU, Esin POYRAZOĞLU ÇOBAN, H. Halil BIYIK
416	26.05.2016 10:30 - 12:30	Landmark based on Geometric Morphometric Analyses of <i>Dicranoptycha fuscens</i> (Schummel, 1829) Populations in Turkey Okan ÖZGÜL, <u>Rahşan İvgin TUNCA</u> , Ersin DOĞAÇ, Hasan KOÇ, Gürkan NACAR
417	26.05.2016 10:30 - 12:30	Pollen and Achene Morphology of <i>Cardopatum corymbosum</i> and <i>Zoegea lepturea</i> (Tribe Carduae, Asteraceae) from Turkey <u>Ayşe KAPLAN</u> , Bekir DOĞAN, Esra MARTİN, Meryem ŞEKER, Ahmet DURAN
418	26.05.2016 10:30 - 12:30	Ab-initio Study of Structural and Vibrational Properties of Coumarin and Cis-Coumaric Acid <u>Murat TURAN</u> , Sevgi ÖZDEMİR KART, Ramazan MAMMADOV
419	26.05.2016 10:30 - 12:30	Theoretical Investigations of Structural, NMR and FT-IR Spectra for Some Derivatives of Monoterpenes <u>Murat TURAN</u> , Hasan Hüseyin KART, Ismahan DÜZ, Ramazan MAMMADOV
420	26.05.2016 10:30 - 12:30	Ex situ Conservation of Some Endemic and Threatened Plant Species in Ankara <u>Şenay BOYRAZ TOPALOĞLU</u> , Canan YAĞCI TÜZÜN, Mecit VURAL, Kürşad ÖZBEK, Haşim ALTINÖZLÜ, Barış ÖZÜDOĞRU, Meral PEŞKİRCİOĞLU
421	26.05.2016 10:30 - 12:30	Calliphoridae and Rhiniidae (Diptera: Oestroidea) Fauna of Turkey <u>Gamze PEKBİYE</u>
422	26.05.2016 10:30 - 12:30	Numerical Analysis of the Genus <i>Heptaptera</i> (Apiaceae) in Turkey <u>Yasemin GÜRBÜZ</u> , Ahmet DURAN
423	26.05.2016 10:30 - 12:30	Pollen and Achene Morphology of <i>Amphoricarpus</i> (Tribe Carduae, Asteraceae) from Turkey Bekir DOĞAN, <u>Ayşe KAPLAN</u> , Esra MARTİN, Meryem ŞEKER, Ahmet DURAN
424	26.05.2016 10:30 - 12:30	The effects of reforested applications on beetle communities in <i>Quercus coccifera</i> (L.) shrublands <u>Mahmut TUNÇ</u> , <u>Burçin Yenisey KAYNAS</u>
425	26.05.2016 10:30 - 12:30	Genetic analysis among <i>Barbarea</i> (Brassicaceae) taxa in Turkey using with Inter Simple Sequence Repeats (ISSR) method <u>Güldane ORHAN</u> , Meryem ŞEKER, Yavuz BAĞCI
426	26.05.2016 10:30 - 12:30	An Investigation into the Spermiotoxic and Embryotoxic Effects of Copper Pyrithione (CuPt) on <i>Paracentrotus lividus</i> (Lamarck, 1816) <u>Ezgi TAŞCI</u> , Sibel HAYRETDAG
427	26.05.2016 10:30 - 12:30	Macromycetes Determined in Aydınca (Amasya) District <u>İbrahim TÜRK EKUL</u> , Hakan İŞİK
428	26.05.2016 10:30 - 12:30	Pollination Biology of <i>Pancratium maritimum</i> (Sea daffodil) Birkan KAHRAMAN, <u>Serdar Gökhan ŞENOL</u>
429	26.05.2016 10:30 - 12:30	Chromosome numbers of some species of the genus <i>Origanum</i> in Turkey <u>Esra MARTİN</u> , Tuncay DİRMENÇİ, Turan ARABACI, Ekrem AKÇİÇEK
430	26.05.2016 10:30 - 12:30	Change of Antioxidant Vitamins during Drying in <i>Craterellus cornucopioides</i> <u>Mahfuz ELMATAŞ</u> , İbrahim TÜRK EKUL

431	26.05.2016 10:30 - 12:30	Comparison of Variation in Forewings of Mud Dauber Wasp (<i>Sceliphron curvatum</i>) (Hymenoptera) from Different Localities of Turkey by Geometric Morphometric Analysis <u>Yaşar GÜLMEZ</u> , İlyas CAN, Faruk Tolga ÇUBUK, Yahya TAYHAN
432	26.05.2016 10:30 - 12:30	A Systematic Study On Water Mites (Acari, Hydrachnellae) Of Tokat, Turkey, Province <u>Ahmet BURSALI</u> , Muhlis ÖZKAN
433	26.05.2016 10:30 - 12:30	Karyomorphological Analysis of <i>Muscari macrocarpum</i> and <i>Muscari racemosum</i> species (Asteraceae) From Turkey <u>Tuna UYSAL</u> , Meryem BOZKURT
434	26.05.2016 10:30 - 12:30	Root Anatomy of the Subgenus <i>Caropodium</i> (STAPF & WETTST.) TAMAMSCH. & V.M.VINOGR. from the Genus <i>Grammosciadium</i> DC. Fatma ULUSOY, <u>Dudu Özlem MAVİ İDMAN</u> , Muhammet Ali KARAKAYA, Barış BANI
435	26.05.2016 10:30 - 12:30	Comparing pollution levels between Adıgüzel and Gökpınar Dams by measuring some biomarker levels in <i>Cyprinus carpio</i> <u>Serdar POLAT</u> , Mustafa DURAN, Adile SARI, Gürçay Kıvanç AKYILDIZ
436	26.05.2016 10:30 - 12:30	The Molecular Characterisation of <i>Centaurea pseudoscabiosa</i> and Its Subspecies By ISSR markers Tufan AKYÜZ, <u>Kuddisi ERTUĞRUL</u> , Meryem Bozkurt, Tuna UYSAL
437	26.05.2016 10:30 - 12:30	Analysis of Phytoplankton Communities and Some Water Quality Parameters of Buldan Süleymanlı Lake (Denizli) <u>Derman TİYENŞAN</u> , Mustafa DURAN, Sabri KILINÇ, Gürçay Kıvanç AKYILDIZ, Recep BAKIR, Serdar POLAT
438	26.05.2016 10:30 - 12:30	Molecular phylogeny of genus <i>Minuartia</i> (Caryophyllaceae) inferred from trnLE-F sequence data <u>Seyma ÇETİN</u> , Meryem ŞEKER, Murat KOÇ, Ergin HAMZAOĞLU, Ahmet AKSOY
439	26.05.2016 10:30 - 12:30	Macromorphological and Micromorphological Characters of <i>Acer platanoides</i> L. (Sapindaceae) in Turkey <u>Nagihan SEKİ</u> , Talip ÇETER, Nurcan YİĞİT, Hayri DUMAN, Barış BANI
440	26.05.2016 10:30 - 12:30	Insecticidal Effect and Biological Activity of Endemic <i>Cyclamen parviflorum</i> <u>Murat TURAN</u> , Ramazan MAMMADOV
441	26.05.2016 10:30 - 12:30	Insecticidal Effect and Biological Activity of <i>Cyclamen alpinum</i> <u>Murat TURAN</u> , Ramazan MAMMADOV
442	26.05.2016 10:30 - 12:30	Biodiversity Study of <i>Fusarium</i> Species on <i>Orobanche cernua</i> in Erzurum, Turkey Tuba GENÇ KESİMCİ, İrfan ÇORUH, <u>Cafer EKEN</u>
443	26.05.2016 10:30 - 12:30	Diversity of Fungi Isolated from <i>Medicago sativa</i> in Turkey Cafer EKEN
444	26.05.2016 10:30 - 12:30	Diversity of Fungi on <i>Onobrychis viciifolia</i> Seeds in Turkey Cafer EKEN
445	26.05.2016 10:30 - 12:30	The Synonyms for <i>Cryptochironomus</i> in Turkey and New Additions to Genus <i>Cryptochironomus</i> Kieffer, 1918 <u>Recep BAKIR</u> , Gürçay Kıvanç AKYILDIZ, Serdar POLAT, Mustafa DURAN
446	26.05.2016 10:30 - 12:30	Using Morphometric Characters Combination to Identify <i>Chironomus</i> Species in Turkey <u>Recep BAKIR</u> , Gürçay Kıvanç AKYILDIZ, Adile SARI, Mustafa DURAN
447	26.05.2016 10:30 - 12:30	The availability of the Seaweed as Hormone <u>Vildane GERÇEK</u>
448	26.05.2016 10:30 - 12:30	The Effects of Topographic Factors on Soil Properties <u>Tuğba BOZLAR</u>
449	26.05.2016 10:30 - 12:30	Phytochemical Analysis of Taxa <i>Crocus pallasii</i> subsp. <i>Pallasii</i> <u>Nahide DENİZ</u> , Ramazan MAMMADOV
450	26.05.2016 10:30 - 12:30	Weight-Lenght and Lenght-Lenght Relation at the Endemic Fatty Fish (<i>Pseudophoxinus anatolicus</i> Hanks, 1925) <u>İsmail ERBATUR</u> , Abdulkadir YAĞCI
451	26.05.2016 10:30 - 12:30	Otolith length, breadth and weight with total length of fish relation among of Anatolian endemics Giant Spring Minnow (<i>Pseudophoxinus anatolicus</i> Hanks, 1925) <u>Abdulkadir YAĞCI</u> , İsmail ERBATUR
452	26.05.2016 10:30 - 12:30	Antioxidant Activity and Phenolic Contents of Cherry Varieties Ali ÇELİK, Emine Nur HERKEN, Aysun Yurdunuseven YILDIZ, Güven GÖRK, <u>Ahmet ERMİŞ</u>
453	26.05.2016 10:30 - 12:30	New Breeding Site of Eleonora's Falcon (<i>Falco eleonora</i>) in South-Western Turkey <u>Hakan KARAARDIÇ</u> , Feyyaz KÖSE
454	26.05.2016 10:30 - 12:30	Inhibition and Docking Studies of New Pyrimidinyl Acyl Thioureas Compounds as HSP90 Inhibitors İrfan KOCA, Aykut ÖZGÜR, Muhammet ER, <u>Mehmet GÜMÜŞ</u> , Kübra Açıkalin COŞKUN, Yusuf TUTAR
455	26.05.2016 10:30 - 12:30	Inhibition Studies of Novel Coumarine Derivatives as HSP90 and HSP70 Inhibitors <u>Mehmet GÜMÜŞ</u> , İrfan KOCA, Kübra Açıkalin COŞKUN, Yusuf TUTAR, Ali DİŞLİ
456	26.05.2016 10:30 - 12:30	Assessment of Water Quality Parameters Using Multivariate Analysis for Marmara Basin, Türkiye <u>Gürçay Kıvanç AKYILDIZ</u> , Mustafa DURAN, Serdar POLAT, Recep BAKIR
457	26.05.2016 10:30 - 12:30	Assessment of Water Quality Parameters Using Multivariate Analysis for Meriç-Ergene Basin, Türkiye <u>Gürçay Kıvanç AKYILDIZ</u> , Mustafa DURAN, Serdar POLAT, Recep BAKIR

458	26.05.2016 10:30 - 12:30	Assessment of Water Quality Parameters Using Multivariate Analysis for Susurluk Basin, Türkiye Gürçay Kıvanç AKYILDIZ, Mustafa DURAN, Serdar POLAT, Recep BAKIR
459	26.05.2016 10:30 - 12:30	Sex differences in immunity in a bushcricket (Orthoptera: Phaneropterinae) Hasan SEVGİLİ
460	26.05.2016 10:30 - 12:30	Antioxidant Activity and Total Phenolic Content of <i>Erysimum kotschyianum</i> Extracts Özge KILINCARSLAN, Ramazan MAMMADOV
461	26.05.2016 10:30 - 12:30	Determination of Some Biological Activities of Different Solvent Extracts from <i>Stellaria media</i> Akgül RAKHİMZHANOVA, Ozge KILINCARSLAN, Nahide DENİZ and Ramazan MAMMADOV
462	26.05.2016 10:30 - 12:30	Screening of <i>Heliotropium europaeum</i> L. Extracts for Antioxidant Activity Cennet ÖZAY, Yağmur AYAĞ, Ramazan MAMMADOV
463	26.05.2016 10:30 - 12:30	Theoretical Studies on a compound formed by Ca²⁺ and Flavonoid Aslı ÖZTÜRK KİRAZ, Fatih YALÇIN, Ramazan MAMMADOV
464	26.05.2016 10:30 - 12:30	Ecological analysis of floral biodiversity of mountainous part of Lankaran Elshad GURBANOV, Sanubar ASLANOVA
465	26.05.2016 10:30 - 12:30	Systematic significance of nutlet morphology in Turkish <i>Lamium</i> L. species (Lamiaceae) Ferhat CELEP, Zeynep ATALAY, Çiğdem Can, Musa DOĞAN
466	26.05.2016 10:30 - 12:30	Where may <i>Cricotopus sylvestris</i> have entered to Turkey from? Adile SARI, Mustafa DURAN
467	26.05.2016 10:30 - 12:30	The Diversity of Exopolysaccharide Producer Lactic Acid Bacteria in Tarhana Fermentation Duygu ZEHİR, Ömer SİMSEK
468	26.05.2016 10:30 - 12:30	The Diversity of Bacteriocin Producing Lactic Acid Bacteria in Tarhana Fermentation Halil İbrahim KAYA, Ömer SİMSEK
469	26.05.2016 10:30 - 12:30	Histological Activity of Extracts Isolated from <i>Crocus pallasii</i> spp. <i>pallasii</i> and <i>Crocus cancellatus</i> spp. <i>mazziaricus</i> Species on Rat Nahide DENİZ, Barbaros ŞAHİN, Arzu KASKA, Ayşen ÇETİN KUÇUKER, Suleyman DEMİR, Ramazan MAMMADOV
470	26.05.2016 10:30 - 12:30	The Histopathological Effects of Diazinon on Gills of <i>Oreochromis niloticus</i> Pelin UĞURLU, Elif İpek SATAR, Tarık ÇİÇEK
471	26.05.2016 10:30 - 12:30	Histopathological Changes in the Kidney of <i>Anabas testudineus</i> Exposed to Cypermethrin Elif İpek SATAR, Babu VELMURUGAN, Senthil KUMAAR
472	26.05.2016 10:30 - 12:30	Genetic Characterization of Field Populations of <i>Culex pipiens</i> Sampled From Aegean Region of Turkey Belgin GÖÇMEN TAŞKIN, Sercan KILIÇ, Vatan TAŞKIN, Taylan DOĞAROĞLU, Ersin DOĞAÇ
473	26.05.2016 14:30 - 16:30	A Preliminary Linkage Map and Possible QTLs for Yellow Rust (<i>Puccinia striiformis</i>) Disease in a Durum Wheat Population Derived from Kunduru-1149 x Cham-1 Cross Based on Gliadin, HMW-Glutenin and RAPD markers Belgin GÖÇMEN TAŞKIN, Özlem ÖZBEK, Sibel KESKİN ŞAN, Zeki KAYA
474	26.05.2016 14:30 - 16:30	Inhibitory Effect of Isovitexin on Human Colon Carcinoma <i>in vitro</i> Kadriye Özlem SAYGI, Ramazan ERENLER
475	26.05.2016 14:30 - 16:30	Comparison of ELISA and HPLC DAD methods for the detection of acetamiprid and imidacloprid residues in different agricultural products Kadriye ozlem SAYGI, Emel CANPOLAT, M. Senay SENGUL
476	26.05.2016 14:30 - 16:30	The distributions of three invasive fish species (<i>Carassius gibelio</i> (Bloch, 1782); <i>Pseudorasbora parva</i> Temminck & Schlegels, 1846; <i>Gambusia holbrooki</i> Girard, 1859) in Central Anatolia, Marmara, Western Black Sea and Aegean regions of Turkey Mehmet Borge ERGÖNÜL, Danial NASSOUHI, Sibel ATASAGUN, Cüneyt N. SOLAK
477	26.05.2016 14:30 - 16:30	Comparative studies of photosynthetic apparatus parameters and yield in old and new Ukrainian winter wheats varieties Galina PRIADKINA
478	26.05.2016 14:30 - 16:30	The Clonal Variability of the Growth Parameters for Poplars and Willows in Field and Laboratory Conditions Nataliia KUTSOKON, Jamal RAKHMETOV, Svitlana RAKHMETOVA, Svitlana LOS, Natalya VYSOTSKA, Konstantin KRUTOVSKY, Namik RASHYDOV
479	26.05.2016 14:30 - 16:30	Mutual relation of halophyte and glycophyte in chloride saltiness condition: Biological melioration Khuraman KHALILOVA, Dariko RASULOVA, Sima QANI-ZADE, Zumrud ABBASOVA, Elmira ZEYNALOVA
480	26.05.2016 14:30 - 16:30	Effect of nitrogen supply on the vegetation shift of two halophyte species: <i>Sarcocornia perennis</i> and <i>Halimione portulacoides</i> Nihan BÖREKÇİ, Lale Yıldız AKTAŞ, Volkan EROĞLU, Serdar Gökhan SENOL
481	26.05.2016 14:30 - 16:30	Geochemical features of Antimony mineralization in Hasköy-Derebağzı (Nazilli-Aydın), Menderes Massif, Western Turkey Barış SEMİZ, Gürkan SEMİZ, Gürçay Kıvanç AKYILDIZ, Mustafa DURAN
482	26.05.2016 14:30 - 16:30	Antimony and arsenic concentrations in soil samples around the abandoned Hasköy-Derebağzı mine (Nazilli-Aydın) Barış SEMİZ, Gürkan SEMİZ

483	26.05.2016 14:30 - 16:30	Antimony and arsenic accumulation in some plants growing in abandoned Hasköy-Dereboğazi mining area (Nazilli-Aydın) <u>Gürkan SEMİZ, Barış SEMİZ</u>
484	26.05.2016 14:30 - 16:30	How is global warming affecting the distribution of the species? An example of <i>Origanum minutiflorum</i> Schwarz & P. H. Davis <u>Canan DÜLGEROĞLU, Ahmet AKSOY, Orhan ÜNAL</u>
485	26.05.2016 14:30 - 16:30	Essential oil contents and compositions of <i>Hypericum scabrum</i> L. and <i>Hypericum linarioides</i> BOSSE <u>Ayşe Betül AVCI, Mustafa KORKMAZ</u>
486	26.05.2016 14:30 - 16:30	Micropropagation of Some Fern Species Grown Naturally in Turkey <u>Tolga İZGÜ, Başar SEVİNDİK, Pembe ÇÜRÜK, Ehsan Mohammad TAGİPUR, Gamze ŞEKER, Belgin BİÇEN, Özer YILMAZ, Gönül KAYNAK, Yıldız Aka KAÇAR Yeşim Yalçın MENDİ</u>
487	26.05.2016 14:30 - 16:30	Redescription of <i>Dysdera sultani</i> Deeleman-Reinhold, 1988 (Araneae: Dysderidae) with the first description of the female <u>Recep Sulhi ÖZKÜTÜK, Gizem KARAKAŞ</u>
488	26.05.2016 14:30 - 16:30	Investigation on possible damages of most commonly used pesticides on the growth of tomato plants grown in Muğla province <u>Mahmut YILDIZTEKİN, Atilla Levent TUNA, Mehmet Ali ÖZLER, Said NADEEM</u>
489	26.05.2016 14:30 - 16:30	Soil Properties and Mineral Nutrients of Clementine Mandarin (<i>Citrus reticulata</i> Blanco) Grown in The Köyceğiz Region of Muğla Province <u>Semir KUZU, Mahmut YILDIZTEKİN</u>
490	26.05.2016 14:30 - 16:30	Micropropagation of Some Fern Species Grown Naturally in Turkey <u>Tolga İZGÜ, Başar SEVİNDİK, Pembe ÇÜRÜK, Ehsan Mohammad TAGİPUR, Gamze ŞEKER, Belgin BİÇEN, Özer YILMAZ, Gönül KAYNAK, Yıldız Aka KAÇAR Yeşim Yalçın MENDİ</u>
491	26.05.2016 14:30 - 16:30	Quantitation of gallic acid of three <i>Origanum</i> species from south-eastern Turkey <u>Aslı SEMİZ, Gürkan SEMİZ, Gurbet ÇELİK-TURGUT, Erhan GÖNEN</u>
492	26.05.2016 14:30 - 16:30	Determination of gallic acid content of microwave-assisted <i>Salvia tomentosa</i> Mill. extract <u>Gurbet ÇELİK-TURGUT, Aslı SEMİZ, Gürkan SEMİZ</u>
493	26.05.2016 14:30 - 16:30	The current situation of <i>Teucrium sandrasicum</i> O. Schwarz and <i>Teucrium alyssifolium</i> Staph. and their conservation categories from Sandras Mountain <u>Gürkan SEMİZ</u>
494	26.05.2016 14:30 - 16:30	Contribution to awareness of nature and environment: A nature science camp <u>Gürkan SEMİZ, Gürçay Kıvanç AKYILDIZ</u>
495	26.05.2016 14:30 - 16:30	Larvicidal activity of <i>Pinus brutia</i> Ten. Seed Oil against to <i>Thaumatopoea wilsoni</i> Tams. <u>Kübra KOCABİYYİK, Erhan GÖNEN, Gürkan SEMİZ, Hüseyin ÇETİN</u>
496	26.05.2016 14:30 - 16:30	Biological figures on archaeological ruins at Tripolis City (Yenicekent-Denizli) <u>Gürkan SEMİZ, Bahadır DUMAN</u>
497	26.05.2016 14:30 - 16:30	Short-Term Effects of Thinning on Forest Soils of Oriental Beech Plantations in Different Sites <u>Ayhan USTA, Murat YILMAZ, Selvinaz YILMAZ, Esengül Benli KENÇ</u>
498	26.05.2016 14:30 - 16:30	Investigation of Biomorphological Characteristics and Impacts on Health of <i>Hirudo medicinalis</i> (Annelida, Hirudinea) <u>Aysel KEKİLLİOĞLU, Fatma Seçil KOÇ</u>
499	26.05.2016 14:30 - 16:30	Levant Voles <i>Microtus guentheri</i> (Danford and Alston 1880) prefer Southerly-Facing Slopes in Habitats at Feke/Adana, TURKEY <u>Mustafa YAVUZ</u>
500	26.05.2016 14:30 - 16:30	Levant Voles <i>Microtus guentheri</i> (Danford and Alston 1880) Prefer Southerly-Facing Slopes in Habitats at Mut/Mersin, Turkey <u>Mustafa YAVUZ, Mehmet Rızvan TUNÇ</u>
501	26.05.2016 14:30 - 16:30	Heavy Metal Accumulation and the Road Effect: In Social Voles (<i>Microtus socialis</i> (Pallas, 1773) at the Feke/Adana, Turkey <u>Mustafa YAVUZ, Özgür AKTAŞ</u>
502	26.05.2016 14:30 - 16:30	Heavy Metal Accumulation and the Road Effect: In Persian Voles (<i>Microtus irani</i> Thomas, 1921) at the Dört Yol/Adana, Turkey <u>Mustafa YAVUZ, Mehmet Rızvan TUNÇ</u>
503	26.05.2016 14:30 - 16:30	Some Endemic Chasmophytes of Antalya (Turkey) Province and Their Threat Status <u>R. Süleyman GÖKTÜRK</u>
504	26.05.2016 14:30 - 16:30	Monitoring <i>Caretta caretta</i> (Linnaeus, 1758) Population at Bostanlı Beach in Phaselis/Antalya in Summer 2015 <u>Recep GÜLER, Mustafa YAVUZ, Mehmet ÖZ</u>
505	26.05.2016 14:30 - 16:30	Diversity and Ecology of Algae from the Ilıca Stream, Eastern Black Sea Basin, Turkey <u>Beyhan TAŞ, Murat ÇETİN</u>
506	26.05.2016 14:30 - 16:30	A New Record for the Turkish Mite Fauna: <i>Ledermuelleriopsis tamariski</i> Maleki and Bagheri (Acari: Stigmaeidae) <u>Meryem BİNGÜL, Salih DOĞAN</u>
507	26.05.2016 14:30 - 16:30	The Determination of the Indicator Microorganisms in Black Mussels (<i>Mytilus galloprovincialis</i>) Associated With Fecal Contamination <u>Bülent KAFKA, Berna KILINÇ</u>

508	26.05.2016 14:30 - 16:30	The Relationship Between the Algal Blooms and Microbiological Loads of Harvested Black Mussels (<i>Mytilus galloprovincialis</i>) Bülent KAFA, Berna KILINÇ
509	26.05.2016 14:30 - 16:30	The Investigation of <i>Vibrio</i> spp. on Black Mussels (<i>Mytilus galloprovincialis</i>) for Human Health and Shellfish Industry Bülent KAFA, Berna KILINÇ
510	26.05.2016 14:30 - 16:30	The Determination of Microbiological Security of Fried Black Mussels Related to Pathogenic Bacteria Bülent KAFA, Berna KILINÇ
511	26.05.2016 14:30 - 16:30	<i>Stachys distans</i> Benth. var. <i>distans</i> (Lamiaceae, Sect. <i>Olisia</i>): A New Record for the Flora of Turkey Ekrem AKÇİÇEK, Tuncay DIRMENÇİ, Özal GÜNER, Ekrem DÜNDAR
512	26.05.2016 14:30 - 16:30	The Geographical Distribution of <i>Stachys</i> L. (Lamiaceae) sect. <i>Olisia</i> Dumort. in Turkey Ekrem AKÇİÇEK, Tuncay DIRMENÇİ, Özal GÜNER
513	26.05.2016 14:30 - 16:30	The Determination of Life Forms of Common Plants in Melet River (Ordu/Turkey) Tuğba BAYRAK ÖZBUCAK, Öznur ERGEN AKÇİN, Gülaycan POLAT, Metin Deveci, Selahattin ÖZBUCAK
514	26.05.2016 14:30 - 16:30	Morphological and Molecular Identification of Scenedesmacae Members Isolated from River Basin of Ergene (Thrace, Turkey) Füsün AKGÜL, İnci TÜNEY, Rıza AKGÜL, Hüseyin ERDUĞAN
515	26.05.2016 14:30 - 16:30	Genotoxic Effect of Water Soluble Fractions of Crude Oil in Molly Fish (<i>Poecilia sphenops</i>) Özlem ÖNEN, Cennet ÖZAY, Sema İŞİSAĞ ÜÇÜNCÜ
516	26.05.2016 14:30 - 16:30	Using Living Microalgae <i>Tetracystis isobilateralis</i> R.M.Brown & H.C. Bold (Chlorococcales) in the Removal of Heavy Metals Cumhur MIÇOĞULLARI, Rıza AKGÜL, Füsün AKGÜL, Hüseyin ERDUĞAN
517	26.05.2016 14:30 - 16:30	Biochemical characteristics of microalgae <i>Tetracystis isobilateralis</i> R.M.Brown & H.C. Bold (Chlorococcales) Cumhur MIÇOĞULLARI, Rıza AKGÜL, Füsün AKGÜL, Hüseyin ERDUĞAN
518	26.05.2016 14:30 - 16:30	Two new subspecies records of <i>Ziziphora clinopodioides</i> Lam. (Lamiaceae) from Turkey Tuncay DIRMENÇİ, Ferhat CELEP, Murat Ünal, Taner ÖZCAN
519	26.05.2016 14:30 - 16:30	Distribution, Habitat Preference and Threats on Rare Blenniid Fish <i>Coryphoblennius galerita</i> (Linnaeus, 1758) in the Southern Black Sea Dilruba SEYHAN, Semih ENGIN
520	26.05.2016 14:30 - 16:30	Some Ecological Features and Distribution of the Black Sea Endemic Cling Fish <i>Diplecogaster euxinica</i> Murgoci, 1964 (Gobiesocidae) Semih ENGIN, Dilruba SEYHAN, Erhan IRMAK, Uğur ÖZDEN
521	26.05.2016 14:30 - 16:30	Established population of Lessepsian dragonet <i>Synchiropus sechellensis</i> Regan, 1908 (Callionymidae) in the Northern Levantine Coast Erhan IRMAK, Uğur ÖZDEN, Dilruba SEYHAN, Semih ENGIN
522	26.05.2016 14:30 - 16:30	Investigation of Some Medicinal Activities of <i>Viburnum opulus</i> from Tokat- Turkey Canan USTA, Ahmet SİMSEK
523	26.05.2016 14:30 - 16:30	A Preliminary Study on the Parasite Fauna of Large-Eye Dentex, (<i>Dentex macrophthalmus</i> Bloch, 1791) (Teleostei: Sparidae) Collected in Çanakkale and Izmir Regions, Aegean Sea, from Turkey Serdar DÜŞEN, F. Banu YALIM, Hesna YAKA GÜL, Tuğba SAĞLAM, Ayşe KARAMAN
524	26.05.2016 14:30 - 16:30	A Preliminary Helminthological Study of <i>Pelophylax carlitanus</i> (Arikan, 1988) from Beyşehir Lake, Konya, Turkey Serdar DÜŞEN, Hesna YAKA GÜL, Murat SELVİLİ, Nihal KAYMAK KUZU
525	26.05.2016 14:30 - 16:30	A Preliminary Helminthological Study of Eurasian Marsh Frog (<i>Pelophylax ridibundus</i> Pallas, 1771) in Seyhan River Collected from Adana Province, Turkey Hesna YAKA GÜL, Serdar DÜŞEN, Elife Buket TOPAL, Nesrin CEYLAN GÜRKAN
526	26.05.2016 14:30 - 16:30	Helminth Fauna of Atlantic Horse Mackerel (<i>Trachurus trachurus</i> L., 1758) from the Marmara Sea, İstanbul, Turkey Serdar DÜŞEN, Hesna YAKA GÜL, Berkay DOBRUCALI, Orinda DARALI, Ahmet KOŞAR, Gülşah ÖZÜLKE
527	26.05.2016 14:30 - 16:30	A Preliminary Research on The Protozoa Existence in Raw Milk Samples in Denizli City Center Tuğba SAĞLAM, Serdar DÜŞEN
528	26.05.2016 14:30 - 16:30	The Taxonomical Situation of the Genus <i>Colchicum</i> (Colchicaceae) in Turkey Olca DÜŞEN
529	26.05.2016 14:30 - 16:30	The Evaluation of Floral Motifs on The Archaeological Architectures in Stratonikeia Ancient City (Muğla / Turkey) Uygur SARP KAYA, Betül GÜRCAN, Olca DÜŞEN
530	26.05.2016 14:30 - 16:30	Additional Lichen Records from Denizli Province, Turkey Çağrı GEDİZ, Özge TUFAN ÇETİN, Olca DİNÇ DÜŞEN
531	26.05.2016 14:30 - 16:30	The Nomenclatural Situation of the Genus <i>Potentilla</i> (Rosaceae) in Turkey Uygur SARP KAYA, Olca DÜŞEN
532	26.05.2016 14:30 - 16:30	Morphological, Anatomical and Palynological Features of Some <i>Rhododendron</i> Species (Ericaceae) in Turkey Betül GÜRCAN, Uygur SARP KAYA, Olca DÜŞEN, Yücel SEMİZ
533	26.05.2016 14:30 - 16:30	Lichens of Stratonikeia Ancient City (Muğla/Turkey) Çağrı GEDİZ, Özge TUFAN ÇETİN, Olca DİNÇ DÜŞEN

534	26.05.2016 14:30 - 16:30	Two years data of breeding Ruddy Shelducks (<i>Tadorna ferruginea</i>) in Lake Acıgöl (Denizli-Afyonkarahisar / Turkey) Merve TEPE, Mehmet Ali TABUR, Raşit URHAN, Cemil Ozan AKBULUT
535	26.05.2016 14:30 - 16:30	Method for Treating Trichophytoses of Large and Small Cattle M. Nursoy, D.K. Sunakbayeva, A.D. Akbasova, M.M. Akeshova
536	26.05.2016 14:30 - 16:30	Bioecological features of Eucalyptus L'Herit. genus species in Absheron conditions T.S.Mammadov, <u>S.B.Bagirova</u>
537	26.05.2016 14:30 - 16:30	Natural plant covers of Lesser Caucasus Mountains <u>M. Y. HASANOVA</u> , S. AKBERLI, S.A.ALIYEVA, R.A. HASANOV
538	26.05.2016 14:30 - 16:30	Phytocenological Grouping of Yalama Forests <u>K.A. MAMMADOVA</u>
539	26.05.2016 14:30 - 16:30	Chrysomphalus dictyospermi as Harmful Pest of Eucalyptus in Absheron Sh.Sh.GAHRAMANOV, H.A.MAMMADOV
540	26.05.2016 14:30 - 16:30	Introduction of Some Species of Tamarix in Absheron and Their Meaning A.P.BAGIRLI, I.O.MAMMADOVA
541	26.05.2016 14:30 - 16:30	Biocontrol against toxic influence of Traheomikoz in Solanaceae family plants <u>J.T. AGAYEV</u> , N.K.AGAYEVA
542	26.05.2016 14:30 - 16:30	Edible Mushrooms from the Kale (Denizli) Region Kutret GEZER, Oğuzhan KAYGUSUZ, <u>Semih AKGÜN</u> , Dilek ŞENKAYA, Ebru DEMİR, Mine BEŞTAŞ, Yasir IBRAHEEM
543	26.05.2016 14:30 - 16:30	Cyclamen pseudibericum Extracts Induces, miR-146 and miR-200c Expression is Strongly Inhibited Invasion and Migration Capacity on PC9 and PC14 NSCLC Cells Ege Rıza KARAGÜR, <u>Hakan AKÇA</u> , Ramazan MAMMADOV
544	26.05.2016 14:30 - 16:30	Showing the Environmental Effects of Heavy Traffic Pollution Sources <u>Ali AYDIN</u> , Nedim KARAGENÇ
545	26.05.2016 14:30 - 16:30	Introducing Some East-Asia Flora Elements in Azerbaijan Climate Condition Z. ABBASOVA, E. SALAHOVA, F. RUSTAMOVA, K. AGALARLI
546	26.05.2016 14:30 - 16:30	Idioadaptation of Allium L. Genus Species Propagated in Azerbaijan <u>CH.T. NAMAZOVA</u>
547	26.05.2016 14:30 - 16:30	Growing of Henna in Azerbaijan Indoor Conditions, Obtaining at the First Time Monoflor Honey from Them and Its Medicinal Profit <u>T.M.SADIGOV</u> , T.S.MAMMADOV, M.A.GAFAROVA, S.H.ORUJOV, V.N.BADALOVA, Z.T.MUSTAFAYEVA, R.H.AKBAROVA
548	26.05.2016 14:30 - 16:30	The Comparative Study Between Absheron Peninsula and Antalya (Turkey) Region's Dendroflora <u>T.S. MAMMADOV</u> , Sh.R. ALIYEVA
549	26.05.2016 14:30 - 16:30	Variety Trial on Tomato Hybrids in Greenhouse Conditions of the PreAral Area in Kazakhstan Elina DYAMURSHAYEVA, Rakhym KUDIYAROV, Gulsym SAUYTBAYEVA, Galina DYAMURSHAYEVA, Salima SADYBEKOVA
550	26.05.2016 14:30 - 16:30	Studies on the Distribution of Encarsia formosa to Control the Greenhouse Whitefly Trialeurodes vaporariorum on Tomato Crops in Greenhouse of the PreAral area in Kazakhstan Elina DYAMURSHAYEVA, Rakhym KUDIYAROV, Gulsym SAUYTBAYEVA, Galina DYAMURSHAYEVA, Salima SADYBEKOVA
551	26.05.2016 14:30 - 16:30	Flora of Tripolis Ancient City (Yenicekent-Denizli) <u>Gürkan SEMİZ</u> , Bahadır DUMAN
552	26.05.2016 14:30 - 16:30	The endemics of the Lichen Flora of Azerbaijan <u>Sevda ALVERDIYEVA</u>
553	26.05.2016 14:30 - 16:30	Geophytes of Trabzon (Turkey) <u>Ali ÇELİK</u> , Güven GÖRK, Ahmet ERMİŞ

ORAL PRESENTATIONS

ORAL-PLTBIO-OP101

Current checklist of the bryophytes of Rize, TurkeyGökhan ABAY¹, Nevzat BATAN², Turan ÖZDEMİR³¹*Department of Plant Materials and Propagation Techniques, Division of Landscape Architecture, Recep Tayyip Erdogan University, Rize, Turkey*²*Maçka Vocational School, Karadeniz Technical University, Trabzon, Turkey*³*Department of Botany, Division of Biology, Karadeniz Technical University, Trabzon, Turkey*
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Aim of the study: The scope of this compilation is to collate and update the available bryophyte species occurring in Rize province, to fill one of the gaps in our knowledge of hornworts, liverworts, and mosses of Rize, and to provide a useful material for biodiversity studies and conservation.

Material and Methods: In this review, we used the available bryofloristic researches covering the province Rize (Henderson and Muirhead, 1955; Henderson 1961a, 1961b, 1964; Papp, 2004; Abay, 2004; Townsend, 2005; Abay et al., 2006a, 2006b, 2007, 2009a, 2009b; Kürschner and Parolly, 2006a, 2006b; Keçeli and Abay, 2007a, 2007b, 2012, 2014; Keçeli et al. 2008; Uyar et al. 2008; Lara et al. 2010; Kırmacı et al. 2012; Kürschner et al. 2012; Kırmacı and Kürschner, 2013; Kürschner, 2013; Abay and Keçeli, 2014). Each taxon record was obtained from published literatures concerning the city between the years 1955-2014. The accepted names of the hornwort and liverwort taxa encountered in the literatures were determined according to Ros *et al.* (2007) and Özenoğlu Kiremit and Keçeli (2009). Family names that were outside the content of the above mentioned reference works were added via the Tropicos web site: <http://www.tropicos.org/>. The checklist of Ros *et al.* (2013) was the basic reference work for the accepted names of the moss taxa and families. All taxa were arranged alphabetically in between its own group. Author abbreviations follow Brummit and Powel (1992).

Results: The checklist reports data on 411 bryophytes recorded from different localities within the Rize province. The list includes 45.11 % of the total hornwort and liverwort flora of Turkey that equals 31 families, 46 genera and 83 taxa (81 species and 2 subspecies), and it also comprises 44 families, 126 genera, and 328 moss taxa (310 species, 14 varieties, and 4 subspecies), that equals 42.00 % of the total moss flora of Turkey. In hornworts, *Anthoceros* is the only genus represented in the list. With 11 taxa, the large number of liverwort species was found in the family Jungermanniaceae. Scapaniaceae (10), Lepidoziaceae (5), and Lophocoleaceae (5) following the Jungermanniaceae were some of the other families rich in terms of number of taxa. With 8 taxa, *Scapania* was the dominant genus of the liverworts. The genera *Jungermannia* and *Lophozia* followed it with four taxa. The biggest number was found in Pottiaceae family with 36 taxa. Some other richest families are Brachytheciaceae (31), Grimmiaceae (30), Orthotrichaceae (22) and Mniaceae (18), respectively. *Orthotrichum* (17), *Sphagnum* (15), *Grimmia* (13), and *Racomitrium* (10) were the dominant genera of the mosses. The genera *Brachythecium*, *Dicranum*, *Ptychostomum*, and *Tortula* shared the fifth row with eight taxa each.

Keywords: Bryophyte, checklist, hornwort, liverwort, moss

ORAL-PLTBIO-OP102

Determination of Inter Species Genetic Variation of the Endemic Species; *Phlomis physocalyx*, *Phlomis oppositiflora* and their hybridsGökhan SEZER¹, Ertuğrul YÜZBAŞIOĞLU², M. Yaşar DADANDI²¹Department of Biology, Arts and Science Faculty, Osmaniye Korkut Ata University, 80000 Osmaniye, Turkey.²Department of Biology, Science Faculty, Erciyes University, 38039 Kayseri, Turkey.
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Aim of the study: Genetic diversity is of a great importance for its short and long term survival of an endemic species. Interspecific hybridization plays a significant role in plant evolution. Randomly Amplified Polymorphic DNA markers (RAPD) were used to assess the genetic variation and hybrid identity. In this study, inter species genetic variation of endemic species, *Phlomis physocalyx* Hub.-Mor., *Phlomis oppositiflora* Boiss. & Hausskn. and their hybrid's location between ancestor species were investigated.

Material and Methods: A total of 309 individuals in 11 populations were provided from herbarium material and measured by quantitative 28 characters. The fertility of the pollens of those populations was also estimated by preparations. The dried leaves of single plants were used for DNA isolation. In order to DNA amplification, fifteen selected RAPD primers were used. Amplification products were separated by electrophoresis and stained agarose jells were photographed over UV light. RAPD bands were scored absence or presence and bands statically were analyzed.

Results: The results of the assays indicated that these 15 selected primers generated 135 RAPD bands and of the total bands, 99.26 % (134 bands) were polymorphic among the samples. According to clustering analyses, the hybrid species was closely clustered with *P. physocalyx* at most and *P. oppositiflora* as the ancestral species. The band pattern of some hybrids inherited either from *P. physocalyx* or *P. oppositiflora*, whereas, in some cases, it originated from both ancestors. In addition, some hybrid populations possessed some original band traits. Nei (1972)'s genetic variation was identified between 0.14 and 0.32, Shannon index changed from 0.17 to 0.49 and the percentage of polymorphic locus varied from 28 to 94%. Molecular variation analysis (AMOVA) showed that there was a 25 % variance among the populations. Genetic variation (H) has the value between 0.11-0.32 per as Nei (1972). The UPGMA tree dendrogram was figured out to compare genetic identity and genetic diversity as per Nei (1987). The hybrid population has the highest degree of genetic variation in all populations; however, the hybrids have the lowest pollen fertility.

Acknowledgements: The authors wish to thank Research Projects Unit of Erciyes University for the support of this project under grant no FBY-09-1028.

Keywords: Genetic variation, diversity, *P. physocalyx*, *P. oppositiflora*, Endemic.

ORAL-PLTBIO-OP103

Anticancer Activity and Phenolic Profile of *Ganoderma resinaceum* Boud.Mehmet Emin DURU¹, Selçuk KÜÇÜKAYDIN¹, Gülsen TEL ÇAYAN¹, Aziz TÜRKÖĞLU²¹Muğla Sıtkı Koçman University, Faculty of Science, Department of Chemistry
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Aim of the study: It is known that the usage of mushrooms as therapeutic agents is not new. In the old times, they are used by the local people as food as well as medicines, particularly in the Asian countries such as, China, Japan, Korea as well as in some part of Africa. Nowadays, mushrooms are used in medicine, pharmacy, food, and fermentation fields, as well. Particularly, mushrooms are mostly used as therapeutic agents besides their nutritional properties. Generally, mushrooms are thought that they are natural foods and are produced or naturally grown all over the world. Cancer is a substantial health threat in all over the world, and the biggest cause of death in peoples of various age groups. The literature survey shows that the mushrooms have been used particularly for their anticancer and immunomodulatory activities. In this study, anticancer activity (against PC-3 and HeLa cancer cell lines) and phenolic profiles of *Ganoderma resinaceum* was analyzed.

Material and Methods: *G. resinaceum* is a basidiomycete fungus belonging to the order Polyporales and the family Ganodermataceae. *G. resinaceum* was collected in January 2015 from Fethiye (Muğla), in the South-western part of Turkey. *G. resinaceum* was identified by Professor Aziz Türkoğlu. Voucher specimens were deposited in the Herbarium of Department of Biology, Muğla Sıtkı Kocman University. Dried mushroom samples was extracted by hexane and methanol respectively. The anticancer activity screening of the extract was performed using PC-3 (prostate), and HeLa (cervical) human tumor cell lines. The phenolic profile was determined according to the method of Barros et al. (2009) with slight modification.

Results: The hexane extract of *G. resinaceum* exhibited anticancer activity (PC-3 an HeLa cell lines) with IC₅₀ of 15.54 and 38,35 µg/mL, respectively. The methanol extracts of *G. resinaceum* exhibited anticancer activity (PC-3 and HeLa cell lines) with IC₅₀ of 4,17 and 100 µg/mL, respectively. Sixteen phenolic and organic acids i.e. gallic acid, fumaric acid, protocatecheuic acid, catechin hydrate, p-hydroxybenzoic acid, 6,7-dihydroxy coumarin, caffeic acid, vanillin, 2,4-dihydroxy benzoic acid, p-coumaric acid, ferulic acid, coumarin, trans-2-hydroxycinnamic acid, ellagic acid, rosmarinic acid and trans-cinnamic acid were analysed. Fumaric acid was found as major organic acid in *G. resinaceum* (2.73 µg/g).

Acknowledgements: This study is supported by a grant (114Z550) from The Scientific and Technological Research Council of Turkey (TÜBİTAK).

Keywords: *Ganoderma resinaceum*, Anticancer activity, PC-3 cell line, HeLa cell line, Phenolic contents

ORAL-PLTBIO-OP104

Study and Collection Onion (*Allium cepa* L.) GermplasmNesrin HUSEYNZADE¹, Zeynal AKPAROV²¹Research Institute of Vegetable-growing, Baku Azerbaijan²Head of the Genetic Resources Institute of ANASh-nesli@mail.ru

Aim of the study: This study is about the spread, usefulness, gather and learn of different (local and foreign) sorts of onion (*Allium cepa* L.). Currently, local and introduced varieties of onion (*Allium cepa* L.) are widely cultivated various regions of Azerbaijan (Absheron, Hovsan, Khachmaz, Ganja, Barda, Lankaran, Masalli, Astara and Nakhichevan, etc.). There is a need to meet the people onion demand and develop more productive and high-quality varieties. Suitable to resolve this issue with the participation of foreign-introduced varieties.

Material and Methods: Research materials are 1 local (Sabir) and 4 foreign originating (Purple onion-Turkey, Valanciana-Turkey, Karatalskiy-Uzbekistan, Red Baron-Holland) sorts. Local Sabir sort is cultivated in practice field and regional experience stations of institute. In order to do practical work in time and in high quality, the practice fields were chosen, plowed, harrowed in advance, planting lines and irrigation ditches were opened. Phenological observations were made after complete growth of plants. During research agrotechnical works were done for example, cleaning lines and plant breaks, filling the bottoms of plants with fine soil and watering them, and after watering to soften the bottoms of pants. Line breaks were fertilized and weed control was done.

Results: As result, Sabir and Purple onions originated from Turkey and Valanciana respectively are in the first place for all characteristics among 1 local (Sabir) and 4 foreign originating (Purple onion, Valanciana, Karatalskiy and Red Baron) sorts. Development of onion (*Allium cepa* L.) year by year, cultivation of local and foreign originating sorts and gaining high results from them require much attention.

Keywords: sort, local, regional, agrotechnical, phonological, fertilizers.

ORAL-PLTBIO-OP105

ISSR-PCR Optimisation for Genus *Rubus* Subsection *Glandulosi*(Rosaceae)

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Aim of the study: Genus *Rubus*(Rosaceae) has 9 species in Turkey and distributed widely. Subsection *Glandulosi* has 3 species but 4 taxa, these are *Rubus caucasicus*, *R. tereticaulis* and *R. hirtus* (*R. platyphyllos*). Inter simple sequence repeats (ISSR) have been widely used to research genetic relationships. In this study, ISSR protocol was optimized for subsection *Glandulosi* based on concentrations of primer, $MgCl_2$, dNTP, template DNA and suitable ISSR primers were determined.

Material and Methods: The fresh leaves were placed in plastic bags containing silica gel and transferred to the laboratory. One individual from each locality was randomly selected to ISSR-PCR optimisation. Genomic DNA was isolated using the CTAB method. The quantity and quality of DNA were determined by using a Nanodrop spectrophotometer and agarose gel electrophoresis. DNA samples were diluted to 2.5 ng/ μ L and stored at $-20^\circ C$ until PCR analyses. 25 ISSR primers were initially screened with different concentration of $MgCl_2$ (1-3 mM), template DNA (2-10 ng), dNTP (2.5-10 mM) ve ISSR primers (2.5-10 μ M). PCR reactions were performed in a final volume of 25 μ L and conducted in ABI gradient thermocycler using the following thermal profile: 3 min of predenaturation at $94^\circ C$, 40 cycles of 45 s at $94^\circ C$, 45 s at the annealing temperature of $50^\circ C$ to $64^\circ C$ depending on the ISSR primers, 1 min at $72^\circ C$, with a final extension at $72^\circ C$ for 5 min. The amplification products were separated on 1.4 % agarose gel containing EtBr at 90V for 70 min and digitally photographed.

Results: ISSR primer optimization is a procedure that needs to be repeated for each different plant species. In this study, among 25 ISSR primers tested, 5 of them produced faint or no polymorphic bands and 10 primers produced no bands. Rest of 10 primers produced clear and reproducible fragments: GAG-(CAA)₅, VHV-(GT)₇G, (AC)₈YT, (AG)₈T, (AG)₈C, (AC)₈C, (AGC)₆G, (AGC)₆C, BDB-(ACA)₅, (AG)₈YT. For PCR amplifications, the satisfactory results were obtained by using 2.0 mM $MgCl_2$, 2.0 μ M primer, 8 mM of dNTPs (2 mM each) and 4 ng template DNA. In conclusion, this study is the first molecular-based study for species of *Glandulosi* subsection. Optimized ISSR-PCR protocols can be easily applied in further studies concerning genetic relationships of these taxonomically complex species.

Acknowledgement: This study was supported by Anadolu University Scientific Research Found (Project No: 1001F04).

Keywords: ISSR-PCR optimisation, *Rubus*, *Glandulosi*, Genetic relationship, Turkey.

ORAL-PLTBIO-OP106

Study of biodiversity of perspective ornamental plants for creating compositions in AbsheronTofik MAMMADOV¹, Shalala GULMAMADOVA²^{1,2}*Institute of Dendrology NAS of Azerbaijan
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Aim of the study: There are described results of scientific research works on determining works of most introduced, perspective, trees and shrubs from local flora and plants from foreign countries in using of creating different compositions in Absheron. Also there are studied their biological and ecological features. In Institute of Dendrology NAS of Azerbaijan has studied research works at first time the scientific bases of floral compositions and their ornamental use in climate conditions of Absheron. During landscape composition creations has used 2 styles: regular and landscape styles. There are recommended for use in parks, squares, in various composition creations ornamental plants in Absheron.

Materials and Methods: The research objects are different species and genus of ornamental trees, shrubs and herbaceous plants. Morphological features of vegetative organs have been studied by method I.T.Vasilchenko and I.Q.Serebryakov, and morphology of roots system by method V.A.Kolesnikov. There are collected many plants in Institute of Dendrology from round the world. Greenhouse stocks in Institute of Dendrology are a living museum of tropical and subtropical plants. There are scientifically studied biocological features and their use in landscape architecture of subtropical and tropical plants in greenhouses. Some of designed landscape compositions have been shown in article's figures. We have used 2 styles of composition structures: regular in form of geometric shapes or landscape. In compositions of the regular style are created different geometrical shapes, such as "Square", "Rhomb", "Circle", "Star", but in landscape style - the original form of the compositions, such as "Flowers", "Buta", "Map of Azerbaijan", etc. These plants are hyacinth, tulip, narcissus, gladiolus, crocus and etc. Bulbous and tuberous plants are differed of high decorative quality, beautiful, fast flowering and are used in design of flower-gardens. In the research work has studied biological and ecological features of bulbous and tuberous plants and there has used in the creation of compositions.

Results: By research works held in Institute of Dendrology and its scientific bases of floral compositions are determined in conditions of Absheron climate their decorative quality uses, flowering time and their resistance to environmental factors. It was found, that introduced from different countries and from local flora ornamental trees, shrubs and herbaceous plants has been well adapted in Absheron climate. They are also prospectively and there are recommended for use in a various composition's creation of parks and gardens design in Absheron. As results of research-scientific works are defined the most perspective ornamental plants used in contemporary creating the compositions in Absheron greening: about 25 genus of trees and shrubs plants, about 25 genus of herbaceous plants. There is determined growth of 87 families, 230 genus, 660 species of woody-shrub plants recently in Absheron and in close areas in natural and cultural condition. The higher taxa indicators of introducent are following: to gymnosperm 71 species, to angiosperm 589 species. Studied woody-shrub species and herbaceous introducents are perspective plants for use in different sectors of economy. The growth phases of plants used currently in greening are going normal.

Keywords: biodiversity, perspective, decorative, plants, composition

ORAL-PLTBIO-OP107

Pollen morphology of *Cheirolepis* (Boiss.) O. Hoffm. section of *Centaurea* L. (Asteraceae) in TurkeyBurcu YILMAZ ÇITAK¹, Hüseyin DURAL¹, Tuna UYSAL¹, Nur Münevver PINAR²¹Department of Biology, Faculty of Science, Selcuk University, Turkey² Department of Biology, Faculty of Science, Ankara University, Turkeyburcuyilmaz@selcuk.edu.tr

Aim of the study: This study includes a detailed pollen morphological analysis of seventeen taxa of *Cheirolepis* section of *Centaurea* genus.

Material and Methods: The plant materials were collected from several localities for *Cheirolepis* section. All of the specimens that used this research were stored in KNYA herbarium. Wodehouse technique (1935) was used for light microscopic investigations. In this technique pollen grains were obtained from mature anthers and then were stained with glycerin-jelly with safranin, and were covered by coverslip. Pollen slides were photographed with Olympus light microscope. Measurements were based on 30 or more pollen grains per specimen. For scanning electron microscopy (SEM) studies, dried pollen grains directly were transferred on aluminium stubs and coated with gold in a Cressington Auto 108 sputter-coater. They were photographed with ZEISS EVO LS10 SEM at Advanced Technology Research and Application Center, Selcuk University, Konya. The determined qualitative and quantitative characters were scored for numerical analysis with PRIMER7 programme.

Results: The pollen grains of *Cheirolepis* section are radially symmetrical and isopolar. Pollen grains are mainly tricolporate. Pollen shape of species is variable from oblate-spheroidal to prolate with the polar axes 31.5-45 µm and equatorial axes 27.4-46.3 µm. Scabrate-perforate ornamentation is observed in taxa. Colpus length (clg) is variable among species 37.2-20.7 µm, colpus width is 4-10.2 µm. Porus length (plg) changes between 5.7-12.5 µm, porus width is variable 5-14 µm. Studied pollen taxa have apocolpium changing dimensions between 19.5-37 µm. The amb shape is subtriangular and changes between 3-34 µm. Intine and endexine have similar thickness in taxa. Taxa have distinct costae and its thickness changes between 2-3.4 µm. *C. deflexa*, *C. sericea* and *C. ensiformis* have cavea which is more evolved pollen character according to Wagentiz's study. Pollen shape, the numbers of spine, presence/absence of cavea have been observed as essential pollen morphological characters for discriminating species. Principal component analysis was performed and obtaining dendrogram was showed similarity of the examined taxa of *Cheirolepis* section.

Acknowledgements: We wish to thank the Selçuk University Scientific Research Unit for its financial support (Project No: 15101010).

Keywords: Asteraceae, *Centaurea*, *Cheirolepis*, Pollen

ORAL-PLTBIO-OP108

Ascomycota Biodiversity of Gaziantep Province (Turkey)

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Aim of the study: This study aims to make a contribution to the mycobiota of Turkey by determining the ascomycetous macrofungal biodiversity of Gaziantep province (Turkey).

Material and Methods: Ascomycetous macrofungi samples were collected from suitable habitats within the boundaries of Gaziantep province between 2013 and 2015. Necessary morphological and ecological characteristics of the samples were recorded and they were photographed in their natural habitats. Then the samples were taken to the fungarium for further investigations. Microstructural data was obtained by using a Nikon Eclipse Ci trinocular light microscope and some reagents such as distillate water, Congo-red, Meltzer's reagent etc. were used during microscopical investigations. Comparing the obtained data with literature, the samples were identified. The specimens were deposited at Karamanoğlu Mehmetbey University, Kâmil Özdağ Science Faculty, Department of Biology.

Results: Hundred and forty seven ascomycetous macrofungi taxa belonging to 5 classes, 9 orders, 25 families and 75 genera were identified. According to the literature, 8 of the determined taxa are edible, 135 are inedible and 2 are more or less poisonous. Among the edible taxa, 3 are collected and consumed by local public. Eighty nine of the identified taxa are recorded for the first time from Turkey. Two of them are new at family level, 31 are new at genus level, and the remaining 56 are new at species level.

Acknowledgements: The authors would like to thank TÜBİTAK 212T112 for supporting this project financially.

Keywords: Biodiversity, macrofungi, Gaziantep, Turkey.

ORAL-PLTBIO-OP109

Anatomical Responses of *Salicornia prostrata* (Amaranthaceae) to Salinity StressAdnan AKÇİN¹, Erkan YALÇIN²¹ Department of Crop and Animal Production, Programme of Seeding, Suluova Vocational School, Amasya University, Suluova, Amasya, Turkey.² Department of Biology, Faculty of Art and Science, Ondokuz Mayıs University, Samsun, Turkey
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Aim of the study: In this study, we examined the effects of salinity on root and stem anatomy of *S. prostrata* Pall. with increasing salt levels. The main objective of this study was to evaluate anatomical adaptation mechanisms of halophytic species to different salinity levels and to better understand the effects on the anatomical characters of salt stress.

Material and methods: Soil samples were taken from different localities of the Kızılırmak Delta, Samsun, Turkey during the year 2011. EC meter (electrical conductivity meter) was used to determine the electrical conductivity in the soil extract. In the study area, three different salinity levels were determined and were collected populations of *S. prostrata* from the low (EC 2.0-4.2 dSm⁻¹), moderate (EC 9.3-10.7 dSm⁻¹) and high saline soils (EC 18.4-26.2 dSm⁻¹). For the anatomical studies, transverse sections of root, succulent stem and surface sections of stem were made. The microscopic observations and the obtained images were photographed using a Nikon Coolpix P5100 digital camera. Image-J program was used to measure of various cells and tissues on the figures. The data were subjected to statistical analyses (ANOVA) using the computer program.

Results: The obtained results showed that root anatomical characters as thickness of periderm, the diameter of aeriferous cavities in cortex and the number of xylem vessels increased with the rise in salinity levels. There was a decrease in diameter of xylem vessels with increasing salt levels. Increasing salinity resulted in a significant increase in thickness of palisade tissue and water storage tissue in succulent stem. However, stomatal index was reduced significantly with salinity.

Acknowledgements: This work was financially supported by Ondokuz Mayıs University Scientific Projects Research Fund (Project No: PYO. FEN. 1904.11.022)

Keywords: *Salicornia prostrata*, salinity, anatomy, halophyte.

ORAL-PLTBIO-OP110

Effects of Salinity on Anatomical Characters of *Suaeda prostrata* subsp. *prostrata* (Amaranthaceae)Adnan AKÇİN¹, Erkan YALÇIN²¹ Department of Crop and Animal Production, Programme of Seeding, Suluova Vocational School, Amasya University, Suluova, Amasya, Turkey.² Department of Biology, Faculty of Art and Science, Ondokuz Mayıs University, Samsun, Turkey
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Aim of the study: The aim of this study was to investigate the effects of salinity stress on root, stem and leaf anatomy of *Suaeda prostrata* Pall. subsp. *prostrata* from saline soils. This study was determined the role of the anatomical characters in the adaptation mechanism of this halophytic plant against salt.

Material and methods: Samples of the plants and soil were collected from Kızılırmak delta, Samsun, Turkey on June 2011. The electrical conductivity (EC) of the soil samples were determined using an EC meter. Three main salinity levels (low, moderate, high) were defined in the study area. Plant samples were collected from these three locations. Cross sections of the root, stem and leaf and the surface sections of the leaf were performed using a light microscope. The observations and micrographs were made with a digital camera (Nikon Coolpix P5100). Anatomical characteristics recorded for root, stem and leaf by an Image-J program. A one-way ANOVA was achieved to compare the mean values using the SPSS package.

Results: A significant reduction in the thickness of periderm and diameter of xylem vessels on root was observed at the high salinity. In contrast, the thickness of cortex and the number of xylem vessels on stem were increased significantly with the increase in salt concentrations. In *S. prostrata* subsp. *prostrata* leaves, salt stress resulted in a significant increase at the palisade parenchyma thickness. However, we observed a substantial increased stomatal dimensions and stomatal index with increasing salt stress.

Acknowledgements: This work was financially supported by Ondokuz Mayıs University Scientific Projects Research Fund (Project No: PYO. FEN. 1904.11.022)

Keywords: *Suaeda prostrata* subsp. *prostrata*, salinity stress, anatomical modifications, halophyte.

ORAL-PLTBIO-OP111

The Research of Morphophysiological Changes in Wheat Genotypes from the Influence of Drought Stress FactorsTamraz TAMRAZOV¹, Javanshir TALAI², Atif ZAMANOV³¹Dept. of Plant Physiology and Biotech., Research Institute of Crop Husbandry, Azerbaijan²Dept. of Plant Physiology and Biotech., Research Institute of Crop Husbandry, Azerbaijan³Dept. of Plant Physiology and Biotech., Research Institute of Crop Husbandry, Azerbaijan
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Aim of the study: The aim of the research work is conducting researching of different physiological parameters with modern and innovative methods in various phases of vegetation in durum and aestivum wheat genotypes which differ for the duration of the ripening from the impact of the drought in accordance to different land and climate conditions of the Republic. The base of this research work consists of selection of more sustainable and productive wheat genotypes in accordance with different regions for further expansion of sown area and giving different contributions about increasing of grain production.

Material and Methods: The main purpose in conducting of the study is choosing have different characteristics and ripening periods morphophysiological with different genotypes of high-yielding and drought-resistant forms of stress factors, choosing to prepare recommendations for the use as initial material selection. As the object of study, 12 wheat genotypes were used including 4 genotypes especially in each group differing according to the duration of ripening. The experiments were carried out in 2 versions: 1) the optimal watering conditions (irrigated), 2) non-irrigated; variant. The stomata become closed according to the decrease of turgor pressure in leaves and water potential, to the high deficit of water pressure in atmosphere in drought conditions. 1. Genotypes early ripe of wheat grades (Garagylchyg-2, Alinja-84, Nurlu-99 and Gobustan), 2. Genotypes average ripe of wheat grades (Vugar, Giymatli-2/17, Azametli-95, Guneshli), 3. Genotypes late ripe of wheat grades (Baraketli95, Tartar, Gyrgyzgul1, Tale-38). Given in manuscript physiological parameters were measured during grain formation stage. Photosynthesis rate ($P_n - \mu \text{ mol CO}_2 \text{ m}^{-2} \text{ S}^{-1}$), stomatal conductance ($g_s - \text{mol H}_2\text{O m}^{-2} \text{ S}^{-1}$), intercellular CO₂ concentration ($C_i - (\mu \text{ mol CO}_2 \text{ mol}^{-1})$), transpiration rate ($T_r (\text{mol H}_2\text{O m}^{-2} \text{ s}^{-1})$). The main physiological parameters of various durum and bread wheat genotypes studied were learned by using a Portable photosynthesis System LI-6400 XT (LI-COR Biosciences, Lincoln, NE, USA).

Results: The measurements were carried out basically on two, seventh and eighth circles of a sheet body of a plant. As a beginning of the vegetative of process 7-th and 8-th sheet in the durum wheat of Garagylchyg-2 P_n -31: 9%, G_s -34:16%, C_i -20: 3%, T_r -36:34%, but in the genotype of Alinja-84 P_n -32: 21%, G_s -34:18%, C_i -20: 8% , T_r -29: 26% was in the rate. Genotypes average ripe of wheat grades Vugar beginning period of vegetation P_n -15; 21%, G_s -12;23%; C_i -42; 40%; T_r -20; 9,1%. Other bread wheat varieties Azametli-95, P_n -22%; 31%; G_s -17; 9%; C_i -12; 9%; T_r -12,5; 20%. On the basis of given for the characteristic of group it is possible to note, that in comparison with early grades here between variants on several parameters was large. As dynamics changes of physiological parameters at late grades on a phase of sprouts at a firm grade Baraketli-95, P_n -18;14%, G_s -11; 3%; C_i -48; 42%; T_r -18; 10%, bread wheat Gyrgyzgul 1- P_n -47; 28%, G_s -36; 34%; C_i -1; 11%, T_r -14; 27%. One of the physiological processes in plants is the photosynthesis price affecting the formation of the product. The price of photosynthesis depends on many external and internal factors affect.

Keywords: Wheat varieties, bread wheat, stress factors, physiological parameters, drought resistance, transpiration rate.

ORAL-PLTBIO-OP112

Studying the acclimatization and agricultural peculiarities of early species of tangerine introduced from Japan in condition of AdjaraRezo Kh. JABNIDZE¹, Nato V. JABNIDZE², Gocha Th. BERIDZE³¹*Batumi Shota Rustaveli State University, Georgia*²*Batumi Shota Rustaveli State University, Georgia*³*Ministry of Agriculture of Ajara, Georgia**jabnidze.rezo@gmail.com*

The aim of the study: Phenological observations have been provided over 11 species of tangerines (Nichinani, lura-Vase, Taguchi Vase, Miagava Vase, Kavada, Nankani-20, Ohotsu Vase, Ueno Vase, Aoshima, Okitsu Vase, Mukaiama) introduced from Japan in 2010 on the experimental plot of DabaChakvi in Kobuleti Municipality. The studies showed that only three species of the abovementioned species of tangerines (Nichinani, lura-Vase, Taguchi Vase) belong to the super early species of tangerine according to their biological peculiarities and massive ripening period of fruits. They ripen 35-40 days earlier than any other basic industrial species (broad-leaved Unshiu), their fructification period is long and they are characterized with high productivity and better quality of fruit. Citrus in Georgia was imported from China and Japan in 1880s. The first plantations were cultivated in DabaChakvi. Only some of the species of tangerine adapted to the local soil and climatic conditions, and especially the tangerine Unshiu (imported in 1886 by the expedition of the professor Krasnov and an agronomist Klingen), one of the flaws of which is considered to be the ripening of fruits from the mid-November, which has negative influence on the durability of the plant and on the accumulation of protecting organic substances.

Materials and methods: The experiment was conducted on south-eastern slopes with 15-20 degree, where the plants are planted with 4x2,5 m feeding area, on the height of 20-25 m above the sea level. The soil under the experimental plants is red. We took 10 plants from each species and conducted experiments of 110 plants. All the experimental plants were numbered, labeled, and the data obtained as a result of observation were brought into a special register where all the data were recorded for each plant provided for phenological observations. We took photographs of both - fruit-bearing plants and the process of picking fruit. We took fruit from different expositions of the plant for studying its biochemical indicators. We determined the end of vegetation of the first and second growth on each species, the start of ripening fruit of the plant (height, stem, rootstock and scion diameters in cm.) and massive ripening of fruit, productivity (pieces, kg.), the average weight of one fruit (gr.), fruit coloring, the quality of skin removal off the pulp, the number of particles in the pulp, foliation, etc.

Results: The species of tangerine introduced from Japan revealed almost the same peculiarities in our conditions as in their homeland. The following three species are to be particularly distinguished: Nichinani, lura Vase and Taguchi Vase. Their fruit started to ripen in the 1 decade of September and massive ripening of fruit – in the end of September and in the beginning of October. Harvest is satisfactory. The average weight of one fruit ranges from 50 to 80 gram. The number of particles in pulps is 10-11. The species lura Vase is distinguished with higher sugar content. Ascorbic acid is normal in the fruit but its negative feature is thin skin which is very difficult to remove from the pulp (10). As for the fruits of Miagama Vase, Kavada, Nankani 20, Ueno Vase and Okitsu Vase, they are ripe in the third decade of October and are distinguished with their high quality marketability (schedule 1).

Keywords: Tangerine, acclimatization, species, introduction.

ORAL-PLTBIO-OP113

Stevia (*Stevia rebaudiana* Bertoni) culture in GeorgiaNana JABNIDZE¹, Suliko BERIDZE², Marina BAGRATIA³, R.H.KHALILOV⁴¹Batumi Shota Rustaveli University, Georgia²Deputy of Minister of Ajaria³Batumi Shota Rustaveli University, Georgia⁴Institute of Dendrology Azerbaijan National Academy of Sciences, Azerbaijan
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The aim of the study:The following tasks have been defined for achievement of this purpose:Studying of rooting of sprigs on the various substrata and their degree of establishment in the conditions of hothouses and an open ground;The results of studying and wintering of the quantity of spears, their growth-development in the vegetative period; Ascertainment of the phenological stages of growth - development of *Stevia*, its biometric features of vegetative and generative organs.The intensity of becoming of sprigs and the ability of regeneration against a background of various variants of gathering of green weight;Dependence of *Stevia* on the soil and climatic conditions;Studying of carbohydrates, vitamins and others biologically active compounds of *Stevia* leaves.

Material and Methods: Study of various methods of vegetative reproduction of *Stevia* have shown, that for rooting with success it is possible to use the half wooden, as alar as top gentle sprigs in length of 5-8 cm with 2-4 leaves. It is possible to reproduce by dividing of shrubs and cutting of stalks.Rooting of sprigs is made on the preliminary prepared beds where landed as alar as top sprigs of *Stevia* by length 5-8 cm with 2-4 leaves with distance 5-6 cm, on depth 2,5-3. Plants were watered, necessarily. For rooting of springs maintained the temperature with 20-23 degrees, at comparative humidity of air with 90-95 percent;The rooting of springs normally proceeded in the conditions of maintenance of temperature and humidity. On the slice of stalk it was formed the small roots for 7-8 days, and for 15-18 day they are already ready for relocation on a constant place. By this time at saplings are already developed 3-6 steams of leaves, height of 15-20 cm and have well developed 8-12 roots in length of 5-8 cm;It is established by our experiment, that for cultivation of *Stevia* in wide industrial scale the rooting method of the gentle springs in the hothouses, the hotbeds, an open ground on a substratum from a mix of sand with river silt and virgin land in the ratio 1:1 at which as a result of rooting of springs it is received 76-90 percent of standard saplings and it is necessary 40-50 thousand pieces of saplings for recalculation on the hectare;We studied carbohydrates in leaves of cultivated *Stevia* in Georgia. The glucose, arabinose and raminosa are identified, the maintenance of monosaccharide is 0,5-1 %, cellulose basically meets from polysaccharide to 10 percent;It is established, that the glycosides are located non-uniformly in various parts of *stevia*.

Results:Results of biotechnical research of leaves of *Stevia* allow asserting, that these new unconventional raw materials for our country should be used for manufacturing of foodstuff and half-finished products with high food indicators.The conclusions received by the result of studied questions, give us the basis, to recommend the distribution of *Stevia* in areas of a subtropical zone of Georgia. For this purpose it is necessary to equip the special hothouses and to develop the measures of raising the level of crop yield, the processing and uses of the received production that will promote the increasing of financially-economic level the population.Withal, the use of agricultural holdings becomes more rational due to cultivation of the alien cultures of *Stevia* in Georgia. Studying of the raw materials of *Stevia* and productions received from it will allow to use raw materials more effectively, besides as much as possible keeping biologically active substances that has the big practical value at an increasing demand for raw materials of *Stevia* and maintenance of the industry with it.

Keywords:Stevia,Georgia, culture, leaves, sweet, agricultural-biological.

ORAL-PLTBIO-OP114

Research of heat resistance of Azerbaijan rare trees and shrubs in Absheron conditionElman ISGENDER¹, Gulnara BAGIROVA², Rauf ABBASOV³¹Central Botanical Garden of ANAS, Azerbaijan²Baku State University, Azerbaijan³Azerbaijan Agrar University, Azerbaijanacae55@hotmail.com

Aim of the study: Plants are in impacts of physical, chemical, biological factors depending on variable living conditions features. These impacts could be direct or indirect. Impacts could reduce of types of species, diminish of areals, have negative influences on propagation and other development features. There are recently carried out an important researches on the plant species known in world flora, especially in protection of endemic species grown in narrow areas. There are studied impacts of ecological factors on plants and determination of reasons of disappearance and diminishing of areas of rare and endangered trees and shrubs. Nevertheless there are defined by latest researches that rare trees and shrubs species in Azerbaijan flora have been increased. According to climate changes are observed acute high temperatures in summer months in research areas. Our research objects was study main affects on their growth development, diminishing of rare plants areas during climate changes periods.

Materials and methods: As research material were taken out distributed in Azerbaijan flora 19 families, 24 genuses, 27 species of rare and endangered trees and shrubs. Research works are carried in ex situ condition. Phenological observations on the study of plants are taken out by Q.N.Zaytsev (1981), growth and development by V.V.Smironov (1964) A.A.Molchanov and V.V.Smironov (1967), the classification of plants by Classification USDA Plants və APG III (2009) system. There are used the methods of K.A.Axmatov(1972) by the study of heat resistance of plants. Also there are used thermos bottles in study of heat resistance of plants organs as research subject. By research work carried out during in period of in most heat 3 days of July month measured by thermometer heat changes in the lower, middle and upper parts of plants growth.

Results: There are determined that in terrestrial parts of soil heat is changed depending on species between 25-33⁰C. Iso there are defined that heat degree changed from the surface of soil to the top of plants in less of 5-10⁰C. In Ex situ condition researched plants have showed that some plants species in *Parrotia persica*, *Alnus subcordata*, *Populus hyrcana*, *Corylus colurna*, *Albizia julibrissin*, *Pterocarya pterocarpa*, *Castanea sativa*, *Euonymus velutina*, *Pyrus grossheimi*, *Pyrus hyrcana* et.c. are observed withering, falling of leaves, scorch. Scorch begins at first from leaf side, after some time moves towards to the middle of the leaf and cover the entire leaf petioles and eventually leaves dumped. In connection with a reduction in temperature occurs in plants coming again in leaf. As a result of experiments conducted in the study they are divided into 3 groups according to the leaves of plants and heat resistance.

1. More resistant (54-56⁰C) – *Buxus hyrcana*, *Euonymus velutina*, *Pyracantha coccinea*, *Populus hyrcana*, *Zelkova carpinifolia* et.c;

2. Medium resistant (52⁰C) – *Corylus colurna*, *Cotoneaster saxatilis*, *Celtis taurnefortii*, *Diospyros lotus*, *Gleditsia caspica*, *Parrotia persica*, *Pyrus hyrcana*, , *Pterocarya pterocarpa*, *Quercus castaneifolia* et.c.;

3. Low resistant (48-50⁰C) – *Albizia julibrissin*, *Alnus subcordata*, *Hedera pastuchowii* et.c.

By the results of the study is concluded that the heat is not the main factor in reduction of plants natural habitats.

Keywords: ex situ, rare species, tree-shrubs species, heat resistance.

ORAL-PLTBIO-OP115

Assessment of fruit and some biochemical characteristics of almond genotypes selected from natural populations of Kayseri province

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Aim of the study: In this study, we aimed to show fruit and some biochemical characteristics of almond genotypes selected from natural populations of Kayseri province.

Material and Methods: Single or small almond tree populations located around Alidağı north of Erciyes Mountain and south of Kayseri city center, Haymana Baglari, Hisarcik Valley, Talas Tablakaya, Begendik Baglari, Sakar Çiftligi, mountainous sections around Kayseri Organized Industrial Region and Yılanlidag regions were used as the plant material of the present study. A total of 480 almond trees were evaluated and 34 of them were selected with regard to blooming, yield and fruit characteristics. Yield levels were assessed through a scale. Fruit weight, fruit length, fruit width, fruit height, kernel taste, double kernel and fruit shape of selected genotypes were analyzed. Among the biochemical characteristics, crude oil and protein ratios were determined in accordance with Aslantas (1993). Statistical analyses were performed, differences among selected genotypes were put forth and ultimately superior ones were identified.

Results: Variations were observed among genotypes with regard to investigated traits. Of the selected almond genotypes, 19 were identified as high yield, 11 as medium yield and 4 as low yield. Fruit weights varied between 1.51 – 7.64 g and significant variations were observed in fruit weights of the genotypes. Significant differences were also observed in fruit dimensions of the genotypes. Fruit lengths varied between 4.74 - 19.90 mm, fruit heights between 17.37 – 10.29 mm and fruit widths between 27.62 – 11.79 mm. With regard to fruit shape of the genotypes, 13 were long oval, 12 were elliptical, 5 were hearth-shaped and 4 were round shaped. With regard to kernel color, 6 had light, 19 medium and 9 had dark color kernels. Considering the taste of kernels, 9 had bitter taste and 25 had sweet taste. Protein ratios of almond genotypes varied between 54.87 - 42.13% and crude oil ratios varied between 24.58 - 17.71%.

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Keywords: diversity, fruit breeding, genetic resources, *Prunus amygdalus*.

ORAL-PLTBIO-OP116

An Important Eurasian genus: *Scutellaria* L.Ersin MİNARECİ¹, Sinem PEKÖNÜR¹¹Faculty of Science and Letters, Department of Biology, Celal Bayar University, Turkey,
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Aim of the study: *Scutellaria* is found on every continent except for Antarctica. Especially it is found in Eurasia which has rich areas with the most species. The genus has been used medicinally for its anxiolytic, anti-inflammatory and analgesic properties. Some species in the genus have ability to inhibit cancer cell growth and have a great potential as ornamentals. Some countries grow *Scutellaria* species in the field. But in Eurasian, cultivation for crop production hasn't been worked on yet. The objective of this study is to focus on the importance of this genus. *Scutellaria* species need to be set a value upon and evaluated.

Material and Methods: Geographical distribution of the taxa belonging to the genus *Scutellaria* was obtained from online databases and atlases mainly based on their localities taken from Floras and literatures. The herbarium specimen's data were collected in order to clarify spreading limits of the taxa. The number of present taxa was determined through making a list of *Scutellaria* distributed all over the world. The ranges of distribution, Phyto-geographic region, the danger categories of the endemic taxa belong to the genus have been revised from the literatures. Uses in alternative medicine, bioactive compounds and medical studies were investigated from the literatures. Bioactive compounds of anticancer species were determined. Some articles about cultivated species were examined. The characteristics of cultivated *Scutellaria* species as an ornamental were identified. The taxa used for a folk medicine were investigated in order to learn how it is used.

Results: The literatures about *Scutellaria* show that some species have been used for thousands of years in Chinese medicine for a variety of ailments. Currently, a total of 35 species have been studied and nearly 300 compounds have been identified. The genus *Scutellaria* is rich in flavonoids and diterpenoids. *Scutellaria* active principles possess a wide range of pharmacological actions, such as antitumor, anti-angiogenesis, hepatoprotective, antioxidant, anticonvulsant, antibacterial, antiviral activities and cancer cell inhibition. According to researches, genus *Scutellaria* is a cosmopolitan plant as they can live in very different kind of habitats. In conclusion we suggest that these species should be cultivated. Actually some countries such as the US and China achieved cultivation of this genus and they grow some species of *Scutellaria* as a crop production and ornamentals. In Eurasia where Turkey is also situated, *Scutellaria* species can be cultivated so as to gain economic and ecological benefits. Even though the wild populations of *Scutellaria* is widely distributed in the world, some of these species are becoming rare or threatened with population pressure, environmental pollution, and destruction of their natural habitat. Conservation by cultivation is an effective means for protecting genetic resources.

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Keywords: *Scutellaria*, Lamiaceae.

ORAL-PLTBIO-OP117

The phenolic compounds and fatty acids compositions of *Plagiomnium affine* (Blandow ex Funck) T.J. Kop. extractsAyse Sahin YAGLIOGLU¹, Serhat URSAVAS², Duygu GÜNEŞ¹, Muhammet OREN³¹Department of Chemistry, Faculty of Science, Cankiri Karatekin University, 18100 Cankiri, Turkey²Forest Engineering Department, Faculty of Forestry, Cankiri Karatekin University, 18200 Cankiri, Turkey³Department of Biology, Science and Art Faculty, Bülent Ecevit University, 67100 Zonguldak, Turkey
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Aim of the study: The plant secondary metabolites such as saturated and polyunsaturated fatty acids and phenolic compounds have some biological effects that are antiproliferative, antidiabetic, anti-inflammatory and antioxidant. However, according to our research there is no study on *Plagiomnium affine* (Blandow ex Funck) T.J. Kop. For this reason, in this study were investigated the secondary metabolites of *P. affine*.

Material and Methods: *P. affine* was collected from Sinop. The mosses were separated as aerial part and root. Then, the aerial parts were extracted with hexane, chloroform, ethyl acetate, n- butanol, methanol, respectively. The profiles of hexane and chloroform extracts were performed by GC-MS analysis. The quantitative phenolic components of the other extracts were analyzed by HPLC/TOF-MS.

Results: In the ethyl acetate extract of the aerial parts of *P. affine*, syringic acid and vanillic acid were obtained as main components. Naringin and syringic acid were major compounds in the n- butanol of the aerial part. In addition to, gentisic acid from the methanol extract of the mosses aerial parts was observed as main compound. The thirty-six components were determined from the hexane extract of the aerial parts of *P. affine*. Myristicin (55.96%) was main component in the extract. However, in the chloroform extract of the aerial parts of *P. affine* were observed fifty components. β -Selinene (19.43 %) and tetratriacontane (12.50%) were major components in the extract.

Keywords: *Plagiomnium affine* (Blandow ex Funck) T.J. Kop., phenolic compound, fatty acids, β -Selinene, Myristicin, Naringin.

ORAL-PLTBIO-OP118

Wild food plants traditionally consumed in the city of Mersin, TurkeySeyid Ahmet SARGIN¹, Selami SELVİ²¹Department of Science Education, Alanya Alaaddin Keykubat University, Turkey²Medicinal and Aromatical Plants Programme, Altınoluk Vocational School / Balıkesir University, Turkey
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Aim of the study: Turkey has the largest coastal area in the Mediterranean, possesses an extraordinarily rich flora, and a great traditional knowledge. Mersin province, located in the Southern part of Turkey is the research area, surrounded by the Taurus Mountains of North, and under the effects of the Mediterranean Floristic Region. The Taurus is one of the centers of the Mediterranean Region with rich plant diversity. In accordance with this purpose in this study, it is emphasized that the detection of wild plants consumed often by the indigenous people of the city of Mersin as traditional food, and the transfer of the ethnobotanical richness to future generations.

Material and Methods: In this study, attributes a review article, the ethnobotanical studies had been done by Abay and Kılıç, 2001; Akaydın et al., 2003; Everest and Öztürk, 2005; Sağıroğlu et al., 2013; Sargin, 2015; Sargin et al., 2015b on wild plants in Mersin and its surroundings are considered.

Results: 175 taxa were identified as wild plants in the study area belonging to 54 different families. Lamiaceae (23 taxa) were the most commonly consumed as food. It was followed by Asteraceae (14), Rosaceae (14), Orchidaceae (11), and Apiaceae (7), respectively. The herba (aerial portions), fruits and leaves were determined as the most favored parts about the plants. *Orchis* and *Sideritis* were the most represented genera with 5 species. *Rhus coriaria* and *Rosa canina* are among the most widely consumed wild plants in the area. Wild edible plants are consumed in a variety of ways. The most common type of consumption was in tea (%56), raw (%33), and spices (%29). In terms of ethnobotanical perspective, Mersin seems like staying valuable just because of the winding roads over the mountains and along the coast are very difficult to drive making the coastal districts of the city too far from large cities and mass tourism centres.

Keywords: Edible wild plants, Ethnobotany, Traditional consumption, Mediterranean, Southern Turkey

ORAL-PLTBIO-OP119

The Ultrastructural of Achene Surface in the Genus *Cyanus* Mill. (Asteraceae)Emrah ŞİRİN, Kuddisi ERTUĞRUL, Tuna UYSALDepartment of Biology, Science Faculty, Selçuk University, Konya, Turkey
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Aim of the study: The main aim of this study was to characterize the microsculpture of the achene surface of the Turkish species of the genus *Cyanus*.

Material and Methods: Plant materials of the genus *Cyanus* were collected between 2009-2015 years and stored in KNYA herbarium. Only two specimens (*C. cheiranthifolius* var. *purpurascens* and *C. pinardii*) were provided from herbarium materials. At least ten achenes for each species were dehydrated in alcohol series (70%, 80%, 96% and 100%) for SEM observations. Achenes were coated with gold under ZEISS EVO LS-10 model SEM high-vacuum mode for observing their surface at 30X, 1000X and 2000X.

Results: Micro- and macromorphological characteristics of achenes belonging to 20 taxa from Turkey were observed using scanning electron microscopy. Detailed descriptions of the achene surface were given for each taxon and a dendogram was established by numerical analyses derived from the observed micromorphological characteristics. *C. pinardii* was distinguished by being epappose and *C. depressus* is distinct by having longer pappus than achene. The results showed that the examined taxa had very high variations regarding their achene surface. According to the results, pericarp texture and color, hilum position and pappus hairs could be used for taxonomical diagnosis of the *Cyanus* species. The hairiness of the surface and eliosome in the basal of pericarp were characteristic in all *Cyanus* species.

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Keywords: Asteraceae, Achene morphology, SEM, Taxonomy.

ORAL-PLTBIO-OP120

Flora biodiversity of the ravines of the Kapaz mountainU.V.BAYRAMOVA¹, V.S.NOVRUZOV²^{1,2} *Ganja State University, Azerbaijan*
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Aim of the study: Formation of ravines is a complex process, which dictates the implementation of necessary irrigation/melioration and forestry programs to prevent the process. From the botanical perspective ravine ecosystems have not been studied. To this end, seriously affected by anthropogenic influences, as well as a network of specially protected natural territories (Goygol National Park) have been investigated in the biodiversity of flora ravines of Kapaz mountain system. Area has an uneven mountainous terrain, divided into 4 geomorphological regions. Kapaz mountain ravines considered as natural spurs and kept natural biodiversity, as well as specially protected natural territories can be considered as a future perspective.

Material and methods: The ravine ecosystem of Azerbaijan from botanical point of view has not been investigated up to now yet. It makes possible to determine the development trends of ravines by studying their vegetation. Ravine vegetation is also used as pasture and meadow. Ravines can also be considered as natural refugium which keeps natural vegetation. Therefore, the ravine can be viewed as a perspective element of specially protected natural territories. Finally, ravines turn into an active arena of vegetation sinanthropus that, ultimately, sinanthropus plant communities occur. It is essential to predict the further development of monitoring sinanthropus processes. For this purpose, here flora biodiversity of Kapaz mountain ravines were investigated. The research area covers Kapaz mountain systems in the North - Eastern part of the Lesser Caucasus. The route and stationary methods were used. Generally accepted phytosociological methods were used to describe plant communities. "Azerbaijan Flora", "The Review of Azerbaijan Flora" were used to name species involved in plant communities, as well as the "International Code of Botanical Nomenclature" was taken into account. The description and classification of ravine plants were carried out on the basis of dominant edaphic methods.

Results: One of the negative effects of humans' intensive economic activities is the formation of ravines due to the soil erosion. Ravines often create a huge space. As a result, the natural pastures, ravine systems of valuable arable land is becoming infertile. Formation of ravines is a complex process, which dictates the implementation of necessary irrigation/melioration and forestry programs to prevent the process. From the botanical perspective ravine ecosystems have not been studied. To this end, seriously affected by anthropogenic influences, as well as a network of specially protected natural territories (Goygol National Park) have been investigated in the biodiversity of flora ravines of Kapaz mountain system. Area has an uneven mountainous terrain, divided into 4 geomorphological regions. It is important to carry out afforestation in medium and large ravines. It is not advisable to carry out afforestation in 5-6 m. deep ravines, as well as in small ravines. Afforestation that's deeper than 5 m. should be carried out in installments and separately depending on the inclination of slope. It should be 50-60 cm. in order to determine the distance between the normal growth of forest plants. Water containing hydraulic engineering installations should be established and sowing should be carried out to reduce erosion processes in slopes. The north slopes are more profitable to sow seeds.

Keywords: Goygol National Park, formation, biodiversity, ecosystems.

ORAL-PLTBIO-OP121

A Phytosociological Investigation on the Macchie Vegetation of Bodrum (Muğla) Peninsula

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Aim of the study: The study area is within the boundary of Muğla city. The approximate size is 400 km². This investigation was carried out between 2011 and 2013 in order to research the vegetation of Bodrum (Muğla) Peninsula. In this study, our aim was to identify the macchie vegetation of Bodrum (Muğla) Peninsula.

Materials and Methods: Vegetation studies have been made according to the Braun-Blanquet method (Br.-Bl., 1932). In order to compare associations, we used Jaccard's index of similarity. For the definition of the plant associations, sample plots were taken from each plant formation, in adequate number and in suitable size. Consequently, the floristic compositions of the associations, and the dominance and constancy of the species were determined. In total, 44 sample plots were taken, and 4 plant associations and 1 subassociations were individuated by the analyses of these plots.

Results: Macchie vegetation is secondary vegetation that causes the destruction of *Pinus brutia* forest. This vegetation represented four plant associations, which belong to two orders. *Gageo graecae-Quercetum cocciferae* Aytepe & Varol ass.nova, which is classified as *Quercetalia ilicis*. The others are classified as *Pistacio lentisci-Rhamnetalia alatarni*. Associations and their higher syntaxa are as follows:

Quercetea ilicis Br.-Bl. 1952*Quercetalia ilicis* Br.-Bl. ex Molin. 1934*Gageo graecae -Quercetum cocciferae* Aytepe & Varol ass.nova*Pistacio lentisci-Rhamnetalia alatarni* Rivas Mart. 1975*Oleo sylvestris-Ceratonion siliquae* Braun-Blanq. ex Guin. & Drouineau 1944*Tordylio apuli-Phlomidetum lyciae* Aytepe & Varol ass.nova*Rubo sancti - Nerietum oleandri* Aytepe & Varol ass.nova*Pistacio lentisci-Oleetum europeae* var. *sylvestris* Aytepe & Varol ass.nova*juniperetosum phoenicae* Aytepe & Varol subass. nova

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Keywords: Bodrum, Macchie, Muğla, Peninsula, Phytosociology, Vegetation.

ORAL-PLTBIO-OP122

Floristic Features of *Pinus pinea* L. Forests in the north-west Region of Turkey (Yalova)

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Aim of the study: In the study, the aim was to assess the floristical structure of *P. pinea* L. forests which are naturally distributed in Yalova (Armutlu-Fıstıklı village) province.

Material and Methods: The materials of this investigation are comprised plant specimens collected (Yalova province) in the *Pinus pinea* L. forests during a vegetational study between 2003 and 2005. The majority of the specimens were identified by using the Flora of Turkey and the East Aegean Islands (Davis 1965-1985, Davis et al. 1988). In cases of uncertainty, Flora Europaea (Heywood and Tutin 1964-1981) were used as well. The plants are listed in the appendix according to Davis system (1965-1988). The plant specimens prepared for herbarium collection have been stored in the Department of Biology, Faculty of Science, Muğla Sıtkı Koçman University.

Results: This floristic study was carried out with approximately 370 plant specimens collected a period of three years. As a result of the identification of the plant specimens, 36 families, 115 genera, 147 taxon were determined. Seven of the collected taxa are endemic.

Acknowledgements: This study is a project of TÜBİTAK (Project Number-TOVAG 3160). I would like to thank to TÜBİTAK for financial support.

Keywords: Armutlu, Yalova, floristic composition, *Pinus pinea*, stone pine.

ORAL-PLTBIO-OP123

Floristic Biodiversity of City Hatay (Turkey)Atilla OCAK¹ Samim KAYIKÇI²¹ *Eskişehir Osmangazi University Biology Dept., Eskişehir*² *Nature, Art and Tourism Association of Antioch, Hatay
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Aim of the study: In this study we aimed mainly to present the rich plant biodiversity of the city of Hatay and evaluate this biodiversity and also to determine the negatory and unfavorable effects on the rich plant diversity. Hereby, we would be able to propose precautions, how to maintain and how to protect.

Material and Methods: It was organized several field surveys between 2000 and 2015 and obtained datas. The obtained datas were evaluated together with the datas which were obtained from the previous floristic studies performed in Hatay.

Results: Hatay, placed on the easter side of the Mediterranean Region, has an authentic value for our country because of it's rich biodiversity. As the result of the investigations; It has been observed that there are 2405 plant taxa, where 252 plants are endemic in this taxa. The location of Hatay is also important that it is the place where 143 species and 39 subspecies in total 182 plants taxa are gathered as type specimens. Many of the plant species have their names by Antakya (the other name of Hatay). More than 30 species have their names from mounts of Amanos. Around 20 species have their name from mount of Keldağ (Cassius). In Hatay there are 26 species and 31 subspecies in total 157 plants are endangered. 89 (73 species and 16 subspecies) of the endangered species are endemic. 5, 36, 21 and 27 of the endemic taxa are in the category of CR, EN, VU and DD respectively. 3, 54, and 11 of the non-endemic taxa are in the category of EN, VU and DD respectively. It's been ascertained that there are many anthropogenically unfavorable effects on the natural plant species such as; unplanned and casual housing, formation into the agricultural land, improper agricultural activitiy, improper mining, unpredicted and not sustainable overuse, polluting of the environment, soil erosion, over feeding of the animals in this areas. Its very critical that to reduce the unfavorable effects and to protect the natural habitat.

Acknowledgements: The authors acknowledge Lütfü Savaş, mayor of the Hatay metropolitan municipality fort supporting the study partly.

Keywords: Hatay, Endemic, Amanos, IUCN, Biodiversity.

ORAL-PLTBIO-OP124

Relation of Gypsiferous and Marl Soils with Vegetation in Eskişehir (Turkey)Derviş ÖZTÜRK¹, Okan SEZER², Onur KOYUNCU², Atila OCAK²¹ Eskişehir Osmangazi Üniversitesi Mahmudiye Atçılık Meslek Yüksekokulu, Eskişehir² Eskişehir Osmangazi Üniversitesi Biyoloji Bölümü, Eskişehir

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Aim of the study: In this study we aimed to present the biodiversity in the gypsiferous and marl soils, and to assess on this rich biodiversity and the relation of the gypsiferous and marl soils with vegetation.

Material and Methods: It was organized several field surveys between 2011 and 2015 and obtained data. The obtained data were evaluated together with the data which were obtained from the previous floristic studies performed in Eskişehir. 59 soil samples were collected in the 183 specimen area and 0-30 cm deep. The chemical analysis (pH, electrical conductivity, determination of salinity, calc, organic substance, phosphorus and potassium) and the physical analysis (moist, sand, silt and clay) were performed in the soils

Results: As the result of the investigations and diagnoses; 354 genus, 673 species, and 737 taxa that all are under 72 families were determined. In the research field, 129 (% 17.5) endemic taxa were detected. The chemical and physical analysis performed in 5600 m² surfaced area of gypsiferous and marl soils in the city border of Eskişehir, when the amount of clay increased calcium, iron and phosphorus ions form low soluble compounds. Because these compounds are not soluble in water they are not taken by plants. High amount of clay is disadvantageous for the plants as well as the low amount of clay. There is an ideal environment for every single plant. In this study of us, high tolerated indicator plants vegetating in gypsiferous and marl soils are determined as; *Achillea gypsicola* Hub.-Mor., *Achillea ketenoglu* H.Duman, *Aethionema dumanii* Vural & Adigüzel, *Anthemis kotschyana* Boiss. var. *gypsicola* H.Duman, *Gypsophila viscosa* Murray, *Klasea yunusemrei* A. Ocak, *Verbascum gypsicola* Vural & Aydoğdu. It has been observed that, as a consequence of adaptive evolution happening in the extreme edaphic environment (called edaphic islands) the local gypsophil endemics have adapted in these soils with "shelter model"

Keywords: Eskişehir, Endemic, Biodiversity, Gypsiferous, Marl.

ORAL-PLTBIO-OP125

Bioecological features of the wetland vegetation of Kura-Araks lowland of AzerbaijanElshad GURBANOV¹, Kamala ASADOVA²¹ Institute of Dendrology, Baku, Azerbaijan² Botany Department, Baku State University, Baku, Azerbaijan
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Aim of study: Aim of conducted research is to determining the bioecological features of wetland vegetation in Kura- Araks region. In Azerbaijan different vegetation types are distributed: forest, meadow, mountain-xerophyte, semi-desert, desert, wetland etc. Kura-Araks lowland of Azerbaijan is suitable for agriculture and cattle-breeding as well as is natural resource for water avifauna. The ponds situated in this region are very important for wetland vegetation. Wetland plants may serve as sensitive hydrologic indicators of water-quality parameters such as salinity, turbidity, pH, nutrients; presence of various pollutants; or frequency and duration of inundation.

Materials and methods: During conducted researches in the region of Kura-Araks the following formations are found:

Aquiherbosa immerse formation group.

1. *Aquiherbosa immerse natanta formation semi-group.* This formation semi-group include *Ceratophyllum demersum*, *Ceratophyllum submersum*, association of *Ceratophyllum* with *Myriophyllum* L., *Potamogeton crispus* L. and *Lemnaceae trisulca* L.

Ceratophylletum formation. *Ceratophylla* genus is represented with two species in Azerbaijan flora. These two species form an association separately, as well as with each other and with other species. In Kura-Araks lowland we observed associations of *Ceratophyllum demersum*, *Ceratophyllum submersum*, association of *Ceratophyllum* with *Myriophyllum* L., *Potamogeton crispus* L., *Lemnaceae trisulca* L.

Ceratophyllum demersum association - this association was defined in the lakes of Kura-Araks lowland. Association also large distribute in ponds. In associations which formed by *Ceratophyllum demersum* and *Ceratophyllum submersum* we also determined spreading of other species: *Myriophyllum spicatum*, *Potamogeton pectinatus*, *Batrachium divaricatum*, *Utricularia vulgaris*, *Phragmites communis*, *Schoenoplectus litoralis* etc.

2. *Aquiherbosa imersa radicata formations semi-group.* This semi-group include the following formations and associations:

Najasetum formation. This formation include the following associations:

- *Najas marina association, Najadaceae + Zannichellia association.*

Najas marina association forms a clear association in the end of June and beginning of August consisting of only from *Najas marina*. These associations become very thick, so the other species cannot develop in such association.

- *Najas + Zannichellia.* Association of *Najas minor*, *N.graminea* with *Zannicheliapolystris*, *Z.pedunculata* develop in 20-30 sm depth of water. We determined the following mixed association of *Najadaceae* with *Zannichellia*:

Najas minor + Zannichellia palustris, *Z. pedunculata*; *N.minor + Chara contraria*, *Ch. vulgaris*; *N.graminea + N.minor*; *N.graminea + Zannichellia pedunculata*.

In this association also the following species are presented: *Sagitaria trifolia*, *Callitriche verna*, *Juncus lampocarpus*, *Lemna minor*, *Picciocarpus natans*, *Marsilia quadrifolia* etc.

In comparison with other ones, the ponds in Kura-Araks lowland are favourable for developing of *Phragmites australis*.

Results: As a result of conducted researches we defined that the wetlands plants have a significant role in improving of water quality be removing nutrients and some toxins from the water and storing them. Moreover, wetland plants can reduce peak flood events and stabilize soils.

Keywords: wetland vegetation, formation, association, Kura-Araks lowland.

ORAL-PLTBIO-OP126

Determination of genetic differences and similarity of banana accessions sampled from Turkey based on directed amplification of minisatellite DNA (DAMD) PCR**Markers**

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Aim of the study: Although banana has been grown in some part of Turkey since 1934, reports on diversity among banana cultivars and clones are scarce. There is no more report on genetic differences and similarity of at Dwarf Cavendish, Grand Nain and local genotype Azman clones for breeding programs. Therefore more studies are needed to provide detailed genetic information on bananas grown in Turkey. This study was conducted to estimate genetic relationships and natural somatic mutations among selected banana genotypes from different region of Turkey Directed Amplification of Minisatellite DNA (DAMD) PCRmolecular markers.

Material and Methods: Genomic DNA was extracted from young leaves of 70 banana accessions by CTAB method as described by Doyle and Doyle (1990). A total of 7 directed amplification of minisatellite DNA (DAMD) marker primers, were used to amplify minisatellite regions of banana accessions following to protocols as DAMD markers. PCR products were separated on 2% agarose gel in 1 x TBE buffer at 115 volt for 3 h for DAMD PCR products. The fragment patterns were photographed under UV light for further analysis. A 100 bp standard DNA ladder as the molecular standard in order to confirm the appropriate markers were used for DAMDPCR analysis. Molecular analysis was carried out as follows: each band was scored as present (1) or absent (0) and data were analyzed with the Numerical Taxonomy Multivariate Analysis System (NTSYS-pc) software package (Rohlf 2000). A similarity matrix was constructed using DAMDPCR data based on Dice (1945) coefficient. Then, the similarity matrix was used to construct a dendrogram using the UPGMA (unweighted-pair group method arithmetic average) to determine genetic relationships among the cultivars studied. The genetic similarity matrix and ultrametric distance matrix produced from UPGMA-based dendrogram with COPH module nested in the same software was compared using Mantel's matrix correspondence test (Mantel 1967).

Results: A total of 70 bands were scored from 7 DAMD markers and 85% of them were polymorphic. Number of bands per primer combination was 10 whereas polymorphic bands per primer combinations was 7.5. Genetic similarities of the 70 banana genotypes ranged between 0.72 and 1.00. Most of the banana genotypes were distinguished and few of them were identical. Results showed that DAMD markers have provided useful results to understand genetic differences and similarity of banana cultivars and clones. In addition, these markers revealed different knowledge from the other DNA-based marker system among the banana genotypes studied. Also, DAMD-PCR markers appeared to be as useful as SRAP and RAPD markers for genetic analysis in banana cultivars and their clones.

Keywords: Banana, genetic similarity, DAMD markers.

ORAL-PLTBIO-OP127

Changes of Some Morphological Characteristics of Naturel Grown Carob (*Ceratonia siliqua* L.)**Leaves**Hakan KELEŞ¹, Hasan PINAR², Zeki YETKİN³, Nebi BİLİR⁴¹*Eastern Mediterranean Forestry Research Institute/ MERSİN*²*Erciyes University, Agricultural Biotechnology / KAYSERİ*³*Mersin University, Computer Engineering / MERSİN*⁴*Süleyman Demirel University, Forest Faculty/ ISPARTA*
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Aim of the study: Natural Carob (*Ceratonia siliqua* L.), is one of our important species due to having commercial value of its seeds and fruit and limited distribution in Turkey. Beside its economic value its resistance to drought and fire cause it to be one of the species that has a high potential value for our forestry sector. This work aims to determine the morphological features of the leaves of the natural Carobs populations spread in the Mersin province and demonstrates the differences among the populations.

Material and Methods: In the work, three different natural Carob populations are collected from a total of 60 trees in Mersin (Tarsus, Erdemli and Silifke) where 10 leaves for each tree are considered in order to measure the leaf width, length, surroundings, area of the 600 leaves as well as the leaf numbers as the characteristic features with Image processing method. In order to create the dataset, all leaves are transformed to the digital image by scanning the leaves, after noise elimination, thresholding method is applied to determine the foreground objects, which are leaves, and using the pixel counting method the measurements of leaf characters are performed. Variance analysis and Duncan tests are applied on the dataset.

Results: As the observed results, significant statistical differences are observed among the three populations in terms of the size, surroundings, area, and the leaf number characteristics features, however, no meaningful difference is observed in measurements of the leaf widths.

Keywords: Natural carob, leaf characters, image processing method, variation.

ORAL-PLTBIO-OP128

Dangerous and Poisonous Plants in West JavaHarni MUTIA¹, Joko KUSMORO Drs. MP¹
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Aim of the study: The provincial government are prioritizing development in the southern region of West Java. High biodiversity of plants in WestJava is a resource that should be researched, protected, and utilized. Plant fall into category of the dangerous and poisonous plant can provide information to increase alertness, management, utilization, and protection the role of a plant in the ecosystem.

Material and Methods: This research used observation method and study literature method.

Results: The results of data collection recorded 88 species of the dangerous and poisonous plant throughout the region. Dangerous and poisonous plants in the nature reserve area Bojonglarang Jayanti recorded 56 species. Dangerous and poisonous plants in the area of ecotourism recorded 39 species. Dangerous and poisonous plants in the nature reserve Pangandaran recorded 33 species. Dangerous and poisonous plants in the nature reserve area Leuweung Sancang recorded 23 species. Many of secondary metabolites substances contained on dangerous and poisonous plants were found, that is ethanol, saponin, alkaloid, cyanide acid, triterpene, flavonoid, kafeat acids, phenol, tannin, essential oil, bergenin, rotenon, resin, terpenoid, antosianida, caffeine, deoregin, anakordala acid, polyphenol, papain, mimosin that contained in the roots, stems, leaves, flowers, fruits, seeds, and tubers. Section dangerous organs were found is spines and trichomes. The dangerous and poisonous plants can cause dermatitis, dermal wounds, swelling, irritation, dizziness, hair loss, throat burn, nausea, indigestion, liver damage, enlarged spleen, hallucination, fetal miscarriage, paralysis, and death. The venom with correct dosage can be used as insecticide, nematicide, fungicide, herbaticide, viruses killer, bacteria killer, poison fish, etc.

Acknowledgements: The authors would like to thanks the support of Biology Department Padjadjaran University, and Kloroblas.

Keywords: Dangerous Plant, Poisonous Plant, Secondary Metabolites Substances.

ORAL-PLTBIO-OP129

In vitro culture of *Lavandula angustifolia* Mill.Mariia BELOVA, Mikhail CHEREDNICHENKOFaculty of Agronomy and Biotechnology, Russian Timirjazev State Agrarian University, Russia
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Aim of the study: Lavender (*Lavandula* L.) is a genus of the family Lamiaceae (or Labiatae), which includes about 25-30 species. It has anti-inflammatory and antispasmodic properties. Lavender is well used in medicine, in manufacture of perfumes and cosmetic products, it is widely used as a spice in cooking. Useful characteristics of lavender are determined by its content of essential oil (Bochkarev et al., 2013). Essential oils belong to secondary metabolites. The development of production technologies of these matters in medicinal and aromatic plants is very important, it will make it possible to obtain the necessary material during all year.

Material and Methods: Variety Munstead is a decorative kind of *L. angustifolia* with purple-blue flowers. We have studied various modes of sterilization at *in vitro* introduction of seeds *L. angustifolia* Mill. var. Munstead, carried out clonal micropropagation of obtained plants. The effect of the hormonal composition (auxins and/or cytokinins in different proportions) of the cultural medium Murashige and Skoog (MS) on the efficiency of morphogenesis in culture of plant tissue isolated segments also was studied.

Results: Preliminary conclusion that the investigated sterilization modes don't differ in their effects on germination was made, so we can recommend a minimum duration in 5 minutes. For *in vitro* introduction of non-sterile seedling of *L. angustifolia* optimum sterilization mode with 5% solution of sodium hypochlorite is 5 minutes. The highest incidences of roots and shoots formation in clonal micropropagation were marked on medium MS with 1 mg/l NAA. In the experiments on the induction of morphogenesis the highest frequency of root organogenesis was observed on MS with 1 mg/l IAA, callusogenesis on MS supplemented with 3 mg/l BAP + 0.1 mg/l IAA.

Keywords: *Lavandula angustifolia* Mill., *in vitro* culture, clonal micropropagation, callus, somatic organogenesis.

ORAL-PLTBIO-OP130

***Rhodiola rosea* L. (Roseroot) *in vitro* culture**Olga ZUDOVA¹, Mikhail CHEREDNICHENKO²¹Faculty of Horticulture and Landscape Architecture, Russian Timiryazev State Agrarian University,
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Aim of the study: For centuries, *R. rosea* has been used in the traditional medicine of Russia. Nowadays it has been included in officinal Russian medicine. *R. rosea* has been categorized as an adaptogene by Russian researchers due to its observed ability to increase resistance to a variety of different stressors. Its claimed benefits include antidepressant, anticancer, cardioprotective, and central nervous system enhancement. *R. rosea* can be propagated by seed or vegetatively, but yield of roots is small after 1 year. The aim of this stage of our work is receiving enough of plants to researches into the callus formations and the subsequent morphogenesis.

Material and Methods: For our experiment were used plants and seeds of *R. rosea*. For sterilization we used 0,1 % mercury chloride (II), sodium hypochlorite and ethanol. Seeds and cuttings were locating on nutrient media (MS and B5) with various hormonal compositions (combinations of auxins and cytokinins). For obtaining callus plants cuttings also were locating on MS media with hormones.

Results: Plant cuttings are not suitable as explants in culture *in vitro*. All cuttings after sterilization were contaminated or died. Also plants cuttings used to obtain callus didn't get any success. Sterile plants obtained from seeds are the only material for continue work. The best method of plant sterilization is the treatment with the composition of sodium hypochlorite and ethanol. To grow health sterile plants of *R. rosea in vitro* can be used MS nutrient medium without hormones.

Keywords: *in vitro* culture, callus, sterilization, *Rhodiola rosea*.

ORAL-PLTBIO-OP131

Effect of plants growth regulation on *Agastache* species *in vitro*

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Aim of the study: In the *Agastache* plants more than 97 biologically active compounds were identified. Secondary metabolites of all *Agastache* species include phenylpropanoids and terpenoids. These compounds have useful pharmacological properties such as anesthetic, anti-inflammatory, anticarcinogenic, antimicrobial, antiviral, antioxidant and other. The *Agastache in vitro* culture can be used like source of special secondary metabolites. Applying of tissue cultures of plants for obtaining phytochemicals has several advantages compared intact plants, incl. the ability to regulate the synthesis of secondary metabolites through changes in physical factors of cultivation. Our investigation is dedicated to *in vitro* cultivation of *Agastache* species, including morphogenesis and callus induction.

Material and Methods: Seeds of different *Agastache* species were surface sterilized by immersion in 70% ethanol for 1 minute followed 2,5 % sodium hypochlorite for 10 minute. The sterilized seeds were cultured in Murashige and Skoog medium. Material for explant preparation was obtained 30-day-old *in vitro* seeding. All explants (leaves and stems) were cut into pieces and cultured on medium containing plants growth regulators, such as benzylaminopurine, indole-3-acetic acid, 2,4-dichlorophenoxyacetic acid and kinetin in different concentrations. Each plants growth regulation treatment had 5 replicates. Each replicate contained 10 explants of different types. After 3 weeks of cultivation results were estimated.

Results: The highest organogenesis frequency in *Agastache* genus plants for medium containing benzylaminopurine and indole-3-acetic acid was observed. A medium with supplement of 2,4-dichlorophenoxyacetic acid and kinetin is more suitable for induction callus in *Agastache* species.

Keywords: secondary metabolites, *in vitro* culture, *Agastache*, Lamiaceae.

ORAL-PLTBIO-OP132

The Plant Biodiversity of Ballica Cave Nature Park and Surrounding AreaHakan Mete DOĞAN¹, Fergan KARAER², Betül ÖZENLİ¹¹*Soil Science and Plant Nutrition Department, Gaziosmanpaşa University, Turkey*²*Biology Department, Ondokuz Mayıs University, Turkey*hmdogan@hotmail.com

Aim of the study: In this study, geographic information systems (GIS) and remote sensing (RS) tools were integrated and used to investigate and map the plant biodiversity of Ballica Cave Nature Park and surrounding area in Akdağ-Pazar/Tokat. Four distinct diversity indices including Number of Plant Species (NPS), Shannon Wiener (SW), Simpson (SIMP), and Margalef (MARG) were employed in order to express the plant biodiversity.

Material and Methods: The study conducted in the area (32,98 km²) located in Pazar district of Tokat Province. Basically this area is situated in the Mid Black Sea geographical region of Turkey. The general topography of the study area is mountainous, and elevation changes between 680 and 1850 m. Field studies between 2011 and 2014 were conducted during the important vegetation periods. In the field studies, total 150 quadrats with a size of 50m X 20m were established. Species component, number of species, species cover (%), and species density (plant m⁻²) were identified in each quadrat. The locations of the quadrats were determined by GPS. Using field data and algorithms of the diversity indices, NPS, SW, SIMP, and MARG values of the quadrats were calculated. Employing Kriging (spherical semivariogram) interpolation method in GIS, determined diversity indices were transformed to raster maps (30m x 30m resolution).

Results: At the end of this research, 657 plant taxa that belong to 81 families were identified, and total 34 taxa were found endemic. (endemism ratio: 5,18%). Four raster maps were developed for NPS, SW, SIMP, and MARG indices. The developed plant diversity index maps were compared with each other and interpreted. Considering the different responses of the interpolated map layers, NPS, SW, and MARG layers were found suitable for rare cover types, while SIMP layer might be appropriate for single dominant land covers in the study area.

Acknowledgements: Authors thank to the Scientific Research Commission of Gaziosmanpaşa University that funded this project (2011/103)

Keywords: GIS, Ballica Cave, Plant Biodiversity, Diversity Indices, Spatial Analysis.

ORAL-PLTBIO-OP133

Analyzing Diversity of *Cirsium* (Asteraceae, Cardueae) Taxa Spatially to Determine Genotype-Environment InteractionFatma AYDINOGLU¹, Melahat OZCAN², Arif Cagdas AYDINOGLU³¹Department of Molecular Biology and Genetics, Gebze Technical University, Turkey²Department of Forest Engineering, Artvin Coruh University, Turkey³Department of Geomatics Engineering, Gebze Technical University, Turkey
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Aim of the study: *Cirsium* Miller is perennial, biennial or rarely annual, spiny species and one of the largest genera of the Asteraceae, contains more than 250 taxa. It is also a typical example of a genus with a high affinity to form interspecific and intersubspecific hybrids which make them useful model for genome and plant distribution studies. This genus is represented 77 taxa at the level of species, subspecies and twenty eight of them are endemic to Turkey. Distribution of *Cirsium* depends on environmental conditions where they are grown. Therefore, to define and maintain environmental conditions of the local distribution area of plants are crucial to protect them from extinction.

Material and Methods: In this context, 6 provinces of north-east Anatolia of Turkey including Giresun, Trabzon, Rize, Artvin, Gümüşhane, and Bayburt was chosen as study area. The elevation of this region begins at sea-level and exceeds 3000 m with steep slopes. Mountains, hills, and high plateaus generally take part in inner land of the region. After determining potential *Cirsium* distribution areas by field work and Remote Sensing, 109 plants representing 28 taxa were collected with location coordinates. By using Geographical Information Systems (GIS) techniques, environmental data such as elevation, slope, aspect, road, river, geology, and soil data were collected for all regions from base maps and satellite images. These data sets were combined in GIS database and analyzed by using spatial analysis and surface analysis techniques. After determining elevation of all regions, slope and aspect data sets were produced from elevation model. Distance to road and river data sets were calculated from road and river data sets respectively. Other environmental data sets were classified.

Results: As a result, environmental data values were analyzed and produced for each *Cirsium* distribution area. *Cirsium* distribution areas were categorized in view of classes of elevation levels, slope and aspect groups, distance to road and river, and so on. Depending on chromosome number of *Cirsium* taxa, relations and correlations between plant distribution areas and other environmental data were analyzed geo-statistically. The results showed the distribution of *Cirsium* genotypes are correlated with environmental factors. In this way, these environmental variables are used for determining more and less adapted *Cirsium* genotype in their distributed areas. The results suggest which genotype has priority for biodiversity protection.

Keywords: Plant biodiversity, *Cirsium*, genotype-environment interaction, geographical information systems, spatial analysis.

ORAL-PLTBIO-OP134

Alpine Plant Biodiversity of TurkeySeyran Palabaş UZUN, Alper UZUN, Zeynep YAVUZ, Ali DURMAZ, Sibel YAĞMUR, Merve KUŞCUOĞLU*Department of Forest Botany, Faculty of Forestry, Kahramanmaraş Sütçü İmam University,
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Aim of the study: Aim of this study to determine and compile plant diversity and features in Alpine Vegetation in Turkey.

Material and Methods: We used field surveys, country flora, recently published papers, check lists, regional floras and revision works.

Results: According to floristic surveys and literature works in Alpine vegetation, 195 plant taxa belong to 28 families were documented in detailed. Poaceae is the leading family among all, with 48 plant taxa (24.6 %, almost one fourth). Second family is Plantaginaceae with 22 plant taxa (11.3 %). Rosaceae is the third family with 16 plant taxa (8.2%), Amaryllidaceae has 12 plant taxa (6.2%), Lamiaceae, Ranunculaceae and Rubiaceae have 10 plant taxa each (5.1%), Orobanchaceae with 8 plant taxa (4.1 %). Brassicaceae with 7 plant taxa (3.6 %) and Gentianaceae Orchidaceae and Scrophulariaceae have 6 plant taxa each (3.1%). The rest 16 families have fewer than 6 plant taxa which is gradually decreasing. The distribution of phytogeographical elements of the Alpine data-set in Turkey is 24.6% for Irano-Turanian elements (48 taxa), 24.1% for Multi-regional or unknown (47 taxa), 15.4% for Euro-Siberian elements (30 taxa), 13.8% for Euxine elements (27 taxa), 8.2% for Euxine (mt.) elements (16 taxa), and the rest have fewer than 10 plant taxa.

Keywords: Alpine, Vegetation, Biodiversity, Plant species, Turkey.

ORAL-PLTBIO-OP135

DNA Barcoding of Some Medicinal and Aromatic PlantsFethullah TEKİN¹, Banu AVCIOĞLU², Ahmet EFE³¹*Medicinal and Aromatic Plants Research Department/GAP International Agricultural Research and Training Center (GAPUTAEM), Turkey*²*R&D Department/Biyans Biological Products R&D Ltd, Turkey*³*Quality and Technology Laboratory Unit/GAPUTAEM, Turkey
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Aim of the study: DNA barcoding is used for taxonomic identification of unknown samples of any species even with very small tissues. It is also useful to survey plant biodiversity quickly for conservation or agricultural purposes, forensic sciences and customs. The aim of this study is to submit DNA barcode sequences of some endemic medicinal and/or aromatic plants of Turkey.

Material and Methods: Six medicinal and/or aromatic plants were selected for DNA barcoding: Four of them were among the various medicinal and aromatic plants collected by GAPUTAEM from its territory via several surveys and two of them were from other regions of Turkey. The plants are; *Tulipa sintenisii* Baker (Muş lalesi), *Sideritis libanotica* subsp. *kurdica*, *Sideritis vulcanica* HUB.-MOR, *Origanum minutiflorum* (Sütçüler kekiği), *Origanum sanctum* and *Cyclotrichium leucotrichum*. DNA was isolated with Promega™ Wizard™ Genomic DNA Purification Kit either from fresh or dried material. For DNA barcoding, PCR amplification of chloroplast ribulose 1,5-bisphosphate carboxylase/oxygenase large subunit (*rbcL*) via universal primer set (*rbcLa F* and *rbcLa_R*) was performed. After running agarose electrophoresis, single PCR products about 600 bp size were observed. The product bands were excised from the gel, cleaned by Macherey Nagel NucleoSpin® Gel and PCR Clean-up Kit. Products are to be sequenced and sequence data will be evaluated by BLAST analysis.

Results: PCR amplification of *rbcL* gene via universal primer set produced single bands about 600 bp on the agarose gel. Products are to be sequenced and sequence data will be evaluated by BLAST analysis. DNA barcode sequences will be submitted to NCBI and barcoding databases.

Acknowledgements: This study was partly supported by the Project named *Ex-Situ Conservation, characterizations and pre-evaluation of some Medicinal and Aromatic Plants in South East Anatolia Region* (Project no: TAGEM/TA/11/06/01/001).

Keywords: Medicinal and aromatic plants, endemic, DNA barcoding, *rbcL* gene.

ORAL-PLTBIO-OP136

Ploidy Reduction Techniques for Tetraploid AlliumsAli Ramazan ALAN^{1,2} and Fevziye CELEBI TOPRAK^{1,2}¹*Pamukkale University Plant Genetics and Agricultural Biotechnology Application and Research Center (PAU BIYOM), Kinikli, Denizli, Turkey*²*Pamukkale University, Department of Biology, Denizli, Turkey*
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Aim of the study: The genus *Allium* contains important vegetable, medicinal, and ornamental species of great economic significance. It is believed that domestication did not cause major changes in ploidy status of many species of *Allium*. Genetic analysis of important traits and variety development via classical breeding are rather difficult in cultivated tetraploid *Allium* species due to long life cycle, polyploidy, and high levels of heterozygosity. Our research group made considerable progress in the development of ploidy manipulation techniques for leek and garlic chive.

Material and Methods: Leek (*A. ampeloprasum* var. *porrum*), and garlic chive (*A. tuberosum*) materials used in this study were confirmed to be tetraploids using flow cytometry analysis. Plant materials were grown in an unheated greenhouse. The following procedures were carried out to obtain plants with reduced ploidy levels in both species. Unopened flower buds collected from umbels were surface sterilized and cultured in various tissue culture media to induce embryo formation from unfertilized egg cells (gynogenesis). Flowers buds showing response to induction were transferred to a plant growth regulator free medium. Gynogenic plants were extracted from responsive buds and transferred into the glass tubes containing the same medium. Nuclear DNA samples isolated from the regenerants were analyzed using a flow cytometer. Plants with known ploidy levels were transferred to greenhouse for further evaluations.

Results: All leek and garlic chive materials used in this study showed gynogenesis response in various induction cultures and many gynogenic plants were obtained from both species. Flow cytometry analysis showed that about two third of the leek regenerants obtained were diploids whereas only a few garlic chive regenerants could be detected. In general, plants with reduced ploidy levels showed significantly slower growth and had smaller plant size than their tetraploid counterparts. Gynogenic regenerants will be further evaluated for morphological features and whether they will provide selfed seeds.

Acknowledgements: This research was supported by the Scientific and Technological Research Council of Turkey (TUBITAK-TOVAG, Project No. 113O232) and PAU BIYOM.

Keywords: *Allium ampeloprasum* var. *porrum*, *A. tuberosum*, Gynogenesis, Ploidy.

ORAL-PLTBIO-OP137

Clonal Propagation Protocol for Aronia (*Aronia melanocarpa*)Fevziye CELEBI TOPRAK^{1,2} and Ali Ramazan ALAN^{1,2}¹Plant Genetics and Agricultural Biotechnology Application and Research Center (PAU BIYOM),
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Aim of the study: Aronia (*Aronia melanocarpa*, Elliot black chokeberry) is an important fruit plant. The Aronia berries are highly nutritive and rich in vitamins and antioxidants. The berries can also be processed and used in food products such as wine, jam, syrup, juice, tea, beer, ice cream, and tinctures. Clonally propagated plants of important Aronia varieties are in high demand. However, there is no simple propagation method suited for all genotypes. The major aim of this study is to develop an *in vitro* based clonal propagation protocol for three varieties of Aronia.

Material and Methods: Actively growing shoots were collected from the mature field-grown plants of *A. melanocarpa*. The shoots were from three Aronia varieties (Eastland, Viking and Nero) washed thoroughly under tap water, cut into pieces and kept in sterilization solution for 30 min. After surface sterilization, shoots were rinsed three times with sterile double distilled water in a Laminar Flow Hood. Nodal explants were prepared from young shoots and placed in Magenta boxes containing various regeneration media. M1 was a regular Murashige Skoog (MS) medium without plants growth regulators. M2 was composed of MS medium supplemented with 0.7 mg/l 6-benzylaminopurine (BAP). M3 was Driver-Kuniyuki Walnut medium (DKW) containing 700 mg/l BAP and 0.01 mg/l Indole-3 butyric acid (IBA). Cultures were grown in a growth chamber adjusted to 16 h light/25°C and 8 h dark/17°C. Shoot stocks maintained *in vitro* were used as the source for new nodal explants that were subcultured in the Magenta boxes with fresh media. For rooting, shoots developed from these cultures were transferred into woody plant medium (WPM) supplemented with 1 mg/l IBA (R1) or ½ WPM supplemented with 3 mg/l IBA (R2). Leaf samples from rooted plants were used for ploidy analysis using flow cytometer analysis.

Results: A highly efficient micropropagation protocol was developed for all three Aronia varieties included in this study. In this protocol, nodal explants prepared from the shoots of the field grown mature plants are placed in M1 medium for the initiation of *in vitro* shoot development. In general, culturing in M1 provide a few vigorous shoots per nodal explant. For shoot multiplication, nodal explants prepared from the shoots developed in M1 are placed in M2 where up to 15 shoots per explant can be produced. Multiplication can be continued in M2 to produce high numbers of shoots. To obtain well rooted Aronia plants suited for agricultural production, nodal explants are placed in R1. It takes about six months to obtain hundreds of rooted clones of Aronia varieties ready for transferring to *in vivo*. Acclimated plants were transferred to a greenhouse for further growth and development.

Acknowledgements: This research was supported by PAUBIYOM

Keywords: Acclimatization, *Aronia*, clonal propagation, *in vitro*.

ORAL-PLTBIO-OP138

Doubled haploid (DH) Turkish Onion (*Allium cepa* L.) LinesFevziye CELEBI TOPRAK^{1,2} and Ali Ramazan ALAN^{1,2}¹Plant Genetics and Agricultural Biotechnology Application and Research Center (PAU BIYOM),
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Aim of the study: Onion (*Allium cepa* L.) is a highly heterozygous biennial plant with a great economic importance. Onion breeding is a long and difficult process. Development of onion inbreds takes over 10 years through classical methods. Gynogenesis-based doubled haploid (DH) technology allows development of completely homozygous onion lines in a few years. We are investigating applicability of DH technique in the development of DH lines from Turkish onion landraces. Gynogenic plants were obtained from all onion lines included in this study. Important features of DH onion lines developed in this project were compared with the donor lines from which they were produced.

Material and Methods: We cultured unopened flower buds collected from ten donor onion lines in gynogenesis induction media. The gynogenic and somatic regenerants obtained from these cultures were evaluated for their ploidy levels and transferred to in vivo for further evaluation. Gynogenic (haploid and spontaneous DH) and somatic plants obtained from bud cultures and seedlings of donor onion lines were placed in pots filled with a soilless mix. All onion plants were grown in an unheated greenhouse for their bulbs. Onion materials were evaluated for important agronomic features. Bulb features (color, shape, weight, length and diameter), root length, and pseudostem diameter and length of the plants were noted. Viable pollen production and fecundity levels in the flowering DH lines were determined.

Results: Gynogenesis response was obtained from all groups of Turkish onion donor lines. Responses were generally low and varied between 0.6 and 1.15%. According to nuclear DNA content analysis with flow cytometry, the majority of the gynogenic plants produced were haploid (46.47%). About 19% of them were spontaneous diploid and the remaining lines were either mixoploids or tetraploids. Some of the gynogenic plants showed growth vigor comparable to somatic and donor materials. DH onion lines produced plenty of viable pollen (>80%) and high number of seeds whereas haploid plants did not produce viable pollen and they were not fecund. Results from this study show that Turkish onion lines are responsive to gynogenesis induction and DH lines with desirable quality features can also be developed. Fully homozygous onion lines developed through DH technology can be used as parents in the production of F1 hybrid cultivars.

Acknowledgements: This research was supported by the Scientific and Technological Research Council of Turkey (TUBITAK-TOVAG, Project No. 110O095) and PAU BIYOM.

Keywords: *Allium cepa* L., Gynogenesis, Onion.

ORAL-PLTBIO-OP139

***In vitro* Multiplication of Turkish *Vitex agnus-castus* L. Materials**Fevziye CELEBI TOPRAK^{1,2}, Yeşim KARA^{1,2} and Ali Ramazan ALAN^{1,2}¹Pamukkale University Plant Genetics and Agricultural Biotechnology Application and Research Center (PAU BIYOM), Kinikli, Denizli, Turkey²Pamukkale University, Department of Biology, Denizli, Turkey
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Aim of the study: *Vitex agnus-castus* L. (chaste tree) is an uncultivated medicinal and aromatic plant found in arid and semi-arid regions of Turkey. This plant is generally propagated through seeds. However, plants developed from seeds are highly heterozygous. The major aim of this study is developing an efficient *in vitro*-based clonal propagation technology to propagate and preserve Turkish *Vitex* materials. *In vitro* technologies can help producing disease-free propagation materials that can be maintained without the risk of major genetic changes for long periods. The protocol developed in this study allows production of hundreds of genetically identical plants within six months.

Material and Methods: *Vitex agnus-castus* seeds were collected from plants naturally growing around the town of Pamukkale (Denizli, Turkey). The seeds were sown in pots containing peat and perlite mixture (3:1 v/v) in a greenhouse at Pamukkale University, Plant Genetics and Agricultural Biotechnology Application and Research Center (PAU BIYOM). Seedlings were taken out of the pots when they reached to 7-9 nodes and brought to the tissue culture lab. After the removal of the roots, the whole shoots were surface sterilized in a Laminar Flow Hood. Nodal explants prepared from each seedling were placed in Magenta boxes containing regeneration media. Two regeneration media were tested. RM1 was consisted of regular Murashige Skoog (MS) medium without plant growth regulators. RM2 was a MS medium supplemented with 2 mg/l 6-benzylaminopurine (BAP) and 0.1 mg/l Kinetin (K) medium. Cultures were placed in a growth room. Eight weeks later, shoots developed from nodal explants were taken out of the Magenta boxes for further propagation. Nodal explants prepared from shoots developed *in vitro* were subcultured in Magenta boxes containing fresh regeneration media. The subculturing procedure was repeated in every eight weeks. Flow cytometry analysis was done to determine possible large scale chromosomal abnormalities among propagated materials.

Results: An efficient *in vitro*-based multiplication system was developed for Turkish *Vitex* materials. In this system, nodal explants prepared from *in vivo* grown plants are placed in RM2 medium for the initiation of *in vitro* shoot development. In this medium, multiple shoots are produced from each nodal explant by the end of the eighth week of culture. Shoots developed in RM2 are taken out of Magenta boxes and nodal explants prepared from them are either subcultured in RM2 to maintain the cultures or transferred to RM1 medium to produce rooted plants. Rooted plants acclimated and transferred to a greenhouse for further growth and development. Results of this study showed that Turkish *Vitex agnus-castus* could be propagated and maintained *in vitro* without any major problems. *In vitro* propagation system is an excellent choice for a long-term conservation of *Vitex* germplasm materials. This system allows production of genetically stable and disease-free clonal plants without seasonal restriction.

Acknowledgements: This research was supported by PAUBIYOM.

Keywords: Genetic stability, *In vitro*, propagation, *Vitex agnus-castus*.

ORAL-PLTBIO-OP140

Propagation and Preservation of *Hypericum perforatum* L.Ali Ramazan ALAN^{1,2}, and Fevziye CELEBI TOPRAK^{1,2}¹*Pamukkale University Plant Genetics and Agricultural Biotechnology Application and Research Center (PAU BIYOM), Kinikli, Denizli, Turkey*²*Pamukkale University, Department of Biology, Denizli, Turkey*
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Aim of the study: *Hypericum perforatum* is considered to be a facultative apomictic species with multiple reproduction mechanisms. Therefore, a considerable amount of genetic variation is present among the *H. perforatum* plants grown from seeds. Genetic variability in plant materials can lead to heterogeneity in quality of the *Hypericum* products. Clonal propagation systems can be a better alternative than seeds since they can provide genetically identical plants. Such systems can also be used for fast multiplication and maintenance of valuable genotypes selected for high bioactive compounds. Some *in vitro* techniques can also be used to develop genetically distinct lines from this important medicinal plant.

Material and Methods: *H. perforatum* plants used in this study were obtained from various sources. Plants were produced by planting seeds collected from plants naturally grown in central campus of Pamukkale University (Denizli, Turkey). Shoot tips and nodal explants obtained from these plants were surface sterilized and cultured in Murashige Skoog (MS) medium without plant growth regulators. Cultures established *in vitro* were used as the source of nodal explants for multiplication and maintenance of the *H. perforatum* materials in Magenta boxes. Unopened flower buds collected from greenhouse-grown plants were used as the source of anther explants. Anthers excised from surface sterilized buds were cultured in a regeneration medium (MS with 1 mg/l 6-benzylaminopurine and 1 mg/l \square -naphthaleneacetic acid). Anther-derived calluses with emerging shoots were transferred to MS medium and plants obtained from them were maintained by subculturing nodal explants in fresh MS media.

Results: *In vitro* propagation technique used in this study provided high numbers of clonal plants from *H. perforatum* genotypes. Each genotype was maintained in three magenta boxes each containing nine plants. This strategy allowed production of rooted *H. perforatum* plants ready for transfer to *in vivo* within six to eight weeks. Majority of the anthers cultured in regeneration medium provided calluses from which whole plants were developed. Flow cytometric analysis of anther-derived calluses and plants showed that they were tetraploids.

Acknowledgements: This research was supported by PAUBIYOM.

Keywords: Anther culture, clonal propagation, *Hypericum perforatum* L., St. John's wort.

ORAL-PLTBIO-OP141

An Updated Overview of Genus *Reseda* (*Resedaceae*) in Turkey

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Aim of the study: In this study, an updated overview of genus *Reseda* (*Resedaceae*) in Turkey in the light of collected specimens from field trips carried out in 46 provinces between 2013 and 2015, is presented. In addition to the current distribution of the genus in Turkey, palynological properties, morphological, anatomical characters and general information about rediscovered endemic species are discussed.

Material and Methods: Materials used for this study were collected field trips carried out in 46 provinces between 2013 and 2015. Data of all morphological characters is based on the measurements of recently collected specimens. "Flora of Turkey and the East Aegean Islands" (Davis 1988; Özhatay 2000) and "The *Resedaceae*: A Taxonomical Revision of the Family (final insaltment)" (Abdallah & De Wit 1978) are used for identification. In palynological studies, pollen slides are prepared according to Erdtman (1960). The followed parameters were measured on fifty pollen grains: Polar axis (P), equatorial axis (E), length of colpi (Clg), wide of colpi (Clw), length of pori (Plt), pollen diameter in polar view (Amb), apocolpia and exine thickness. The pollen images has been taken by Olympus CX41-E330 imaging system. All pollens are photographed by Scanning Electron Microscope (SEM). For anatomical studies, Leica Crytome Microtome is used to take cross-sections of root and stem.

Results: *Resedaceae* is represented by only genus *Reseda* in Turkey. The genus has approximately 65 species worldwide, which are widely distributed in the Mediterranean basin. There are 23 indigenous taxa in Turkey and 10 of them are endemic. The western Mediterranean area and the eastern Mediterranean and southwest Asia region seem to be the major centers of differentiation and diversification for the family depending on number and abundance of the species and endemism rate in these region. The species of *Reseda* are annual or perennial herbs that can grow up in limestone soil and arid environments. The 3 endemic taxa are rediscovered during field trips.

Acknowledgements: The specimens in this study were collected during field trips for the project "Taxonomy of *Reseda* L. Genus (*Resedaceae*) in Turkey" (Supported by Hacettepe University Scientific Research Center, Project No: 013 D04 601 003). We also wish to thank Münevver Pınar, Cahit Doğan, Edibe Baysal, Derya Şimşek and Aydan Acar.

ORAL-PLTBIO-OP142

In vitro culture of *Salvia sclarea* L.

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Aim of the study: The purpose of the research was to breed a population *in vitro* and to find out optimal conditions for the growth of different varieties of *Salvia sclarea* L. In the experiment there were 3 varieties of seeds: Voznesensky 24, Vkus Gribov and Klassica. *Salvia sclarea* is very interesting primarily for exploring accumulation of secondary metabolites, which are of great medical and pharmaceutical value. The clonal micropropagation of plants affords us to get a huge number of viable plants, including rare and endangered species which need the people's help.

Material and Methods: Clary sage (*Salvia sclarea* L.) is a subshrub from the genus of Lamiaceae. To evaluate the effect of sterilization regime on the effectiveness of *S. sclarea* seeds germination we used: 5 % solution of sodium hypochlorite, 0,1 % solution of mercury (II) chloride and 5 % solution of lysoformin. The seeds were placed on the sterile nutrient Murashige and Skoog medium. As a control group we used non-sterile germination of seeds on a wet filter paper in Petri dishes. After examining germination of received seedlings they were replanted onto nutritious media containing auxins (IAA, IBA, NAA). Now we observe the dynamics of growing of the derived aseptic plants.

Results: After exploring impact of sterilization mode on efficiency of germination and their growth dynamics it was concluded that seeds of variety Voznesensky 24 have low germination rate after sterilization, wherein there were no significant differences in effectiveness of various modes of sterilization. Treatment of seeds of variety Vkus Gribov and Klassica with 0,1 % solution of mercury (II) chloride was more effectively than treatment with 5 % solution of sodium hypochlorite. There is no significant differences of sterilization mode on growth dynamics of chosen varieties found. Induction of cuttings rooting is managed to get on the sterile nutrient Murashige and Skoog medium with auxins IAA and IBA on 40th day after plant.

Keywords: *Salvia sclarea*, germination, essential oil, secondary metabolites.

ORAL-PLTBIO-OP143

Plant Diversity of Nevşehir (Central Anatolia) ProvinceDeniz ULUKUŞ¹, Ferhat CELEP², Osman TUGAY¹, Fatma BARA³¹*Department of Biology, Faculty of Sciences, Selçuk University, Turkey*²*Department of Biology, Polatlı Faculty of Sciences and Arts, Gazi University, Turkey*³*Department of Biology, Faculty of Sciences and Arts, Nevşehir Hacı Bektaş Veli University, Turkey*
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Aim of the study: The aim of the study is to determine plant diversity of Nevşehir (Central Anatolia) province.

Material and Methods: In Botanical trips, 1350 plant specimens were collected in 2014. All of the plant specimens were collected from “square B5” according to the Grid square system. At least one sample for each taxon was prepared according to common herbarium techniques. These specimens were identified by using Flora of Turkey and The East Aegean Islands.

Results: As a consequence of the examination of around 1350 plant specimens which were collected from the research area in 2014, 530 taxa belonging to 77 families and 296 genera have been determined. In the research area, the number of endemic taxa are 67. According to the phytogeographical regions, the figures of the taxa are as follows: Irano-Turanian elements number are 150 (28.30%), Mediterranean elements number are 32 (6.03%) and Euro-Siberian elements number are 31 (5.84%). Phytogeographical regions of remaining 317 (59.81%) taxa are either widespread or unknown.

Acknowledgements: The authors wishes to thank to Kürşat İLDENİZ for helping us during field studies. This work was supported by Eko-Zon Public Health and Environmental Consultation.

Keywords: Endemic, Phytogeography, Plant diversity, Nevşehir.

ORAL-PLTBIO-OP144

Introduction in vitro *Dracocephalum moldavica* L. seeds

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Aim of the study: Dragohead (*Dracocephalum moldavica* L.), height 15-60 cm, is a perennial herb belonging to the Lamiaceae family. It is native to central Asia and is naturalized in Eastern and Central Europe. Also it grows in the South of Siberia and the Himalays. It is commonly consumed as a food-related product and as a herbal preparation. *Dracocephalum* flowers in July and sets fruit in August. This plant is widely used in folk medicine. The essential oil of the vegetable organs is reported to have several therapeutic, including tranquilizing and appetizing effects, antiseptic and antibacterial properties. The oil of dragonhead has antioxidant activity. The purpose of the research was introduction *in vitro* *Dracocephalum moldavica* and finding out optimal conditions for the seed germination.

Material and Methods: We explore different modes of sterilization: 1) in 5 % solution of sodium hypochlorite during 5, 10 and 15 minutes; 2) in 0.1 % solution of mercury (II) chloride during 2.5, 5 and 7.5 minutes; 3) in 5 % solution of hydrogen peroxide during 5, 10 and 15 minutes. There were 2 varieties in the experiment: Gorynych and Limonnyi aromat. After sterilization the seeds were placed on Murashige and Skoog medium. As a control group we used non-sterile germination of seeds on a wet filter paper in Petri dishes. Test samples are placed in light room conditions with a 16-hour light day.

Results: Preliminary data for the impact on the sterilization mode effectiveness for dragonhead germination of seeds were obtained.

Keywords: *Dracocephalum moldavica*, essential oil, germination, *in vitro*, sterilization.

ORAL-PLTBIO-OP145

Gardens and Flowers of IstanbulKenan KAYA¹ Mesut KIRMACI²¹*Nezahat Gökyiğit Botanic Garden/Ali Nihat Gökyiğit Foundation, Turkey*²*Biology Department/ Faculty of Arts & Sciences, Adnan Menderes University, Turkey*
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Aim of the study: to introduce flowers, gardens and effect of them to daily life in Istanbul especially between 1453 and at the end of 18th century.

Material and Methods: This study was prepared for exhibition. The information and visual materials used for the study were gathered from many sources, including 17 museums, 10 libraries, our esteemed advisors, above all the renowned art historian Prof. Dr. Nurhan Atasoy, and art lovers.

Results: This study showed that how people are aware of Istanbul's rich and diverse garden and flower culture, and the need to bring it to the attention of a wider public. Growing flowers and breeding new varieties became a fine art, pursued in Istanbul with as much passion as poetry and music. Ottoman sources record the names of 1585 tulip and 1018 rose varieties and their breeders, for example. In the 17th century Evliya Çelebi writes that there were several thousand gardens in Istanbul, and around eighty florists' shops within the walled city, showing how widespread the love of flowers was at this time.

Acknowledgements: Many thanks to the project team which are Project Director A. Nihat Gökyiğit, Project Consultant Prof. Dr. Nurhan Atasoy, Assistant Project Consultant Feride Demirbağ, Compilation and Adaptation Mehmet Bilgin, Photography and preliminary Design Kenan Kaya, Translation Mary Işın, Design and Layout Çizge Tanıtım ve Kaan Grafik, Consultants Prof. Dr. Mehmet Zeki Kuşoğlu, Seyit Ali Kahraman and Cevat Ülkekel responsible for the emergence of this great study.

Keywords: Istanbul, flower, garden, Ottoman, Turkish.

ORAL-PLTBIO-OP146

The Endemic Plants of Osmaniye (Turkey) ProvinceOsman TUGAY¹, Kuddisi ERTUĞRUL¹, Deniz ULUKUŞ¹¹*Department of Biology, Faculty of Sciences, Selçuk University, Turkey*
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Aim of the study: The aim of the study is to determine the endemic plants of Osmaniye (South Anatolia) province.

Material and Methods: As a result of the botanical trips, 1200 plant specimens were collected between 2014-2015. The research area is in the C6 square according to the Grid system. The collected plants were dried according to common herbarium technics. The dried specimens were identified with the help of Flora of Turkey and East Aegean Islands.

Results: As a result of the examination of 1200 plants specimens which were collected from the research area between 2014-2015, 669 taxa have been determined. With literature records, 186 of total 1073 taxa are endemics and the rate of endemism is 17.3 %. 480 of the total taxa are new records for Osmaniye Province. The some endemic species in Osmaniye are below; *Alkanna amana*, *Allium karamanoglui*, *Arenaria kotschyana* subsp. *stenophylla*, *Astragalus thiebautii*, *Campanula haradjanii*, *Carduus amanus*, *Centaurea antitauri*, *Centaurea ptosimopappa*, *Cephalaria taurica*, *Crocus adanensis*, *Cyclamen pseudoibericum*, *Draba haradjanii*, *Ferula amanicola*, *Galatella anatolica*, *Galium setuliferum*, *Gladiolus osmaniyensis*, *Herniaria amoena*, *Hesperis hamzaogluii*, *Iris stenophylla* subsp. *margaretiae*, *Myopordon thiebautii*, *Noccea densiflora*, *Paracaryum amani*, *Prangos turcica*, *Pseudosempervivum amanum*, *Rhabdosciadium oligocarpum*, *Rhynchosorys elephas* subsp. *boissieri*, *Satureja amani*, *Scorzonera yıldırımlii*, *Scorzonera zorkunensis*, *Silene amana*, *Silene doganii*, *Thlaspi elegans*, *Thurya capitata* and *Viola dirimliensis*.

Acknowledgements: We thank to "EKOİZ" for financial support. We also thank the Curators of ANK, GAZI, HUB and ISTE, who allowed us to study their specimens.

Keywords: Endemic, Plant diversity, Osmaniye.

ORAL-PLTBIO-OP147

The relationship between *Oenanthe pimpinelloides* and *Oenanthe silaifolia* (Apiaceae) and their distribution in Turkey**Ebru DOĞAN GÜNER***Health Services Vocational School, Gazi University, 06830, Ankara – Turkey; e-mail: ebrudogang@gmail.com*

Aim of the study: There are 35-40 species of *Oenanthe* L. genus in the world. It is represented by 9 species in Flora of Turkey. However, the existence of *Oe. incrassans* which is known as the synonym of *Oe. pimpinelloides* L., is suspicious species in Turkey. According to Flora of Turkey, *Oe. pimpinelloides* and *Oe. silaifolia* are closely related species, despite they have got distinctive characters. Within the scope of the revision studies on *Oenanthe* species in Turkey, numerous fieldworks were held between 2014–2015. Also a lot of herbarium specimens were examined in both national and international herbariums. During the investigations, it was realized that two species were confused with each other many times. This study aims the solving of complexity between *Oe. pimpinelloides* and *Oe. silaifolia* with morphological comparison and to present the distribution of the species in Turkey.

Material and Methods: The specimens of *Oenanthe pimpinelloides* and *Oe. silaifolia* were collected in different regions of Turkey between 2014–2015 and they were compared with the representative collections present at E, W, WU, GAZI, ANK and HUB. Differences of two species were given in table by comparatively. Their photographs were also presented in this study. The distribution map is provided with the herbarium records and the localities in which they collected.

Results: *Oenanthe pimpinelloides* and *Oe. silaifolia* are different from each other in respect to their root systems, leaves features, inflorescence structure and fruit characters. It is very easy to recognize, especially when they are collected with their roots. Both species shows wide distribution in Turkey and sometimes they can be found in the same locality. Concerning the habitat preference of two species, it is seen that *Oe. pimpinelloides* is spread under trees or lowlands also in wetlands. But *Oe. silaifolia* prefer wetlands and marshy areas.

Acknowledgements: I would like to thank TUBITAK for its financial support (Project number KBAG–114Z005).

Keywords: Apiaceae, *Oenanthe*, morphology, Turkey.

ORAL-PLTBIO-OP148

**Cytological and Biochemical Analysis of Regenerated Plants of Cabbage (*Brassica oleracea* L.),
obtained from the Reproductive Organs *in vitro***

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The aim of this work is to study the dynamics of accumulation of phenolic compounds in the leaves of cabbage, depending on the ploidy level of cells.

Material and Methods: The objects of study were the leaves, isolated with intact diploid plants of cabbage, and plants-regenerants obtained in vitro culture of reproductive organs (ovaries and anthers), characterized by a different set of chromosomes. In our study we used a new universal method for preparation of chromosomes of plants "SteamDrop". Determining the amount of soluble phenolic compounds was performed according to the method of M. N. Zaprometov. The content of flavanol was determined with 1% solution of vanillin in 70% sulfuric acid at 500 nm. The content of flavonols was determined by reaction with 1% aqueous solution of $AlCl_3$ followed by spectrometry at 415 nm.

Results:As a result of cytological studies, we have shown that the regenerated plants of cabbage, obtained in vitro from the reproductive organs, had different levels of ploidy (n, 3n, 5n). It is known that changing the genome of plants is accompanied by significant changes of their physiological and biochemical functions. The level of ploidy is an important cytogenetic characteristics of cells that determine the physiological and biochemical characteristics of plants. In some cases there is a direct correlation between the ploidy level of plant tissues and their ability to form different classes of phenolic compounds. In turn, the level of accumulation of phenolic compounds to some extent serves as a "criterion" potential resistance of cells/plants to stressful environmental factors. For the first time for cabbage was studied the total content of soluble phenolic compounds, as well as flavans and flavanols in the leaves of different ploidy level of regenerated plants cells (n, 2n, 3n, 5n). It is experimentally established, that with increase of the ploidy level the synthesis of phenolic compounds decreases: to plants-regenerants of haploid forms (n) it remains at a higher level compared to the diploid (2n), which probably indicates a change of the phenolic metabolism. Also for the first time from plant biomass of haploid and diploid regenerated plants of cabbage in vitro were obtained the plant extracts, which exert a weak inhibitory effect (from 10% to 30%) on viability of cell line M-HeLa (human cervical cancer). However, the greatest cytotoxic effect was in the extracts of haploid plants.

Keywords: ploidy level, the accumulation of phenolic compounds, extracts, *in vitro*.

ORAL-PLTBIO-OP149

Ethnobotanical Study on the Useful Plants of Çat (Çamlıhemşin/Rize) Valley and Environs, Kaçkar Mountains National Park, Rize, TurkeyHüseyin BAYKAL¹, Vağif ATAMOV²¹*Department of Plant and Animal Breeding, Pazar Vocational School, Recep Tayyip Erdogan University, 53300 Pazar, Rize-Turkey*²*Department of Biology, Faculty of Arts and Sciences, Recep Tayyip Erdogan University, 53100, Rize-Turkey
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Aim of the study: Even though there are some reviews, except Saraç et al. (2013) and Baykal (2015), about the ethnobotany of Rize there is not any research based on field surveys and face-to-face interview method. Baykal (2015) studied the ethnobotany of Başhemşin and environs in detail. This study is continuation of the Baykal's (2015) study. In this study ethnobotanical features of Çat and environs, underneath of Başhemşin and environs, were recorded. Findings were analysed together with Baykal's (2015) data. The main goal of this study is to record the ethnobotanical features of Başhemşin and environs.

Material and Methods: Plant materials of this study were collected between 2013-2014 vegetation seasons from Çat-Ortayayla region. Plant specimens were identified by Flora of Turkey and East Aegean Islands (Davis, 1965-1985; Davis et al., 1988; Güner et al., 2000) and neighboring country floras. Current situation of the taxa were determined according to Vascular Plants of Turkey, Vascular Plants (Güner, 2012). The ethnobotanical datas were gathered by face-to-face interview method. All of the identified plant species, dried and stucked on the cartoons according to the herbarium techniques, were showed one by one to the local residents. The questions in questionnaire asked them one by one and the datas were recorded. We paid attention especially old people.

Results: In this study, 552 taxa were identified. 64 of these plant species belonging to 45 genera and 25 families were found to be used as folk medicine, antiseptic, nutritions, tea, amulet, ornamental, construction materials, footstool materials such as musical instrument, strawy and firewood. The villagers use medicinal plants for treatment of urine problems, diabetes, cancer, blood stimulator, cold, sniffles, cough, flue, kidney problems, abdominal and stomach ache, bleeding, wounds and antiseptic for animals. Local name, used parts and ethnobotanical uses of taxa were determined. The usage of these taxa in the study area was as follows: nutritions 33, folk medicine 23, tea 10, firewood 8, ornamental 6, amulet 3, animal antiseptic 1 and construction material 1.

Keywords: Ethnobotany, Useful plants, Çat valley, Rize, Turkey.

ORAL-PLTBIO-OP150

Phenolic compounds in higher plants: accumulation, regulation and food security

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Aim of the study: Higher plants, unlike many other organisms, are capable of the biosynthesis of phenolic compounds (PC). These representatives of secondary metabolites produced in virtually all cells. In the young shoots the level of PC is usually high, although in some cases their accumulation increased in the last stages of growth.

Results: The content and composition of the PC are substantially defined by genetic characteristics of plants, their species and the phase of ontogenesis, as well as other factors, including exogenous influences. It should be emphasized that wood plants have a higher ability to accumulate these substances, as compared to herbaceous. The composition of PC is more diverse in green (photosynthetic) tissues of plants, where the main components are bioflavonoids-substances with high biological and antioxidant activity. Such factors as the intensity of light, UV-B rays, growth regulators, signaling molecules (salicylic and jasmonic acids) contribute to the PC concentration in plants, which is important for their resistance to stressors. PC are important for defending biological molecules against oxidative damage. In recent years, the polyphenols are becoming more widely used in pharmacology and medicine, because of their high biological activity and a broad spectrum of action. PC influence on the immune, cardiovascular, antioxidant human systems. They are characterized by biostatic and antitumor activity. All this indicates to the importance of plant polyphenols in maintaining human life and protect the organism against stress factors and adverse environmental conditions.

Acknowledgements: We are grateful to the Russian Foundation for Basic Research for financial support (grant № 14-04-01742).

Keywords: plants, phenolics, accumulation, regulation, pharmacology.

ORAL-PLTBIO-OP151

**The Sub-endemics of the Specially Protected Natural Areas of the North East of the Minor
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Aim of the study: The analysis of endemic flora of the specially protected natural areas shows that they are non- equally distributed in the protected areas having different life forms. Basing on the literature information some endemic status changed into the sub-endemic status. During the investigation it was determined that 16 families, 21 species , 24 kinds in Goy-Gol National Park, 15 families , 23 species , 28 kinds in the Eldar Shamlığı State Nature Reserve - 10 families , 11 species , 11 kinds in the Garayazi State Nature Reserve, 12 families, 14 species, 14 kinds of supendemic are spread in the Korchay State Nature Reserve.

Material and Methods: The investigation was conducted in Goy-Gol National Park, Eldar Shamlığı State Nature Reserve, Korchay State Nature Reserve. The research material has been SPNA's flora and fauna. The stationary and route methods were used in the investigation. The coverage was 250-3600 m above sea level and the area was 28932.6 hectares. At the same time, floristic - systematic, areological, botanical, geographical, fitosenological, statistical methods used in the floristic botany were taken into account. The size of the sample area was 100m². 10 m² sample areas were selected in the territory where the size of the grow area not allowed. Also the small pitches in the sample area of 10m² have been established. In the selection of the sample area the homogeneous rock plants, homogeneous reef plants were taken into account. In some cases, if the sample area is less than 100 m² in size the description of the vegetation measures the boundaries of the natural reserve. The size of the sample areas was taken so that it could fully cover the plant groups which we learned in it. Over 1000 herbarium materials have been collected.

Results: The analysis of endemic flora of the specially protected natural areas shows that they are non-equally distributed in the protected areas having different life forms. As a whole in the investigation area, 13 families, 24 species, 30 Azerbaijan kinds, 22 families, 37 species, 48 kinds superdomes and Caucasus kinds are known. *Allium szovitsii*, *Rosa prilipkoana*, *R. komarovii*, *R. nizami*, *Vavilovia formosa*, *Viola caucasica*, *Acantholimon tenuiflorum*, *Salvia verbascifolia*, *Ziziphora serpyllacea*, *Thymus fedtschenkoi*, *Veronica minuta*, *Euphrasiakurdica*, *E. nisami*, *Galium kiapazlı* localized in the Goygol National Park. In GNP 8 families, 11 species, 14 species are paleoendems. *Pyrus eldarica*, *Pinus eldarica*, *Netorularia eldarica*, *Galium eldaricum*. Paleoendems are spread in the Eldar Shamlığı State Nature Reserve. As a result of the monitoring observations it was established that there are 8 families, 13 kinds of endems according 12 species in the reserve. Basically endems are Iran, Iberia, Turan and Albanian rooted. Here Hirkan, Dagestan and Minor root endems are not founded. 15 kinds of Iran, 6 kinds of Turan, and 5 kinds of Iberia endems and supendems roots are spread. In the Qarayazi Natural State Resere 5 families, 6 species, 6 kinds, in the Korchay State Nature Reserve 5 families, 7 species, 7 kinds are spread. 170 species of Caucasian origin are spread in the four investigated reserves.

Keywords: flora, family, species, endemic, sub-endemic indigenous, allaxton, floragenesis, xerophytes.

ORAL-PLTBIO-OP152

Chemical and Biological Evaluation of Some *Alyssum* L. Taxa Distributed in the Aegean Region, TurkeyCennet ÖZAY¹, Ramazan MAMMADOV¹¹Department of Biology, Pamukkale University, Turkeycennetozay@hotmail.com

Aim of the study: In this research the phenolic composition, antioxidant, antibacterial and cytotoxic activities of the methanolic extracts obtained from some *Alyssum* L. taxa (*A. foliosum* var. *megalocarpum*, *A. fulvescens* var. *fulvescens*, *A. simplex*, *A. murale* var. *murale*, *A. strigosum* subsp. *strigosum*, *A. corsicum*, *A. virgatum*, *A. cypricum*, *A. sibiricum*, *A. discolor*) known as kuduzotu in western Turkey, were firstly investigated.

Material and Methods: The antioxidant activity of the extracts was determined by DPPH, metal chelating, phosphomolybdenum, β -carotene/linoleic acid and ferric reducing power assays. Total phenolic and flavonoid contents of each extract were also investigated by using both Folin-Ciocalteu reagent and aluminium chloride. The brine shrimp (*Artemia salina* L.) lethality test was used to screen for the possible cytotoxic activity of the extracts. Three human cancer cell lines (MCF-7, H1299 and HeLa) were used for the determination of cytotoxic effects on cancer cells of extracts. MIC concentrations were determined with broth microdilution assay for the antibacterial activity. The phenolic components were determined by HPLC. The quantification of some heavy metals (Cr, Cd, Ni, Co, Fe and Cu) in ten *Alyssum* taxa was carried out using microwave assisted digestion followed by inductively coupled plasma optical emission spectrometry (ICP-OES).

Results: The amounts of cinnamic acid derivatives were higher in hyperaccumulator taxa, while the benzoic acid derivatives were higher in non-hyperaccumulator taxa. Total phenolic and flavonoid contents in the extracts were correlated with antioxidant potentials. Generally, *A. simplex* ve *A. discolor* were the most biologically active taxa in all assays as non-hyperaccumulators, while *A. virgatum* was the most biologically active taxon in the hyperaccumulator taxa. More detailed investigations are needed to test the biological activities of *Alyssum* taxa as hyperaccumulator and non-hyperaccumulator taxa. Because the genus *Alyssum* L. is one of the biggest genera in Turkey and many of them are endemic.

Acknowledgements: This study was supported financially as a doctoral project (Project No: 2013FBE029). The authors are thankful to the Scientific Research Projects Coordination Unit (PAU-BAP), Pamukkale University, Turkey for providing financial support.

Keywords: *Alyssum* L., antioxidant capacity, antibacterial activity, cytotoxicity, HPLC.

ORAL-PLTBIO-OP153

Plant Diversity of Kayseri Province (TURKEY)Ahmet AKSOY¹, Bayram ATASAGUN²,¹*Akdeniz University, Science Faculty, Department of Biology, Antalya, TURKEY*²*Erciyes University, Science Faculty, Department of Biology, Kayseri, TURKEY*

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Aim of the study: Turkey's flora is more unique and richer than the neighbouring countries because of its geographic location, its position as a bridge between Europe and Asia, its geological history, different climatic conditions and different topographic conditions it has.

Kayseri is located in the B5, B6 and C5 squares according to Grid squaring system. Kayseri is one of the regions of Turkey which has the richest plant diversity among other regions. Kayseri becomes more important as it has important altitudes within its boundaries such as Aladağlar, Tahtalı and Erciyes Mountain both of which show the richest plant diversity. In this study, the floristic diversity of the Kayseri province has been evaluated.

Material and Methods: Scientific studies on flora of Kayseri and its surrounding which has been established at different years are analysed and evaluated.

Results: Kayseri province situates in the Irano-Turanian phytogeographical region. 2260 taxa (1611 species, 388 subspecies and 256 varieties) belonging to 119 families, 618 genera are detected in consequence of an evaluation of floristic studies in Kayseri. The subdivision Gymnospermae includes 20 taxa belonging to 4 families and 9 genera. The subdivision Angiospermae includes 2222 taxa belonging to 110 families and 601 genera. 532 of these taxa are endemic. The rate of endemism is ~24 %. 25 of these is only specific to Kayseri (local endemic).

Keywords: biodiversity, endemic, flora, Kayseri, Turkey.

ORAL-PLTBIO-OP154

Micropropagation and Cryopreservation of Some *Cyclamen* Species Naturally Grown and Endemic to TurkeyTolga İZGÜ¹, Başar SEVİNDİK², Pembe ÇÜRÜK², Özhan ŞİMŞEK², Yıldız Aka KAÇAR²,
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Aim of the study: The origin of 20 *Cyclamen* taxon belongs to *Primulaceae* is Mediterranean region and grown under trees and bushes. There are 10 *Cyclamen* species grown naturally in our country. Five endemic *Cyclamen* species are grown in Turkey where is a gene center of many plant species. *Cyclamens* are under extinction due to destruction of natural habitats, unconscious usage of agricultural areas and taking out the tubers continuously from nature for export. For this reason, conservation studies and biotechnological researches on cyclamen which is an important genetic resource are significant. *In vitro* propagation and cryopreservation techniques are used to preserve plant genetic resources using biotechnological techniques.

Material and Methods: To investigate *in vitro* preservation possibilities of *Cyclamen* which is an important genetic resource in our country, the media of somatic embryogenesis were optimized using different plant growth regulators (2,4-D and 2iP) and different explant types for *C. persicum*, *C. cilicium*, *C. mirabile*, *C. pseudibericum* and *C. parviflorum*.

Results: The most effective explant types for callus induction were leaves (56% for *C. cilicium* and 59% for *C. parviflorum*) and petioles (80% for *C. mirabile* and 100% for *C. pseudibericum*). Callus growth from the leaves and petioles of *C. cilicium* was 30 days earlier than that of *C. mirabile* and *C. pseudibericum*. The most embryogenic callus formed from the petioles of *C. pseudibericum* (100%) in medium with 2.5 mg l⁻¹ 2,4-D and 1 mg l⁻¹ 2iP.

Keywords: Cryopreservation, *Cyclamen*, endemic, micropropagation.

ORAL-PLTBIO-OP155

In vitro propagation, Cryopreservation and Synthetic Seed Production in Some *Crocus* SpeciesBaşar SEVİNDİK¹, Tolga İZGÜ², Pembe ÇÜRÜK¹, Ehsan Mohammad TAGİPUR³,
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Aim of the study: The aim of this study was to propagate some *Crocus* species which are cultivated and grown naturally in our country (*Crocus sativus* L., *Crocus ancyrensis*, *Crocus pallasii* ssp. *pallasii*) using somatic embryogenesis technique and to observe the stages of callus growth histologically for only *Crocus sativus* L.

Material and Methods: *In vitro* regeneration experiments were conducted using corm explants belong to different *Crocus* species to search micropropagation possibilities of this plant which is a valuable genetic resource of Turkey. In the experiments, different plant growth regulators; NAA (0, 0.5, 1.0, 2.0 mg L⁻¹), BA (0, 0.5, 1.0, 2.0 mg L⁻¹), 2 İP (0, 0.5, 1.0, 2.0 mgL⁻¹) and 2,4-D (0, 0.5, 1.0, 2.0 mgL⁻¹) combinations and concentrations were used to determine the growth and development of plants.

Results: As a result, the best callus growth was obtained from MS medium with 2 mg L⁻¹ 2.4D + 1 mg L⁻¹ 2 İP for *C. sativus* L, 1mg L⁻¹ NAA + 0.5mg L⁻¹ BA for *C. pallasii* subs. *pallasii*, 1mg L⁻¹ NAA + 0 mg L⁻¹ 2İP for *Crocus ancyrensis*. The highest conversion of callus structure to microcorm was obtained from MS containing 2 mg L⁻¹ NAA, 2 mg L⁻¹ BA as 60% for *Crocus sativus* L. The number of somatic embryo per explant were 130 for *C. sativus* L, 90 for *C. pallasii* subs. *pallasii*, 75 for *Crocus ancyrensis*. *In vitro* cryopreservation and synthetic seed production protocol was improved.

Keywords: Cryopreservation, *Crocus*, micropropagation, *in vitro*.

ORAL-PLTBIO-OP156
Bryophytes of Jeyranchol Plateau (Azerbaijan)T. P. GASIMOV¹, V.S. NOVRUZOV²¹*Institute of Botany, Azerbaijan National Academy of Sciences, 40 Badamdar Highway, Baku, AZ1073, Azerbaijan.*²*Ganja State University, Shah Ismayil Khetayi Avenue, Ganja, Azerbaijan
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Aim of the study: Jeyranchol plateau located in Kura lowland between Kura and Iora rivers. Jeyranchol area is one of the best winter pastures of Azerbaijan. Winter pastures of area is located in Agstafa, Tovuz, Shamkir, Samukh districts and area is 169.6 thousand hectares. The highest peak Jeyranchol plateau is Chobandagh (from above sea level 890-900 m) and the lowest level is the Kura River. Jeyranchol length from North-West to South-East is 140 km, width from North to South direction is 15-30 km.

Material and Methods: Geomorphological condition, different soil types carrying landscape characteristics, development regularity of bryophytes and obtainment of results with scientific experience importance on phylogenesis is extremely important to study the bryophyte flora of the area. Analysis of families of mosses Jeyranchol plateau seems that *Brachytheciaceae*, *Bryaceae*, *Encalyptaceae*, *Grimmiaceae*, *Orthotrichaceae*, *Pottiaceae* dominated in area and consist of 85.6%, *Amblystegiaceae*, *Ditrichaceae*, *Fissidentaceae*, *Hypnaceae*, consisting 14.4%. The liverworts of Jeyranchol plateau *Aytoniaceae*, *Cephaloziellaceae*, *Frullaniaceae*, *Porellaceae*, *Radulaceae* families were represented each family in one species and carried monospecific character.

Results: As a result of the investigations carried out in Jeyranchol plateau of Azerbaijan, the spread of 47 species of bryophytes 10 families, 22 genera, 42 species belong to mosses and 5 families, 5 genus, 5 species belong to liverworts.

Keywords: Jeyranchol plateau, mosses, liverworts, family, species.

ORAL-PLTBIO-OP157

Two VOCs, trans- β -caryophyllene and α -humulene, mediated relationship between *Thaumetopoea wilkinsoni* Tams. and *Pinus brutia* Ten.Gürkan SEMİZ^{1,2}¹Pamukkale University, Department of Biology, TURKIYE²FAGUMER - Flora and Fauna Research, Development and Application Center of Pamukkale University
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Aim of the study: Plants emit VOCs after insect attacks and the release of these gaseous compounds has been demonstrated to affect the chemical and physical properties of the atmosphere. Herbivore insects induces plant defenses, as the emission of herbivorous-induced plant volatiles, which could easily be used by parasitoids. In response to these attacks, plants release these VOCs, which play an important role in the communication between plants and the associated community members, such as other herbivores, phytopathogens and the natural enemies of herbivores. In this study, I searched for the VOCs differences between infested and healthy trees in *Pinus brutia*.

Material and Methods: The plant materials were collected in 2012 from a clonal seed orchard located in Cigliik, Antalya, in southern Turkey. The orchard consists of 30 selected clones originating from a seed stand situated in Eskibag-Gundogmus, near Manavgat region of Antalya in Turkey. Each clone in the orchard was represented by about 70 ramets. VOCs collected tubes were transported in dried ice from sampling sites to the laboratory in Pamukkale University and stored at -20 °C until analysed. VOCs from infested and healthy trees were identified using GC-MS combined with ATD analyses.

Results: GC-MS analysis showed qualitative and quantitative differences among volatiles emitted by infested and healthy trees. Two sesquiterpene VOCs (trans- β -caryophyllene and α -humulene) were detected in higher amount in infested trees, in respect to healthy trees. Our study adds basic knowledge to the behavioral ecology *Pinus brutia-Thaumetopoea wilkinsoni* complex. From an applied point of view, the field application of the above-mentioned VOCs may help to enhance effectiveness of biological control programs.

Acknowledgements: This research has been fully supported by TUBITAK-(Project No:110T976).

Keywords: *Pinus brutia*, *Thaumetopoea wilkinsoni*, VOCs.

ORAL-PLTBIO-OP158

The Final Taxonomic Status of *Fritillaria* (Liliaceae) Subspecies in Turkey

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Aim of the study: The genus *Fritillaria* (Liliaceae) comprises approximately 140 species of bulbous perennials which are distributed in the temperate zone of the Northern Hemisphere and currently divided into eight subgenera. 43 taxa belonging to the three subspecies of *Fritillaria* distributed in Turkey. *Fritillaria* genus includes taxa of both horticultural and medicinal importance. In Turkish flora, *F. acmopetala*, *F. alfredae*, and *F. sibthorpiana* have one of each subspecies. *F. crassifolia* has two subspecies. In this study, these subspecies were raised species level and some subspecies also were evaluated again species level by taxonomic and detailed morphological, seed surface, karyological studies and geographical distribution on these taxa.

Material and Methods: The specimens of *Fritillaria* taxa were collected in different regions of Turkey and they were compared with the representative collections present at Turkish and abroad herbaria. Differences of nine species were given separately in table by comparatively. The distribution maps of species and old subspecies are given. For chromosome studies, root tips taken from bulbs were pretreated with α -monobromonaphthalene for 16 h at 4 °C and fixed in Farmer. They were then hydrolyzed in 1N HCl at 60 °C for 12 min and stained in Feulgen for 1 h. Root tips were squashed in a drop of 45% acetic acid. After removing of cover slips in liquid nitrogen, air-dried slides were mounted in Depex. Chromosome numbers were determined at least in ten metaphase plates and karyotypes and idiograms were determined at least in 5 metaphase plates for each taxon. In order to determine the average seed sizes, 20 seeds from each species were measured. Seed samples were obtained from mature capsule and prepared to investigate for SEM study, mature seed were transferred to stubs and coated with gold. A JEOL JSM-5600 scanning electron microscope was used for examinations.

Results: *F. acmopetala* subsp. *wendelboi* is evaluated in species level as *F. wendelboi*, *F. sibthorpiana* subsp. *enginiana* as *F. enginiana*, *F. crassifolia* subsp. *hakkarensis* is raised species level as *F. hakkarensis*. *F. alfredae* subsp. *glaucoviridis*, which was reduced subspecies level by Rix in 1979, is evaluated again species level as *F. glaucoviridis*. Samely *F. alfredae* subsp. *platyptera* is evaluated again species level as *F. platyptera*. *F. crassifolia* subsp. *kurdica*, which was reduced subspecies level by Rix in 1974, is evaluated again species level as *F. kurdica*.

Acknowledgements: I would like to thank TUBITAK for its financial support (Project number TBAG-100T121).

Keywords: Liliaceae, *Fritillaria*, taxonomy, karyology, Turkey.

ORAL-GMOBIO-OP159

Different ways to increase polymorphism decorative characteristics *Linum grandiflorum* Desf.Irina LYAPINA, Alexander TYURIN*Russian Timiryazev State Agrarian University, Russia, 127550, Moscow, Timiryazevskaya st., 49
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Aim of the study: *Linum grandiflorum* Desf. is a widespread ornamental plant. It has large bright flowers and a high adaptive capacity, as well as interesting economic characteristics, but the range of flower shape and corolla colour is extremely poor. Since it is these characteristics are critical in determining the variety's decorativeness, there is a need to change the genome that can be achieved in various ways. For example, the previously applied chemical mutagenesis (Lagron, Lyakh, 2002), induction of somaclonal variation due to prolonged passaging callus culture or genetic transformation.

Material and Methods: We used *Linum grandiflorum* seeds of two forms: album and rubrum, Murashige and Skoog (MS) and Gamborg (B5) medium, as well as growth regulators BAP, NAA and 2,4-D in different concentrations, sterilizer: 5 % sodium hypochlorite solution (exposure 15 min.) and unsterile control. For transformation were used *pGfpAgrobacterium tumefaciens*.

Results: We've perfected a technique of introduction *in vitro* *L.grandiflorum* two forms: rubrum and album, analysed the efficiency of the seeds germination on hormonal and nonhormonal medium and in control, received the data for root formation and morphogenesis, as well as spontaneous callusogenesis, studied the dynamics of callus growth taking into account the effect of prolonged passaging on medium MS and B5 with different hormonal composition. Data on the use of *Agrobacterium*-mediated *L.usitatissimum* transformation techniques on *L.grandiflorum* were received.

Keywords: *Linum grandiflorum*, somaclonal variability, genetic transformation, decorative.

ORAL-GMOBIO-OP160

The use of Genetically Modified Plants around the World

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Aim of the study: The purpose of this paper is to answer the question: "What is the current use of Genetically Modified plants around the world?"

Material and methods: The increasing cultivation of GM crops has raised concerns with respect to health risks, food safety, environmental and socio-economic issues. Nevertheless, the global market share of transgenic crops is already large and is still growing fast. Therefore, in this study, the current increasing usage of GM plants around the world is discussed in the light of literature.

Results: Commercial cultivation of transgenic crops started in the early 1990s. Today, around the World, almost 150 million hectare GM crops are now commercially planted in 22 countries. USA, Argentina, Brazil, Canada and China are the largest producers of the GM crops. The modified traits for the commercial cultivation are mostly herbicide tolerance and insect resistance. The most prominent cultivated plants are soybean, maize, cotton, and rapeseed. Moreover, transgenic plants can also be used in the production of effective substances of the drugs, monoclonal antibody, and other recombinant proteins. As the total farming acreage is no longer increasing, the world food prices will likely to rise up in the next decade. On the other hand, the use of Genetically Modified (GM) crops for the livestock fodder has been quadrupled in the last 50 years, primarily driven by increasing wealth in the developing World, with no sign of stopping. This has led to a point that, %80 of the lands should be used for the production livestock feeding crops.

Keywords: Genetically Modified Plants, GMO, GM cultivation, World.

ORAL-ECOTOUR-OP161

A Fair Rural Tourism Practice: Eco-agro Tourism and Voluntary Exchange (TaTuTa)Esen ORUÇ¹, Orhan GÜNDÜZ², Abdullah TAŞKIN³¹ *Gaziosmanpaşa University Faculty of Agriculture Department of Agricultural Economics - TOKAT/TURKEY*² *Inonu University Vocational School of Battalgazi MALATYA/TURKEY*³ *Gaziosmanpaşa University Faculty of Agriculture Department of Agricultural Economics - TOKAT/TURKEY*esen.orucbuyukbay@gop.edu.tr

Aim of the study: TaTuTa project is a practice of rural tourism which continued in Turkey since 2003 founded by Buğday Association for Supporting Ecological Living. It is seen that, as of 2016, 82 farms are involved in TaTuTa, Turkey wide. The aim of study was to reveal the specific characteristics of farm, farm owners or farm managers who primary utilizers of the TaTuTa project and was to assess the utility level from the project.

Material and Methods: To reach these aims, in 2014, data obtained by questionnaire from the 65 of 69 farms were analyzed. Data has been interpreted by the percentage distribution, mean values and comparisons.

Results: According to results of research, farm owners are pleased generally that they are engaged in these activity. The majority of them express that these activity is a mid-level source of income. Research results showed that if the TaTuTa project expands to whole country, it will be benefit.

Keywords: Rural Tourism, TaTuTa, Eco-agro Tourism.

ORAL-ECOTOUR-OP162
Plant Diversity and Ecotourism on Tunceli

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Aim of the study: Aim of this study is to share the possible economic contributions of ecotourism for residents of Tunceli. Thus, they may find some support for sustainable development of their communities and knowledge about the research related to the usage of ecosystem and environment. The unplanned ecotourism activities were investigated and some solutions how they can become useful and more comprehensive.

Material and Methods: The areas where ecotourism can be used were examined. The routes were planned considering their purposes and the ways. Current nature trips and their contributions to local community as well as their effects on environment were observed. Additionally, the Munzur Valley National Park was observed by many visits during several periods. Many meetings were arranged with different environmental groups and the Nature Conservation and National Parks XV. Regional Office. Small groups including sometimes up to 40-50 people, carry out tracking and climbing activities in Tunceli. Many people from different cities of Turkey, as well as abroad participated in those activities. The activities include visits of glacier lakes, sightseeing of *Fritillaria imperialis* and other geophytes and/or holy areas identified by the community. During those trips, environment and living things can be damaged unconsciously. The observations were carried out following such routes.

Results: Tunceli consists of mountains ranging from 1500 m to 3000 m watering by different small and large streams. The reasons behind the protection of natural life in those areas are twofold: areas consisting of mountains and deep valleys, and rare human population. This province can be considered as a haven for wildlife and plants. There are six glacial lakes in the province. Tunceli consists of 75% mountains, 25% plateaus and 5% plains. Moreover, Munzur Valley National Park is one of the Turkey's largest national parks and was declared as a national park since 1971. Tunceli has a unique structure because of its different and noteworthy nature and culture. The Flora of Tunceli has 18% rate of endemism. New species for the science world are still being identified. In Tunceli, which has the highest literacy rate in Turkey, community is aware of the importance of nature and tries to protect it. Some suggestions about the better ways of increasing the value of this potential are presented. The routes for nature trails in Tunceli were determined. An area regulated for Geophytes in the national park was planned. Some special species and habitats also have been proposed to be protected and monitored.

Acknowledgements: I would like to thank Zeynel Duman who is director of SOS Munzur. I am really grateful to Republic of Turkey Ministry of Forestry and Water Affairs, General Directorate of Nature Conservation and National Parks, especially, Ali Haydar Gürsönmez and Murat Özel at the same institution in Tunceli.

Keywords: Tunceli, ecotourism, plants, endemic, flora.

ORAL-ANIBIO-OP163

A Contribution to the knowledge of family Dytiscidae (Coleoptera: Adephaga) of Bingöl Province (Eastern Anatolia, Turkey)Medeni AYKUT¹¹Dicle University, Science and Technology, Research and Application Center, 21280, Diyarbakır, Turkey.medeni.aykut@dicle.edu.tr

Aim of the study: The ordo Coleoptera has two suborders, i.e., Polyphaga and Adephaga. Subordo Adephaga has one superfamily named Caraboidea and 11 families. Family Dytiscidae is the second largest family of Adephaga. In the Palearctic region, it is represented by 42 genera, and approximately 1100 species. In our country, 27 genera, and 139 species of Dytiscidae have been reported. Bingöl province has numerous habitat types that are suitable for aquatic insects. Despite the available habitats; only two Dytiscid species have been reported from this province up to now. The aim of this study was to determine the aquatic coleopters fauna (Coleoptera: Dytiscidae) of Bingöl province.

Material and Methods: This study was conducted in Bingöl province in the Eastern Anatolian region of Turkey. Total of 105 aquatic localities were investigated during the study period (May, July and September 2014 and 2015). Specimens were collected from various aquatic habitats using a net with a mesh size of 0.5 mm. Beetles were fixed and preserved in 70% ethanol at the spot. Coarse particles of beetles were cleaned with a small paintbrush; also minor particles were cleaned with portable ultrasonic cleaner. Photographs were taken using a stereomicroscope (Z16 APO; Leica, Wetzlar, Germany) and scanning electron microscope (SEM) (Quanta 250 FEG; FEI, Eindhoven, The Netherlands).

Results: A total of 1875 specimens belong to family Dytiscidae were collected during the study period. In the study are 36 species belong to 16 genera were identified. Of these 35 species were first records for Bingöl province. Also; *Hygrotus impressopunctatus* (Schaller, 1783) and *Eretes sticticus* (Linnaeus, 1767) were the second records for Turkish aquatic coleopters fauna. In addition some species that have not been identified fully are considered to be new records for Turkish fauna. Consequently; detailed studies for each province must be performed to determine the aquatic coleopters fauna of our country.

Acknowledgements: This study was supported by the Research Fund of Dicle University (DUBAP); project no 14-DÜBTAM-81.

Keywords: Dytiscidae, Aquatic coleopters, Bingöl.

ORAL-ANIBIO-OP164

Scorpion (Scorpiones) Fauna of Turkey: Biodiversity and EndemismErsen Aydın YAĞMUR¹, Fatih Yeşilyurt²¹Celal Bayar University, Alaşehir Vocational School, Manisa, Turkey,²Hakkari University, Yüksekova Vocational School, Hakkari, Turkey
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Aim of the study: Aim of this study is introduce scorpion biodiversity and endemic species in Turkey.

Material and Methods: The specimens were collected from under the stones in daytime and using UV lamp at night from all regions of Turkey. The literature records were also used.

Results: Turkish scorpion fauna includes 36 species belonging to 13 genera and four families: *Androctonus crassicauda*, *Buthacus macrocentrus*, *Compsobuthus matthiesseni*, *C. schmiedeknechti*, *Hottentotta saulcyi*, *Leiurus abduhbayrami*, *Mesobuthus caucasicus*, *M. eupeus*, *M. gibbosus*, *M. nigrocinctus*, *M. phillipsii*, *Orthochirus zagrosensis* (Buthidae), *Scorpio maurus* (Scorpionidae), *Neocalchas gruberi*, *Calchas anlasi*, *C. birulai*, *C. kosswigi*, *C. nordmanni*, *lurus kinzelbachi*, *Protoiurus asiaticus*, *P. kadleci*, *P. kraepelini*, *P. kumlutasi* (Luridae), *Euscorpius arikani*, *E. avcii*, *E. ciliciensis*, *E. eskisehirensis*, *E. gocmeni*, *E. italicus*, *E. lycius*, *E. mingrelicus*, *E. phrygius*, *E. rahsenae*, *E. sultanensis*, *E. uludagensis*, *E. koci* (Euscorpiidae). The species *Leiurus abduhbayrami*, *Neocalchas gruberi*, *Calchas anlasi*, *C. birulai*, *C. kosswigi*, *C. nordmanni*, *lurus kinzelbachi*, *Protoiurus asiaticus*, *P. kadleci*, *P. kraepelini*, *P. kumlutasi*, *Euscorpius arikani*, *E. avcii*, *E. ciliciensis*, *E. eskisehirensis*, *E. gocmeni*, *E. lycius*, *E. phrygius*, *E. rahsenae*, *E. sultanensis*, *E. uludagensis*, *E. koci* are endemic or subendemic for Turkey. A total 17 of scorpion species is endemic in Turkey (%47).

Keywords: Scorpiones, Scorpion, Fauna, Endemism, Turkey.

ORAL-ANIBIO-OP165

Turkish Aphid Diversity with New Additions From Eastern Part of TurkeyÖzhan ŞENOL¹, Gazi GÖRÜR², Gizem GEZİCİ³, Hayal AKYILDIRIM BEĞEN⁴¹*Nigde University, Science and Art Faculty, Department of Biology, 51000, Niğde*²*Nigde University, Science and Art Faculty, Department of Biotechnology, 51000, Niğde*³*Nigde University, Science and Art Faculty, Department of Biology, 51000, Niğde*⁴*Artvin Coruh University, Forestry Faculty, Botany Department, Artvin/Turkey**shenol_euzhan@hotmail.com*

Aim of the study: Aphids are small herbivorous insects. Recently they invaded new areas and increased damages to agricultural crops due to their partenogenetic reproduction, telescopic generation and the high level of adaptation capabilities. Nearly 5000 aphid species determined for world aphid fauna and more than 500 aphid species listed for Turkey aphid fauna. There are increased amount of study conducted during last 10 years added considerable number species to current Turkey aphid fauna. In this aspect, this study conducted in eastern part of Turkey (Adıyaman, Malatya, Şanlıurfa Provinces) aimed to find out the current composition of the aphid fauna of Eastern part of Turkey and their possible contribution to Turkey aphidofauna.

Material and Methods: This study was conducted in Eastern Part of Turkey (Adıyaman, Malatya, Şanlıurfa Provinces) on November in 2015. Species identification process was carried out according to Blackman and Eastop (2016). The taxonomic status of the species was checked according to Favret, (2013); Nafria, (2013). Voucher samples were kept at the Biotechnology Department of Nigde University. The geographic distribution of the species is presented after Holman (2009), Blackman and Eastop, (2016).

Results: About 532 aphid species are known in Turkey. Görür et al. (2012) were listed about 480 species and Şenol et al. (2014; 2015a, 2015b) were added nearly 30 aphid species. With recent study which conducted in Eastern part of Turkey *Anocea haupti*, *Melanaphis bambusae*, *Dysaphis radiocola* and *Indiochaitophorus furcalus* added as a new entry for Turkish aphidofauna. These are preliminary findings of the planned study which indicated how results are going to be important for Turkey aphid fauna.

Acknowledgements: Author thanks to Turkish Scientific Council (project number 115Z325) for supporting this study.

Keywords: Aphid diversity, Hemiptera, New entry, Eastern Part of Turkey.

ORAL-ANIBIO-OP166

Predatory Mammal Species of Osmaniye Province (Mammalia: Carnivora) from Turkey

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Aim of the study:Osmaniye where is located on Anatolia diagonal, Mediterranean Region of east and Cilicia end point is surrounded by Amanos mountains and it contains many mammal species because of landforms. Predatory mammals are a significant order located at the top of the food pyramid in the ecosystems in which they exist in the wild life. They have important roles in balancing the populations of animals which are smaller and large in numbers with a potential for spreading diseases and causing an economic loss.

Material and Methods:This study was based on field surveys conducted in the natural areas of Osmaniye province at 2014. Observations were made in all of Osmaniye province in field work and ten Carnivora species either directly or stool, foot, hairy traces, and etc. were detected. In addition, predatory mammal species were determined using photo-traps and SLR camera.

Results:It was determined in field surveys that *Mustela nivalis* (Weasel), *Martes foina* (Stone Marten), *Meles meles* (Badger), *Herpestes ichneumon* (Egyptian Mongoose), *Vulpes vulpes* (Red Fox), *Canis lupus* (Wolf), *Canis aureus* (Jackal), *Felis chaus* (Jungle Cat), *Caracal caracal* (Caracal) ve *Felis silvestris* (Wild Cat) species from order Carnivora are distributed. Environmental pollution, expansion of agricultural areas, increased urbanization, traffic accidents and hunting activities are to threat to species.

Acknowledgements: This work was supported by the Turkish Ministry of Forest and Water Works, Nature Protection Head Office of National Parks, VII. Region Directorate, Osmaniye Branch Directorate and EKOİZ Limited Company.

Keywords: Osmaniye, carnivora,species.

ORAL-ANIBIO-OP167

A Light Microscopy Study on Larval Integument Cycle of LepidopteraSadettin ÜNSAL¹, Naci GÖRER²¹ Department of Biology, Science Faculty, Selçuk University, TR-42075 Konya-Turkey² Department of Biology, Science Faculty, Selçuk University, TR-42075 Konya-Turkey
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Aim of the study: To better understand the effect of chitin selective insecticides on integument for pest control, the cycle of sixth stage larval integument of a Lepidoptera example, the beehive pest *Galleria mellonella* (Linnaeus, 1758) (Lepidoptera: Pyralidae) was investigated by light microscopy.

Material and Methods: The *G. mellonella* larvae used in this study were obtained by reproduction from Insect Culture Laboratory stock cultures of the Biology Department in the Science Faculty of Selçuk University. Two hundred *G. mellonella* larvae were selected and maintained in glass jars. Larvae were fed with semi-synthetic food. These jars were incubated under total darkness at 28 ± 2 °C with 78% relative humidity. Four healthy larvae were taken for examination at 12 and 120 hours among. Larvae were anesthetized; head and abdomen were cut and fixed with 10% neutral formaldehyde solution for 48 h. Samples were prepared and obtained as blocks as follows: washing, dehydration, clearing, passing from soft and hard paraffin. Blocks were then sectioned at 6 µm thick. An Olympus light microscope was used to measure cuticle thickness at ×400 magnification and Leica light microscopy was used for photography at ×400 and ×1000 magnifications. Thickness measurements were done at least ten times for each sample from the integument tergum cuticle at time points stated above. Four samples were used for each time point. Arithmetic mean and standard deviation of the measurements were calculated

Results: Larval integument cycle of a Lepidoptera example *Galleria mellonella* occurred at 108 h. Epicuticle shape was completed by epidermal cells at 12 hours. Epidermal cells underwent mitosis at 72 h. At 84 h, procuticle shaping was completed and interzone cuticle occurred. Apolysis occurred at 96 h. After apolysis, endocuticle of old cuticle was digested. At 108 h, molting occurred by disposing larval integument epicuticle and exocuticle.

Acknowledgements: This work is supported by Selçuk University BAP Office with the research Project number 10201074.

Keywords: larval integument, integument cycle, cuticle, light microscopy

ORAL_ANIBIO-OP168

**Enlarging the Knowledge on the Distribution and Hosts of *Sympiesis lucida* Storozheva, 1981
(Hymenoptera: Eulophidae)**Yunus BAYRAM¹, Yasemin GÜLER², Victor FURSOV^{2,3}¹ Department of Plant Protection Products, Ankara, Turkey² Plant Protection Central Research Institute, Ankara, Turkey³ Institute of Zoology of National Academy of Sciences of Ukraine, Kiev, Ukraine
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Aim of the study: South American tomato moth, *Tuta absoluta* (Meyrick) (Lepidoptera: Gelechiidae) has a great economical importance for the agriculture. Although the pest is a Neotropical species, it was also recorded in many countries of Palearctic region. Turkey is among these countries since 2009, and the pest quickly infested tomato plantations across the country. Chemical control is partially successful on the pest. Therefore, biological control and biotechnical methods became important to bring the pest under control. This study was carried out to determine the potential new parasitoids of *T. absoluta* as additional to seven parasitoid species previously recorded from Turkey.

Material and Methods: Over 200 tomato seedling samples were collected in the farming fields near Diyarbakır city on 10-20 June 2014. About 20 seedlings samples which were naturally infested with *T. absoluta* larvae and pupae have been found. These 20 infested tomatoes seedling pots were transferred into lattices under constant climatic conditions at $25,0 \pm 1,0$ °C, $65,0 \pm 5\%$ RH and photoperiod of 16:8 (L: D) in the laboratory. The tomato seedlings were watered and controlled daily till the end of the study (15 July 2014). The first adult parasitoid emerged from the larva of *T. absoluta* on 04 July 2014. The specimens of emerging parasitoids were sent to the experts in the Plant Protection Central Research Institute, Ankara for the species identification. The parasitoids were pinned and labelled according to current taxonomic rules. The identification of the species was made according to the relevant literature.

Results: The parasitoid is identified as *Sympiesis lucida* Storozheva, 1981 (Hymenoptera: Eulophidae). This species is firstly recorded as the parasitoid of *Tuta absoluta*. It is also a new record of *S. lucida* for the fauna of Turkey. Therefore, Turkey was the third country in terms of the distribution of it after Lithuania and Bulgaria. Although the *Sympiesis* is a large genus of the family Eulophidae (Hymenoptera: Chalcidoidea) with 137 valid species being larval and pupal parasitoids of many species of Lepidoptera, Coleoptera, Diptera, Hemiptera and Hymenoptera, nine species are just recorded in Turkey. Further researches are needed to confirm the efficiency of parasitoid *S. lucida* Storozheva as potential biological agent and to determinate other *Sympiesis* species in Turkey.

Acknowledgements: The authors would like to thank Dr. Münevver KODAN (Plant Protection Central Research Institute, Ankara) and Ayhan ÖĞRETEN (Plant Protection Research Institute, Diyarbakır) for their contributions.

Keywords: First record, parasitoid, new host, *Tuta absoluta*.

ORAL-ANIBIO-OP169

Assessment of Locating Ecological Passages on Roads for Protecting Wildlife BiodiversitySercan GÜLCİ¹, Abdullah Emin AKAY²¹Faculty of Forestry, Kahramanmaraş Sutcu Imam University 46100, Kahramanmaraş, Turkey.²Faculty of Forestry, Bursa Technical University, 16300, Bursa, Turkey.sgulci@ksu.edu.tr

Aim of the study: All human demands on nature directly or indirectly affect forest ecosystems where wild animals mostly sustain their lives. Increasing social pressure and human demands require easy access to forested areas through road networks which are also important structures for planning and sustainable management of forest resources. However, road network can be considered as the most massive engineering structures on earth due to its surface cover. Recently, noticeably increased public awareness on nature, governmental or non-governmental organizations triggered discussion platforms for researching ecological effects of road networks. Eventually, the term of “road ecology” gathered all multidisciplinary aspects involving road effects. In this study, ecologic passages, as one of the most common research topics in road ecology, were evaluated in order to reduce barrier effect of road networks in forest ecosystems.

Material and Methods: Roe deer (*Capreolus capreolus*) was considered as model species that are widely exist in Osmaniye province of Turkey. Firstly, a GIS-based suitability model was developed to estimate wildlife movement corridors. After estimated habitat suitability modelling, Least-cost path approach was applied for designing movement corridors. Then, movement corridors and road networks intersected to identify mitigation points (eco-passage location).

Results: The results indicated that, quick and logical spatial locations for ecological passages can be effectively determined by using GIS-based multi-criteria approaches with in the concept of protecting wildlife biodiversity.

Keywords: Wildlife biodiversity, Ecological passages, Suitability modelling, Roe deer.

ORAL_ANIBIO-OP170

Biodiversity of Superfamily Raphignathoidea (Acari: Prostigmata) in TurkeyMustafa AKYOL¹, İsmail ULUÇAY², Kamil KOÇ¹¹*Department of Biology, Faculty of Science and Art, Celal Bayar University, Manisa, Turkey*²*Colemerik Vocational School, Hakkari, Turkey*makyol77@gmail.com

Aim of the study: In this study, the number and distribution of the species belonging to the Raphignathoidea distributed in Turkey is shown. In order to contribute to the literature on the mites of world and Turkey and reveal the mite fauna species zoogeographic distribution in Turkey.

Material and Methods: The literature was compiled and species of the superfamily Raphignathoidea in Turkey were determined. Systematic of this superfamily are shown at tables and graphics.

Results: The Raphignathoidea are represented by 11 family in the world. A total of 174 species, including 23 genus of 7 families of this superfamily have been identified in Turkey. Showing the highest diversity of these families, including the 11 genera and 95 species is Stigmaeidae. The diversity of species belonging to this family are shown in the graphics. The Raphignathoidea are represented by the about 900 species in the world to have 174 species of our country, in terms of species diversity is an indication that Turkey's too rich biodiversity. There is still need for research to be done in this area.

Keywords: Acari, Raphignathoidea, biodiversity, Turkey.

ORAL_ANIBIO-OP171

Morphology Larvae of Neuropteran (Neuroptera:Insecta) Disturbed in Mardin, Batman and Diyarbakır Provinces of TURKEY.Sadreddin TUSUN¹, Ali SATAR²¹Dicle University, Education Faculty, Biology Department, 21280 Diyarbakır TURKEY.²Dicle University, Science Faculty, Department of Biology, 21280 Diyarbakır TURKEY.
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Aim of the study: Neuropterans (especially species of family Myrmeleonidae, and Nemopteridae) adults and larvae are predators; they are commonly used in biological control. Therefore, they are of economic importance. Whereas Adults commonly feed on caterpillars and aphids, larvae of some species feed on surface dwellers such as ants and some of larvae of harmful insects to crop. It is important to know biology of this species because of used in biological control. The south-eastern part of Turkey is known as one of the best preserved and undamaged natural habitats of Turkey, thanks to the traditional farming methods applied here. During this study, samples were collected in the Mardin, Batman and Diyarbakır during the last two years. Larvae of neuropteran are described and illustrated.

Material and Methods: We collected larvae and adults twice a month using net, beating branches of bushes and trees over an umbrella, hand-collecting larvae, and light-trapped specimens at night. Neuroptera from 15 localities were obtained from May to September in 2014, and 2015. The region as a whole is characterized by Iran-Turan steppe biome. Three cities represented natural habitat of vegetation typical for south-eastern of Turkey; viz. forests predominated by *Quercus infectoria*, *Q. brantii*, *Q. libani* and *Q. cedrorum*. Other parts were on agricultural land such as meadows located between fields.

Results: Larvae of eleven species from 8 genera of Neuroptera were identified, representing the families Myrmeleontidae (5 genera, 5 species), Nemopteridae (3 genera, 6 species). The different parts of larvae such as head, mandibles, and antennae are described and illustrated

Acknowledgements: This project was supported by the Dicle University Research Fund. (Project No: 14-ZEF-80).

Keywords: Neuroptera, Myrmeleontidae, Nemopteridae), Larvae Turkey.

ORAL_ANIBIO-OP172

Crustacean ectoparasite Fauna Linked to Seasonal changes and Host Fish Size of fishes in Lake Dam Kunduzlar, Asia Minor

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Aim of the study: A crustacean ectoparasite, *Argulus foliaceus* infestation was examined on seven fish species.

Material and Methods: The fish specimens were caught by local fishermen using gill-nets. After sacrificed, the lengths of the fishes were recorded and the skin, fins, gills, and oral cavity were cut off the body, and placed in separate petri dishes with physiological solution. Some of the parasites were fixed in glacial acetic acid and preserved using glycerine-gel under the cover glass in accordance with Pritchard and Kruse (1982). For the identification of the parasite specimens, based on Bychowskaya-Pavlovskaya et al. (1962) a light microscope with x100 and x400 magnification was used.

Results: All of the fish species were infected with *Argulus foliaceus*, except *Chondrostoma nasus*. Infected six host fish species are as follows: 3 out of 38 *Alburnus escherichii* (prevalence 7.9%, mean intensity per fish and standard deviation 4.3±3.1), 9 out of 16 *Barbus plebejus* (56.2%, 47.9±28.5), 12 out of 47 *Capoeta tinca* (25.5%, 27.5±18.9), 7 out of 17 *Carassius gibelio* (41.1%, 6.9±5.3), 4 out of 4 *Cyprinus carpio* (100%, 4.3±5.2) and 6 out of 14 *Squalius cephalus* (42.8%, 2.3±2.8). The infection was found on gills, fins and skin of the host fish. In addition to parasitological findings were evaluated with respect to seasonal changes and age and older groups of the host fish.

Keywords: *Argulus, Alburnus, Barbus, Capoeta, Carassius, Cyprinus*.

ORAL_ANIBIO-OP173

Systematic studies on zerconid mites (Acari, Zerconidae) in Inner Aegean Region of Turkey – IIIRaşit URHAN¹, Elif Hilal DURAN², Esat KIZILKAYA², Mehmet KARACA³¹Pamukkale University, Faculty of Arts & Sciences, Biology Department, Denizli, TURKEY²Pamukkale University, Institute of Sciences, Biology Department, Denizli, TURKEY³Pamukkale University, Denizli Vocational School of Technical Sciences, Denizli, TURKEYrurhan@pau.edu.tr

Aim of the study: This study is based on material of the family Zerconidae Canestrini, 1891 collected from different localities in Inner Aegean region (Turkey) between August 2015 and February 2016. In this study, 23 species of belonging to 2 genera from the family Zerconidae were recorded from Turkey. We aim to reveal the biological richness which is done insufficiently before and consequently we aim to contribute Turkey and World mite fauna.

Materials and Methods: Litter, soil, lichen and moss pad samples with mites were placed into plastic bags, labelled and transferred to the laboratory. Samples were placed into combined Berlese funnels, and mites were extracted for 5–7 days according to their humidity. At the end of this process, the contents of bottles were transferred into Petri dishes and mites were separated under a stereo-microscope. They were placed in 60% lactic acid for clearing and mounted onto permanent microscope slides using a glycerin medium. The examination and drawing of mites were done using an Olympus CX41 microscope with DP25 camera. After the analysed and identified of samples were photographed with a microscope and their shapes were drawn and different body parts were measured. Then, the samples were put in stock bottles containing 70 % alcohol and 1- 3 drops glycine and labelled.

Results: The present paper provides an updated taxonomic list of zerconid species known from Inner Aegean region of Turkey. A total of 23 species belonging to 2 genera of the family Zerconidae have been reported from the region. Of these, 17 species belonging to the genus *Zercon* (*Z. alattini*, *Z. arslani*, *Z. beleviensis*, *Z. burdurensis*, *Z. carpathicus*, *Z. cokelezicus*, *Z. colligans*, *Z. denizliensis*, *Z. hispanicus*, *Z. huseyini*, *Z. inonuensis*, *Z. juvarae*, *Z. laczii*, *Z. longisetosus*, *Z. marinae*, *Z. quadricavum*, *Z. turcicus*) and 6 species belonging to genus *Prozercon* (*P. banazensis*, *P. denizliensis*, *P. erdogani*, *P. graecus*, *P. morazae*, *P. tragardhi*).

Acknowledgement: This research was financially supported by the Scientific and Technological Research Council of Turkey (TUBİTAK), Project number: 113Z717.

Keywords: Acari, Zerconidae, Systematic, Inner Aegean region, Turkey.

ORAL-ANIBIO-OP174

Glance at Pelagic Birds of Didim (Aydın, Turkey) with a new recordCemil Ozan AKBULUT¹, Raşit URHAN¹, Merve TEPE¹¹ Pamukkale University, Faculty of Arts&Sciences, Biology Department, Denizli, Turkey
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Aim of the study: The aim of this study are to determine the pelagic birds of Didim (Aydın, Turkey) which is located close to a crucial migration route for bird species in Aegean sea and to make crucial emphasis on the random records of some birds preferring the region for breeding, wintering or visiting.

Material and Methods:In this study, bird counts and species determinations are made between August 2015-April 2016 by point counting method in 3 stations detected in pelagic region of Aegean Sea of the vicinity of Didim (Aydın, Turkey). Guide books and IUCN Redlist criterias are benefited for species determinations and species observed in the area are photographed and filmed.

Results: At a result of this study 9 pelagic species are detected to prefer this region for different reasons. Yellow-legged Gull (*Larus michahellis*), Mediterranean Gull (*Ichthyaetus melanocephalus*), Black-headed Gull (*Chroicocephalus ridibundus*) and Audouin's Gull (*Ichthyaetus audouinii*) are breeders; Slender-billed Gull (*Chroicocephalus genei*) is a summer visitor; Yelkouan Shearwater (*Puffinus yelkouan*) is a winter visitor; Pomarine Skua (*Stercorarius pomarius*), Scopoli's Shearwater (*Calonectris diomedea*), European Storm Petrel (*Hydrobates pelagicus*) are random visitors. In addition Pomarine Skua (*Stercorarius pomarius*) is recorded for the first time in Didim.

Acknowledgements: This research is financially supported by Pamukkale University Scientific Research Projects Supporting Department (PAUBAP, Project Number: 2015FBE043).

Keywords: Pelagic Birds, Didim, Aydın, Turkey, Aegean Sea, New Record.

ORAL-ANIBIO-OP175

Statistical Analysis of Numerical Dispersion of Raphignathoidea (Acari: Prostigmata) from the Aegean coast of TurkeyMustafa AKYOL¹, Ali ÖZDEMİR²¹*Department of Biology, Faculty of Art and Science, Celal Bayar University, Manisa, Turkey*²*Department of Mathematics, Faculty of Art and Science, Celal Bayar University, Manisa, Turkey*
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Aim of the study: Aegean coast is a rich biodiversity area that contains many different ecosystems. Coastal ecotons are consist of special habitats there organisms can live in extreme conditions due to the high salt. In this study it is aimed to evaluate the statistical analysis of the dispersion of mite fauna can live in extreme conditions from Raphignathoidea superfamily.

Material and Methods: These specimens were brought to the laboratory in nylon bags. Mites were extracted in Berlese funnels for 7 days and preserved in 75% ethanol. The mites were collected from the samples under a stereomicroscope and mounted on slides in Hoyer's medium. The setal nomenclature used in the species description follows Kethley (1990). The type specimens are deposited in the Zoological Museum of Celal Bayar University.

For the statistically analysis, 10 months were selected. This selection was based on the variations and plenty of the mite species. Significance of the differences between the species and months were evaluated by Analysis of variance (Regression Analysis) and Pearson correlation. The differences were assessed by one-way ANOVA test. Statistical analysis were performed using MINITAB software package.

Results: The results of this study, the seasonal distribution of newly defined and explored species was determined. In addition, the distribution of species belonging to the same family was found to be statistically relevant. According to the statistical results derived, there is a considerable relation between taxa which are close taxa as systematically of the same family, at the level of $P < .01$ and $.05$.

Keywords: acari, Prostigmata, Raphignathoidea, fauna, Turkey, statistically.

ORAL-ANIBIO-OP176

Mitochondrial DNA Variation in Mediterranean fruit fly (*Ceratitis capitata*) Populations

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Aim of the study: The Mediterranean fruit fly *Ceratitis capitata* is considered to be one of the world's most destructive and highly invasive agricultural pests. Considering the economic impact of the agriculture in Mediterranean basin, the deep knowledge of the population genetic structure of Mediterranean fruit fly is an essential prerequisite in order to evolve large scale and improved management programs for the region. Keeping in view the importance of the pest and peculiarities of mitochondrial DNA, the fundamental aim of the present study was to obtain new information about population structure and genetic variation of *Ceratitis capitata* populations in Turkey.

Material and Methods: Individual flies were collected from 10 different sampling sites, from 7 provinces, where the presence of *Ceratitis capitata* has been reported in Turkey. Our analyses centered on a variable section of mtDNA that have been previously used and allowed a good discrimination. This polymorphic region, which is around 1.300 bp, includes partial regions of *ND4*, *tRNA-His* ve *ND5* genes.

Results: The presence of a certain level of genetic polymorphism are observed among Mediterranean and Aegean region populations.

Acknowledgements: This study was financially supported by Mugla Sitki Kocman University Scientific Research Funds (project numbers MSKUBAP-2015/075 and 2015/177).

Keywords: *Ceratitis capitata*, mitochondrial DNA, *Dacus* species, Mediterranean fruit fly

ORAL-ANIBIO-OP177

Comparison of Leaf Beetle (Coleoptera: Chrysomelidae) Diversity of Turkey and Neighboring Countries with Respect to Species Numbers and Endemicity

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Aim of the study: To understand and evaluate the biodiversity of a particular region, one criterion, maybe the best one, is to know the species numbers dwelling there. From this point of view, this study mainly aims to compare the leaf beetle diversity of Turkey and neighboring countries with respect to species numbers and the rate of endemicity. The secondary aim of the study is to determine a possible correlation between the species numbers and the surface area of selected countries.

Material and Methods: The neighboring countries of Turkey are selected according to contiguity either by land or sea. Totally 14 countries, namely Turkey, Bulgaria, Greece, Romania, Moldova, Ukraine, Russia (in part), Georgia, Armenia, Azerbaijan, Iran, Iraq, Syria, Cyprus (whole island), are included. Total number of leaf beetles (species and subspecies) reported from each country is determined by reviewing the relevant literature, as well as the number of endemics. The endemicity rates of all countries are calculated and compared. The number of total taxa and endemics are then evaluated considering the total surface area (data taken from the website of FAO) of each country.

Results: According to number of leaf beetle species and subspecies, Turkey is the most diverse country by far among its neighbors with 916 reported taxa. The species numbers of neighboring countries are as follows: Bulgaria 603, Ukraine 582, Greece 507, Romania 495, Iran 479, Russia (only the southern European part included) 441, Azerbaijan 373, Armenia 294, Georgia 273, Syria 254, Cyprus (whole island) 136, Iraq 120 and Moldova 103. As to number of endemic taxa, Iran and Turkey keep ahead with 103 and 88 endemics respectively. The closest country is Greece with 32 endemics and Moldova contains no endemic taxa. However, when we calculate the rate of endemism, Iran is unmatched with an endemism ratio of 21.50%, followed by Iraq and Turkey having 10.00% and 9.61% endemism ratios respectively. When we consider all countries (except Russia, because it is partly included in the current study), there is an insignificant weak correlation between the number of species and the surface area of selected countries ($r=0.41$, $p>0.05$). Normally, under similar biogeographic conditions, a larger area should include more species, but all countries here are not similar in terms of biogeography. In fact, the known species numbers of a region are also greatly affected by the quantity and quality of relevant research conducted in that area. Here, the case of Iran (and perhaps some other countries) is most likely associated with the low number of research on leaf beetles. When we exclude Iran, there is a moderate positive correlation between the number of species and the surface area ($r=0.65$; $p<0.05$).

Keywords: Chrysomelidae, biodiversity, Turkey, species number, endemicity.

ORAL-ANIBIO-OP178

Notes on the two rare *Idaeae* Treitschke species in the fauna of Turkey (Lepidoptera, Geometridae)

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Aim of the study: The genus *Idaeae* Treitschke, 1825 includes 70 species in the Turkey. Many *Geometridae* species, belonging to genus *Idaeae* are known only from the type specimens. In this study, *Idaeae allongata* (Staudinger, 1897) and *Idaeae proclivata* (Fuchs, 1902) that are rare and known only one locality in Turkey is presented. The distribution and ecology of the species are discussed.

Material and Methods: The specimens were collected in Batman and Siirt provinces from southeast of Turkey, between 2014 and 2016. Materials were captured by a special UV light trap. Genital preparations were made after the samples held in museum standart. In study, distribution areas of the species are indicated on the map. The picture of habitats and adults are given and genital structure of the species were presented for the first time. Diagnose becomes difficult, when search for the original source of identified species was written in centuries ago and because of morphological features were explaining in there much more in writing. It is often not possible to find the genitalia armatures of such rare species in the literature. Therefore, diagnose of specimens could be made by compared the species within the Munich museum (Zoologische Staatssammlung Muenchen).

Results: *I. allongata* (Staudinger, 1897) is described from Israel (Jerusalem). After that this species is given from Turkey (Mardin) by Staudinger and Rebel (1901). Additionally, it has been identified from Jordan, northern Mesopotamia and Crete. In this study, second locality record in Turkey is presented from Batman (Batıraman) province. It was captured in April at 570 m high above sea-level from steppe areas in the intensive herbaceous plants. *Idaeae proclivata* was described from Armenia and then it is recorded from Iran (Khorasan) by Brandt (1941). So far, this species is known only Kahramanmaraş province in Turkey. In this study, second locality record is given from Siirt (Akyamac) province. Samples were captured at 700-800 m high above sea-level, between june and july months of the habitats that contains *Quercus* and *Astragalus* plants. It is estimated that distribution of many endemic geometrid species showing similarities in terms of geographical, ecological and vegetation types from Levant, northern borders of the Middle East, southeast of Turkey to Caucasia. But, determining of distribution areas of these species is so difficult, due to insufficient studies in the region. In this regard, these results may contributes to improve knowledge about their ecology and distribution areas.

Acknowledgements: The author is thanks to Dr. Axel Hausmann (Zoologische Staatssammlung München, Germany) for his invaluable help in determining of the species.

Keywords: *Idaeae*, *allongata*, *proclivata*, Geometridae.

ORAL-ANIBIO-OP179

A test on barcoding power of two molecular markers: the utility of COI and ITS2 in insectMahir BUDAK¹, E. Mahir KORKMAZ¹, M. Bora KAYDAN², Hasan H. BAŞIBÜYÜK³¹*Department of Molecular Biology and Genetics, Faculty of Science, Cumhuriyet University, Turkey*²*Imamoglu Vocational School, Çukurova University, Turkey*³*Department of Biology, Faculty of Science, Cumhuriyet University, Turkey*budakmah@gmail.com

Aim of the study: DNA barcoding is designed to provide rapid, accurate, and automatable species identifications by using short, standardized gene regions as internal species tags. The COI gene as the widely used molecular marker in bio-identification system for animals has suffered from great disputations. The most important problem related with it is that the presence of wide overlap between intra- and interspecific sequence variability. The internal transcribed spacer 2 (ITS2) is a non-coding region located inside the nuclear ribosomal DNA cluster. ITS2 sequence variability is thought to be appropriate to differentiate species for bio-identification system, which can be further improved if structural information is considered. Here we use representatives of four insect orders (Hymenoptera, Hemiptera, Coleoptera and Orthoptera) to evaluate the barcoding powers of COI and ITS2.

Material and Methods: A total of 198 ethanol preserved specimens kept in 99% ethanol were used for DNA extraction. Whole genomic DNA was extracted from hind leg of the specimens by DNeasy tissue kit (Qiagen) according to the instructions provided by the manufacturer. The 5.8S-ITS2-28S region of ITS2 and Former region of COI were amplified. Sequencing reactions were carried out in both directions using the same primers with the PCR reactions. The forward and reverse nucleotide sequences were assembled, edited and aligned by using Geneious 9.1.2 (<http://www.geneious.com>) and controlled by eye. ITS2 sequences were delimited from the alignment between the 5.8S and 28S proximal stem motifs with the HMM-based annotation tool present at the ITS2 database V. 4200 sequence was obtained from Genbank to construct COI and ITS2 data sets. Intra and inter-specific p-distances were calculated by using MEGA version 5.

Results: In comparisons of inter-specific genetic distances among congeneric species using two markers, the COI region exhibited the higher inter-specific divergence. On the other hand, ITS2 showed low intra-specific genetic diversity. ITS2 exhibited the lowest intra-specific divergence in Hymenoptera and the highest in Hemiptera. Secondary structure of ITS2 region comprises some conserved motifs. The motif located near to 3' end is specific to order level but the other motif near to 5' end is specific to family/superfamily level. As a conclusion, using both markers provide more robust results for species identification.

Acknowledgements: We thank TÜBİTAK (The Scientific and Technological Research Council of Turkey, project number 113Z753) for providing financial support. The members of Cumhuriyet University Molecular Systematics Research Group (CÜMSAG) are thanked for their contributions in laboratory work.

Keywords: ITS2, COI, Barcoding, Insects.

ORAL-ANIBIO-OP180

Altitude and Habitat Preferences of Zerconid Mites (Acari: Zerconidae) in Kırklareli ProvinceMehmet KARACA¹, Raşit URHAN², Elif Hilal DURAN³, Esat KIZILKAYA³¹*Pamukkale University, Denizli Vocational School of Technical Sciences, Electronic & Automation Department, Denizli-TURKEY.*²*Pamukkale University, Faculty of Arts & Sciences, Biology Department, Denizli-TURKEY*³*Pamukkale University, Institute of Sciences, Biology Department, Kınıklı Campus, Denizli-TURKEY
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Aim of the study: This study was aimed researching height zones and habitat types of detected zerconid species in Kırklareli. It was determined 16 species of zerconid mites spread in Kırklareli province by surveys which were hold between November 2012 and April 2014.

Material and methods: Litter, soil and moss samples were taken from different habitats of Kırklareli province and transferred to laboratory. Samples were put in Berlese funnels and mite species were collected in 70 % alcohol bottle. Than, zerconid mites were extracted by stereo microscope. 60 % lactic acid was used for decolourising and cleaning of zerconids. Microscopic research (Olympus BX50 and CX41, Nikon SMZ 745T) were made in glycerin medium generally. After identification process, spreading height zones and habitat types of detected zerconid species were taken.

Results: According to datas which deal with altitude and habitat preferences of zerconids, *Z. anatolicus* and *P. fimbriatus* spread only low heights (between 0-50 meters), some species spread only one height zones (*Z. bulgaricus*, *Z. foveolatus*, and *Z. turcicus*) and remaining species spread widely in terms of height zones (*Z. carpathicus*, *Z. colligans*, *Z. juvarae*, *Z. magdae*, *Z. marinae*, *Z. similifoveolatus*, *P. bulbiferus*, *P. carpathofimbriatus*, *P. graecus*, and *P. tragardhi*). A similar situation is visible for habitat preferences of species. Some species spread more than one habitat types (*Z. carpathicus*, *Z. colligans*, *Z. foveolatus*, *Z. juvarae*, *Z. magdae*, *Z. marinae*, *Z. similifoveolatus*, *Z. sklari*, *P. bulbiferus*, *P. carpathofimbriatus*, *P. graecus*, and *P. tragardhi*), some species spread only one habitat type (*Z. anatolicus*, *Z. bulgaricus*, *Z. turcicus*, and *P. fimbriatus*). With this datas, it is predicted that zerconid species have various preferences in terms of both altitude zones and habitat types.

Acknowledgement: This study was financially supported by Pamukkale University Scientific Research Projects Unit (PAÜBAP) by 2012FBE067 project number.

Keywords: Acari, Zerconidae, altitude, habitat, preference, Kırklareli, Turkey.

ORAL-ANIBIO-OP181

The Utility of Compensatory Base Changes (CBCs) of ITS2 in Species Delimitation: A Case Study in Symphyta (Hymenoptera: Insecta)Murat GÜLER¹, Mahir BUDAK², E. Mahir KORKMAZ², Battal ÇIPLAK³, H. Hüseyin BAŞIBÜYÜK¹¹*Department of Biology, Faculty of Science, Cumhuriyet University, Turkey*²*Department of Molecular Biology and Genetics, Faculty of Science, Cumhuriyet University, Turkey*³*Department of Biology, Faculty of Science, Akdeniz University, Turkey*

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Aim of the study: The accurate identification of biological diversity is an important task in biology. Conventional characters used for identification has been inappropriate for many reasons and a few molecular markers have been proposed for identification of species in recent years. The COI was the first commonly applied barcoding marker for identification but its strength as a universal marker has been increasingly questioned. This led to search for alternative markers and consequently ITS2 has been shown to be a reliable nuclear marker in many eukaryotes. Here, we test the utility of ITS2 sequence-structural alignment data for identification and delimitation of species in sawflies.

Material and Methods: A total of 165 ethanol preserved specimens representing 63 species of six families were used for DNA extraction. The ITS2 region was amplified and sequenced. The obtained sequences were assembled, edited and aligned by using Geneious 9.1.2. Secondary structures of ITS2 were predicted (i) by delimitation of the alignment between the 5.8S and 28S proximal stem motifs at the ITS2 database V and (ii) later submitting to the RNA folding program Mfold Server. The structures and sequences were synchronously aligned by 4SALE. To estimate the probability of the occurrence of at least one CBC in a pairwise species sequence-structural alignment, a CBC matrix table was manually generated based on pairwise comparisons and the absolute frequency for discrimination of species was calculated using the overall sum.

Results: The nucleotide divergence of ITS2 sequences among species was approximately 3 to 5% implying to be a relevant barcoding tool. However, the folding pattern of secondary structures was very similar but it was inconsistent with the common core structure present in eukaryotes. It was extremely branched like the structure reported in insects. The CBC analyses revealed that it is also a useful tool for delimitation of species in sawflies. The CBC species concept assumes that if there is a CBC then there are two different species with a probability of 93.11% and this concept is currently applied as a practical marker for eukaryotic species delimitation. A similar correlation was found in the pairwise comparisons of sawflies species implying the presence of 53 distinct species. In conclusion, the CBCs can be utilised to elucidate the species boundaries in sawflies. However, further studies are required to understand the full account of ITS2 as a molecular identifier in Hymenoptera.

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ORAL-ANIBIO-OP182

Comparison of Variation in Forewings of *Ammophila heydeni* (Hymenoptera) from Different Localities of Turkey by Geometric Morphometric Analysis

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Aim of the study: Forewing veins and their angles mostly included in keys which have been used to identify and distinguish between taxa in Hymenoptera. Geometric morphometrics make possible to reveal shape variations in different samples and compare them to each other. The aim of this study is to compare the amount of variation among the forewings of *Ammophila heydeni* samples collected from different localities in Turkey by using geometric morphometry.

Material and Methods: Forewings of 74 samples from Ankara, Kırşehir, Kars, Çankırı, Amasya, Tokat and Sivas provinces belonging to *Ammophila heydeni* were photographed with Canon 650D camera. 25 landmarks were digitized on each picture using tpsDig2 (Thin Plate Spline Digitizer). Procrustean transformations were conducted with Morphoj software. Centroid size (CS) was used as a wing size index. Centroid size was compared by Kruskal-Wallis test. Shape variations between localities were examined through Procrustes analysis of variance. Additionally differences between wing shapes were grouped according to localities by canonical variate analysis (CVA).

Results: Although no significant difference was observed among centroid sizes of samples from different localities ($P= 0.07$), their wing shapes varied according to the localities ($P<0.05$). Canonical variate analysis showed that the wing shapes of samples from Kırşehir were constituted a distinct group however the others grouped together. Further studies based on more samples are needed in order to clarify the situation of *Ammophila heydeni* population from Kırşehir.

Keywords: *Ammophila heydeni*, geometric morphometrics, forewing, variation.

ORAL-ANIBIO-OP183

Chromosomal Diversity in the Jewel-Beetle Species (Coleoptera, Buprestidae) and Its Taxonomic SignificanceYavuz KOÇAK¹, Üzeyir ÇAĞLAR²¹*Department of Environmental Engineering/Faculty of Engineering and Architecture,
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Aim of the study: The family Buprestidae consists of about 14500 described species worldwide as a large group of Polyphagan beetles. This cosmopolitan family contains many species which are agricultural and forestry pests. Buprestid beetles have received much less attention in terms of their cytogenetic. Hitherto, the chromosome studies were performed on only about 90 species, corresponding to 0.60% of all nominal species in the family. Nowadays chromosome data play little role in taxonomic studies of the jewel-beetle species. The purpose of this study is point out to the necessary and contribution of cytogenetics for the solution of many problems in areas of research ranging from taxonomy, systematics or genetics to phylogenetics of buprestids by reviewing all the known chromosomal studies. Therefore, we report a full check-list of the chromosome numbers and karyotype formulae known for the buprestids.

Material and Methods: A list of all available chromosomal data on the buprestid species of the world fauna were obtained from previously published papers.

Results: Although the number of species studied is not large, buprestid beetles exhibit a remarkable variety of chromosome numbers and mechanisms of sex determination. Hence, the species studied cytogenetically clearly displays the chromosome heterogeneity of this family. Consequently, karyotypic features of these beetles can be used for taxonomic identification and solving taxonomic problems at various levels. Thus, it is suggested that further comparative chromosomal studies in a relatively large number of buprestid species are needed.

Keywords: Chromosomal Diversity, Taxonomy, Jewel-Beetle, Buprestidae, Coleoptera.

ORAL-ANIBIO-OP184

May Southern Turkey be a Contact Zone of migratory European (*Hirundo rustica rustica*) and sedentary East-Mediterranean (*Hirundo rustica transitiva*) barn swallows?Hakan KARAARDIÇ¹, Matthew R. WILKINS²¹ Elementary Science Education Department, Education Faculty, Alanya Alaaddin Keykubat University, Alanya, Turkey² School of Biological Sciences, University of Nebraska-Lincoln, USA
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Aim of the Study: Sexual selection plays a key role in the diversification of numerous animal clades and may accelerate trait divergence during speciation. However, much of our understanding of this process comes from phylogenetic comparative studies, which rely on surrogate measures such as dimorphism that may not represent selection in wild populations. We utilize the cosmopolitan barn swallow (*Hirundo rustica*) as a study system to investigate the relative importance of sexual selection for phenotypic divergence across closely related populations. In this study, we assess sexual selection pressures for multiple male visual signals across four barn swallow (*Hirundo rustica*) populations.

Material and Methods: We studied barn swallows at breeding sites, Turkey (Lat 36.857, Lon 31.160) in 2010 and 2011; Israel (Lat 32.928, Lon 35.540) in 2009; Romania (Lat 46.753, Lon 23.834) in 2010; Czech Republic (Lat 49.069, Lon 14.71) in 2010 and 2013. No previous genetic sampling has characterized Turkish barn swallows. We were unsure of this population's subspecies affiliation. Thus, an additional goal of this study was to better understand the placement of this population in the context of other members of the *Hirundo rustica* subspecies complex. At each location, barn swallows were captured during the early breeding season, at which time we took morphological measures, as well as blood and feather samples. We present two years of data in Turkey. Feather samples from four ventral patches (throat, breast, belly, vent) were taped to a standard white card background. The color of each patch was measured using a spectrometer, pulsed xenon light and SpectraSuite software. DNA was extracted from blood or feather samples and single nucleotide polymorphism (SNP) data were generated using a genotyping-by-sequencing (GBS) approach. Two restriction enzymes, EcoRI and MseI, were used to digest genomic DNA, and custom oligonucleotide adaptors were ligated to digested fragments.

Results: Populations did not vary in wing length (ANOVA, $F_{3,327}=1.643$, $p=0.179$). Body Brightness was significantly lower in Israel than the other populations, while Saturation was higher in Israel and Turkey than in Romania or the Czech Republic. Throat Brightness showed the greatest variation. Streamer Length/ Vent Brightness was significantly higher in the Czech Republic compared to the other three populations, which did not differ from each other. However, the apparent difference in Streamer Length/ Vent Brightness between European populations in the Czech Republic and Romania results from a difference in vent brightness (Kruskal-Wallis $X^2=11.2$, $df=1$, $p<0.001$), rather than tail streamers (Kruskal-Wallis $X^2=0.003$, $df=1$, $p=0.957$). We predicted our Turkish population would be more phenotypically similar to widely distributed European populations than *H. r. transitiva*. Indeed, males from Turkey had high Body Brightness, similar to the two European populations; however, streamers were significantly shorter and more similar to the Israel population. Throat Brightness was significantly different and intermediate to the divergent colors of Romania and the Czech Republic, and was not different from Israel. These results seem to indicate that the Turkish population is either composed of assortatively breeding *H. r. transitiva* and *H. r. rustica*, or an admixture of these.

Acknowledgement: Work in Turkey was conducted with permission of the General Directorate of Nature Conservation and National Parks.

Keywords: Barn swallow, Southern Turkey, Population genetics, Contact zone.

ORAL-ANIBIO-OP185

Migration route and strategies in a highly aerial migrant, the Alpine Swift (*Tachymarptis melba*) revealed by light-level geolocatorsHakan KARAARDIÇ¹, Christoph MEIER², Feyyaz KÖSE¹, Felix LIECHTI²¹ *Elementary Science Education Department, Education Faculty, Alanya Alaaddin Keykubat University, Alanya, Turkey*² *Department of Bird Migration, Swiss Ornithological Institute, Sempach, Switzerland*
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Aim of the Study: The tracking of small avian migrants has only recently become possible by the use of small light-level geolocators, allowing the reconstruction of whole migration routes, timing and speed of migration and identification of wintering areas. Alpine swifts are 90-100g heavy, obligatory aerial plankton feeder, spend most of their life time, except for the breeding period, aloft. Their distribution range extends all around the Mediterranean Sea and to the far Middle East, with some dispersed populations north of the Alps in Switzerland and isolated population in South Africa. In this study, we successfully recorded the full migration of Alpine swifts.

Material and Methods: Alpine swifts breed colonially in rock cavities and also in human buildings. Breeding time is between May and August. Migration occurs in September-October and March-April. In 2014 we equipped 76 alpine swift with novel multi-sensory geolocator tag (SOI-GDLpam) in five different breeding colonies in Switzerland, Baden (47.47° N, 8.31° E, 14 tags) and Lenzburg (47.39° N, 8.18° E, 13 tags), in Turkey, Pirasalı Island (36.34° N, 30.53° E, 25 tags), in Spain, Tarragona (41.12° N, 1.25° E, 4 tags), and in Bulgaria, Sofia (42.66° N, 23.34° E, 20 tags). This tag was able to record light level for geolocation positioning every 5 minutes, air pressure and temperature every 30 minutes, and the magnetic field every 6 hours for almost the entire annual cycle. In 2015 we recaptured 71%, 85%, 44%, 100% and 30% of the birds at their nest site in Baden, Lenzburg, Pirasalı Island, Tarragona, and Sofia, respectively. Control birds without a tag had return at rates of 74%, 60% and 33% in Baden, Lenzburg and Sofia (no significant difference to tagged birds $\chi^2=0.26$, $df=1$, $p=0.61$). Light level data were used to calculate the approximate position of each bird at each twilight event using the R-package FLIGHTR.

Results: Based on the stored data, we could reconstruct their non-breeding movements and activity pattern over a period of at least 7 months. Because nest sites are inside a building (in the dark), nest visits of the birds during daytime were easily detectable by the abrupt change in the light level. When the birds are exposed to natural light conditions, light levels change gradually during twilight. The light-based geolocation confirms that Spain and Switzerland populations wintering in West Africa, while eastern populations from Bulgaria and Turkey in eastern Africa. The flight speed in autumn is 320 km/d, 540 km/d, 410 km/d, 420 km/d and 530 km/d respectively. In spring, 450 km/d, 450 km/d, 350 km/d, 340 km/d and 450 km/d respectively. Northern population stay longer in Africa and fly longer distance than southern populations. Travel time short and similar among populations. There is strong connectivity comparing East and West European populations.

Acknowledgement: Work in Turkey was conducted with permission of the General Directorate of Nature Conservation and National Parks.

Keywords: Alpine swift, migration, wintering area, timing.

ORAL-ANIBIO-OP186

Biodiversity of Forensically Important Insects (Arthropoda: Hexapoda) of Cappadocia RegionAysel KEKILLIOĞLU¹, Ersin KARAPAZARLIOĞLU¹, Faruk YIĞIT¹, Şükran ÇİL², Mukaddes BAŞAR²,
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Aim of the study: Insects arrive at a decomposing body in a particular order and then complete their life cycle based on the surrounding temperature. By collecting and studying the types of insects found on a body, a forensic entomologist can predict the time of death. An estimation of the duration of PMI involves setting the minimal and maximal time between death and corpse discovery and is important in narrowing the field of suspects. The minimal PMI is determined largely by estimating the age of developing immature insects collected at the time the corpse is discovered. The maximum PMI is determined from the species of insects that are present and the weather conditions necessary for the specific activity of these species. Therefore, many insect species, constitute a sequential structure on the carcass, in the process of the first to the final stage of decay. That's why, It is vital to know the regional insect fauna to be used them for this purpose.

Material and Methods: Insects that comes onto the body immediately after death, take an active roles of decaying the body. To identify the forensic species of Insects (Arthropoda: Hexapoda) in region of Cappadocia For this purpose, insect traps will be placed in different districts of Nevsehir And also, fresh cow spleen was been placed inside the traps. In addition, traps were allowed to stand in the field for a month and checked regularly. After one month, traps were opened and adult and larvae forms of insects were collected. Then identification of these insects were made.

Results: Finally, the data obtained from this study, can be used to determine the time of death in the fatal incidents that occurred around Cappadocia region with the eco-succession roles of forensic insects diversity.

Keywords:Forensic insects, Diversity, Eco-succession, Decay, Cappadocia.

ORAL-MFWBIO-OP187

Species Composition of Macrozoobenthos in Kargı Stream (Antalya/Turkey)Melek ZEYBEK¹, Murat BARLAS²¹*Department of Biology/Faculty of Arts and Sciences, Süleyman Demirel University, Turkey*²*Department of Biology/ Faculty of Science, Muğla Sıtkı Koçman University, Turkey*melekzeybek@sdu.edu.tr

Aim of the study: The current study was conducted on Kargı Stream where is located in Alanya district of Antalya city (Turkey). The stream is a very important water source for Alanya and it is used for agricultural irrigation. Another important aspect is that the Kargı Stream is one of the tourism centers in the region. However, the macrozoobenthos fauna of this stream have not been identified yet. This study was aimed to determine the macrozoobenthos fauna of Kargı Stream.

Material and Methods: The length of this stream is approximately 45 km. Seven stations were chosen on the stream and macrozoobenthos samples were taken from all stations between July 2014-April 2015 seasonally. Macrozoobenthos communities were gathered from each station by using a standard hand net (50 x 30 size with 500-µm mesh). The collected samples were kept in 70% alcohol and brought to the laboratory and they were sorted and identified to the lowest possible taxonomic level (genus or species) under a stereomicroscope. Shannon Weaver and Simpson indices were applied to detect the biodiversity of the stations. Also, the unweighted pair group method with arithmetic mean (UPGMA) algorithm was used to show possible clustering relationships among the seven stations based on macrozoobenthos. UPGMA and biodiversity indices were applied by using MVSP 3.1.

Results: As a result of the examination of the collected organisms, a total of 94 taxa were detected, 4 of which belong to Gastropoda, 5 of which belong to Oligochaeta, 1 of which belong to Malacostraca, 84 of which belong to Insecta classes. Insecta was found to be the most dominant group among macrozoobenthos. According to UPGMA, the seventh station in the estuarine zone was found to be the most different one from all the other stations in terms of macrozoobenthos. Shannon–Weaver and Simpson diversity indices showed that the lowest diversity was seen at the seventh station and the highest diversity was found at the fifth station. There aren't any studies based on the determination of macrozoobenthos fauna of Kargı Stream. Therefore, all taxa identified for the region have been recorded for the first time.

Acknowledgements: This research has been supported by TUBITAK-KBAG (113Z608 project no) TUBITAK. We are deeply grateful to them for their financial support.

Keywords: Macrozoobenthos, Biodiversity, Kargı Stream.

ORAL-MFWBIO-OP188

Assessment of Asi River's (Hatay, Turkey) Ecological Status by Using Benthic Macroinvertebrates (Hatay, Turkey) Following on Water Framework DirectiveNaime ARSLAN¹, Deniz MERCAN¹, Ali SALUR³, Hasan KALYONCU², Deniz A. ODABAŞI⁴¹ Department of Biology, Faculty of Arts and Sciences, Eskişehir Osmangazi University, Turkey² Department of Biology, Faculty of Arts and Sciences, Süleyman Demirel University, Turkey³ Department of Biology, Faculty of Arts and Sciences, Hitit University, Turkey⁴ Department of Fisheries Engineering, Faculty of Marine Sciences and Technology, Çanakkale Onsekiz Mart University, Turkey
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Aim of the study: Assessing the health of freshwater ecosystems has become a main point worldwide. Recently, the European Water Framework Directive intensified the development of approaches to assess ecosystems' ecological quality. In line with these information, the aim of this study was determined to assessment of Asi River's (Turkey) ecological status with based on some metrics (BMWP, ASPT and Margelef index).

Material and Methods: Macroinvertebrate samples were taken within 2014 at totally 11 stations by using a bottom kick net with 500 µm mesh size. Then samples were sieving and all collected samples were immediately fixed in 80% alcohol in the field. Collected samples were sorted and counted by using a stereomicroscope and then identified to the family level in laboratory. In order to determine ecological status, macroinvertebrate data were analyzed using ASTERICS 3.1 software. BMWP, ASPT and Margalef indices were used to determine ecological status of Asi river. Some environmental parameters (water temperature, pH and dissolved oxygen) were measured *in situ* by using Hach Lange HQ40D and the other parameters were analyzed in laboratory based on Standard Methods. Results of the environmental parameters were also classified according to Regulation on the Management of Surface Water Quality (YSKYY, 2015) to demonstrate water quality.

Results: Totally 23 taxa were determined in Asi River. As a result of environmental parameters, water quality of Asi River were determined as between fairly clean (Class II) and polluted (Class IV) in by YSKYY. In terms of the benthic macroinvertebrates, the highest dominance taxa are meso and polysaprob Oligochaeta (43,06%) and Chironomidae members (37,31%), respectively. It is followed by Corixidae (63,64%), Hydropsychidae and Unionidae (54,55%), and Caenidae (45,4%), respectively. The values of Margalef Diversity Index is varied between 0-2,33; ASPT and BMWP score class varied between III-V and II-IV, respectively. The results of biological metrics support to the results of environmental parameters.

Acknowledgements: This study was supported by TÜBİTAK-MAM financially.

Keywords: Asi River, benthic macroinvertebrate, Water Framework Directive.

ORAL-MFWBIO-OP189

Freshwater Fish Biodiversity of Muğla Province (Turkey): A ReviewDaniela GIANNETTO¹, Fevzi YILMAZ¹, Usay AYAZ¹, Oğuzhan DEMİR², Somayeh DOOSTI¹¹*Department of Biology, Faculty of Sciences, Muğla Sıtkı Koçman University, Turkey*²*Department of Aquaculture, Faculty of Fisheries, Muğla Sıtkı Koçman University, Turkey*
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Aim of the study: Mediterranean Basin is one of the world's biodiversity hotspots hosting more than 250 endemic freshwater fish species. Muğla province (Turkey), bordering both the Mediterranean and Aegean Seas, falls inside this world's biodiversity hotspot.

Although several studies were carried on, information on endemic and native fish of Muğla is still limited and endemic species are the most vulnerable because if they disappear from their distribution area, they are lost forever. The aim of this study was to provide an updated checklist of freshwater fish biodiversity of Muğla province with main attention on endemic species and the main threats affecting their survival.

Material and Methods: Previous data and information on freshwater fish species inhabiting Muğla watercourses were initially collected carrying on a complete literature review of all the available references on presence, distribution, ecology, biology, conservation status and newly taxonomy of these species. To this aim papers, thesis, personal databases, private collections and fisheries data were accurately checked and collected. The second step of the study consists on updating the available information by collect new data directly on the field. To this aim, for each of the main waterbodies of Muğla, sampling stations representative of the whole course were selected. In each sampling station fish fauna is sampled to update the presence and distribution of fish and collect photos of the endemic species and their habitat. All the previous information is then integrated with the new collected data to obtain a complete overview of freshwater fish biodiversity of Muğla.

Results: As a result, it was found that some endemic species of the area are currently listed as Data Deficient in the Red lists of IUCN and their exact geographic distribution is still unknown. In term of biodiversity richness, in a study carried on in 2006 a total of 26 species and 6 subspecies (belonging to 15 different families) were reported from Muğla waterbodies. Here, Köyceğiz Lake was found to be the richest waterbody of Muğla with a total of 20 different reported species. On the other hand, a more recent study mostly focusing on fish communities of rivers, reported only 19 fish species being 7 of them non-native. Habitat loss and degradation (such as pollution, eutrophication, channelization, damming), drought and excessive water abstraction are the main threat for the species but the main threats is represented by the high number of alien species that were introduced in the area for restocking purpose. The obtained results will be useful to encourage and propose management actions and future projects focusing on freshwater fish fauna of Muğla territory and mainly focusing on the endemic and still less known species.

Acknowledgements: The study is supported by the Muğla Sıtkı Koçman University Research Fund (No: 15/199).

Keywords: Muğla, freshwater fish, biodiversity, conservation status, IUCN.

ORAL_MFWBIO-OP190

Zooplankton Distribution and Diversity in the İzmir BayTuncay Murat SEVER¹, Efe ULUTÜRK¹¹*Department of Hydrobiology/Faculty of Fisheries, Ege University, Turkey*
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Aim of the study: The aim of this study is to evaluate the effect of the nutrient loads of the wastewaters discharged from urban wastewater treatments in İzmir Bay on the coastal eutrophication in terms of zooplankton species diversity and number of individuals in m³. discharged the wastewater load of nutrient formed load shore of eutrophication on zooplankton species diversity and number of individuals/ m³ from urban wastewater treatment plants located in Izmir Bay.

Material and Methods: Zooplankton samples collected by vertical hauls using Unesco WP2 plankton net at 8 seasonal periods (November 2008- July 2010) from 9 stations in Izmir Bay (Aegean Sea). Flowmeter (Hydro-Bios 438115) was used to calculate the amount of water drained by plankton net. Samplings were examined by Olympus SZX 7 stereo dissecting microscope. In the study, the seasonal distribution of zooplankton species were given in taxon and the most observed ones namely cladocerans and copepods. In the study, according to stations the seasonal distributions of zooplankton were evaluated at the group level and the most dominant group Copepoda and Clodocera given in the species level. By using Primer 5 software, the community structure of zooplanktonic species in the area were determined with Shannon–Wiener and Pielou's evenness indexes.

Results: By the study, a total of 23 groups were found and 69 copepods and 6 cladocerans been identified in species level. The number of the species were increased from ouyer to inner bay, but the individual number in m³ were decreased from inner to outer bay. Copepoda, cladocera and appendiculars have been observed intense and wide distribution in all seasons and stations but copepoda has been identified as the dominant group. Considering copepods collected from the study area neritic species diversity and density were found more, but in the stations of outer bay it was determined that oceanic species were increased.. During the study period, the number of the zooplanktonic groups were found to be inversely related with Chlorophyll A and this was more noticeable especially in spring and summer.

Acknowledgements: This study is a part of project supported financialy by TÜBİTAK with project number 106G124. Urban Waste Management in Turkey Coasts: Hot spots and Re – Identification of Sensitive Areas and Determination of waste assimilation by Monitoring- Modelling Methods Development of Sustainable Municipal Waste-Water investment plans.

Keywords: Izmir Bay, Zooplankton, Copepoda.

ORAL_MFWBIO-OP191

Investigations of Physical and Chemical Properties of Eber Lake (Turkey)Numan Emre GÜMÜŞ¹, Cengiz AKKÖZ¹, Murat BARLAS²¹ *Biology Department, Faculty of Science, Selçuk University, Campus/ Konya, Turkey*² *Biology Department, Faculty of Science, Muğla Sıtkı Koçman University, Campus/ Muğla, Turkey*cakkoz@selcuk.edu.tr

Aim of the study: The lake Eber is located in south-western Turkey and is kept as a conservation area, and has an importance for irrigation and drinking water source. Most of surface waters in western Turkey are getting polluted due to industrialization and urbanization. Ecologically it is one of Turkey's most shallow and eutrophic lakes. In this study, it was aimed to investigate seasonal changes of some physico-chemical features and to determine water quality classes of Eber Lake water.

Material and Methods: Five different stations were chosen as sampling area and water samples were taken from these stations in April 2014, July 2014, November 2014 and February 2015. Taken water species had been analysed in the laboratory and their physical and chemical quality were specified. One-Way Anova Test, Pearson Correlation Analysis and the Bray-Curtis Similarity statistical methods were used during the evaluation of the obtained results.

Results: The measured data were given as following (minimum, maximum, average); water temperature values were (7,2-27,8-14,9 °C), pH (7,72-9,72-8,93), dissolved oxygen (0,11-15,56-5,15 mg/l), conductivity (697-2590-1537 µS/cm), percentage of oxygen saturation (1,5-142,5-31,5 %), turbidity (5,23-257-61,4 NTU), color (32-161-83 Pt-Co), suspended solid content (1,2-102-23,9 mg/l), BOD₅ (1,56-3,6-2,36 mg/l), COD (27,9-177-106,8), chloride (74,8-540-247,8 mg/l), sulphates (77,4-172-114,7 mg/l), total hardness (8,25-42,9-18,69 FS°), magnesium (12,7-68,32,7 mg/l), calcium (26,7-117-63,6 mg/l), ammonium nitrogen (0,032-15,7-3,03 mg/l), nitrite nitrogen (0,02-3,45-0,92 mg/l), nitrate nitrogen (0-14,7-1,98 mg/l), total phosphates (0,309-8,35-2,43 mg/l), chlorophyll- *a* (1,4-115,1-31,04), and orto phosphates (0,01-6,49-1,91 mg/l). Results were compared with according to water pollution Control Regulation (WPCR), water intended human consumption standards (TS 266), eutrophication limit value, Environmental protection Agency (EPA), European Communities (EC) and Klee, (1991).

Acknowledgements: My PhD thesis was financially supported by the Selçuk University Scientific Research Project Coordinator with the project coded (BAP-14201044) and Tübitak BİDEB.

Keywords: Water quality, Eber lake, Pollution, Water Standards.

ORAL-MFWBIO-OP192

**The Influence of Leaf Litter on the Distribution of Aquatic Oligochaetes in Tunca River
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Aim of the study: The study was carried out in Tunca River that rises and is mostly located in Bulgaria and only a part of it is located in the European part of Turkey. With Arda and Ergene River, Tunca River constitutes a portion of Meriç basin that is one of the largest river systems in East Balkan Basin. Our experiment was designed to comparison potential differences on colonisation of oligochaetes in various leaf packages. There aren't any studies based on this statement in Tunca River.

Material and Methods: The length of this river is 384 km-long and its basin area is 7.884 km². Tunca River 12 km along forms the border with Turkey - Bulgaria. Then flowing for a while inside Turkey (approximately 30 km) mixed with Meric River in the South-west of Edirne. Three localities were chosen on the river and 5 different leaves of trees found in the environment and a hand net were used to take samples. Oligochaeta samples were taken between May 2012 - October 2012. 20 kg sacks of potatoes were used while packaging of leaves and a total of 25 packs were put in localities. The collected samples were kept in 70% alcohol and brought to the laboratory and they were sorted and identified to the lowest possible taxonomic level under a stereomicroscope. Shannon Weaver and Simpson indices were applied to detect the biodiversity of the leaf packages. Also, the unweighted pair group method with arithmetic mean (UPGMA) algorithm was used to show possible clustering relationships among the six leaf packages based on oligochaetes. UPGMA and biodiversity indices were applied by using MVSP 3.1. Principal Components Analysis (PCA) was used to detect the relation between the oligochaete species and the leaf packages.

Results: As a result, a total of 79 samples were obtained in areas of six different mesohabitats: *Platanus orientalis* leaf litter, *Ulmus leavis* leaf litter, *Morus alba* leaf litter, *Juglans regia* leaf litter, *Buxus* sp. leaf litter and a hand net samples. In the mesohabitats sampled, 751 specimens were identified, among them of 17 taxa belonging to family Naididae. Among the oligochaetes identified Naididae was represented by nine genera (*Limnodrilus*, *Tubifex*, *Potamothrix*, *Psammoryctides*, *Aulodrilus*, *Branchiura*, *Dero*, *Aulophorus*, and *Nais*). Principal components analysis (PCA) revealed the first two axes explained 89.3% of the total variance of the data. *Limnodrilus hoffmeisteri* Claparede, 1862 was associated with the *Juglans regia* leaf litter and *Psammoryctides albicola* (Michaelsen, 1901) was associated with the *Platanus orientalis* leaf litter. Most species determined were demonstrated apparent affinity with the *Buxus* sp. leaf litter mesohabitats.

Acknowledgements: This research has been supported by Trakya University BAP (2011-130 project no). We are deeply grateful to them for their financial support.

Keywords: Aquatic Oligochaetes, Community structures, Leaf litter, Tunca River, Edirne.

ORAL-MFWBIO-OP193

Fatty acid composition of total lipid, phospholipid and triacylglycerol in the muscle and liver tissue of *Aspius vorax*

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Aim of the study: Owing to the favourable effects of n-3 fatty acids on human health, there has been a great degree of interest in the fatty acid profiles of fish species in recent years. There has been no study on the fatty acid profiles of phospholipid and triacylglycerol from *Aspius vorax*. Therefore, the objectives of the present work were to investigate the total lipid contents and fatty acid profiles in the muscle and liver of *A. vorax*. These goals aim to provide nutritional information with respect to the consumption of *A. vorax* for nutrient balance as a foodstuff.

Material and Methods: Fishes were caught with casting nets from Atatürk Dam Lake on March 2009. Fish were killed with a sharp blow to the head; muscle and liver were excised. Fish sex was determined by their gonad. The samples were stored at $-30\text{ }^{\circ}\text{C}$ in a freezer prior to analysis. Muscle and liver tissues were homogenised in chloroform/methanol (2/1 v/v) solution in order to extract muscle and liver tissue lipids. The amount of lipid was determined gravimetrically. Then the total lipids were spotted on preparative thin layer chromatography (TLC) plates using commercial silica gel TLC plates. After applying the lipid extracts, the TLC plates were developed in petroleum ether: diethyl ether: acetic acid (80:20:1 v/v). The fractions were scraped into reaction vials, and the associated fatty acids were transmethylated by refluxing the fractions in acidified methanol for 2 hours at $85\text{ }^{\circ}\text{C}$. The fatty acid methyl esters were extracted with hexane. Fatty acid methyl esters were separated and quantified by capillary gas chromatography (GC) using a Hewlett Packard GC, a flame ionization detector (FID) and Hewlett-Packard ChemStation software. Statistical analyses were done with SPSS 15.0.

Results: The major SFAs (saturated fatty acids) were myristic acid (C14:0), palmitic acid (C16:0) and stearic acid (C18:0). Oleic acid (C18:1n-9) and palmitoleic acid (C16:1n-7) were the prominent MUFA (monounsaturated fatty acids). The dominant PUFAs (polyunsaturated fatty acids) were linoleic acid (LA, C18:2n-6), linolenic acid (ALA, C18:3n-3), arachidonic acid (AA, C20:4n-6), eicosapentaenoic acid (EPA, C20:5n-3) and docosahexaenoic acid (DHA, C22:6n-3) in both tissues. The distributions of Σ SFAs, Σ MUFAs and Σ PUFAs proportions were found to be different among PL and TG fractions. TG contained a lower proportion of Σ PUFA, but a higher proportion of Σ MUFA and Σ SFA than PL.

Acknowledgements: This study was financed by the Dicle University Scientific Research Foundation (DUAPK-08-FF-07).

Keywords: *Aspius vorax*, fatty acid, phospholipid, triacylglycerol.

ORAL-MFWBIO-OP194

Evaluation of water quality of certain streams in Antalya Basin, according to Saprobi Indices and Physico-chemical variables¹Hasan KALYONCU, ²Ali SALUR, ³Naime ARSLAN, ⁴Ömer ERDOĞAN,
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Aim of the study: The aim of the study is to determine water quality, according to biological (saprobic indices) and physicochemical variables at Antalya rivers basins.

Material and Methods: Water and macrozoobenthic samples were collected from total 10 stations, located in Manavgat, Köprüçay, Aksu, Düden, Boğa, Karpuz, Alara Stream, Isparta Stream and Kırkgözler outrun in Antalya Basin. This study was performed seasonally in 2014 year (April, June and September) but sampling could not be done during the winter. Macroinvertebrate communities along the stream were sampled at each of the 10 stations using a standard hand net (50 × 30 size with 500-µm mesh). The samples were taken from an area of nearly 100 m² in order to include all possible microhabitats at each station.

All water samples were analyzed within 24 h after sampling. Water temperature, pH, dissolved oxygen (DO), and conductivity were measured during sampling in situ. Other variables [Cl⁻, NH₄⁺-N, NO₂⁻-N, NO₃⁻-N, PO₄⁻-P, biological oxygen demand (BOD)] were measured in the laboratory by following the standard methods (APHA, 1998).

Results: Plecoptera members were found only in source and downstream part of Köprüçay River but no any other member was found in other stations. There were 28 taxa found in source part of Köprüçay Stream and Baetidae family was the most dominant taxon found from the Order Ephemeroptera. The most numerous taxon was seen in this station, as compared to other stations. While *Gammarus sp.* was the most dominant taxon in Manavgat River, Ephemeroptera and *Gammarus sp.* taxa were dominant in Aksu River, Oligochaeta and Ephemeroptera were dominant in downstream part of Düden Stream, Ephemeroptera was dominant in Boğa and Karpuz Streams, Ephemeroptera (*Colen dipterum*) and Corixidae taxa were dominant in Alara Stream and taxa belong to Odonata and Corixidae were dominant in downstream part of Köprüçay. There are 12 taxons determined in Isparta River and taxa belong to Oligochaeta were highly dominant. *Gammarus sp.* was the most dominant taxon in Kırkgözler Spring. According to physico-chemical variables Isparta River was found the most polluted River and that finding was supported by Saprobic Indices. Isparta River was determined as near to polysaprobic level while water quality was found as quality level IV according to physico-chemical variables.

Acknowledgements: The research was supported by Republic of Turkey Ministry of Forestry and Water Affair, General Directorate of Water Management. Authors thanks to their financial supports.

Keywords: Antalya Basin, Saprobi Indice, Macrozoobenthos, Water Pollution

ORAL-MFWBIO-OP195

Odonata Fauna of Alara and Karpuz Streams and their Relations with Physico-Chemical Variables¹Hasan KALYONCU, ¹Fusun KILÇIK, ²Ali SALUR¹Süleyman Demirel University, Faculty of Science and Art, Department of Biology, Isparta TÜRKİYE²Hitit University, Faculty of Science and Art, Department of Biology, Çorum, TÜRKİYEhasankalyoncu@sdu.edu.tr

Aim of the study: This study determines Odonata fauna of Karpuz and Alara Streams and tried to reveal their relationships with the physicochemical parameters.

Material and Methods:Water samples and samples, belonged to larvae of aquatic Odonata were collected in between January 2014 – November 2014 years from 10 stations each of Alara and Karpuz Streams. Odonata communities along the stream were sampled at each of the 20 stations using a standard hand net (50 × 30 size with 500-µm mesh). The samples were taken from an area of nearly 100 m² in order to include all possible microhabitats at each station. All water samples were analyzed within 24 h after sampling. Water temperature, pH, dissolved oxygen (DO), and conductivity were measured during sampling in situ. Other variables [Cl⁻, NH₄⁺-N, NO₂⁻-N, NO₃⁻-N, PO₄⁻-P, biological oxygen demand (BOD)] were measured in the laboratory by following the standard methods (APHA, 1998).

Results: Nine Odonata taxa were found in Alara River and 4 Odonata taxa were found in Karpuz Stream as a result of this study. *Caliaeshna microstigma*, *Epallage fatime*, *Ischnura elegans* and *Platycnemis pennipes* are the taxa, found in both streams. While *Calopteryx virgo festiva*, *Ischnura elegans*, *Platycnemis pennipes* were found only in 10th station, *Onychogomphus forcipatus albotialis* and *Epallage fatime* were found in all stations other than 10th. *Gomphus schneideri* was only seen in 7th station but could not be seen in 4th, 5th, 9th and 10th stations. *Epallage fatime* was seen in all stations other than 10th. *Caliaeshna microstigma*, *Ischnura elegans* and *Platycnemis pennipes* were seen in 10th station. *Epallage fatime* is found as the most dominant taxon in Karpuz Stream while *Caliaeshna microstigma* and *O. forcipatus albotialis* are the most dominant taxa in Alara Stream. Water qualities of the first 8 stations are found as quality level I, 9th station is as quality level I – II and 10th station is found as quality level II according to physico-chemical variables Alara and Karpuz Streams. 9th and 10th stations are affected by pollutants while first 8 stations are usually not much affected by farming areas and residential areas

Acknowledgements: This research has been supported by Unit of Scientific Research Projects, Süleyman Demirel University (Project No: 3771-M1-13). We are deeply grateful to them for their financial support.

Keyword: Odonata, water quality, Alara Stream, Karpuz Stream

ORAL-MFWBIO-OP196

New records of neonates and gravid females of *Rhinoptera marginata* in the Mersin Bay, North-eastern MediterraneanNuri BAŞUSTA¹, E. Mümtaz TIRAŞIN²¹Fisheries Faculty, Fırat University, 23119, Elazığ, Turkey²Institute of Marine Sciences and Technology, Dokuz Eylül University, İzmir, Turkey
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Aim of the study: Lusitanian cownose ray, *Rhinoptera marginata* is a large benthopelagic batoid chondrichthian species inhabiting the coastal waters of the Mediterranean Sea and the Eastern Atlantic Ocean from Portugal to Senegal. Although it is abundant along Africa's western coast, it is less frequent in the Mediterranean and globally assessed as "Near Threatened" by the IUCN. Other than reports of its occurrence and some biometric data, very little is known about it in the Mediterranean. This study intends to provide some information about its reproduction and also call attention to a possible nursery and reproduction area on the Turkish Mediterranean coast.

Material and Methods: The material used in the study consists of 129 specimens of Lusitanian cownose ray caught in the eastern Mediterranean Sea in a single haul at about 30 m depth off Deliburun coast between Mersin province and Karataş county (36° 48' 086" N - 34° 46' 072" E) by a commercial purse seiner on 12 February 2013. The sampled fish were iced and immediately transferred to the laboratory of the Fisheries Faculty of Fırat University, where dissections, various size (down to nearest mm) and total weight (with an accuracy of 0.01 g) measurements were carried out. Because tails of this species are fragile and often damaged, measurements made on width of discs (distance between tips of pectoral fins, DW) were considered more reliable indicators of body size than total length measurements. When desired, estimated averages of measurements grouped according to gender and reproductive status were compared with independent *t*-tests at a 5% significance level. Prior to tests, weight measurements were log transformed to ensure normality and homoscedasticity.

Results: Of the 129 specimens, 89 were female and 40 were male. When dissected, 36 of the female fish were found gravid, each bearing one embryo. The average DW of the gravid females was 804 mm (sd= 78 mm) and significantly higher than that of the remaining females, 749 mm (117 mm). However, the average TW values for gravid and nongravid fish, 6952 g (2333 g) and 5787 g (3351 g), respectively, did not differ significantly. Males were significantly smaller than females in terms of both size and weight. Estimated average values of DW and TW for males were 699 mm (106 mm) and 4067 g (1621 g), respectively. Observed ranges of DW and TW for all fish were 557-982 mm and 3746-12672 g, respectively. Catching such a big number of fish of various size, including many gravid specimens together in one single haul, suggests that these animals were in a schooling formation when they were captured. The location of the haul, a marine area between the estuaries of the two rivers Tarsus and Seyhan, furthermore suggests that these fish may be using this region as a reproduction and nursery area.

Acknowledgements: A part of this work was supported by Scientific Research Projects Coordination Unit of Fırat University. Project Number SUF.12.03.

Keywords: *Rhinoptera marginata*, Lusitanian cownose ray, reproduction biology, Mersin Bay, nursery area.

ORAL-MFWBIO-OP197

Limnological Monitoring Project of the Trophic Structure in Lake Eğirdir

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Aim of the study: This project study will reveal as a seasonal phytoplankton, zooplankton, benthic organisms and fish fauna being examined in terms of qualitative and quantitative, and this species of water quality parameters of the relationship and the lake's trophic structure with the identification of indicator species Lake Eğirdir in 3 years. At the same time, the fish community structure, determination of spatial and seasonal distribution of Lake Eğirdir, detection of changes that are likely to be seen in the fish fauna and identification of parasites in the fish will be made available.

Material and Methods: Lake Eğirdir, which is a tectonic feature lake, is located with a total surface area is 47.250 ha. Plankton, benthic, fish and water quality parameters samples will be taken seasonally between January 2016-December 2018 from four 5 stations in the lake. Carlson's Trophic State Index (TSI) will be calculated for TP, SD and chl-a. The *Brachionus: Trichocerca* quotient (QB/T) will be also calculated to determine the trophic level of Eğirdir Lake.

Results: This study which will be done in the Lake Eğirdir is about the changes occurring as a source of drinking water used in the water quality of the lake, and this change will lead the efforts to protect the prospective identification of potential sources of water quality in Lake Eğirdir, will show a way for other studies. It will also ensure follow-up of the trophic structure. Effects of parasites inside of economic and endemic fish for the lake on fish will be presented as well as implications for human health. This study will demonstrate that long-term results with the biodiversity of the lake, data processing will be provided in the future and is undoubtedly shed light on future work. Also this study is unique about the long-term investigation of lake in Turkey (3 years).

Acknowledgements: This work is supported by the moment TAGEM/HAYSUD/2016/A11/P-02/2

Keywords: Lake Eğirdir, zooplankton, phytoplankton, benthic, fish fauna, trophic state, water quality.

ORAL-MFWBIO-OP198

The Benthic Macroinvertebrate Fauna of Eşen RiverBülent YORULMAZ¹, Atakan SUKATAR², Murat BARLAS³¹ *Biology Department, Science Faculty, Muğla Sıtkı Koçman University, Muğla, Turkey*² *Biology Department, Science Faculty, Ege University, İzmir, Turkey*³ *Biology Department, Science Faculty, Muğla Sıtkı Koçman University, Muğla, Turkey*yorulmaz@mu.edu.tr

Aim of the study: This study was carried out to determine the benthic macro invertebrate fauna of Eşen River (Kocaçay) between June 2003 and June 2005. For this purpose, seven sampling points were selected and the benthic macroinvertebrate were collected.

Material and Methods: Macroinvertebrate communities along the stream were sampled monthly by using a bottom kick net (500 µm mesh). The samples were taken from an area of nearly 100 m² in order to include all possible microhabitats at each station. In some areas with the presence of large stones, the collected macroinvertebrates were first picked out and washed into the kick net in order to remove pupae and other attached individuals. In addition, macroinvertebrate samples were separated from the macrophytes and the sediment using sieves (250 µm). Collected organisms were immediately fixed in formaldehyde (4%) in the field and then transferred to 70% ethyl alcohol. The macroinvertebrates were sorted, identified to the lowest possible taxon (species, genus or families) and counted under a stereomicroscope.

Results: From the investigation of collected benthic macroinvertebrates, a total of 111 taxa, consisting of 48 genera and 63 species, which belong to classes Turbellaria, Gastropoda, Bivalvia, Hirudinea, Crustacea and Insecta were identified. Of these, %86, 84 (96 taxa) belong to Insecta. It was determined that, *Gammarus sp.*, was dominant on Kırkpınar, Çaygözü, Yakapark and Saklıkent, while *Chironomus sp.* was dominant on Ören, Alaçat and Ovaköy. Çaygözü and Yakapark have the highest similarity values while Ovaköy and Yakapark have the lowest similarity values among the sampling points of Eşen River. Alaçat and Ovaköy were separated from Kırkpınar, Çaygözü, Ören, Yakapark and Saklıkent due to high similarity values. When the mean values of biodiversity of the benthic macroinvertebrates were investigated, the highest mean value belonged to Ören and the lowest mean value to Ovaköy.

Acknowledgements: This research is a part of PhD. thesis, funded by Mugla Sitki Kocman University, Scientific Research Projects (2003/10).

ORAL-MFWBIO-OP199

In vitro Antibacterial Activity of *Arisarum vulgare* Plant Extract against Some Fish PathogensZeynep SAYIN¹, Gülşen ULUKÖY²¹Graduate School of Natural and Applied Sciences, Muğla Sıtkı Kocman University, Muğla-Turkey²Department of Aquaculture, Diseases Division, Faculty of Fisheries, Muğla Sıtkı Kocman University, Muğla-Turkey.zeynepsayin10@gmail.com

Aim of the study: The aim of this study was to determine the antibacterial activity of a geophyte plant, *Arisarum vulgare* Targ. Tozz., against virulent pathogenic bacteria strains which were Gram negative; *Vibrio anguillarum*, *Yersinia ruckeri*, and Gram positive; *Lactococcus garvieae*, *Vagococcus salmoninarum*, *Staphylococcus epidermidis*.

Material and Methods: Plant collected from nature and then extracted by using three solvents (water, ethanol, acetone). They were tested at 2, 4, 6, 8, and 10 % concentration by using disc diffusion method. The constituents were then tested in the medium to determine the minimum inhibitory concentration (MIC) by using the microdilution assay.

Results: It was determined that the inhibition zone in Gram positive bacteria strains (*L. garvieae*, *V. salmoninarum*, *S. epidermidis*) were high and the maximum value was at 10% concentration of ethanol extract with the zone of 11 mm. The highest inhibitory zone of Gram negative bacteria strains was determined as 10 mm at 10% concentrations of ethanol plant extract. The MIC were tested for the all strains. MIC obtained as 125mg/mL for *L. garvieae* and *V. salmoninarum* while the other bacterial strains were 250 mg/mL.

Keywords: Disc diffusion, MIC, geophyte plant, fish pathogen, bacteria.

ORAL-MFWBIO-OP200

Morphological and Molecular Identification of Cyanobacteria Isolated from River Basin of Ergene (Thrace, Turkey)Füsün AKGÜL¹, İnci TÜNEY², Rıza AKGÜL³, Hüseyin ERDUĞAN⁴¹*Mehmet Akif Ersoy University, Department of Molecular Biology and Genetics, Faculty of Science and Arts, 15030 Burdur, Turkey*²*Ege University, Department of Biology, Faculty of Science, 35000, İzmir, Turkey*³*Kastamonu University, Faculty of Fisheries, 37200 Kastamonu, Turkey*⁴*Çanakkale Onsekiz Mart University, Department of Biology, Faculty of Science and Arts, 17020 Çanakkale, Turkey*fakgul@mehmetakif.edu.tr

Aim of the study: Cyanobacteria are responsible for primary production in aquatic systems, with a high degree of diversity, structures of economic and biotechnological aspects of chemical substances. Such an important group of organisms are often used in scientific studies. However, information about taxonomy of cyanobacteria is inadequate. Because of morphological characteristics' deficiency, taxonomists support their morphological data by molecular analysis. In this study, the species of Cyanobacteria from inland waters in River Basin of Ergene were made more accurate determination and taxonomic mistakes of the algae species that have economic and commercial importance in Turkey, have been eliminated with the molecular techniques.

Material and Methods: For this aim; water samples were collected from inland waters in River Basin of Ergene (Thrace, Turkey) in May of 2012. Cell isolation was done and culture tubes were grown. When the biomass was reached the late exponential growth phase, algae biomass was harvested and used in molecular and microscopy analysis. Morphological identification was performed according to basic systematic literature. Total genomic DNA from cultured samples were isolated for polymerase chain reaction (PCR) analysis. Sequence analyses of ITS regions were performed and obtained sequences were compared with data from GenBank. Aligned data set was used for creating phylogenetic trees. Unweighted Pair Group Method with Arithmetic Mean (UPGMA) and Neighbor Joining (NJ) algorithms were used for inferring the phylogenetic relationships.

Results: According to our results; there is a discrepancy between morphologic and molecular identifications. Because of the samples that used in this study are microscopic and have very similar morphological characters; some mistakes may be made. To eliminate these errors, molecular researches are essential for these taxa to detect their accurate systematic regions.

Acknowledgments: This research was supported by The Scientific and Technological Research Council (TÜBİTAK), project number 211T181.

Keywords: Cyanobacteria, isolation and culture, molecular taxonomy, phylogenetic.

ORAL-MFWBIO-OP201

Morphological and Molecular Identification of Chlorophyta Members Isolated from River Basin of Ergene (Thrace, Turkey)Füsün AKGÜL¹, İnci TÜNEY², Rıza AKGÜL³, Hüseyin ERDUĞAN⁴¹*Mehmet Akif Ersoy University, Department of Molecular Biology and Genetics, Faculty of Science and Arts, 15030 Burdur, Turkey*²*Ege University, Department of Biology, Faculty of Science, 35000, İzmir, Turkey*³*Kastamonu University, Faculty of Fisheries, 37200 Kastamonu, Turkey*⁴*Çanakkale Onsekiz Mart University, Department of Biology, Faculty of Science and Arts, 17020 Çanakkale, Turkey*fakgul@mehmetakif.edu.tr

Aim of the study: The ecological and biotechnological importance of microalgae makes these organisms more valuable. Molecular techniques have been used in the present systematic studies, in particular related to microorganisms. Because of very small size, similar shapes of these organisms, their taxonomies cannot be done correctly and their systematic categorization changes frequently. The aim of this study is to eliminate this problem and detect the systematic places of microalgae isolated from inland waters in River Basin of Ergene (Thrace, Turkey).

Material and Methods: These isolates were observed by light microscopy, morphological identification has done and DNA sequences from the nuclear ribosomal internal transcribed spacer (ITS) region were analyzed phylogenetically. And accession numbers of all samples were got from NCBI (National Center for Biotechnology Information). Aligned data set was used for creating phylogenetic trees. Unweighted Pair Group Method with Arithmetic Mean (UPGMA) and Neighbor Joining (NJ) algorithms were used for inferring the phylogenetic relationships.

Results: According to results; there is a discrepancy between morphologic and molecular identifications. Because of the samples that used in this study are microscopic and have very similar morphological characters; some mistakes may be made. To eliminate these errors, molecular researches are essential for these taxa to detect their accurate systematic regions.

Acknowledgments: This research was supported by The Scientific and Technological Research Council (TÜBİTAK), project number 211T181.

Keywords: Microalgae, isolation and culture, molecular taxonomy, phylogenetic.

ORAL-MFWBIO-OP202

The Relationships Between Epilithic Algae and Environmental Variables: A study in Kovada Lake and Kovada Channel (Isparta/TURKEY)N. Lerzan ÇİÇEK¹, Fatma YAMUÇ¹¹Eğirdir Fisheries Faculty, Süleyman Demirel University, Turkeylerzancicek@sdu.edu.tr

Aim of the study: Kovada Lake and its Channel are located in Isparta/Turkey. Kovada Lake is one of the important surface waters of Turkey and Kovada channel provides a connection between Eğirdir Lake and Kovada Lake. The lake was declared as Protected Natural Area in 1992. The aim of this study was to determine the epilithic algae diversity and relationships between algae taxa and environmental variables in the research area.

Material and Methods: This study was carried out in four stations chosen from Kovada Lake and its channel. Epilithic algae and water samples were taken from the stations between Jun 2012-May 2013 seasonally. Biodiversity values (based on epilithic algae) were determined with Shannon-Wiener and Simpson diversity indices. A clustering analysis of unweighted pair group mean averages (UPGMA) was applied to determine the similarities between four stations, based on algae taxa. Diversity indices and UPGMA were conducted using the multivariate statistical package (MVSP) program version 3.1. A canonical correspondence analysis (CCA) was used to describe the variation between the epilithic algae taxa and environmental variables.

Results: In this study, a total of 47 taxa were detected, 34 taxa from Bacillariophyta, 8 taxa from Chlorophyta, 3 taxa from Charophyta, 2 taxa from Cyanophyta. Shannon-Wiener and Simpson biodiversity indices showed that the lowest diversity values were seen at the third station in the spring season while the highest diversity values were found at the first station in the summer season. According to CCA, 84.6% of the variance was described by the first four axes of the relations species and environmental variables ($r=0.968$) and pH, NH₄-N and, water temperature were found to be the most influential variables on distribution of epilithic algae. The stations were clustered into main two groups based on UPGMA. The highest similarity value was determined between third and fourth station (94%).

Acknowledgements: This research has been supported by TUBITAK-2209. We are deeply grateful to them for their financial support.

Keywords: Epilithic algae, Biodiversity, CCA, Kovada Lake, Kovada Channel.

ORAL-MFWBIO-OP203

Present distribution of the Pipefishes (Actinopterygii: Syngnathidae) in River Estuaries and Lagoon Lakes of Mediterranean Coast of TurkeyDeniz İNNAL¹, Şule GÜRKAN²¹Department of Biology, Mehmet Akif Ersoy University, 15100, Burdur, Turkey²Faculty of Fisheries, Ege University, 35100, İzmir, Turkeyinnald@gmail.com

Aim of the study: Pipefishes, like most other syngnathids, are characterized by restricted distributions, low mobility, small home ranges, and low fecundity. Brackish populations of Pipefishes currently in decline due to degradation of habitats, pollution of inland and coastal waters and the extensive introduction of exotic fish. The current study aims to update the range of pipefishes occurring in river estuaries and lagoon systems of Mediterranean coast of Turkey.

Material and Methods: A total of 13 sites (Yelkoma Lagoon Lake, Ceyhan River Estuary, Seyhan River Estuary, Berdan River Estuary, Göksu River Estuary, Sultansuyu Creek, Inceağrı Creek, Manavgat River Estuary, Köprüçay River Estuary, Beşgöz Creek, Kopak Creek, Beymelek Lagoon Lake and Köyceğiz Lagoon Lake) were surveyed between November 2014 to March 2016. Shore seine net were used.

Results: Pipefishes were found at only two of the localities investigated. A total of 2 individuals of *Syngnathus acus* were collected from Seyhan River Estuary and 11 individuals of *S. abaster* were collected from Köyceğiz Lagoon Estuary. At each locality, the general observations on the population and its situation were also presented.

Acknowledgements: Field studies in Ceyhan River Estuary, Seyhan River Estuary, Göksu River Estuary, Manavgat River Estuary was financially supported by the TÜBİTAK (Scientific and Technological Research Council of Turkey) under the Project numbered KBAG, 114 Z 259

Keywords: *Syngnathus acus*, *Syngnathus abaster*, Köyceğiz Lagoon Lake, Seyhan River Estuary, distribution.

ORAL-MFWBIO-OP205

A Preliminary Study on Zooplankton Species in Some of the Dam Lakes, Ponds and Streams in Anatolia (Konya, Burdur, Isparta, Denizli, Sivas/Turkey)Meral APAYDIN YAĞCI¹, Vedat YEĞEN¹, Abdulkadir YAĞCI¹, Rahmi UYSAL¹Fisheries Research Institute, Eğirdir, Isparta, Turkeymeralyagci@gmail.com

Aim of the study: In the present study, the zooplankton species in some of the Apa and Sille (Konya), Yapraklı and Onaç (Burdur) Dam Lakes, Keçiborlu (Isparta) and Beylerli (Denizli) Ponds and Mancınık (Sivas) Streams in Anatolia were determined. All species have been recorded for the first time in Apa, Sille, Yapraklı and Onaç Dam Lakes and Keçiborlu, Beylerli Ponds and Mancınık Streams. This research is expected to contribute to the knowledge of zooplankton species of the study areas and Turkey biodiversity.

Material and Methods: Zooplankton sampling were collected one-time study between 2002 and 2012 from the study areas. Samples were taken using plankton net Hydrobios Kiel with a mesh size of 55 µm and preserved with 4% formaldehyde solution. Also, species were determined under a invert, stereo and binocular microscope and the species identified according to Koste (1978), Negrea (1983), Dussart (1967, 1969), Segers (1995); Smirnov (1996), Nogrady and Segers (2002).

Results:At the end of the study, a total of 43 species were identified, including 20 species Rotifera, 18 species Cladocera, 5 species Copepoda. *Pleuroxus aduncus*, *Chydorus sphaericus*, *Bosmina longirostris*, *Leydigia leydigi*, *Keratella cochlearis* and *Asplanchna priodontawere* observed as intensive during the study area. Additionally, zooplankton species (e.g., *Brachionus calyciflorus*, *Brachionus angularis*, *Keratella quadrata*, *K. cochlearis*, *Polyarthra dolichoptera*, *Filinia longiseta*, *Lecane luna*, *B. longirostris*, *C. sphaericus*, *Daphnia sp.*, *Ceriodaphnia sp.*, *Cyclops vicinus*) that are indicators of eutrophic conditions were also well known.

Acknowledgements: We would like to thank the Fisheries Research Institute, Eğirdir, Isparta/Turkey

Keywords: Zooplankton, Dam Lakes, Ponds, Streams, Turkey.

ORAL-MFWBIO-OP206

Exotic Marine Macrophytes Species in the Gulf of Antalya, Turkey (Levantine Sea)

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Aim of the study: Alien species invasion is one of the factors that threat marine bio-diversity. The intrusion of these alien and invasive species into a new environment is described as “biologic invasion” or “biological contamination”. Alien and invasive species migrations has taken up speed thanks to human activities and local populations are now endangered because of the fast expansion of these species. The main vectors for the invasion to Mediterranean are Suez Canal, ships and aquaculture. The effects of the exotic species on new environment are; restructuring food-chain, new diseases and getting into completion with local species and drive them away.

Material and Methods: The specimens were collected by SCUBA and skin diving diving at depths ranging from 0,10 to 40 metres. Thalli preserved in buffered 5 % formaldehyde in seawater for further observations. The parts of algae were treated for stereo light microscope. Specimens are deposited in the Herbarium of Faculty of Aquatic Sciences and Fisheries at Akdeniz University (Turkey).

Results: In this study, 5 red algae (Rhodophyta), 2 brown algae (Ochrophyta), 6 green algae (Chlorophyta) and 1 Seagrass (Tracheophyta) in total 14 exotic marine macrophytes species has been identified in the Gulf of Antalya. These species are believed to be transported by ship and boat traffic.

Acknowledgements: This study was supported by Akdeniz University, The Scientific Research Project Coordination Unit (Antalya, Turkey).

Keywords: Exotic marine macrophytes, macroalgae, seagrass, Antalya Gulf, Turkey.

ORAL-MFWBIO-OP207

Preliminary Results on Checklist Revision of Chironomids for TürkiyeGürçay Kıvanç AKYILDIZ^{1,2,3}, Recep BAKIR², Mustafa DURAN²¹*Program of Biomedical Device Technology/Vocational High School of Technical Sciences, Pamukkale University, Turkey*²*Hydrobiology Laboratory, Biology Department/Faculty of Science & Arts, Pamukkale University, Turkey*³*FAGUMER-Flora and Fauna Research, Development and Application Center of Pamukkale University Denizli/Turkey*
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Aim of the study: In recent years, with the increase in identification guides and researches, it is known that many new species and new records have been given from Türkiye. A compiled usable data as a result of those chironomid collections is of paramount importance. The study was aimed to revise recent checklist of Turkish chironomid fauna.

Material and Methods: Primarily, the chironomid-data provided from both our fieldwork studies and literature was compiled as a data base. The synonym errata and repetitive taxa resulting from using locale and European identification guides were paid attention. Mature and pupae forms were also included with larvae in the checklist. The larvae samples collected from our own fieldworks were sorted based on their systematic under the stereo microscope and then mounted permanent in the laboratory. All the morpho-metric measurements were taken for each individuals and mean values were taken in account.

Results: As a preliminary result of the current study, we are able to say, there are 380 chironomid species from Turkey while 140 species were given for Turkish chironomid fauna in the previous literature studies. Results will be published in scientific papers and prepared databases.

Keywords: Diptera, benthos, data base.

ORAL-WILDBIO-OP208

Rain-Harvesting Agamid Lizards of AnatoliaMelodi YENMİŞ¹, Dinçer AYZAZ¹¹*Department of Biology/Science Faculty, Ege University, Turkey*
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Aim of the study: The aim of our study is to report an additional example of rain-harvesting behaviour with micro-architectural scale hinge structures (only previously known in *Phrynosoma cornutum* and *Moloch horridus*) and associated behaviours and note convergence of these characters among lizards and within the family Agamidae. We report on the histological and morphological structure of interscalar channels on the skin of agamid lizards in detail. We tested for the existence and non-existence of rain-harvesting behaviour in these species living in Turkey and report on a new rain-harvesting agamid lizard *Phrynocephalus horvathi*, which has convergently evolved rain-harvesting.

Material and Methods: Each species was placed into a separate terrarium. Captive observations were started when individuals were placed into the terraria. The drinking behaviour of each animal was observed and recorded during trials. The subject was sprayed with water using a hand-pump sprayer. Spraying lasted 3 min, and time to the beginning of drinking (movement of the jaw and tongue) was recorded. Additionally, the type and duration of rain-harvesting posture, and the presence or absence of licking wet stones was recorded. Minimum and maximum duration of these behavioural characters was measured in seconds. Animals showing typical rain-harvesting posture were photographed using Canon EOS 650D. Each subject was observed in three separate trials with two-week intervals between each trial. Skin sample fixation was with 2.5 % glutaraldehyde followed by washing in buffer solution before skin samples were gold-plated by dehydration for SEM examinations. Preparations were examined with a FEI Quanta FeG 250 Scanning Electron Microscope. Standard paraffin histological preparations were also made using Bouin's fixative. Samples were cut into 5, 7, and 10 μ m thick sections according to the rigidity of skin. Sections were dyed with Ehrlich's haematoxylin, examined with an Olympus CX31 microscope, and were photographed using an Olympus U-CMAD3-LC20 MODEL camera.

Results: Within the species examined, only *P. horvathi* showed rain-harvesting behaviour. During the behaviour, the lizard's head is bent downward until within a few millimetres from the ground and the body is curved upward in a way that it arches. The tail base is raised to become the highest point of the body. Rhythmic mouth movements started simultaneously with adjusting to this posture. These movements consist of a series of transactions of opening the mouth slowly, protruding the tip of the tongue, retracting the tongue by rolling and closing the mouth. Individuals of *S. stellio* and *P. caucasica* did not show rain-harvesting behaviour when sprayed. Individuals of these species ingested water from the ground by following water flowing from sprayed water, licking walls of the terrarium for accumulated water droplets, and drinking water collected in dorsal folds and protrusions on each other's skin.

Acknowledgements: We thank our funders: Financial support was provided by Ege University Accounting Office for Funds (Project No: 12-fen-063) and by The Scientific and Technological Research Council of Turkey (Project No: 114Z055).

Keywords: Rain-harvesting behaviour, Agamidae, Scale hinge, Hinge joint, Convergent evolution, Drinking behaviour.

ORAL-WILDBIO-OP209

The Status of Some Mammals Populations in Yedigöller Wildlife Reserve AreasSerdar GOZUTOK¹, Cihangir KIRAZLI¹¹ *Abant İzzet Baysal University, Faculty of Agricultural and Natural Sciences, Department of Wildlife Ecology and Management, Bolu*
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Aim of the study: The main objective of this study is to investigate population status of some mammal species in the Yedigöller Wildlife Reserve Area and to evaluate the role of those ecosystems for wildlife in regard to ecosystem services, biodiversity value, and management and conservation strategies.

Material and Methods: The study was conducted in the Yedigöller Wildlife Reserve Area that was covered 50950 ha and managed as Reserve Area since 2002 in the Yedigöller National Park. The data of inventory studies particularly for game mammals between 2003-2015 (except 2011) were used for determining the status of Red Deer, Roe Deer, Wild Boar and Brown Bear in the study area. For this purposes, the inventory studies were carried out in 2014 and 2015 in the study area using a kind of drive count method. Besides, earlier results were obtained from Nature Conservation and National Park Directory of Bolu Province. The status of populations of Red Deer, Roe Deer, Wild Boar and Brown Bear were calculated by using correlation analyses in Statistica 8.0.

Results: Our data suggested that Red Deer and Brown Bear populations were displayed positive tendency, and the number of male individuals of Wild Boar and Roe Deer were significantly increased for 13 years, while a negative effect was not observed. Consequently the conservation implications and management programs in Yedigöller Wildlife Reserve Areas were positively influenced the populations of wild mammals. Therefore, those ecosystems might be key areas for the effective inter/intra-action of the species and sustainable ecosystem services. To improve more effective conservation and management programs and to make those programs sustainable, the inventory of top predators including carnivore mammals such as wolf, and raptor bird species should be also performed annually with appropriate methods.

Acknowledgements: This study was carried out under a protocol between Nature Conservation and National Park Directory of Bolu Province and Abant İzzet Baysal University (AIBU). We wish to thank the managers of Reserve Area, Dr. Senol Yildiz, and Dr. Meric Kumbasli (AIBU) for their valuable contribution to the field studies.

Keywords: Bolu, Inventory, Wildlife Reserve Area, Conservation, Population Status, Game Mammals.

ORAL_WILDBIO-OP210

Mammalian Faunal Diversity of the Area of Wind Power Plant in Soma (Manisa) District

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Aim of the study: This study aimed to identify mammalian species diversity in the area of the wind power plant in Soma (Manisa) district. Determination of the mammal species diversity will allow the monitoring of adverse effects of wind power plant and a plurality of turbine on the wild life mammals.

Material and Methods: For this study, field and observational study was conducted in 2013 (January) - 2015 (December), in different habitats in the area of the wind power plant in Soma. During the fieldwork, for two years, optical devices (cameras, telescopes) and *global positioning system devices* has been used. Live capture traps for capture small mammals and mist- net mechanism for capture bats has been used. Individuals captured were released back to nature after species identification. Moreover, determination of mammalian species has been used for animal tracks (footprint, feces etc.).

Results: This research resulted in the terrestrial and aquatic biotope at regions around the wind turbines, is likely to spread 26 mammal species were identified. This mammal species belong to the following orders; Chiroptera (8 species), Carnivora (7 species), Rodentia (7 species), Artiodactyla (2 species), Lagomorpha (1 species) and Erinaceomorpha (1 species). Mammalian fauna, area of wind power plant in Soma, evaluated by IUCN category are determined endangered species. In this context, the four Chiroptera species (*Rhinolophus euryale*- Mediterranean Horseshoe Bat, *Myotis capaccinii*- Long-fingered Bat, *Miniopterus schreibersii*- Common Bentwing Bat and *Rhinolophus mehelyi*- Mehely's Horseshoe Bat) are under threat in Soma District. Other mammal species in the LC (low risk, widely distributed) category. There are no endemic mammalian species in Soma district.

Acknowledgements: This study was sponsored by Republic of Turkey Ministry of Forestry and Water Affairs.

Keywords: Wildlife biodiversity, Wind power plant, Soma, Manisa

ORAL-INV BIO-OP211

Catch Composition of Lessepsian Fish by Purse Seine Fishery in the Mediterranean Coast of Turkey

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Aim of the study: This study was carried out to determine the native and alien species composition by Purse Seine Fishery in the Mediterranean coast of Turkey. The data were obtained from a total of 149 purse seine operations.

Material and Methods: All data were collected from commercial purse seine from the Mediterranean coast of Turkey, 48 operations in the Iskenderun Bay, 33 operations in the Mersin and 68 operations in the Antalya Bay between 2009-2011.

Results: Total catch was 130.315 kg from all operations in the Mediterranean Sea. The catch were 39367 kg, 23507 kg, 67440 kg in the Bay of Iskenderun, Mersin and Antalya respectively, of which Lessepsian proportion were 46%, 42%, 30% in the Bay of Iskenderun, Mersin and Antalya, respectively. Lessepsian species giving a maximum prey in purse seine were *Etrumeusteres*, *Upeneus molluccensis* and *Dussumeria elopsoides*, respectively.

Acknowledgements: Thanks are due to the Ministry of Agriculture and Rural Affairs, General Directorate of Agricultural Research (TAGEM-09/AR-GE/11) for financial support.

Keywords: Purse seine, Lessepsian, North Eastern Mediterranean, Catch composition.

ORAL-INV BIO-OP212

The genetic structure of Mediterranean fruit fly (*Ceratitis capitata*) populations in TurkeyAbuzer GÜLER¹, Ersin DOĞAÇ²¹Department of Biology, Graduate School of Natural and Applied Sciences, Muğla Sıtkı Koçman University, Turkey²Köyceğiz Vocational School, Department of Medicinal and Aromatic Plants, Muğla Sıtkı Koçman University, Turkeyersindogac@hotmail.com

Aim of the study: The Mediterranean fruit fly, *Ceratitis capitata* (Wiedemann) is the most dominant and important pest on fruit orchards in the world, including tropical and sub-tropical areas. The medfly is originated from Africa and it has spread from Africa to the Mediterranean basin. Mitochondrial DNA (mtDNA) markers have demonstrated to be powerful for defining some aspects of the genetic diversity of medfly populations. The aim of this study is to ensure information about the genetic diversity of medfly populations in Turkey. Moreover, the sequences of mtDNA from other countries, registered in National Centre for Biotechnology Information (NCBI), were used for comparison.

Material and Methods: Adult specimens were collected from different provinces of Turkey, including Muğla, Aydın, İzmir and Antalya. From these locations total 60 samples were used in DNA extraction and sequencing. Total DNA was extracted by the Liffon method. Polymerase chain reaction (PCR) was performed using a primer set: TY-J-1460 5'-TACAATTTATCGCCTAAACTTCAGCC-3' and C1-N-2191 5'-CCCGGTAAAATTAATAATAAACTTC-3', which produced a ~724-bp product. Amplifications were performed in 25 µL microtubes containing 0.2 mM each dNTPs, 3 mM MgCl₂, 0.4 µM of each primer, 1X Taq Buffer, 1 U Taq Polymerase, and ~10 ng gDNA. The amplification program has an initial denaturation step of 5 min at 94°C, followed by 39 cycles of 30 s in 94°C, 20 s in 46°C, 60 s at 72°C, and a final extension of 10 min at 72°C. PCR products were purified using Qiagen QIAquick Gel Extraction kit and sequenced unidirectionally by using C1-N-2191 primer. Descriptive statistics were calculated in DnaSP ver. 5.10.01). Median joining network of haplotypes, were performed using NETWORK (ver. 4.6).

Results: Intraspecific genetic diversity was examined using molecular marker obtained from COI sequences in three populations of the medfly from Turkey. The mean number of haplotypes (Hp), haplotype diversity (h) and nucleotide diversity (π) were ranged from 2 (Muğla) to 6 (Antalya), 0.1333 (Muğla) to 0.8285 (Antalya) and 0.0004 (Muğla) to 0.0018 (Antalya), respectively. In 724 bp, there were 11 polymorphic sites, 1 of these sites were singletons, and 10 of them were parsimony informative. According to Fst values İzmir population significantly differed from other populations. Ten haplotypes were found and H1 was the most frequent, widely spread and shared by all other populations. Median joining network tree might demonstrate the probable expansion of this fly from East to West. According to mtDNA results our country (especially H1) is most closely connected with European and American flies.

Acknowledgements: This study was financially supported by the Research Fund of Muğla Sıtkı Koçman University (Grant number: BAP 15/171).

Keywords: *Ceratitis capitata*, genetic variation, mitochondrial DNA, Turkey.

ORAL-INV BIO-OP213

Length-weight, length-length relationships and morphometry of Lessepsian *Pomadasys stridens* (Actinopterygii: Haemulidae) from Antalya Gulf-Turkey

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Aim of the study: Biological invasions represent a significant risk for many ecosystems and have become an issue of increasing concern worldwide. Mediterranean Sea is considered to be one of the main hotspots of marine bioinvasions on Earth, and is by far the major recipient of nonindigenous species among European seas. Although abundance of *Pomadasys stridens* rapidly increase on coasts of Turkey, there has been limited previous references for biological properties from Antalya Gulf. The objective of this study was to provide information on the length-weight, length-length relationships and morphometric characters of *P. stridens* in the Antalya Gulf.

Material and Methods: Samples were collected during November 2014 - March 2016 with nets of various mesh sizes in the Antalya Gulf (Mediterranean-Turkey). Fish samples were immediately transported to the laboratory in the Department of Biology, Mehmet Akif Ersoy University (Burdur-Turkey). All individuals (preserved frozen) were measured for total length (TL, in cm) to the nearest mm and weighted (W, total wet weight in g) to the nearest 0.01 g. Length-weight relationship was calculated by $W = aL^b$. Metric characters of 60 selected individuals were measured with digital slide. Morphometric relationships between parameters were calculated using the linear regression equation.

Results: 122 specimens of *P. stridens* were collected during the study period. Of all the *P. stridens* examined, 63 (51,6%) were female, and 59 (48,4%) were male. Specimens of *P. stridens* ranged from 9 to 16,50 cm TL and from 9,9 to 64,50 g weight. The length-weight relationship for all individuals were described by the parameters: $a = 0.0118$ and $b = 3.0761$. This study also presents the relationships between total length-standard length, total length-fork length, standard length-fork length, total length-head length, total length-head depth, total length-body depth, body depth-head depth, head length-head depth and body depth-head length for *P. stridens*.

Keywords: Lessepsian migration, Mediterranean, *Pomadasys stridens*.

ORAL-GHDBIO-OP214

Antimicrobial Activity on the Skin Secretions of four Anuran Species from TurkeyUğur Cengiz ERIŞMİŞ¹, Pınar AGYAR¹, Elif KORCAN²¹*Molecular Biology and Genetics Department, Sciences and Literature Faculty, Afyon Kocatepe University, Turkey*²*Vocational School of Health Services, Usak University
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Aim of the study: Skin secretions from many species of Anura contain a wide range of compounds with biological activity. These compounds are of great importance for the amphibians to regulate their physiological balance, to resist infection by microorganism, and to escape from being preyed upon by natural predators. However, studies on this subject is limited to a few types of frog in Turkey. The aim of this study is to test the antimicrobial activity of different anuran skin secretions against Gram (+), Gram (-) bacteria and *Candida albicans* cultures.

Material and Methods: Adult specimens of frogs of both sexes (*Bufo bufo*, *Bufo variabilis*, *Bufo verrocosmisscus*) obtain from different regions in Turkey. Preparation of skin secretion, the frogs were washed first with tap water and then with distilled water. Skin secretion was obtained from the dorsal skin using gentle trans-dermal electrical stimulation. Secretions were washed from the skin using deionised water and collected solutions were left in 80°C water bath for 30 min and centrifuged at 5500 rev/min for 30 min. The precipitate was diluted with distilled water, 0.1 N HCl, 0.1 N NH₄OH and 1 M phosphate buffers (pH: 4 and pH: 7). Test microorganisms (*Escherichia coli*, *Staphylococcus aureus*, *Pseudomonas aeruginosa*, *Listeria*, *Micrococcus luteus*, *Bacillus subtilis*, *Klebsiella pneumonia*, *Salmonella thyphi*, *Proteus vulgaris*, *Bacillus cereus*, *Candida albicans*) were obtained from the culture collection of Afyon Kocatepe University. Cultures of these bacteria were grown in Nutrient broth (NB) at 37°C for 24 h. In vitro antimicrobial activity studies were carried out by Agar-Disc Diffusion Method. Nutrient Agar (NA) was preferred as the most suitable medium for antimicrobial activity studies. 20 µl extract was implemented into a sterile 6 mm diameter disc. In addition, continued only solvent was used as negative control. 0.1 N HCl, 0.1 N NH₄OH, 1 M phosphate buffers (pH: 4), 1 M phosphate buffers (pH:7) were used as positive controls.

Results: The highest antibacterial effect showed by 0.1N NH₄OH of *Bufo variabilis* extract against *Micrococcus luteus* (ATCC-9341). Extracts of *Bufo bufo* skin secretion exhibited no effects against *Pseudomonas aeruginosa* and *Micrococcus luteus* However the highest antibacterial effect showed against *E.coli* (10,5-14mm inhibition zone) The more antibacterial effect showed by 0.1 N HCL and 1M phosphate buffers (pH7) extracts of *B. variabilis* than 0.1 N NH₄OH extract and 1M phosphate buffers (pH4).

Acknowledgements: We are indebted to TÜBİTAK (Project no.113Z139) for financial support.

Keywords: Antimicrobial Activity, *Bufo bufo*, *Bufo variabilis*, *Bufo verrocosmisscus* Frog.

ORAL-GHDBIO-OP215

Monitoring of the Fish and Amphibian Bacterial Pathogens (*Flavobacterium* spp and *Aeromonas hydrophila*) using Environmental DNA methods in Turkish Lakes Region¹ Uğur Cengiz ERİŞMİŞ, ¹ Pınar AGYAR, ¹ Selin GÜLEÇ¹ Molecular Biology and Genetics Department, Sciences and Literature Faculty, Afyon Kocatepe University, Turkey

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Aim of the study: Environmental DNA (eDNA) has been defined as genetic material obtained directly from environmental samples (soil, sediment, water, etc.) without any obvious signs of biological source material. To address the potential of environmental DNA as a tool for monitoring freshwater fish bacterial pathogen, we conducted comparative surveys from two natural lakes in Turkey: Beysehir Lake, Isıklı Lake, Eğirdir Lake, and Eber Lake. We used monitoring methods with environmental 16s rRNA based freshwater fish bacterial pathogen (*Flavobacterium* spp) detection and quantification, by applying real time PCR (rt-PCR) to DNA extracted from water samples.

Material and Methods: 4 X 500 mL water samples were taken at depths of 1 to 2 m in four different localities of the Beysehir Lake, Isıklı Lake, Eğirdir Lake, and Eber Lake in the between April and September from 2014 to 2015 years. The water samples were filtered immediately onto a sandwich of a nuclepore filter (pore size, 0.2 µm) and a glass fiber filter (GF/F; Whatman). DNAs of *Flavobacterium* spp. and *Aeromonas hydrophila* was isolated in nuclepore filter of each localities. DNA sample using primers designed to amplify ~ 587 bp and 776bp region of the gene encoding the 16S rRNA of all species within the genus *Flavobacterium* and *A. hydrophila* respectively. Real time PCR (Rt-PCR) was used to measure the relative abundance of *Flavobacterium* spp. and *A. hydrophila* present.

Results: In the present study, the diversity of the genus *Flavobacterium* and *A. hydrophila* using eDNA methods was first analyzed by screening universal bacterial clone libraries for each of the four lakes. We detected *Flavobacterium* spp. and *A. hydrophila* in 6 out of 16 localites from Turkish Lakes Region at this study locations. As another results of this study, eDNA methods are rapidly, moving from technical breakthrough to widespread application and filtration provides the advantage of collecting DNA from larger volumes of water for conservation and management.

Acknowledgements: We are indebted to TÜBİTAK (Project no.113Z139) for financial support.

Keywords: Environmental DNA, *Flavobacterium* spp., *Aeromonas hydrophila* Turkish Lakes Region, Rt-PCR.

ORAL-GHDBIO-OP216

Comparative analysis of hemagglutinin gene from equine influenza viruses isolated on the territory of the Republic of Kazakhstan in 2007 and 2012

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Aim of the study: Genetic analysis of hemagglutinin gene and detection of alterations between equine influenza viruses isolated in RK in years 2007 and 2012.

Material and Methods: Strains of the equine influenza virus isolated in Republic of Kazakhstan in 2007 (A/equine/Otar/764/07) and 2012 (A/equine/Kostanay/09/2012) were used in the work. Sequencing was performed in DNA analyzer (Applied Biosystems 3130). BLAST and SeaView databases were used for alignment and genetic analysis.

Results: Molecular mechanism of host range selection by influenza viruses is not yet identified, still the hemagglutinin gene has been shown to bear a relation to the virus tropism concerning host range selection. It is called forth by the fact that complete HA cleavage by cellular enzymes of one or another organism provides free virion penetration into cells followed by viremia development. Strains of equine influenza virus A/equine/Kostanay/09/2012 and A/equine/Otar/764/07 were sequenced and their sequences were deposited in the international database *GenBank* under numbers *KP202380.1* and *JF683499.1* respectively. The obtained data on the nucleotide sequence sized 1733 n.p. made possible comparative and phylogenetic analysis of the hemagglutinin gene. The findings of the comparative analysis between strains of years 2007 (A/equine/Otar/764/07) and 2012 (A/equine/Kostanay/09/2012) allowed detecting eight nucleotide substitutions that resulted in amino acid alteration at three positions (160 Thr to Ala, 215 Gly to Glu and 497 Glu to Gly). As is known if nucleotide substitutions do not influence amino acid sequence the virus pathogenicity does not practically change. However if amino acid composition changes higher virulence of the virus up to overcoming the interspecies barrier is possible. So, it may be logically concluded that the outbreak of equine influenza in 2012 might be caused by the mutant virus with altered nucleotide and amino acid sequences.

Acknowledgements: Special thanks to the staff of the laboratory "Molecular Biology and Genetic Engineering" Research Institute for Biological Safety Problems, as these studies were conducted in the above-mentioned institution.

Keywords: Equine Influenza, genetic analysis, virus, gene.

ORAL-GHDBIO-OP217

The Biological Activities of Potassium Metaborate; a Boron Compound Belong to the National Wealth of Mineral Diversity in TurkeyTuba BAYGAR¹, Nurdan SARAC², Ozgur CEYLAN³, Aysel UGUR⁴, Rukiye BORAN⁵, Uydu BALCI²¹Material Research Laboratory, Research Laboratories Center, Mugla Sitki Kocman University, Turkey²Department of Biology, Faculty of Science, Mugla Sitki Kocman University, Turkey³Food Quality Control and Analysis Program, Vocational School of Ula Ali Kocman, Mugla Sitki Kocman University, Turkey⁴Section of Medical Microbiology, Department of Basic Sciences, Faculty of Dentistry, Gazi University, Turkey⁵Medical Laboratory Program, Vocational School of Health Service, Aksaray University, Turkey
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Aim of the study: The importance of the global approach to biodiversity and drug discovery involving natural and non-toxic products are gaining much attention for 21st century's scientists. There is an urgent need for new drugs against microbial infections and biofilm formations because of the increased incidence of microbial resistance. Such resistance presents a serious challenge to human health, as well as the costs for the treatment of infections. Boron has been recognized as an essential element for plants since the 1900s and well known with its strong activities. One of the effective borate compounds, potassium metaborate, will be evaluated for its biological activities.

Material and Methods: Potassium metaborate (KBO₂) was used for biological activity analysis. Antioxidant capacity of potassium metaborate was determined by β- carotene bleaching (BCB) assay and hydroxyl radical scavenging activity. Potassium metaborate was evaluated for its antimicrobial effects against yeast (*Candida albicans* ATCC 10239), Gram-positive (*Bacillus subtilis* ATCC 6633, *Staphylococcus aureus* ATCC 25923) and Gram-negative (*Pseudomonas aeruginosa* ATCC 27853, *Escherichia coli* ATCC 25922) bacteria via broth dilution method. The inhibition effect of potassium metaborate on the biofilm formation capability of tested microorganism was measured by microplate biofilm method using MTT (3-[4, 5- dimethyl-2-thiazolyl]-2, 5-diphenyl-2H-tetrazolium-bromide). Characterization of biofilm inhibition was also observed by Scanning Electron Microscope (SEM).

Results: Potassium metaborate was found to have the ability to scavenge hydroxyl radicals with an inhibition rate of 71.13% at 100 mM concentration. Antioxidant activity of potassium metaborate as determined by BCB assay gave higher result with an inhibition rate of 86.96% at the same concentration. According to the MIC (minimum inhibition concentration) values, the potassium metaborate inhibited the growth of *C. albicans*, *S. aureus* and *E. coli* at 62.5 mM concentrations while it was 31.25 mM for *B. subtilis* and 125 mM for *P. aeruginosa*. The highest antibiofilm activity was determined at the MIC of potassium metaborate with the reduction rate of 90.18% against *C. albicans*. Antibiofilm reduction rates were 88.23% against *S. aureus* and 75.98% against *E. coli*, as no antibiofilm activity was observed for *P. aeruginosa* and *B. subtilis*. It was concluded that, potassium metaborate have strong biological activities and can be effectively used for biomedical and environmental solutions.

Keywords: Potassium metaborate, antimicrobial, antioxidant, antibiofilm

ORAL-GHDBIO-OP218

The Effect on β -Catenin Gene Expression of Grape Seed Extract in Experimental Diabetic RatsElif GÜLBAHÇE MUTLU¹, Emine ARSLAN², Hilal ARKOĞLU³¹Department of Physiology, Faculty of Medicine, KTO Karatay University, Turkey²Department of Molecular Biology, Faculty of Science, Selçuk University, Turkey³Department of Medicine Biology, Faculty of Medicine, Selçuk University Turkey
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Aim of the study: Diabetes Mellitus (DM) a chronic metabolic disease which occurred as a result of deterioration in the signaling pathways of insulin in the target tissues. And, this case continued throughout the patient's life and reduced quality of life. WNT pathway is involved in lipid metabolism and glucose homeostasis, and β -catenin is located in this pathway. In this study, we aimed to investigate the effects of grape seed (*Vitis vinifera* L.) extracts on β -catenin gene expression in wistar rats created experimental diabetic.

Material and Methods: Rats were divided into five groups; healthy control group, diabetic control group, 100mg/kg, 200mg/kg and 400mg/kg extracts given the treatment groups. Methanol extract of *Vitis vinifera* was administered orally for 4 weeks. The β -catenin gene expression levels were determined by quantitative Real Time-Polymerase Chain Reaction (Real Time-PCR) method in liver and pancreas of rats. The statistical analysis was performed and One-way ANOVA (Tukey) was used to test for differences between groups.

Results: The results of β -catenin gene expression obtained from the liver and pancreas tissue were determined no significant difference among the groups ($P>0.05$). Our study results showed that the administered treated doses of seed extracts have not any effect on β -catenin gene expression in these tissue.

Acknowledgements: The study was supported by grants from the Coordination Committee of Scientific Research Projects of Selçuk University (BAP, no:13201030).

Key Words: β -catenin, Gene expression, Diabetes mellitus, Grape Seed, *Vitis vinifera* L., Diabetic rat.

ORAL-BIOFOOD-OP219

Exploiting Genetic Sources from Alkali Lakes – isolation of alkaliphilic bacteria from soda lakes in Turkey and their utilization for production of CGTaseEda KABACAOĞLU¹, Barçın KARAKAŞ¹¹Department of Food Engineering, Akdeniz University, Turkey
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Aim of the study: Alkaliphilic microorganisms have attracted much interest in the past few decades because of their ability to produce extracellular enzymes that are active and stable at high pH values. This study aims to isolate and identify cyclodextrin glucosyltransferase (CGTase) producing bacteria from two alkali lakes in Turkey and evaluate their CGTase production potential. This enzyme is used industrially for the production of cyclodextrin, a valuable additive/functional aid used in food processing.

Material and Methods: In order to screen and isolate CGTase secreting microorganisms, lake water including soils was gathered from different locations around Lake Salda and Lake Van. Samples were briefly shaken and left to settle and 100 µL sample of water was plated on modified Horikoshi medium II. Following incubation, selected based on the appearance of yellowish zones at colony periphery, single strains were sub-cultured by streaking on the same medium. Strains were cultivated in Horikoshi broth and the optical density (OD) of the cell cultures was determined spectrophotometrically. Samples of the isolated bacterial strains were diluted with glycerol-water solution and stored at -80 °C. The colony morphology of bacterial isolates was observed and cellular morphology was visualized using the microscope and Gram staining. In order to perform identification based on the 16S rDNA sequence, DNA was extracted from the isolates and PCR was carried out using a universal primer set. The bacterial sequences were evaluated for homology and phylogenetic relation. Strains were cultured for CGTase production and the activity was determined based on the reduction of colour intensity of phenolphthalein after complex formation with β-cyclodextrin.

Results: As a result of the screening procedure, 3 strains from lake Salda and 1 strain from lake Van were identified as CGTase producing bacteria. The colony morphology of the strains and investigation using the microscope indicated that these may be alkaliphilic bacteria. Further investigation of the specimen 16S rDNA sequence showed these bacteria to be of *Bacillus* sp. and different from close relatives present in the databank. However, it can be concluded that the sequences had the highest homology with *Bacillus oshimensis*, *B. patagoniensis*, *B. lehensis* ve *B. agaradhaerensis*. The growth and extracellular CGTase production profiles of the isolates was monitored. Under the applied culture development conditions the cultures peaked in cell density within 24 hours and the CGTase activity obtained varied between 6-8 U/mL.

Acknowledgements: This study was funded by Akdeniz University, Scientific Research Projects Management Unit under project No. 2011.01.0102.008. The authors are grateful to Dr. Per Saris of Helsinki University, Department of Food Science for his aid in part of the primer design and sequence analysis work.

Keywords: LakeSalda, Lake Van, alkaliphilic, bacteria, *Bacillus* sp., cyclodextrin glucanotransferase (CGTase)

ORAL-BIOFOOD-OP220

Antioxidant capacity and antimicrobial activity against food related microorganisms of *Origanum vulgare* L. subsp. *gracile* (C.Koch) letsvaart essential oilRukiye BORAN¹, Aysel UGUR², Nurdan SARAC³, Ozgur CEYLAN⁴, Tuba BAYGAR⁵¹Medical Laboratory Program, Vocational School of Health Service, Aksaray University, Turkey²Section of Medical Microbiology, Department of Basic Sciences, Faculty of Dentistry, Gazi University, Turkey³Department of Biology, Faculty of Science, Mugla Sitki Kocman University, Turkey⁴Food Quality Control and Analysis Program, Vocational School of Ula Ali Kocman, Mugla Sitki Kocman University, Turkey⁵Material Research Laboratory, Research Laboratories Center, Mugla Sitki Kocman University, Turkey
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Aim of the study: The shelf-life of food products is linked to physical, biological (e.g., microbial spoilage) and chemical (e.g., lipid oxidation) factors. Synthetic chemical additives such as antimicrobial agents and/or antioxidants are commonly used to improve quality attributes and potentially offer shelf-life extension to certain foods. Many natural antioxidant and antimicrobial compounds from plants show great potential to preserve the oxidative stability and to reduce microbial spoilage of food products. Furthermore, these compounds also have a broad array of additional health-promoting benefits. The aim of this study was to evaluate the potential use as food additive of *Origanum vulgare* L. subsp. *gracile* (C.Koch) letsvaart essential oil.

Material and Methods: In this study, aerial parts of *O. vulgare* subsp. *gracile* were collected by local residents in Adana province of Turkey in August 2011 and essential oil (EO) was obtained. In vitro antioxidant ability was determined by using DPPH, β -carotene-linoleic acid and total phenol contents. The antimicrobial activity of the EO against *Enterococcus faecalis* ATCC19433, *Staphylococcus aureus* ATCC25923, *Escherichia coli* ATCC25922 and *Salmonella typhimurium* ATCC14028 were tested by a disc diffusion method.

Results: The effectiveness of EO as food preservative was evaluated in this study. Results showed that, the EO have antioxidant and antimicrobial activity. The antioxidant activity of the EO was compared with natural and synthetic antioxidants such as ascorbic acid and BHT. DPPH assay results showed the antioxidant activity (IC₅₀) of the EO, BHT and ascorbic acid were 4.83±0.21 mg/ml, 0.184±0.01 mg/ml and 0.01±0.03 mg/ml, respectively. The results of β -carotene bleaching tests found the IC₅₀ values of the EO, BHT and ascorbic acid to be 0.321±0.01 mg/ml, 0.05±0.012 mg/ml and 0.014±0.2 mg/ml, respectively. The total phenolic content of the EO was evaluated spectrophotometrically and calculated in gallic acid equivalents (GAE) as 384.2± 0.01 mg/ml. The EO also showed microbial growth inhibition against tested all bacteria species. Thus, it is suggested that the EO of *O. vulgare* subsp. *gracile* may be used as a potential source of natural antioxidants and antimicrobials in the application of food industry to extension of shelf-life of foods.

Keywords: *O. vulgare* subsp. *gracile*, essential oil, food additive, antimicrobial, antioxidant

ORAL-BIOFOOD-OP221

Evaluating the Industrial Waste Products of Orange; a Natural Preservative on Shrimp MelanosisYunus ALPARSLAN¹, Cansu METİN¹, Hatice HASANHOCAOĞLU YAPICI¹, Tuba BAYGAR², Ali GÜNLÜ¹, Taçnur BAYGAR¹¹*Department of Seafood Processing Technology, Faculty of Fisheries, Mugla Sitki Kocman University, Turkey*²*Material Research Laboratory, Research Laboratories Center, Mugla Sitki Kocman University, Turkey*
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Aim of the study: Regarding the economical facts of increasing world population, food processing wastes have great potential for recycling raw materials and conversion into useful products of higher value as a by-product. Orange is a citrus fruit consumed in high quantities all over the world in the natural and peeled forms. Orange peel is the main waste product of juicing process. Active packaging technology is mainly used for preserving the food and prolonging its shelf-life. In this study, assessment of edible gelatin coating solution enriched with orange peel essential oil on the sensorial quality and melanosis of cold stored deep water pink shrimp was studied.

Material and Methods: The essential oil was obtained by hydro distillation from dried orange peels and its chemical composition was determined by gas chromatography-mass spectrophotometer (GC-MS) analysis. Antioxidant activity was screened by DPPH (2,2-diphenyl-1-picrylhydrazyl) radical-scavenging activity. Gelatin (G) and 2 % orange peel essential oil incorporated gelatin (G+OL) solution were used for coating the shrimp. Sensory and melanosis evaluation besides physical (color) analysis were carried out for control and coated samples throughout the storage period of 14 days. Microstructure characterization of the gelatin films were also done by Scanning Electron Microscopy (SEM).

Results: The results cleared out that the edible gelatin coating solutions enriched with orange peel essential oil has noticeable effects on the sensorial quality and melanosis formation of shrimps when compared to control group. It was determined that edible gelatin coating solutions used were effective in all groups particularly on melanosis which may occur in shrimps and edible gelatin coating solutions with orange peel essential oil preserved the quality of shrimp better.

Keywords: Orange peel; essential oil; deep water pink shrimp, melanosis

ORAL-RENBIO-OP223

Investigation of the Effects of Safflower Biodiesel Blends with Eurodiesel Fuel on Engine Exhaust Emissions in Common-Rail Diesel EngineA. Engin ÖZÇELİK¹, Mustafa ACAROĞLU¹, Hasan AYDOĞAN¹¹*Selcuk University/Technology Faculty Mechanical Engineering, Turkey*
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Aim of the study:In the present study, the effects of biodiesel obtained from safflower oil through transesterification and Eurodiesel blends on engine exhaust emissions were examined in a four-stroke, common-rail fuel system, water-cooled, four-cylinder diesel engine.

Material and Methods:The biodiesel used in this study was produced from safflower oil through transesterification. Using this biodiesel and diesel fuel, fuel blends of B10 (10% safflower methyl ester-90% diesel fuel in volume), B20 and B100 fuels were prepared. Experiments were conducted on the engine by using these fuel blends. The test engine was a four-cylinder, turbocharged, intercooler diesel engine with a common-rail fuel system.

Results:In the present study, eurodiesel fuel and safflower methyl ester blends were produced. Biodiesel fuels were respectively used in a diesel engine without performing and modifications on the engine. Engine performance and emission characteristics of these fuels were tested at full throttle and different engine speeds. Engine exhaust emission variation curves of each fuel were obtained using the data from the tests and the curves were compared with one another.

Acknowledgements: This study was supported by Selcuk University Scientific Research Projects Center.

Keywords: biodiesel, safflower, engine, common-rail, emissions.

ORAL-RENBIO-OP224

The Clonal Variability of the Growth Parameters for Poplars and Willows in Field and Laboratory Conditions

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Aim of the study: Poplars and willows are forest trees used in many countries as fast growing timber species for production of timber, veneer, furniture, matches and other valuable products in long rotation forests and agroforestry systems as well as wood chips and pellet production in short rotation plantations (SRP) that can be considered as a renewable source of energy. The requirements for plant material for SRP differ from those for traditional forestry: plant material for SRP should be cheap, must have high rooting ability and demonstrate fast growth immediately from the start of planting [Bartko, 2011], while plant material for reforestation should meet ecological requirements of high genetic diversity, adaptability, etc. However, SRP can substitute harvesting natural populations and release pressure on native forests helping to protect their biodiversity. To estimate the clones of poplars and willows available in Ukraine suitable for SRP by their growth characteristics.

Material and Methods: Rooting ability of cuttings in water for 15 poplar and 3 willow clones was determined on 12, 19 and 25 days after starting soaking. The collection of fast growing trees was established at the National Botanical Gardens. Currently, it includes 21 *Populus* and 10 *Salix* clones, many of them were provided by the Institute of Forestry and Forest Melioration, and they are mostly hybrids of Ukrainian origin. Cuttings of 20-25 cm length were planted very densely, and the established plot was watered every week through spring and summer, which was very important because of extreme summer drought. At the end of the first growing season the height, base diameter, number of branches per each plant and biomass weight were measured.

Results: Poplar and willow clones differed a lot by growth parameters in the field conditions and rooting ability in water. Rooting ability of poplars varied across different clones. Five poplar and three willow clones formed a lot of roots already on 12 day, others did it by 7 days later, while five poplar clones were quite rigid and no roots were formed in water. Thus, the clones, which readily formed roots are more suitable for SRP. Average height of the best clones reached more than 2 m while the lowest were around 1 m height and less. Diameter variations ranged within 4–19 mm, while number of branches per plant varied between 1,00 and 2,22, and fresh biomass weight – between 23–341 g. Comparing to others, willow clone Zhytomyrska-1 was the most intensively growing during the first planting season. Other perspective clones of poplar and willows were also determined. To finally recommend the best clones to farmers, the experiments should be continued at least for the next two years until the first rotation will be harvested.

Acknowledgements: This study was carried out in the frame of inter-institutional research supported by a grant from National Academy of Sciences of Ukraine for 2013-2017.

Keywords: Fast-growing trees, Short rotation plantations, *Populus*, *Salix*.

ORAL-BIOMED-OP225

The Radical Scavenging Activity of *Pistacia terebinthus* gallNesrin HAŞİMİ¹, Mesude ALGAN²¹Department of Nutrition and Dietetics/School of Health, Batman University, Batman, Turkey²Department of Biology/Faculty of Science and Letter, Batman University, Batman, Turkey
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Aim of the study: Plants are the important source of natural drugs. The plants are assumed to contain compounds which have potential to be used in modern medicine for the treatment of diseases which are not curable. In this study we determined the antioxidant activity and total phenol/flavonoid content of *Pistacia terebinthus* gall induced by *Slavum aff. mordvilkoii* aphid.

Material and Methods: The gall macerated by petroleum ether, acetone, ethanol and water. The total phenol and flavonoid content of the extracts were expressed as micrograms of pyrocatechol and quercetin equivalents, respectively. Antioxidant activity was examined by DPPH free radical scavenging activity. BHT, BHA and ascorbic acid were used as positive controls.

Results: Total phenolic and flavonoid contents of the extracts were determined as pyrocatechol (PEs) and quercetin (QEs) equivalents, respectively. The phenolic contents of the petroleum ether ($27.32 \pm 0.007 \mu\text{gPEs/mg extract}$), acetone ($204.28 \pm 0.04 \mu\text{gPEs/mg extract}$), ethanol ($202.59 \pm 0.02 \mu\text{gPEs/mg extract}$) and water extracts ($118.61 \pm 0.02 \mu\text{gPEs/mg extract}$) were higher than their flavonoid contents (6.2 ± 0.6 , 10.91 ± 0.47 , 21.21 ± 0.14 , $12.40 \pm 0.07 \mu\text{gQEs/mg extract}$, respectively). In DPPH free radical scavenging activity assay, the petroleum ether indicated no antioxidant activity. On the other hand, The acetone, ethanol and water extracts indicated strong antioxidant activity (IC_{50} : 4.51 ± 0.02 , 3.98 ± 0.05 , $5.79 \pm 0.01 \mu\text{g/ml}$, respectively) as well as ascorbic acid and BHA (4.32 ± 0.07 , $4.94 \pm 0.05 \mu\text{g/ml}$, respectively). The lowest IC_{50} value was recorded by ethanol extract. BHT exhibited weak antioxidant activity (IC_{50} : 49.06 ± 0.08).

Acknowledgements: We thank Dr. Erdem SEVEN, Batman University, for the collection and confirmation of gall.

Keywords: Antioxidant activity, DPPH, *Pistacia terebinthus*, gall, *Slavum aff. mordvilkoii*

ORAL-BIOMED-OP226

The antioxidant, antimicrobial, antibiofilm activities and quorum sensing inhibition potential of *Silybum marianum* (L.) Gaertner growing wild in Mugla, TurkeyAysel UGUR¹, Ozgur CEYLAN², Tuba BAYGAR³, Nurdan SARAC⁴, Rukiye BORAN⁵¹Sect. Medical Microbiology, Dept. of Basic Sciences, Faculty of Dentistry, Gazi Univ, Turkey²Food Quality Cont. Analysis Prog., Vocational School of Ula Ali Kocman, Mugla Sitki Kocman University, Turkey³Material Research Lab., Research Lab.Center, Mugla Sitki Kocman University, Turkey⁴Dept. of Biology, Faculty of Science, Mugla Sitki Kocman University, Turkey⁵Medical Lab. Program, Vocational School of Health Service, Aksaray University, Turkey
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Aim of the study: The research of medicinal plant biodiversity is an important area for treatment the untreatable cases in the present ways. The treatment of the infectious diseases which formed with antibiotic resistance and biofilm forming strains are difficult. For this reason the researches of new antimicrobial and antibiofilm agents are very important. In this study, the aqueous and ethanolic extracts of the aerial parts of *S. marianum* were isolated and its antioxidant, antibiofilm, and quorum sensing inhibitory activities were investigated. This species is growing wild in Mugla, used as a traditional medicine and as a vegetable in this region.

Material and Methods: The ethanolic extract of the aerial parts of this plant obtained with the soxhlet apparatus. The aqueous extract was obtained with decoction. The antioxidant potential was determined by the ferric thiocyanate method (FTC) and the 1,1-diphenyl-2-picrylhydrazyl (DPPH) free-radical scavenging assay. The antimicrobial activity of the aqueous and ethanolic extracts against 15 bacterial strains, including multiple antibiotic resistance strains, and *Candida albicans* were investigated by using disc diffusion and microdilution methods. The antibiofilm effect of the extracts was measured by microplate biofilm method. The quorum sensing (QS) inhibition capacity of the extracts was determined using biosensor bioassay with *Chromobacterium violaceum* CV026. Inhibition of QS-regulated violacein production in *Chromobacterium violaceum* ATCC 12472 and swarming motility in *Pseudomonas aeruginosa* PA01 were carried out using standard methods.

Results: The ethanolic extract was more effective in the radical scavenging, as it reduced the stable free radical DPPH with lower IC₅₀ value (25.68 mg/ml) than the aqueous extract (29.19 mg/ml). Results obtained from FTC assay revealed that aqueous extract carry the antioxidative potential for chain-breaking inhibition of lipid peroxidation (66.16%). In the disc diffusion assay, the ethanolic extract had antimicrobial activity only on four Staphylococci (*Staphylococcus epidermidis* MU 30, *Staphylococcus aureus* MU 40, MU 46 and MU 47) with 8, 7, 11, and 13 mm inhibition zones, respectively. According to the MIC values, the ethanolic extract inhibited the growth of *Pseudomonas fluorescens* MU 181, *P. aeruginosa* MU 188 and MU 189, *S. aureus* MU 40 and MU 46, *S. aureus* ATCC 25923 and *Micrococcus luteus* NRRL B-4375 at 20 mg/mL concentration. The highest antibiofilm activity was determined at the 10 mg/ml concentration of aqueous extract with the reduction rate of 41.83% against *Escherichia coli* ATCC 25922. The violacein inhibition rate was 10.02% for 5 mg/ml aqueous extract and 31.19% for 25 mg/ml ethanolic extract. Aqueous and ethanolic extracts did not inhibited swarming and no effect on pigment inhibition was observed at sub-MICs concentrations for antiquorum sensing activity.

Acknowledgements: The authors acknowledge the Mugla Sitki Kocman University Research Funds for financial support (Project 12/68).

Keywords: *Silybum marianum*, antimicrobial, antioxidant, antibiofilm, quorum sensing inhibition.

ORAL-BIOMED-OP227

**Screening of Antioxidant and Anticholinesterase Activities of various extracts from two Truffle:
Terfezia leptoderma and *Tuber brumale***Gülsen TEL-ÇAYAN¹, Mehmet Emin DURU¹, Meltem TAŞ¹, Fatih ÇAYAN², Aziz TÜRKÖĞLU³¹Department of Chemistry, Muğla Sıtkı Koçman University, 48121 Muğla, Turkey²Department of Chemistry and Chemical Processing Technologies, Muğla Vocational School, Muğla Sıtkı Koçman University, 48121 Muğla, Turkey³Department of Biology, Muğla Sıtkı Koçman University, 48121 Muğla, Turkeygulsentel@mu.edu.tr

Aim of the study: Truffles are popular mycorrhizal fungi that grow in many countries all over the world. They are considered as valuable food sources due to their aroma, delicious taste, and potential health benefits. Among the ascomycete truffles, *Terfezia* and *Tuber* were known as excellent edible fungi with a considerable economic importance. The aim of this study was to investigate the antioxidant and anticholinesterase activities of the *Terfezia leptoderma* and *Tuber brumale*.

Material and Methods: *Terfezia leptoderma* Tul. & C. Tul. and *Tuber brumale* Vittad. collected from Uşak and Osmaniye in Turkey and identified by Dr. Aziz Türkoğlu. Each truffle species was extracted separately with 2.5 L hexane, acetone, and methanol (4 x 24 h), respectively, at room temperature (25 °C), filtered, and evaporated. Antioxidant activity of extracts was tested by five complementary test systems i.e. β -carotene-linoleic acid, DPPH[•] scavenging, ABTS^{•+} scavenging, cupric-reducing antioxidant capacity (CUPRAC), and metal chelating assays. The *in vitro* anticholinesterase activity of extracts was performed against acetylcholinesterase (AChE) and butyrylcholinesterase (BChE) enzymes using the Ellman method.

Results: The acetone extract of *Tuber brumale* exhibited the highest activity all antioxidant tests except metal chelating assay. In DPPH[•], ABTS^{•+} scavenging, β -carotene-linoleic acid and CUPRAC assays, acetone extract possessed good antioxidant activity with IC₅₀ values of 49.87±1.43, 27.36±1.28, 42.96±1.39, and 36.27±0.19, μ g/mL, respectively. In the metal chelating assay, the hexane extract of *T. brumale* (IC₅₀: 116.98±1.87 μ g/mL) showed the highest metal chelating activity among the other extracts studied. As for the anticholinesterase activity, the most active extract was the methanol extract of *Terfezia leptoderma* with percentage inhibition values of 52.60±2.72, 51.00±1.44 μ g/mL at 800 μ g/mL concentration against AChE and BChE enzymes, respectively.

Acknowledgements: Authors would like to thank The Scientific and Technological Research Council of Turkey (TUBITAK-114Z644) for financial support.

Keywords: *Terfezia leptoderma*, *Tuber brumale*, antioxidant activity, anticholinesterase activity.

ORAL-BIOMED-OP228

A comparative phenolic composition analysis of truffles from TurkeyMehmet Emin DURU¹, Gülsen TEL-ÇAYAN¹, Gülay ŞAVKINCI¹, Selçuk KÜÇÜKAYDIN¹, Mehmet ÖZTÜRK¹¹ Department of Chemistry, Muğla Sıtkı Koçman University, 48121 Muğla, Turkey
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Aim of the study: Truffles are rich in protein, amino acids, fatty acids, minerals and carbohydrates. In addition to truffles' nutritional importance and their aroma and flavour, truffles represented largely source of therapeutic compounds such as sterols, ceramides or phenolic compounds. Phenolic compounds exhibit a wide range of biological activities including antioxidant, antimicrobial, anticarcinogenic, anti-inflammatory, antimutagenic, and cytotoxic. The aim of this study was a comparative investigation of phenolic compounds of four different truffles from Turkey.

Material and Methods: *Picoa juniperi* Vittad. (AT-1916), *Picoa lefebvrei* (Pat.) Maire (AT-1915), *Melanogaster broomeanus* Berk. (AT-1418) and *Descomyces albus* (Berk.) Bougher & Castellano (at-1857) collected from Denizli and Muğla in Turkey and identified by Dr. Aziz Türkoğlu. Determination of the selected phenolic compounds in the examined Truffles was carried out according to the previously published paper. Sixteen phenolic and organic acids namely; gallic acid, fumaric acid, protocatecheuic acid, catechin hydrate, p-hydroxybenzoic acid, 6,7-dihydroxy coumarin, caffeic acid, vanillin, 2,4-dihydroxy benzoic acid, p-coumaric acid, ferulic acid, coumarin, trans-2-hydroxycinnamic acid, ellagic acid, rosmarinic acid and trans-cinnamic acid were analysed by HPLC-DAD. The phenolic compounds were characterized according to their retention times and UV data were compared with commercial standards. The results were expressed as µg per g of dry weight (dw).

Results: Fumaric acid, catechin hydrate, caffeic acid, trans-2-hydroxycinnamic acid and trans cinnamic acid in *P. juniperi*, gallic acid, fumaric acid, catechin hydrate, coumarin and trans-cinnamic acid in *P. lefebvrei*, gallic acid, catechin hydrate, p-hydroxybenzoic acid, p-coumaric acid, ferulic acid, trans-2-hydroxycinnamic acid, ellagic acid and trans-cinnamic acid in *M. broomeanus*, gallic acid, fumaric acid, p-hydroxybenzoic acid, caffeic acid, ferulic acid, coumarin and ellagic acid in *D. albus* were identified as phenolic compounds. The most dominant determined phenolic compounds were fumaric acid (12.6 µg/g), catechin hydrate (2.39 µg/g) in *P. juniperi*, fumaric acid (165.2 µg/g), gallic acid (2.62 µg/g) in *P. lefebvrei*, trans-2-hydroxycinnamic acid (6.08 µg/g), catechin hydrate (5.28 µg/g) in *M. broomeanus*, and protocatecheuic acid (24.98 µg/g), gallic acid (9.74 µg/g) in *D. albus*.

Acknowledgements: Authors would like to thank The Scientific and Technological Research Council of Turkey (TUBITAK-114Z644) for financial support.

Keywords: *Picoa juniperi*, *Picoa lefebvrei*, *Melanogaster broomeanus*, *Descomyces albus*, phenolic compounds, HPLC-DAD.

ORAL-BIOMED-OP229

Fatty Acid Composition of *Lactarius volemus* and *Morchella elata*

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Aim of the study: Wild edible mushrooms are traditionally used by much Asian country as food and medicine. Mushrooms have also been reported as therapeutic foods, useful in preventing diseases such as hypertension, hypercholesterolemia, and cancer. These functional characteristics are mainly due to their chemical composition. Wild and cultivated mushrooms contain a huge diversity of biomolecules with nutritional and/or medicinal properties. Due to these properties, they have been recognized as functional foods, and as a source for the development of medicines and nutraceuticals. Edible mushrooms are used extensively in cooking as fresh or dried in the world. Although there were many studies on cultivated and wild edible mushrooms in the northern hemisphere, there was little information available on fatty acid composition of medicinal mushrooms of Turkey. Our objective was to evaluate fatty acid composition of *Lactarius volemus* and *Morchella elata* medicinal mushrooms.

Material and Methods: Mushroom samples were collected from the Black Sea region of Turkey and were authenticated. It has been stored at the Mycology Herbarium Laboratory of Gaziosmanpaşa University. Crude oil was obtained from mushroom samples by hexane extraction. The solvent was removed by rotary evaporator. The extracted oil was used for fatty acids analysis. The fatty acid methyl esters (FAMES) of oil were obtained by transmethylation. Gas chromatographic (GC) analyses were performed using a Perkin Elmer Clarus 500 Series GC system equipped with a flame ionization detector (FID) equipped apolar capillary column. Helium was used as carrier gas. The relative peak area percentages of compounds were calculated based on the FID data.

Results: The fatty acid composition of *Lactarius volemus* and *Morchella elata* species revealed myristic, pentadecanoic, pentadecenoic, palmitic, oleic, linoleic, linoelaidic, and eicosanoic acids. Total unsaturated fatty acid levels were ranged 80-86 percentage and higher than total saturated fatty acid that ranged 12-19 percentages in species. Linoleic acid, was observed at the highest percentage in *Lactarius volemus* using in this study. *Morchella elata* contain oleic acid at the highest percentage. Ratio of USFA/SFA found 4.1 *Lactarius volemus*, and 6.7 *Morchella elata*.

Acknowledgements: The authors are grateful to Gaziosmanpaşa University for their support.

Keywords: Fatty Acid, Mushroom, *Lactarius volemus*, *Morchella elata*.

ORAL-BIOMED-OP230

Screening of Antioxidant Activity of Selected Seaweeds Collected from Morocco

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Aim of the study: This study evaluates the antioxidant activities of four different seaweeds; namely, *Cystoseira stricta*, *Cystoseira compressa*, *Bifurcaria bifurcate* and *Gelidium sesquipedale* Collected from Moroccan Atlantic.

Material and Methods: Seaweeds were collected at low tide time from rocky reefs of the coast of the southern part of Rabat Morocco during May 2015. Collected Seaweeds were harvested, washed with sea water and then with fresh water. Clean weeds were dried separately at room temperature and 50°C for 72 hours. Dried materials were grinded to powder (25 g) and extracted with 70 % ethanol (200 mL) at room temperature overnight, then at 60 °C for 2 hours. The combined ethanol extracts were evaporated under reduced pressure to a dark green semisolid that were lyophilized. DPPH, ABTS, CUPRAC, β -carotene-linoleic acid, metal chelating activities were used to evaluate the antioxidant activity of the extracts.

Results: All extracts demonstrated good activities in the following order: *Cystoseira stricta* > *Cystoseira compressa* > *Bifurcaria bifurcate* > *Gelidium sesquipedale* in DPPH, ABTS and CUPRAC and In β -carotene-linoleic acid assays. In metal chelating assay, however, *Gelidium sesquipedale* indicated good activity.

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Keywords: Algae species; Antioxidant activity; Lipid peroxidation inhibitory activity.

ORAL-BIOMED-OP231

Tyrosinase, acetyl- and butyryl-cholinesterase inhibitory activity of *Bifurcariabifurcate*, *Cystoseiracompressa* and *Cystoseirastricta* collected from Morocco

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Aim of the study: This study evaluates the Tyrosinase, acetyl- and butyryl-cholinesterase inhibitory activities of three selected seaweeds; namely, *Bifurcariabifurcate*, *Cystoseiracompressa* and *Cystoseirastricta* collected from Atlantic coast of Morocco.

Material and Methods: Seaweeds were collected in spring time at low tide from Temara coast (33°92'N; 6° 96'E) located at 5 km in south of Rabat-Morocco. The seaweeds were washed with sea and fresh water in laboratory to remove sands, salts and epiphytes. The seaweeds were dried at 50 °C between 48 to 72h. Dried materials were grinded to powder and extracted with 70 % ethanol (200 mL) at room temperature overnight, then at 60°C for 2 hours. The ethanol extracts were evaporated under reduced pressure to obtain dark green semisolids. Tyrosinase, acetyl- and butyryl-cholinesterase enzyme inhibitory activities of seaweeds were performed spectrophotometrically.

Results: The inhibition activity increased on increasing amounts of the extract concentrations. Ethanol extract of *Bifurcariabifurcate* demonstrated good activity against acetyl- and butyryl-cholinesterase enzymes. Against tyrosinase enzyme, however, both *Cystoseirastricta* and *Cystoseiracompressa* exhibited upright activity. Additionally, *Cystoseirastricta* ethanol extract was more active than that of *Cystoseiracompressa* ethanol extract.

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Keywords: Algae specie; Tyrosinase; Acetyl- and Butyryl-cholinesterase enzyme inhibitory activity.

ORAL-GETBIO-OP232

Estimating Higher Heating Values of Some Lignocellulosics from Turkey Using Their Ultimate Analysis DataMetin BIÇIL¹, Füreya Elif ÖZBEK², Fikret AKDENİZ¹¹Department of Chemistry, Kafkas University, Turkey²Department of Chemical Engineering, Kafkas University, Turkeyfozturkkan36@gmail.com

Aim of the study: Lignocellulosic wastes (such as wood chips and dusts from forest industry, hard and/or soft shells of many nuts, agricultural wastes etc.) can be considered as an alternative, eco-friendly energy source to fossil sources. Being an important fuel property, higher heating values (HHVs) of lignocellulosics are usually determined by using a calorimeter device like other biomass samples. This process requires costly, special designed labs and devices. But, these values can also be estimated from their proximate, ultimate or structural analysis data. In this study, we aimed to estimate the HHVs of eleven different lignocellulosic materials using their ultimate analysis data.

Material and Methods: Eleven lignocellulosic materials including *Quercus ithaburensis*, *Corylus avellana*, *Juglans regia* L., *Pinus nigra* Arnold, *Sambucus ebulus*, *Conyza Canadensis*, *Prunus cerasifera*, *Prunus cerasus*, *Prunus armeniaca*, *Pistacia vera* and *Malabaila dasyantha* were collected from seven cities of Turkey. After drying and grinding process, the samples were subjected to some standard analyses (such as related ASTM and TAPPI standards) including elemental compositions (using a Leco CHNS-932 elemental analyser) and experimental HHVs (using an Ika Werke C2000 Basic calorimeter). Depending upon their C, H, N, S and O contents, an equation was developed to estimate the HHVs of the samples using multiple linear regression analysis. Then, theoretical (calculated from the equation) HHVs were compared with the experimental values.

Results: The equation (regression model) established to estimate the HHVs of the lignocellulosics from sample's ultimate analysis data is as following:

$$HHV (MJ/kg) = 3,802 + (0,395 \times C) - (0,530 \times H) + (0,707 \times N) - (3,198 \times S)$$

Compatible results with those of experimental HHVs were obtained from the above equation in the range of -4.22-3.41 % relative error. These values found to be consistent with the literature data. The regression model resulted in a correlation coefficient (r) of 0.966. The standard error for the estimate and intercept are 0.523 and 3.525, respectively. The result implies that there is a significant linear correlation between HHV values and C, H, N and S contents of the samples used.

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Keywords: Lignocellulosic Materials, Higher Heating Value, Elemental Analysis, Multiple Linear Regression Analysis.

ORAL_SOILBIO-OP233

The presence of *Trichoderma* and *Gliocladium* species in various features of soil in TurkeyMehmet Hadi AYDIN¹, Gülay TURHAN²¹Siirt University, Faculty of Agriculture Department of Plant Protection, 56100 Siirt/TURKEY²Ege University, Faculty of Agriculture Department of Plant Protection, (Retirer) 35040İzmir/TURKEY

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Aim of the study: *Trichoderma* and *Gliocladium* are known as the most widely used antagonists in biological control and has almost all the land and natural habitats in nature especially in areas containing organic substance. They are ecologically relevant not only in the protection of plants against pathogens, producing a wide range of antibiotic substances and parasitizing other fungi, but also in the stimulation of plant growth. Aim of this study was to determine the presence of *Trichoderma* and *Gliocladium* antagonists in the soil taken from different nine regions in Turkey.

Material and Methods: For antagonists isolation, the soil samples of different properties in terms of the presence of microorganisms were taken from different nine regions in Turkey. These regions and general characteristics of their soils were as follows;

Soil affected by the salty lake water (Konya); Soil affected by Van lake water (Van); Potato field soil that from plant diseases free (Ödemiş-İzmir); Potato field soil that from plant diseases free (Bozdağ-Manisa); Forest soil containing organic substance (Fethiye-Muğla); Sandy soil that suitable for the farm of potatoes (Altınova-Balıkesir); Soil from volcanic mountain region (Karacadağ-Diyarbakır); Soil around the Keban dam (Elazığ); Soil with intensive calcareous that adjacent position Travertene (Pamukkale-Denizli).

Feature of these regions were the lack of agricultural activity, having salty and chalky soil, volcanic regions or forested areas etc. Physical and chemical analysis of these soils were also performed by suitable methods.

Results: 280 *Trichoderma* and *Gliocladium* isolates were isolated from the soil samples collected from different locations of Turkey. They were determined to belong to 14 *Trichoderma* spp. and 1 *Gliocladium* spp. These species were *T. asperellum* Samuels, Lieckf. & Nirenberg., *T. atroviride* Bissett., *T. crassum* Bissett., *T. croceum* Bissett., *T. gamsii* Samuels & Druzhin., *T. hamatum* (Bonard.) Bainer., *T. harzianum* Rifai., *T. inhamatum* Veerkamp & W. Gams., *T. neokoningii* Samuels & Soberanis., *T. spirale* Bissett., *T. strigosum* Bissett., *T. tomentosum* Bissett., *T. virens* J.H., Mill., Giddens & A.A Foster., *T. viride* Pers., and *Gliocladium roseum* Bainier. Antagonists were isolated from the soil of all regions. However, different numbers and species were isolated. Most of the antagonists were obtained around Van lake, forest soil at Fethiye and volcanic mountain soil at Karacadağ. General features of these soils were to contain more organic substance than other soils. A minimum of ratio isolates were obtained from Ödemiş and Altınova potato - growing regions. There were intensive agricultural activities in these two areas; so, the lower isolates obtained from these areas. Some *Trichoderma* species were only isolated from one of the soil region. For example; *T. gamsii* was isolated from soil where surround Van lake, *T. croceum* was isolated from potato producing region of the soil at Bozdağ and *T. strigosum* was also isolated from forest soil at Fethiye. When comparing from other *Trichoderma* species, more *T. harzianum* had been obtained than other *Trichoderma* species, while *T. viride*, *T. hamatum* and *T. tomentosum* had been isolated only from some regions and as the minimum number of species.

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Keywords: *Trichoderma* spp., *Gliocladium* spp., Soil biodiversity

ORAL-MICBIO-OP234

Viral Diversity of Pine Processionary Moth, *Thaumetopoea pityocampa*

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Aim of the study: Pine processionary moth (PPM), *Thaumetopoea pityocampa* Schiff is undoubtedly the most harmful species among pine defoliators. They are also responsible for dermatitis, ocular lesions and, more rarely, respiratory signs and anaphylactic reactions in humans and animals. They cause severe damage to pine plantations. The most forests in Turkey consist of Calabrian pine (*Pinus brutia* Ten), which are distributed particularly in the coastal regions of Turkey. Although, mechanical, biological and chemical control strategies have been utilized to reduce the population of PPM, its serious damage still increases year by year. Insect pathogens have been considered as a safe and effective biopesticide agent to use against noxious insects. Because of being non-bioaccumulative in the environment and suitable for Integrated Pest Management programs and having prolonged effect and narrow host range, insect viruses are one of the best candidate to be utilized for the safe control of PPM.

Material and Methods: Screening of insect viruses by light and electron microscopies, polymerase chain reaction and partial sequencing and meta-transcriptomic techniques

Results: Four different viruses have been detected in Pine processionary moth (PPM), *Thaumetopoea pityocampa* Schiff distributed in the blacksea region of Turkey. Up to know, we have been able to detect four different viruses (Cypovirus, Inflavirus 1, Inflavirus 2, Baculovirus) in the population of PPM by using light and electron microscopies, polymerase chain reaction and partial sequencing and meta-transcriptomic techniques. These viruses have great potential in the biological control programs of PPM.

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Keywords: Viral diversity, Insect viruses, Pine processionary moth, *Thaumetopoea pityocampa*.

ORAL_MICBIO-OP235

The Studies of Cyanobacterial Composition in Karahayıt/DenizliMeral YILMAZ CANKILIÇ¹, Emine ÇELİKOĞLU¹¹*Biology Department/Science Faculty, Anadolu University, TURKEY*
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Aim of the study: The aim of the study is to determine of cyanobacterial diversity in Karahayıt hot spring using cultural and molecular methods based on the amplification, cloning and sequencing of 16S rRNA genes from enrichment cultures and natural samples.

Material and Methods: Chemical analysis of the water samples from the hot spring was performed with the Spectroquant® NOVA 60 photometer using Merc cell tests. The bacterial genomic DNAs from purified cultures and total genomic DNA from water samples were obtained. After extraction, DNA was subjected to PCR amplification of the cyanobacterial 16S rRNA gene plus ITS. The PCR products were used for cloning and DGGE (Denaturing Gradient Gel Electrophoresis). The 16S rRNA gene amplicons obtained from the genomic DNA of the culture and clones were used for ARDRA with two different restriction endonucleases, MspI and MboI (MBI Fermentas). Partial sequences of 16S rDNAs from representatives of each ARDRA group were determined. All sequences were compared to the sequences in the BLAST search program at the National Center for Biotechnology Information website (<http://www.ncbi.nlm.nih.gov>). 16S rRNA sequences of the hits for our sequences were obtained through the RDP (Ribosomal Database Project) site at Michigan State University (<http://rdp.cme.msu.edu/>). The top five hits as well as some additional relevant sequences were used for phylogenetic analysis.

Results: In our study, we analysed the physicochemical parameters and cyanobacterial composition of the water samples collected from Karahayıt hot spring. With the cultivation and cloning study, we have obtained thermophilic cyanobacterial isolates having different morphotype and clone libraries. Partial sequences of 16S rRNA gene region of isolates and clones have exhibited that these sequences belong to the thermophilic cyanobacterial genus and environmental sequences in the gene bank. As a result of this study, the diversity and distribution of cyanobacterial groups in the spring were not high.

Acknowledgements: This study was support by Anadolu University Research Project No: 1002F85.

Keywords: Thermophilic, Cyanobacteria, Karahayıt.

ORAL-MICBIO-OP236

spa Typing of *Staphylococcus aureus* isolated from bovine mastitis in Konya Province

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Aim of the study: *Staphylococcus aureus* in humans and animals causes a various of serious diseases. Bovine mastitis is one of the most widely known. Bacterial virulence factors are important in the pathogenesis of mastitis causing a large of economic losses because of causing reduced milk quality, leading to a loss in production, increased use of drug and veterinary services. Protein A containing a polymorphic X region and five homologous IgG-binding domains is a membrane-bound exoprotein produced by most of the *S. aureus*. In this study was aimed typing of *S. aureus* with spa gene encoding the Xr region and the IgG binding region.

Material and Methods: Ninety-eight *S. aureus* strains were isolated from raw milk of bovine intramammary infections. spa typing was performed by polymerase chain reaction (PCR) methods using the number of repeats in the Xr region and the IgG binding region of protein A gene.

Results: In this study, existence/absence of virulans genes of spa-Xr and spa-IgG were determined in 98 *Staphylococcus aureus* strain isolated from bovine mastitis. According to the results of PCR, 98 *S. aureus* strains contained 97,95% Xr region, 80,61% IgG binding region. While the amplification of Xr region displayed 3 different sizes of 100 bp, 250 bp and 300 bp, The spaA gene that encodes the IgG-binding region of protein A revealed sizes of 800 bp and 900 bp. Consequently, these results shown that spa typing provides low-cost, reliable, rapid and accurate method to discriminate *S. aureus* strains. Typing of *S. aureus* strains by these virulence genes ensuring to evade host immune responses is an important in determination of genetic variation for use in outbreak investigations, in vaccine development works, in the primarily clonal population structure of *S. aureus* and development effective control measures of mastitis.

Acknowledgements: This study has been supported by Selçuk University BAP with project Number 14401063.

Keywords: *S. aureus*, spa, typing, bovine, mastitis.

ORAL-MICBIO-OP237

Purification and Characterization of α -Amylase from *Bacillus subtilis*Sema AGÜLOĞLU FİNCAN¹, Veysi ORTAKAYA¹, Barış ENEZ²¹Science Faculty, Department of Biology, Dicle University, Diyarbakır/Turkey²Vocational School of Technical Sciences, Bingöl University, Bingöl/Turkeyantortakaya@hotmail.com

Aim of the study: The study aimed for industrial amylase production, purification and characterization from the strain *Bacillus subtilis*.

Material and Methods: In this study, bacteria were isolated from the soil obtained from Ergani Makam Mountain (Diyarbakır, TURKEY). Optimum temperature and pH were determined. The effects of carbon and nitrogen sources on the production of enzyme was investigated. The enzyme was purified using ammonium sulfate precipitation (40–80% saturation), Diethylaminoethyl (DEAE)-cellulose ion exchange and Sephadex G-100 gel filtration chromatography. α -Amylase activity was determined according to Bernfeld method. Sodium dodecyl sulfate polyacrylamide gel electrophoresis (SDS-PAGE) of these samples was carried out.

Results: Bacteria which isolated with the help of morphological, physiological, biochemical tests and 16S rRNA analysis defined as *Bacillus subtilis*. It was determined that the obtained isolate is gram-positive and has rod-shaped cells with the ability to form spores. Optimal conditions of bacterial growth were determined at 48th hour, 37°C and pH 7.0, respectively. α -Amylase of *Bacillus subtilis* can be purified because of it's features in next steps. The molecular mass of purified enzyme determined by SDS-PAGE.

Keywords: *Bacillus subtilis*, bacteria, α -amylase, characterization, purification.

ORAL-MICBIO-OP238

Determination of Lipolytic Enzyme Activity of Two Halophilic Archaea Isolated from Raw HideGözde TURHAN BİLGİ¹, Binnur MERİÇLİ YAPICI², Sadi Turgut BİLGİ³¹*Biology Department, Graduate School of Natural and Applied Sciences, Canakkale Onsekiz Mart University, Turkey.*²*Biology Department, Faculty of Arts and Sciences, Canakkale Onsekiz Mart University, Turkey.*³*School of Health, Canakkale Onsekiz Mart University, Turkey.**stbilgi@comu.edu.tr*

Aim of the study: The primary concern of the current study is to determine lipolytic enzyme capabilities and the conditions for optimal activity of two extremely halophilic archaeal identified and previously isolated from salted raw hide samples.

Material and Methods: Phenotypic and phylogenetic methods were applied for the identification of the isolates used in the study. p-nitrophenyl butyrate (p-NPB) and p-nitrophenyl laurate (p-NPL) substrates were used in quantitative determination of esterase and lipase activity, respectively. The activities were measured daily. Different temperatures (4-60⁰C), pH (3,0-12,0 pH) and NaCl (0,5-5M) conditions were modified in reactions to determine their effects on enzyme activities.

Results: Both strains, findings concerning qualitative enzyme activity of which were positive, displayed Gram negative reactions. In addition, it was found that they were susceptible to the antibiotics bacitracin and novobiocin. Results obtained by comparative 16S rRNA sequence analyses yielded that isolate 1 shared similarities with *Halomicrobium zhouii* strain 144, and isolate 2 with *Haloarchaeon* strain 129. According to the results of enzyme activity, the maximum esterase activity for isolate 1 was elicited at 35⁰C, pH 8, and 2,5 M NaCl, and for isolate 2 at 35⁰C, pH 7, and 3 M NaCl. On the other hand, the maximum lipase activity for isolate 1 was explored at 40⁰C, pH 7,5, and 2 M NaCl, and for isolate 2 at 35⁰C, pH 7, and 2 M NaCl. In this research, two halophilic archaea were phylogenetically identified. It was found out that they had lipolytic enzyme activities and moreover their optimal activity conditions were determined. There are few recent studies on this topic. Therefore, the findings obtained from this research study will allow the solution of microbial problems encountered by leather industry and the discovery of new industrial enzymes.

Keywords: Salted hides, Halophilic Archaea, Esterase and Lipase activity.

ORAL-MICBIO-OP239

Investigation Of Antibiotic Susceptibility of Extreme Halophilic Archaea Isolated From Salted Raw HideSadi Turгут BİLGİ¹, Binnur MERİÇLİ YAPICI²¹School of Health, Canakkale Onsekiz Mart University, Turkey.²Biology Department, Faculty of Arts and Sciences, Canakkale Onsekiz Mart University, Turkey.stbilgi@comu.edu.tr

Aim of the study: This research aims to isolate extremely halophilic archaea from salted hides, to determine their antibiotic susceptibility, and to identify them by using phenotypic and molecular methods.

Material and Methods: Eight salted hides and skins (4 local and 4 foreign), which were processed in Turkey, were used in this study. The 1st sample was obtained from Nigde, the 2nd from Aksaray, the 3rd from Kayseri, the 4th from Gaziantep, the 5th from Iraq, the 6th from Turkmenistan, the 7th from Kazakhstan, and the 8th from Armenia. Isolates from these samples were separately enumerated. SW 25 medium was used for culture isolation, activation and phenotypic tests. For the antibiotic sensitivity test, disc diffusion method was used and antibiotic discs with 6mm diameters were used for Ampicillin 10 µg (A 10), Bacitracin 10 µg (B 10), Erythromycin 15 µg (E 15), Novobiocin 30 µg (NV 30), Penicillin G 10 U (P 10), Streptomycin 10 µg (S 10), Tetracycline 30 µg (T 30), Vancomycin 30 µg (VAN 30), Chloramphenicol 30 µg (C 30), and Cefotaxime 30 µg (CTX 30).

Results: In this study, a total of 186 extremely halophilic microorganisms were isolated. It was found that all of the isolates were susceptible to bacitracin and novobiocin. Also, it was observed that 50 isolates (27%) were sensitive to tetracycline, 16 isolates (9%) to chloramphenicol, 14 isolates (8%) to erythromycin, 7 isolates (4%) to ampicillin, 5 isolates (3%) to penicillin G, 2 isolates to vancomycin, 1 isolate to streptomycin and 1 isolate to cefotaxime antibiotics. In our study, taking into account the phenotypic findings of the research, 34 of 186 isolates were selected. These isolates were identified by 16S rRNA sequence analysis and 15 different strains of extreme halophilic archaea were identified. 13 strains of these were identified for the first time from salted raw hides and skins in our study including *Natrialba aegyptia*, *Halococcus thailandensis*, *Halococcus dombrowskii*, *Halovivax asiaticus*, *Halovivax* sp. E107, *Haloarchaeon*, *Natronococcus* sp., *Halorubrum* sp., *Halomicrobiumzhouii*, *Natronococcusjeotgali*, *Haloterrigenathermotolerans*, *Natrinemaversiforme*, *Halobacteriumnoricense*. Later, antimicrobial susceptibility of these strains were compared. Research results are expected to contribute to further studies and to solve the microbial problems of the leather industry. Moreover, the strains described in raw hide for the first time is important in terms of biodiversity.

Acknowledgements: This research study was supported by Scientific Research Project of Canakkale Onsekiz Mart University (Project no. 2010/23).

Keywords: Salted Raw Hide, Extremely Halophilic Archaea, 16S rRNA, Antibiotic Susceptibility.

ORAL-MICBIO-OP240

Investigation of Bacterial Diversity and Assessment of Bioremediation Potential for an Industrial Wastewater Treatment PlantNilgun POYRAZ¹, Mehmet Burcin MUTLU¹¹ Department of Biology, Faculty of Science, Anadolu University, Eskisehir, Turkey
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Aim of the Study: This study examines the bacterial diversity of an industrial wastewater treatment plant, which is an extremely important issue from an environmental perspective. In addition, bioremediation potential of various bacteria have been evaluated. In particular phenol and toluene elimination potential was examined. For reason that these are toxic hydrocarbons and used as solvents in many areas such as chemicals, pharmaceuticals, manufacturing of rubber, resins and plastics, leather and textiles, petroleum refineries, foundry processes and paperwork. The phenol and toluene using bacteria will contribute to industrial and environmental applications such as ensuring of bioremediation of contaminated areas by hydrocarbons and biological treatment.

Material and Method: Wastewater and sludge samples were collected from an industrial plant in Eskisehir. Samples' pH, BOD value and ionic composition were detected. For total DNA extraction from sludge and water manual extraction protocols were used. High-throughput pyrosequencing was used to examine 16S rRNA genes of bacteria in the wastewater treatment systems. Raw sequence reads from each sample were processed and analyzed by using CLCommunity software (<http://www.chunlab.com>). To detect bioremediation potential large subunit of phenol hydroxylase and toluene monooxygenase genes were amplified using the previously described primers from total DNA. In addition phenol and toluene containing medium were used in order to cultivate the microorganisms capable of utilizing phenol and toluene. 16S rRNA gene amplification was performed for isolates which were obtained from phenol and toluene media. For bioremediation potential whether large subunit of phenol hydroxylase and toluene monooxygenase genes of these isolates were detected and sequencing to positive isolates was carried out.

Results: Bacterial composition of industrial wastewater treatment plant were in the phylum level 31.13% Proteobacteria, 21.82% Firmicutes, 17.06% Bacteroidetes, in family level 17.43% Streptococcaceae, 9.07% Prevotellaceae, 6.53% Zoogloea, in genus level 8.90% *Lactococcus*, 8.44% *Streptococcus*, 5.82% *Zoogloea*, in species level 8.15% *Lactococcus chungangensis*, 6.76% *Streptococcus equinus* group, 5.82% *Zoogloea*, 4.67% *Branchymonas denitrificans*. Culture studies showed that the PCR results for toluene monooxygenase gene, only 2 isolates were positive. These isolates were identified *Stenotrophomonas sp.* and *Pseudomonas balearica*. PCR results for phenol hydroxylase gene by the 32 isolates from the culture medium with the phenol, 29 isolates were positive. These isolates were identified *Pseudomonas sp.*, *Acinetobacter sp.*, *Burkholderia multivorans* and *Alcaligenes sp.* The results obtained by both high-throughput pyrosequencing analysis and culture-dependent methods provided insight into the bacterial community structure of these waste water treatment plants and their biotechnological potential. Moreover culture-dependent methods allowed us to obtain some bacterial isolates having bioremediation potential.

Acknowledgements: This work was supported by Anadolu University Research Foundation Grant No: 1504F169.

Keywords: Bioremediation, PCR, phenol, toluene, wastewater treatment plant.

ORAL-MICBIO-OP241

Characterization of High Level of Deoxynivalenol Producer *Fusarium graminearum* and *F. culmorum* Isolates from Turkey

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Aim of the study: Three chemotypes for class B-trichothecenes have been associated with strain-specific mycotoxin production profiles as nivalenol (NIV), deoxynivalenol (DON) with 3-acetylated deoxynivalenol (3-AcDON) and DON with 15-acetylated deoxynivalenol (15AcDON). DON is predominating mycotoxin type produced by *Fusarium graminearum* and *F. culmorum*. The toxin is accumulated on small grain cereals and contamination result in yield loses. Thus, precise and fast analysis to detect, determine and quantify DON is crucial step in *F. graminearum* and *F. culmorum* associated diseases. In this study, *F. graminearum* and *F. culmorum* isolates obtained from diseased cereals planted in Turkey were subjected to chemotype analysis.

Material and Methods: Diseased wheat, barley and maize samples collected between the years 2006-2015 then *Fusarium* spp. were isolated and used after single spore isolation. *Fusarium* isolates were grown in Czapek Dox Agar/Broth for seven days at room temperature and these cultures were used in DNA and RNA extraction. After morphological characterization, isolates were subjected to species-specific polymerase chain reaction (PCR) assays. PCRs were formed in a volume of 25 µL including 50 ng templates DNA, 1X PCR buffer, 2.5 mM MgCl₂, 0.4 mM dNTPs, 10 pmol primers and 1U *Taq* DNA Polymerase. Cycling conditions were as follows: 35 cycles of 94°C for 1 min, 50-60°C for 1 min, 72°C for 1 min. Multiplex PCRs targeting *tri3* and *tri13* genes were used in chemotyping. ClustalW analysis was used to confirmation of high and low DON production potential of *Fusarium* isolates. *tri5* amplification was also used in distinguishing high and low DON producers. Trichothecene production was analysed at trascryptomic level via *tri11* gene. High pressure liquid chromatography (HPLC) analysis was used in precise trichothecenes detection.

Results: Totally 21 and 37 monosporic isolates were characterized as *F. graminearum* and *F. culmorum*, respectively. 1-3µg/µL DNA's and 0.5-2 µg/µL RNA's were isolated. Isolates were confirmed via species-specific PCR markers. Fifty eight isolates were characterized as potential DON producer by amplification of 282 bp *tri13* band. Sixteen isolates were detected as 15-AcDON producer with 863 bp partial *tri3* region whereas 42 isolates were as 3-AcDON producer by 583 bp of *tri3* region. Alignment analysis showed that isolates of different *Fusarium* species of same chemotype can be characterized as high- or low-DON producers by *tri5* amplification. Low DON and NIV producer isolates were clustered together in ClustalW analysis. *tri5*-specific PCRs resulted with 200 bp bands from isolates meaning that they are potential high-DON producers. Besides, 137 bp cDNA amplicons were obtained from fungal isolates. HPLC analysis showed that DON and its acetylated derivatives can be co-produced with NIV in the range of 0-2481 µg/kg trichothecene production.

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ORAL-MICBIO-OP242

Bacterial Biodiversity of Aydın and Trabzon Providences' Industrial SoilsBahadır TÖRÜN¹, Rabia Gizem KALYONCU¹, Esin POYRAZOĞLU ÇOBAN¹,
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Aim of the study: The aim of this study was to determine bacterial biodiversity of industrial soils from Aydın and Trabzon providences using morphological, culturel, biochemical and molecular methods. Factory wastes, detergents, pesticides and gasoline are some pollutants of our environment. Bacteria that live in these kinds of soils can also be used to clean these pollutants from our environment. By determining the biodiversity of these soils we will be able to see the bacterial species which can be used as environmental cleaner.

Material and Methods: Soil samples were collected from factory waste dumping sites, sewers, city garbage dump and industrial sites. Xylene, chloroform, acetone and methanol was added to each soil sample at the concentration of 1%. Soil samples were incubated at 30°C for 5 days. Bacterial growth was realized on Plate Count Agar (PCA) and Pseudomonas Selective Agar at 30°C for 48 h. After incubation each different colony was isolated and stocked in skim milk. Morphological, cultural and biochemical identifications were made according to the Bergey's Manual of Systematic Bacteriology. For molecular identification DNA isolation of the samples were made according to De Boer and Ward (1995). After isolations DNA concentration and purity was measured with nanodrop spectrometer (Thermo Scientific). 16S rRNA PCR reactions were carried out at initial denaturation 95°C 5min, denaturation 94°C 40 sec, annealing 50°C 40 sec, extension 72°C 40 sec with 35 cycles and final extension at 72°C 10dk. Reagents concentrations were 10X Taq Buffer, 0.5M dNTP mix, 10 pM from each primer, 7.5 mM MgCl₂ and 1U Taq polymerase with the final volume of 25 µl. PCR products were sent to the sequencing (GATC BioTech, Germany) after electrophoresis at 1.4% agarose jel at 90 V 40 min.

Results: *In this study* a total of 65 samples which can tolerate xylene, acetone, chloroform and methanol were acquired. According to the morphological, cultural and biochemical tests, 48 of these samples were found to be *Bacillus sp.* and 17 of them were found to be *Pseudomonas sp.* *Pseudomonas sp.* is a Gr(-) rod shaped bacteria with glycerol, lactose, sucrose and mannitol fermentation abilities, produces H₂S, hydrolyses gelatine and is citrate positive while *Bacillus sp.* were Gr (+) rod shaped, endospore forming bacteria with catalase, glucose, sucrose, mannitol, gelatine hydrolysis and citrat positive, PCR results of these samples were sent to the sequencing (GATC BioTech, Germany). It is expected to be found *Bacillus subtilis*, *Bacillus cereus*, *Bacillus megaterium*, *Bacillus licheniformis*, *Pseudomonas aeruginosa*, *Pseudomonas fluorescens*, and *Pseudomonas putida*. Molecular identification will be made by compairing sequence results with Genebank using BLASTn software.

Acknowledgements: This study was supported by TÜBİTAK-BİDEP (1919B011401692) and carried out at Adnan Menderes University Biology Department Microbiology Laboratory.

Keywords: Biodiversity, 16S rRNA, Bacteria, Molecular Identification, Industrial Soil

ORAL-TOXBIO-OP243

Role of Proline on Boron Stress Tolerance Mechanisms in *Arabidopsis thaliana*Aykut SAĞLAM¹, Mehmet DEMİRALAY², Ahmet Gencer YEDİYILDIZ³, Asım KADIOĞLU³¹Department of Molecular Biology and Genetics, Karadeniz Technical University, Turkey²Department of Forestry, Artvin Çoruh University, Turkey³Department of Biology, Karadeniz Technical University, Turkeysaglama@ktu.edu.tr

Aim of the study: Boron is important for the development of higher plants, but excess boron in the soil become toxic and restricts plant growth. Therefore, developing plants having tolerance to boron stress is important. According to our previous studies, exogenously applied proline provides plants with stress tolerance against boron. However how proline make plants tolerant is not known exactly. Therefore, this study was conducted to find out which mechanism(s) of boron tolerance such as osmotic adjustment, metal chelating, antioxidant system and boron transport were more related with proline.

Material and Methods: For this study, a wildtype *A. thaliana* ecotype Columbia-0 (Col-0) as background, Δ^1 -pyrroline-5-carboxylate synthetase-1 (P5CS1) knockout mutant (*p5cs1-4*) and a mutant which have high level of proline, (*eskimo1*, *esk1-1*) were used. The plants will be growth in a liquid nutrient media then the plants were subjected to boric acid (H_3BO_3). To determine level of boron stress tolerance of the plants, leaf fresh weight, leaf water potential and contents of photosynthetic pigments were measured. To detect the effects of proline on osmotic adjustment, osmotic potential, proline and total sugar contents and expression levels of proline biosynthesis enzymes (P5CS1) and proline dehydrogenase (PDH) were measured. For determination of the effects of proline on antioxidant system, total glutathione content, glutathione reductase (GR) activity and expression level of *GR* gene were measured. The effects of proline on metal chelating was determined by quantifying expression level of *metallothionein 1* which plays a role in metal chelating. The effects of proline on boron transport were determined by measuring expression level of *BOR1*, a boron transport gene and leaf boron content.

Results: The plants were determined to tolerate 5 mM of boron as H_3BO_3 based on leaf water content. Leaf osmotic potential in *esk1-1* was induced more by boron than *p5cs1-4* and Col-0. Wildtype and *p5cs1* mutant plants. *Esk1-1* accumulated higher level of proline as compared to the others. *P5CS1* gene expression up regulated in Col-0 and *esk1-1* by boron while *PDH* was down regulated in all plants under boron stress. Glutathione synthesis was induced by boron stress. *Metallothionein1* was upregulated more in *esk1-1* than the *p5cs1-4* and Col-0. *BOR1* was also upregulated in all plants under boron stress. *Esk1-1* stored more boron in its leaves than *p5cs1-4* and Col-0 under boron stress.

Acknowledgements: This study was supported by TUBITAK Project 114Z083.

Keywords: *Arabidopsis thaliana*, boron stress, chelating, proline, tolerance.

ORAL-TOXBIO-OP244

Protective Role of Taurin and Curcumin on Bisphenol A Induced Toxicity in Rat BloodHatice BAŞ¹, Suna KALENDER²¹Department of Biology/Faculty of Arts and Science, Bozok University, Turkey²Department of Science/Faculty of Gazi Education, Gazi University, Turkeyhatice.bas@bozok.edu.tr

Aim of the study: Bisphenol A (BPA) is a chemical with over 3.8 million tons produced annually worldwide, and is used as an intermediate in the production of polycarbonate plastic. Taurine is an amino acid that has important roles in cell proliferation, and prevention of oxidant induced injury in many tissues. Curcumin, is present in turmeric (*Curcuma longa* L.) and has a wide array of pharmacological activities, including anti-inflammatory, anticarcinogenesis, antioxidant activities. With this study, it is aimed to investigate the possible effects of taurin, curcumin and BPA, on the blood using rats as a model organism for a period of 28 days.

Material and Methods: The protocol was approved by the Gazi Univ. Animal Experiments Local Ethics Committee (G.Ü.ET – 14.075). Procedures were performed in accordance with international guidelines for care and use of laboratory animals. In the present study 7 groups were formed (6 animals in each): control, olive oil, curcumin, taurin, BPA, BPA+curcumin and BPA+taurin. Taurin was dissolved in distilled water, curcumin and BPA were dissolved in olive oil. Blood samples were collected into heparinized tubes after treatment. Erythrocytes were separated from plasma by centrifugation. And they were suspended in phosphate buffer. Erythrocytes were destroyed by osmotic pressure and the resulting mixtures were subjected to centrifugation. Supernatants were isolated. We investigated the effects of BPA (130 mg/kg b.w.), taurin (100 mg/kg b.w.) and curcumin (100 mg/kg b.w.) on the levels of malondialdehyde (MDA), activities of superoxide dismutase (SOD), catalase (CAT), glutathione-S-transferase (GST) and glutathione peroxidase (GPx) in rat erythrocytes by spectrophotometrically. The data were analyzed by one-way analysis of variance (ANOVA) and Tukey test for comparison of groups using SPSS program for Windows (20.0 version). Differences were regarded significant at $P < 0.05$.

Results: There were no statistically significant changes in values of MDA and in enzyme activities between the control, olive oil-treated, curcumin-treated and taurin-treated groups. Treatment with BPA alone increased the levels of MDA, activities of SOD and GPx and decreased CAT and GPx activities in erythrocytes. Treatment with BPA+curcumin and BPA+taurin prevented BPA induced changes in antioxidant enzyme activity and lipid peroxidation except GST activity. Curcumin is more effective than taurin when we take into consideration of numeric data. However there were no statistically significant changes in examining parameters between BPA+curcumin and BPA+taurin groups. From the data of this study, it was evident that BPA caused toxicity, including lipid peroxidation and disturbances in antioxidant enzyme activities. These results were probably due to generation of reactive oxygen species, causing damage to cell membranes. With the present study we determined the protective effects of curcumin and taurin on BPA caused oxidative stress in rat erythrocytes. Data in this study showed that curcumin and taurin have beneficial effects on BPA mediated toxicity, but not protect completely.

Acknowledgements: There are no financial supports (as organization, institute, project number) which contribute the current study.

Keywords: taurin, curcumin, bisphenol A, MDA, antioxidant enzymes

ORAL-TOXBIO-OP245

The Histopathological Effects of Lambda-cyhalothrin on Gills of *Oreochromis niloticus*Pelin UĞURLU¹, Elif İpek SATAR², Tark ÇİÇEK³¹Science and Technology Application and Research Center, Dicle University, Turkey²Pharmaceutical Toxicology, Faculty of Pharmacy, Dicle University, Turkey³Biology Department, Science Faculty, Dicle University, Turkey

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Aim of the study: It is aimed to determine possible alterations in gill histology of *Oreochromis niloticus* individuals exposed to certain concentrations of lambda-cyhalothrin technical formulation with light microscope.

Material and Methods: At 7th, 14th and 21st days fish exposed to 0,29 µg/L lambda-cyhalothrin were taken from the test solution. The gills were fixed with formalin, dehydrated with ethanol, cleared in xylene, embedded in paraffin. The sections were stained with hematoxylin-eosin and examined.

Results: At 7th, 14th and 21st days the most common histopathologic alteration was collapse of pillar cells. The severity of histopathological alterations were increased with the duration of exposure.

Acknowledgements: This study was supported by TÜBİTAK under grant number 114-Z-730.

Keywords: *Oreochromis niloticus*, lambda-cyhalothrin, histopathological effect, gill, collapse of pillar cells.

ORAL-TOXBIO-OP246

The changes of Biochemical Markers in a Fish Species *Gambusia holbrooki* After Exposure to Acetamiprid-Based InsecticideÖzlem DEMİRCİ¹, Abbas GÜNGÖRDÜ²¹Science Faculty, Department of Biology, Dicle University, Turkey²Science Faculty, Department of Biology, Inonu University, Turkey
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The aim of the study: In this study, we investigated the toxic effects of a neonicotinoid insecticide, acetamiprid on a non-target fish species, *Gambusia holbrooki*.

Material and Methods: The commercial formulation of acetamiprid (RastT 20 SP) were used in this study. Static renewal acute toxicity tests were performed in 3 replicate. Test duration was 96-h. Also, Initially, the 96-h LC₅₀ value of acetamiprid was estimated for *G. holbrooki*. Sublethal concentrations of tested pesticide were applied (1/2, 1/5 and 1/10 of 96-hLC₅₀ value) for 24-h and 96-h. The tested parameters are glutathione S-transferase (GST), glutathione reductase (GR), carboxylesterase (CaE), lactate dehydrogenase (LDH) and aspartate aminotransferase (AST). Integrated Biomarker Response (IBR) values were calculated for combining all assayed biochemical marker responses into one general stress index.

Results: Biochemical analysis indicated that GST and LDH activities were increased after 24-h exposure to highest concentration (LC₅₀/5). Also, CaE and AST were showed increases between 24-h and 96-h exposure periods. The highest IBR level was determined at highest concentration for 24-h exposure period while lowest IBR level was determined at same concentration for 96-h exposure period. On the other hand, the results showed that tested biomarkers may be used to showing the effects of short-term acetamiprid exposure (24-h) at high concentrations but tested biomarker responses in tested fish are weak for showing the effects of acetamiprid for longer exposure period (96-h).

Keywords: Acetamiprid, Fish, Biochemical markers, Toxicity.

ORAL-TOXBIO-OP247

Effect of Some Pesticides Mixture on Biochemical BiomarkersÖzlem DEMİRCİ¹, Kemal GÜVEN¹, Dilek ASMA², Serdal ÖĞÜT³¹Science Faculty, Department of Biology, Dicle University, Turkey²Science Faculty, Department of Biology, Inonu University Turkey³School of Health, Department of Nutrition and Dietetics, Adnan Menderes University, Turkeyozdem22@gmail.com

Aim of the study: This study aims to investigate the combined toxic effects of herbicide Atrazine (ATR) with insecticides indoxacarb (IND), thiamethoxam (THI) and endosulfan (END) on *Gammarus kischineffensis*.

Material and Methods: We used Catalase (CAT), superoxide dismutase (SOD), glutathione reductase (GR) glutathione S-transferase (GST) and acetylcholinesterase (AChE) activities as biomarkers.

Results: Biochemical analysis indicated that; enzymes activities in the mixture groups of atrazine and indoxacarb induced significantly. The combined treatment of atrazine and indoxacarb was caused an antagonistic effect on the biomarkers. The effect of endosulfan and atrazine mixture caused an increase in enzyme activities.

Acknowledgements: This study supported by The Scientific and Technical Research Council of Turkey (TUBITAK Proje No: 111T661) and Dicle University Research Fund (Project no: 12-FF-87)

Keywords: Combined effect, pesticides, Biochemical, Biomarkers.

ORAL-TOXBIO-OP248

Seasonal Dynamics of Insecticide Resistance, Multiple Resistance, and Morphometric Variation in Field Populations of *Culex pipiens*Belgin GÖÇMEN TAŞKIN¹, Taylan DOĞAROĞLU¹, Sercan KILIÇ¹, Ersin DOĞAÇ², Vatan TAŞKIN¹¹Department of Biology, Faculty of Science, Mugla Sitki Kocman University, Mugla, Turkey²Koycegiz Vocational School, Department of Medicinal and Aromatic Plants, Mugla Sitki Kocman University, Mugla, Turkey.tvatan@mu.edu.tr

Aim of the study: In this survey our aim was to investigate the seasonal dynamics in both frequency and genotype of resistance alleles for different groups of insecticides in field *Culex pipiens* complex populations and tried to understand how these populations change with time and what role environmental differences play in the field. We also compared the seasonal variations in asymmetry of wing characters that may be modified in resistant individuals.

Material and Methods: To determine the seasonal changes in resistance-associated mutation frequencies in field populations, individual mosquitoes collected from three different seasons were tested for the presence of insensitive target-site mutations using PCR-based diagnostic assays designed for detection of resistance in *Cx. pipiens*. To investigate the wing size variation in mosquitoes sampled from different field populations in three different seasons, the length of each wing was measured using landmarks.

Results: The results of the PCR-based molecular analysis revealed low frequencies of mutations in *ace-1* and *Rdl* that are associated with resistance to malathion, bendiocarb, and dieldrin and no obvious seasonal changes. In contrast, we detected high frequencies and striking seasonal changes for two *kdr* mutations associated with resistance to DDT and pyrethroids. In addition, the frequency and distribution of these resistance mutations did not vary geographically. Results from the morphological analysis exhibited a similar pattern for both sides and did not show a clear separation among the samples from the three different seasons.

Acknowledgements: This study was financially supported by the Scientific and Technological Research Council of Turkey (TUBITAK-KBAG), project number 111T387, and Mugla Sitki Kocman University Scientific Research Funds (project numbers MUBAP-2011/32 and 2012/71). Taylan DOĞAROĞLU was financially supported by a fellowship from The Scientific and Technological Research Council of Turkey. This study was published in Pesticide Biochemistry and Physiology [129, (2016), 14-27].

Keywords: Mosquito, *Culex pipiens*, Insecticide resistance, Wing morphology, Resistance genes, Turkey.

ORAL-TOXBIO-OP249

Heavy Metal Concentrations in *Squalius fellowesii* (Günther, 1868) inhabiting Tersakan StreamBurak ÖĞLÜ¹, Bülent YORULMAZ², Murat BARLAS³¹Centre for Limnology, Institute of Agricultural and Environmental Science, Estonian University of Life Science, Tartu, Estonia.²Biology Department, Science Faculty, Muğla Sıtkı Koçman University, Muğla, Turkey³Biology Department, Science Faculty, Muğla Sıtkı Koçman University, Muğla, Turkey
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Aim of the study: This study was carried out between November of 2013 and June of 2014, on chosen two stations on Tersakan Stream, which flow in district of Muğla, to determine the heavy metal accumulation *Squalius fellowesii*. The aim of this study is to determine concentrations of cadmium (Cd), cobalt (Co), chromium (Cr), copper (Cu), iron(Fe), manganese (Mn), nickel (Ni), lead (Pb), zinc (Zn) edible tissue of Aegean Chub, taken from Tersakan stream in the South-West of Turkey.

Material and Methods: Total of forty Aegean chub samples were caught seasonally during the field works and investigated. Edible muscle tissues of Aegean chubs were analyzed by ICP-AES after digestion in microwave unit. Statistical analysis of data was carried out using R project and SPSS 20.0 statistical package program.

Results: Lead (Pb) was not found in any stations or seasons while iron was found highest accumulation in the fish. The highest levels of iron were found in 253.05 µg g⁻¹ in autumn. The accumulation of investigated heavy metals in fish from Tersakan stream was in order as: Fe > Zn > Mn > Cu > Ni > Co > Cd. As a result of this study, which was carried out in Tersakan Streams, intensive heavy metal pollution was not determined. However, when the results of present study compared with previous studies, an increase in heavy metal levels was observed.

Acknowledgements: This research was funded by Mugla Sıtkı Kocman University, Scientific Research Projects (13/163).

Keywords: Tersakan Stream, Heavy Metals, Aegean Chub (*Squalius fellowesii* (Günther, 1868))

ORAL-TOXBIO-OP250

Antioxidative Defence Mechanisms in Tomato (*Lycopersicum esculentum* L.) Plants Sprayed with Different Pesticides and Boron compoundsKöksal KÜÇÜKAKYÜZ¹, Mahmut YILDIZTEKİN², Hasan Sungur CIVELEK¹, Said NADEEM³, Atilla Levent TUNA¹¹Department of Biology, Faculty of Science, Muğla Sıtkı Kocman University, 48000, Muğla-Turkey²Department of Herbal and Animal Production, Vocational School of Koycegiz, Muğla Sıtkı Kocman University, 48800, Muğla-Turkey³Department of Chemistry, Faculty of Science, Muğla Sıtkı Kocman University, Kötekli-48121, Muğla-Turkey

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Aim of the study: The study was aimed to investigate oxidative stress in *Lycopersicum esculentum* L. by applying various pesticides and boron compounds for two years.

Material and Methods: *L. esculentum* was planted in the field near Ortaca district of Muğla during the vegetation season. The field was divided in different sections. Each section was treated separately by pesticides i.e. Admiral (AD), Zoom (ZO) and Lazer (LA) in prescribed concentrations. Separately, boron compounds i.e. Boric Acid and Tarımbor were also applied at the three different concentrations (BA-1, BA-2, BA-3 and TB-1, TB-2, TB-3). Control group was only supplied by water. After three weeks of treatments, leaves were collected. Fresh leaves were analysed for total chlorophyll (TCh), carotenoids, proline, malondialdehyde (MDA), superoxide dismutase (SOD), peroxidase (POD), ascorbate peroxidase (APOD), and catalase (CAT). The study was repeated for two years i.e. 2010 and 2011.

Results: During first year, Boric acid (BA-1) caused highest increase in the TCh content ($158.41 \mu\text{g g}^{-1}$) on fresh weight basis (FW) while the least amount was observed in the second dose ($103.11 \mu\text{g g}^{-1}$, FW) of boric acid (BA-2) as compared to the control group ($136.85 \mu\text{g g}^{-1}$, FW). During second year, highest TCh content was observed after the treatment of TB-3 ($236.49 \mu\text{g g}^{-1}$, FW) while ZO treatment decreased it ($142.55 \mu\text{g g}^{-1}$, FW); even less than the control ($149.55 \mu\text{g g}^{-1}$, FW). TB-1 caused the highest increase in proline content ($33.52 \text{ nmol g}^{-1}$) while highest reduction was observed in boric acid (BA-2) ($22.51 \text{ nmol g}^{-1}$, FW) as compared to control group ($26.77 \text{ nmol g}^{-1}$, FW). During the first year study, an increase of boric acid and tarımbor concentrations decreased MDA while during the second year, both increases and decreases were observed in the MDA amount. Highest MDA was found in BA-1 (2.07 nmol g^{-1} , FW) treated plants while the least amount of MDA (1.22 nmol g^{-1} , FW) was found in TB-3 as compared to the control (1.65 nmol g^{-1} , FW). During the second year, MDA content determined 0.87 nmol g^{-1} malondialdehyde (MDA) in tomato leaves. Highest MDA was found in BA-2 (0.99 nmol g^{-1} , FW). Highest SOD amount was found in the first year ZO treated plants i.e. $70.35 \text{ unit SOD/mg protein}$ while TB-1 treatment caused the highest decrease in the SOD amount i.e. $35.21 \text{ unit SOD/mg protein}$ (control: $45.23 \text{ unit SOD/mg protein}$).

Acknowledgements: We are thankful to the (BOREN) the National Boron Research Institute, Ankara, Turkey (Project No: BOREN 2009/ç0225) and BAP (Scientific Research Projects) Muğla Sıtkı Koçman University Muğla Turkey (Project No: BAP-2011/15) for their financial support.

Keywords: Antioxidative enzymes, *L. esculentum*, boric acid, Tarımbor, pesticides.

ORAL-TOXBIO-OP251

Effects of Fertilizer Pollution in Aquatic Habitats on Metamorphosis Process and Welfare of Frog TadpolesHandan KARAOĞLU¹¹Department of Agricultural Biotechnology/Agriculture and Natural Sciences Faculty, Recep Tayyip Erdogan University, Turkey
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Aim of the study: Within the scope of this research, it was aimed that exhibition of the deleterious effects of nitrogenous fertilizer, which is widely used in Eastern Black Sea Region and caused pollution in freshwater habitats, on welfare and metamorphosis process of frog tadpoles which belong to different species. Furthermore, determining whether there was a difference in kind or frequency of the observed deleterious effects among four species was aimed. Finally, the main purpose of the study was defining what kind of effects that fertilizer pollution has on sustainability of biodiversity least partly.

Material and Methods: During the research, ammonium nitrate concentrations (0, 5, 10, 15, 20, 25 mg/L) which is present in freshwater habitats of Eastern Black Sea were applied in the laboratory on 10-day-old toad and frog tadpoles, obtained from the eggs of species collected from natural habitat, were applied from 25th developmental stage to 42nd developmental stage. Each concentration was applied to 30 tadpoles in total as repeated five times and as including six tadpoles. The tadpoles were fed with boiled lettuce throughout the experiments and the abnormalities and mortalities that occur were observed and recorded daily. The experiment solutions were renewed once a week. The experiments were applied in the same way on all species' tadpoles (*Pelophylax ridibundus*, *Rana macrocnemis*, *Pelodytes caucasicus*, *Bufo viridis*) and it was tested where there was a difference among four species in their responses against ammonium nitrate. At the beginning of the experiment, tadpoles were weighed and those which were approximately in the same weight are distributed in all exposure group and repetition. At the end of the experiment, the surviving tadpoles were weighed again and the effects on health were shown by determining the effects of the fertilizer on the development as well as the abnormalities in these tadpoles and these are compared among four species.

Results: At the end of the experiments, it was defined that there was a decreasing for body weight and body height values of all exposure groups for all species. Minimum and maximum decreasing values for 4 species in the lowest and the highest concentration for weight was 3-51% and for height was 2-25%. When the value of average decreasing was calculated for all tadpoles in all exposure groups for each species, the highest decreasing value for weight and height were 47% and 20% respectively for *Bufo viridis* tadpoles. It was determined that time to complete metamorphosis elongated in all exposure groups for all species. Minimum and maximum elongation values for 4 species in the lowest and the highest concentration was 5-23 days. When the value of average elongation was calculated for all tadpoles in all exposure groups for each species, the highest elongation value was 15 days for *Bufo viridis* tadpoles. It was determined that hind limb joint malformation occurred in all exposure groups for all species. Minimum and maximum hind limb joint malformation values for 4 species in the lowest and the highest concentration was 11-75%. When the value of average malformation was calculated for all tadpoles in all exposure groups for each species, the highest malformation value was 52% for *Bufo viridis* tadpoles. At the end of the experiments there was mortality at a certain rate in all exposure groups for all species. Minimum and maximum mortality rates for 4 species in the lowest and the highest concentration was 13-76%. When the rate of average mortality was calculated for all tadpoles in all exposure groups for each species, the highest mortality rate was 54% for *Bufo viridis* tadpoles. Considering all these results, it may be mentioned that nitrogenous fertilizer has significant deleterious effects for all the amphibian species examined and biodiversity.

Keywords: fertilizer pollution, detrimental effects, frog and toad tadpoles.

ORAL-BIOCON-OP252

Biological and Ecological Characteristics of a Monotypic Relict Endemic Species: *Dorystoechas hastata* (Lamiaceae)¹Gülçin IŞIK, ¹Ersin YÜCEL¹ *Anadolu University, Faculty of Sciences, Department of Biology, 26470 Eskisehir/TURKEY*
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Aim of the study: In this study, it's aimed that to determine the biological and ecological characteristics of *Dorystoechas hastata*, one of the most important biological wealth of Turkey, which is the only species belonging to the genus *Dorystoechas*.

Material and Methods: Morphological characters were measured by digital caliper under stereomicroscope if they were small structures, and by scale if they were large structures. Walter's (Ozturk et al., 1997) method (Hamzaoğlu and Aksoy, 2006) was used for climate characteristics. Bouyoucos Hydrometer Method was used to determine texture (Bouyoucos 1962). Soil reactions were measured by Jackson Method (Jackson, 1962). To calculate the amount of moisture in the soil, samples were sieved (2 mm Ø), kept in a drying oven at 105°C overnight (Çepel, 1966). Determination of calcium carbonate in soil samples was made by Volumetric Method (Toker and Schomak, 1963). Determination of the amount of organic matter in soil samples is determined by Wackley-Black's Wet Decomposition Method (Wackley and Black 1934). Determination of nitrogen content of soil and plant samples was carried out by Semi-Micro Kjeldahl method (Jackson, 1962). The amount of phosphorus for plant and soil samples was performed according to the method of Olsen (Aydeniz, 1969). Ca, Mg, K and Na analyzes of soil and plant samples were performed according to the method of Ammonium Acetate (Walsh and Beaton, 1973). Determination of the Fe, Cu, Mn and Zn in soil and plant samples is determined by Wackley-Black's Wet Decomposition Method (Wackley ve Black, 1934). Germination experiments were performed in plant breeding cabin (ML-350 Model Sanyo, Japan). Experiments were carried out in Petri dishes (9 cm Ø) and germination bed formed from filter paper.

Results: *D. hastata* has 40-100 cm length; with pale roots (18,9-29,5 cm); deep branched, woody and globular stem; aromatic; leaves are lanceolate-hastate, 2.2-3.5x5.1-8.7 cm, with dense hairs; inflorescence is a spica (6,8-13 cm); kalix length is 3,48-4,23 mm in flower, 4,6-7,6 mm in fruit; corolla white and 4,3-6,9 mm; pollens which are isopolar, tricolporate and 60x100 µ; fruit is a 0,6-0,9x1,6-2,3 mm, light brown and bright nutlet; is a shrub. *D. hastata* distributes in areas which have climate like Mediterranean type, above calcareous main rock, dominant soil characteristic is arenaceous-silty arenaceous, among elements which have xerophyte macchie characteristics. Seeds of this plant germinates % 1,25 at light and % 1 at dark media. Additionally, statistically significant relationship among plant morphological characteristics and physical and chemical characteristics of the soil were determined.

Keywords: *Dorystoechas hastata*, Ecology, *Lamiaceae*, Monotypic, Morphology

ORAL-BIOCON-OP253

Determination of Phenolic Compounds of Chaste berry seeds (*Vitex agnus-castus* L.) Grown in Denizli (Karahayıt)Beğüm PARLAK¹, Yeşim KARA¹, Kerem KILIÇ¹¹Pamukkale University, Faculty of Science and Art, Department of Biology, Denizli, Turkey
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Aim of the study: In this study, phenolic contents of water extract obtained from seeds of Chasteberry (*Vitex agnus-castus*) was investigated. This plant has been used for hundreds of years in Turkey for female productive system disorders, and has established efficiency in helping with some symptoms associated with premenstrual syndrome. The main active constituents of *Vitex agnus-castus* are glycosides, flavonoids, alkaloids and essential oils. It has dominant pharmacological effect on the inhibition of prolactin secretion. The present study estimated total phenolic content and concentration of flavanoids from seeds of chaste.

Material and methods: The total phenolic contents was determined by using Folin-Ciocalteu method as gallic acid equivalents.

Result: The total phenolic content was found 781,22 GAE/g of extract. Also determined as gallic acid 0,281, p-hidroksi 21,506, caffeic acid 0,647 and ferulic acid 0,122 µgRu/g of extract. The proportion of tocopherols in plant secondary metabolites in Chaste is: alpha –tocophenol 1,013, beta-toc 0,296, gamma-toc 0,191 and delta-toc 0,124 mg/kg. This species (*Vitex agnus-castus*) can be used as a natural antioxidant, in food processing and pharmaceutical industries.

Acknowledgements: This study was supported by Pamukkale Scientific Research Unit (BAP Turkey) Project No: 2013FBE049

Keywords: Chasteberry seed, Secondary Metabolites, Flavanoids, Total Phenolic content, Gallic Acid

ORAL-BIOCON-OP254

Life Indicators of Plants in Areas of Ganja-Gazakh Region Exposed to Erosion

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Aim of the study: Information is given in this article about both the erosion coefficient and life activity of plants on contaminated areas with various degrees in Ganja-Gazakh region. The study revealed that the life activity indicators of some plants found in ecologically clean and contaminated areas are as follows: 26 types are "healthy" with coefficient of 100-80%, 2 types are "weakened" with coefficient of 56-69%, 14 types are "seriously weakened" with coefficient of 49-20%, and 9 types are "destroyed completely" with coefficient of 19% and below.

Material and Methods: Researches were held in Ganja-Gazakh region covering the period of 2014-2015. Material was collected by method of comparable route, biometric measurements were carried out in large numbers about the ontogenic condition of the plants. Life activity indicators (LAI) of plants determined with the method in accordance with method of V.A.Alekseyev. Here: n_1, n_2, n_3, n_4 – number of healthy, weakened, seriously weakened and destroyed plants. 100, 70, 40, 5 – coefficient for life activity level of healthy, weakened, seriously weakened and destroyed plants, N – the total amount of plants from stationary. Plants with coefficient of 100-80 % are considered "healthy", 79-50 % – "weakened", 49-20% – "seriously weakened", 19 % and below – "destroyed completely".

Results: The amount of substances emitted into the atmosphere (4658,401) are twice more compared with a normative (2648,5694) in research site. This first of all has a negative impact on biodiversity. Taking this into consideration the life activity indicators of some plants found in ecologically clean and contaminated areas has been determined in accordance with the methodology: 26 types are "healthy" with coefficient of 100-80%, 2 types are "weakened" with coefficient of 56-69%, 14 types are "seriously weakened" with coefficient of 49-20%, and 9 types are "destroyed completely" with coefficient of 19% and below. Firstly, negative cases in each area should be considered in order to learn relative topographical humidity index. The resulting reduction in plant communities, and at the same time, the formation of strange plants in the area should also be considered. That is why, combining the general classification techniques report can be given in terms of early crops by studying the accuracy of modeling and the biophysical parameters in the areas of process. must be evaluated in advance in addition to the macro climate in order to clarify the area's plants. According to Zobeck and his colleagues, topographic relative humidity index (TRMI) is equal to maximum 60. However in the summer as a result of the industrial important work, this index reaches a maximum. During studies carried out in the area during the summer months, TRMI usual price is not more than 20. Shape assesment of rocks also were carried out in reasearch site. Here, hard is calculated with number of 40. However it is adopted like 20, as the site is mixed with cyst limestone. Taking into consideration all the abovementioned, the sensitivity index of erosion were calculated according to the following evaluation sheet. Risks are as follows in accordance with methodology: 68-100 is low, 34-67 is average, and 0-33 is higher. In this case, erosion is equal to 40 after study of 7 instability of populations in each area and this is compatible with average risk. It also is up to 20% destruction message of plant communities of region flora.

ORAL-BIOCON-OP255

Fito-Ameliorative Measures on Protection of Biodiversity in Shahdagh National ParkArzu MUSTAFAYEV*Ministry of Ecology and Natural Resources of Azerbaijan Republic*

Aim of the study: In this article, there is information about implementation of fito-ameliorative measures in Shahdagh national park area exposed to erosion. Considering all of these it is advisable to implement the following measures in the territory: conducting monitoring and inventoring lands in order to keep natural potential of vegetation; implementation of complex measures in order to prevent degradation of pland and land cover and erosion of mountain lands; planting trees and protective forest lines for relatively strong mountain slopes, implementation of fito-ameliorative measures in expanded fields of rivers and streams, areas prone to landslides; strict observance of the reserve regime.

Material and Methods: Complex fito-ameliorative measures, planting trees, shrubs and aged grass plants on mountain slopes should be taken for preventing land erosion, land degradation, and natural disasters like floods often happening in the territory in spring and autumn months. Each zone has the self-owned natural conditions as the area of national park is located in middle and high mountainous zone. Therefore, selected plant species should be possessing a wide range of spreading that could withstand natural conditions of middle and high mountainous zone.

Results: On this point, species belonging to *Juniperus* genus among other mountain-xerophyte plants were studied in depth. These plants possessing a strong root system can be better developed on 2200-2300 m. above sea level height. Although tree and shrub shaped *Juniperus* species are found at the same territory in lower spots of forest, only shrub shaped species can be found on high mountainous zone. There is almost no erosion in close *Juniper* forest. The reason is cultivation of these species in areas exposed to erosion is advisable: *Quercus macranthera*, *Salix alba*, *Fraxinus excelsior*, *Acer ibericum*, *Amygdalus fenzliana*, *Pyrus salicifolia*, *P. oxyprion*, *Crataegus* ssp., *Rosa* ssp., *Thymus kotschyanus* & *Astragalus* ssp. Plant species used in fito-ameliorative measures will relatively differ from each other as the middle and high mountainous zones. Shahdagh National Park area is located differ from each other for their physical and geographical features. In recent times, in the territory of a national park during the implementation of measures for forest restoration use of oak, hawthorn and hips varieties on arid areas, and use of willow and poplar trees on consolidation for the banks of rivers and streams gave positive results. It is possible to use a different type of forest plants like pear and hawthorn, oak, ash, apple trees without complying with agro-technical measures in forestation of mountain slopes in the high mountainous zone. Especially, hawthorn and hips types are being grown better in these areas. *Juniper* species also has the special significance in greening of the mountain slopes. Plant species used in conducted fito-ameliorative measures should possess strong root system, the ability to form close turf and should prevent snow and rainwater tangle of land surface by strengthening it with the aim of preventing land erosion and floods. It is more relevant to select aged grass plant forming turf for subalpine and alpine gridle, and to select trees and shrubs for middle and high mountainous zone (1600-2200 m a.s.l). Considering all of these it is advisable to implement the following measures in the territory: conducting monitoring and inventoring lands in order to keep natural potential of vegetation; implementation of complex measures in order to prevent degradation of pland and land cover and erosion of mountain lands; planting trees and protective forest lines for relatively strong mountain slopes, implementation of fito-ameliorative measures in expanded fields of rivers and streams, areas prone to landslides; strict observance of the reserve regime.

Keywords: National Park, fito-ameliorative measure, trees and shrubs

ORAL-BIOCON-OP256

Survey of Two Amphibian Pathogens (*Batrachochytrium dendrobatidis*, *Ranavirus*) on the Collections of Endemic Tavas Frog, (*Rana tavasensis*) in Zoological Museum of Pamukkale University, TurkeyUğur Cengiz ERİŞMİŞ¹, Serdar DÜŞEN², Pınar AGYAR¹¹ *Molecular Biology and Genetics Department, Sciences and Literature Faculty, Afyon Kocatepe University, Turkey*² *Department of Biology, Faculty of Arts and Sciences, Pamukkale University, Denizli*
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Aim of the study: The pathogenic fungus *Batrachochytrium dendrobatidis* (*Bd*) is a major conservation concern because of its role in decimating amphibian populations worldwide. We focused only to detect whether affects presence or absence of *B.dendrobatidis* on adult specimens endemic Tavas frogs (*Rana tavasensis*) on the Museum Zoology of Pamukkale University (PUMZ).

Material and Methods: We accessed 7 specimens of Tavas frogs (*Rana tavasensis*) from the Museum of PUMZ. In the *Bd* sampling process, adults were swabbed 30 times along keratinized tissues where *Bd* zoospores are highly concentrated. We followed the standardized sampling protocol detailed by Hyatt et al. (2007). The infection intensity of all samples was determined by using qPCR. We extracted nucleic acids using 50 µl PrepMan Ultra (Applied Biosystems), and the tip of the swab was used instead of a toe. The objective of this work was to detect the presence of ranaviral agents in affected tavas frogs using Polymerase Chain Reaction (PCR) technique as a primary approach to the study of the disease. Primers were designed based on highly conserved iridoviral sequences. Major Capsid Protein (MCP) and Immediate Early Protein (IE) genes were the selected targets. To ensure the integrity of our results, a negative control (dH₂O) was run in triplicate on every 96-well PCR plate. Infection intensity was measured as the number of genome equivalents (GE) per swab, calculated by multiplying the genome equivalent values generated during the qPCR by the dilution factor of the template DNA.

Results: From qPCR assays, we observed that one of seven adult specimens were infected by *Bd* (14 %). The low estimated zoospore load in mean genome equivalents (GE) ± SE across all sites with positives was 0.37 ± 0.34 for adult tavas frogs in PUZM. Quantitative PCR determined the presence of *Ranavirus* (FV-3) like virus in blood was 28% (n = 2). This study is the first report of *Bd* in endemic tavas frogs.

Keywords: *Rana tavasensis*, *Batrachochytrium dendrobatidis*, *Ranavirus*, qPCR.

Acknowledgements: We are indebted to TÜBİTAK (Project no.113Z139) for financial support.

ORAL-BIOCON-OP257

Investigation of antimicrobial effects of essential oil that obtained from *Vitex agnus-castus* plantKerem KILIÇ¹, Yeşim KARA¹, Havser Ertem VAİZOĞULLAR¹, Begüm PARLAK¹¹Pamukkale University, Science and Art Faculty, Department of Biology, Denizli, Turkey
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Aim of the study: Essential oils, also known as volatile oils are complex mixtures that are obtained from various parts of plants by hydrodistillation or pressing. The usage areas of plants containing oily seeds are wide. The oil which is obtained from chaste plant has a very wide application area in the field of medicine.

Material and methods: In this study, essential oil which was taken out of leaves and seeds of *Vitex agnus-castus* L. species was used. Oil was obtained by using Clavenger type device. Antimicrobial effects were determined by standard disk diffusion method on Gr (-) of *Escherichia coli* ATCC 25922, Gr (-) *Pseudomonas aeruginosa* ATCC 27853, Gr (+) *Staphylococcus aureus* ATCC 25923 and Gr (+) *Micrococcus luteus* NCIMB 13267 bacteria with Ampicillin and penicillin antibiotics which were used. Our study showed that the oil from leaves has more antibacterial effects than the seeds of the chaste plant. Moreover, presence of antimicrobial activity on both Gr (+) and Gr (-) bacteria was observed.

Results: As a result, the highest antibacterial properties were determined in the leaves of chaste plant. *S. aureus* was more affected in Gr (-) bacteria and also 5 cm inhibition zone was determined. Effects were not observed in bacteria *M. luteus* as a Gr (+) bacteria. Other Gr (-) bacteria *P. aeruginosa* was not affected as *E. coli*. Up to 0.8 cm inhibition zone was determined under the effect of leaf oil. All these data showed that the leaf oils and seed oil of Chaste plant affect both Gr(+) and Gr (-) bacteria. According to the data given, creating a zone of inhibition shows that chaste plants have antimicrobial activity furthermore the oil should be investigated more extensively in terms of antimicrobial activity and it can also be used in alternative medicine.

Acknowledgements: This study was supported by Pamukkale Scientific Research Unit (BAP Turkey) Project No: 2013FBE049.

Key words: *Vitex agnus-castus*, volatile oil, antimicrobial activity, alternative medicine.

ORAL-BIOCON-OP258

Estimation Anthropotolerance of Rare Geophytes Growing on the Agricultural Soils

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Aim of the study: At present, various methods are used in the assessment of the condition of agrarian ecosystems. Study of tolerance of rare geophytes found in agrocenosis against anthropogenic impacts is of great importance in the ecological assessment of agricultural soils. Rare species of *Tulipa* L. found in agricultural fields in the territory of Ismayilli, Shamakhi, Gobustan and Shabran regions of Azerbaijan can play an important role in the assessment of the condition of ecosystem. These plants differentiated with their tolerance to environmental factors and being less demanding for soil conditions complete their development until summer rapidly growing in early spring.

Material and Methods: Populations of *Tulipa eichleri* Regel and *Tulipa biebersteiniana* Schult. et Schult. in a limited number belonging to *Liliaceae* Juss. are found in agrocenosis, mainly in the edges and inside of the sowing areas, pastures and meadows. Species that include in the “Red Book” of Azerbaijan belong to the category of “species vulnerable to extinction” (VU A2c + 3c). Long - term studies and monitoring conducted in testing grounds appointed in agricultural soils show that the development of species of *Tulipa* L. in the condition of anthropogenic stress depends on certain factors. Study of plants with individual monitoring in testing ground in agrocenosis shows that there is a serious negative impact on the ontogenic development, diversity and number composition of species of *Tulipa eichleri* Regel və *T.biebersteiniana* Schult. et Schult. during various agro-technical measures, cattle grazing and haying. In order to study ecological valence and tolerance of plants, researches conducted on the methodology suggested by Jukova in agrocenosis enable to new approaches in the assessment of tolerance level of rare species. The strengthening of the anthropogenic impact in agricultural fields in causes to the loss of species diversity along with the decrease in the number of small localities of geophytes.

Results: Geophytes differentiated with unique continuity in the conditions of strengthening of anthropogenic impact have the adaptation ability in a high-degree. Although intensive melioration measures conducted in sowing areas, bulbs of of *T. eichleri* and *T.biebersteiniana* located in the depth of 70 – 80 cm of soil survive. Replacement of natural plant formation with secondary plants and erosion of soil weaken the continuity of the population on the slopes of mountain where cattle are intensively grazed. Measures on increasing fertility, water and air permeability of soils in planting areas increases the tolerance ability of geophytes. It was determined that the number and tolerance level of plants depend on tolerance index. The amplitude of ecological tolerance of the studied species (*T.eichleri* and *T.biebersteiniana*) refers to stenobiontis relatively wide. Decrease in the number of rare geophytes shows the loss of continuity of ecosystem and strengthening of anthropogenic influence. It is possible to use the anthropotolerance feature of rare geophytes in the assessment of ecological balance in agrocenosis with this method. Depletion of the number of species of tulips in planting areas can be considered the main indicator or sing for the decrease in soil productivity and acceleration of soil erosion.

Keywords: rare geophytes, anthropotolerance, ecological balance, agrocenosis.

ORAL-BIOCON-OP259

Marine Protected Areas networks in the eastern Mediterranean for the conservation of biodiversity and for the restoration of fishery resourcesParaskevi K. KARACHLE¹, Stelios KATSANEVAKIS², Marianna GIANNOULAKI¹, Vassiliki VASSILOPOULOU¹¹ *Institute of Marine Biological Resources and Inland Waters, Hellenic Centre of Marine Research, Greece*² *Department of Marine Sciences, University of the Aegean, Greece*
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Aim of the study: This effort aims to present two research projects, MARISCA (Marine Spatial Planning in the Aegean Sea for the protection and conservation of biodiversity) and PROTOMEDEA (Towards the establishment of Marine Protected Area Networks in the Eastern Mediterranean), launched recently in the eastern Mediterranean. They aim to investigate the role of MPAs for biodiversity conservation and the enhancement of fishery resources respectively, with the ultimate goal to contribute to the achievement of Good Environmental Status as dictated by the Marine Strategy Framework Directive, and to the implementation of the Marine Spatial Planning Directive.

Material and Methods: Major ecological features and essential fish habitats (EFH) will be mapped in MARISCA and PROTOMEDEA, respectively. Furthermore, mapping of human activities and existing management measures will be conducted in a truly complementary way between the two projects. Valuation of the goods and services of selected ecosystem components will be attempted, using the benefit transfer method. As stakeholder involvement is considered of high importance, stakeholder platforms will be created in both projects and operational objectives for the targeted features will be defined through close interaction. The design of the MPA network and the associated Spatial Plan will be based on the principles of systematic conservation planning, by applying the MARXAN with Zones planning software. In MARISCA, planning will be done in a single phase, where prioritization of areas will be based on the distribution of important and protected ecological features. In PROTOMEDEA, planning will go a step further, as there will be refinement of the proposed MPA networks through MARXAN, considering the outcomes from both the application of Maximum Sustainable Yield (MSY)/Bioeconomic modelling and of ecological modelling (i.e. ECOPATH with ECOSIM/ECOSPACE).

Results: The deliverables of both projects, can be summarized as follows: (a) maps of spatial distribution of important habitats, species and essential fish habitats; fishing effort, human activities and cumulative impacts; (b) valuation of the goods and services of selected ecosystems; (c) technical and scientific indicators to evaluate the effect of MPAs network towards MSY objectives; synthesis table and evaluation report of the different proposed MPAs scenario in terms of the currently established MSY reference points for selected fish stocks; (d) MSY/Bio-economic and Ecopath/Ecosim/Ecospace models. Finally, both programmes will provide maps of the proposed network of protected areas, and zones with restrictions on human activities, in order to conserve biodiversity (MARISCA) and restore fisheries (PROTOMEDEA) in the eastern Mediterranean.

Acknowledgements: The project «Marine Spatial Planning in the Aegean Sea for the protection and conservation of biodiversity» has been funded by the European Economic Area Financial Mechanism 2009-2014 and the National Public Investments Program of Greece. The European Commission (DG-MARE) has funded the Project PROTOMEDEA (Call for tenders MARE/2014/41 [SI2.721917]).

Keywords: biodiversity, fisheries, conservation planning, MARISCA, PROTOMEDEA

ORAL_BIOCON-OP261

Contributions to larger Basidiomycota of Turkey from Yuvacık (İzmit) basinİlgaz AKATA¹, Hasan AKGÜL²¹Ankara University, Faculty of Science, Department of Biology, Tandoğan, Ankara, Turkey²Akdeniz University, Faculty of Science, Department of Biology, Antalya, Turkey

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Aim of the study: The present study is a preliminary investigation of the project which is conducted to determinate the larger *Basidiomycota* of Yuvacık (İzmit) basin. The study aims to make a contribution to Turkish mycobita.

Material and Methods: Samples were collected from different localities of Yuvacık (İzmit) basin in 2015. During field studies, macroscopic and ecological characteristics of the samples were noted and they were photographed in their natural habitats. In the laboratory, macroscopic and microscopic investigations and micro-chemical reactions were carried out. Reagents such as melzer's reagent, 5 % KOH, H₂O, H₂SO₄, congo red etc. were used. The identified samples were deposited in Ankara University Herbarium (ANK).

Results: As a result of this study, 102 species belonging to 35 families were identified. Taxa are given in alphabetical order and are listed together with locality, notes on habitat, geographical position, collection date, and accession numbers.

Keywords: Basidiomycota, Yuvacık, İzmit, Turkey

ORAL_BIOCON-OP262

Macrofungi determined in Beşikdüzü (Trabzon) districtİlgaz AKATA¹, Yasin UZUN¹Ankara University, Faculty of Science, Department of Biology, Tandoğan, Ankara, Turkey²Karamanoğlu Mehmetbey University, Kâmil Özdağ Science Faculty, Department of Biology, Karaman, Turkeyakata@science.ankara.edu.tr

Aim of the study: The aim of the current study is to determine the macrofungal diversity of Beşikdüzü (Trabzon) district and to make a contribution to the Turkish mycobiota.

Material and Methods: The macrofungi samples were collected from different localities within Beşikdüzü (Trabzon) district between 2013 and 2014. Relevant morphological and ecological characters were recorded for the fungi, which were photographed in their natural habitats. In the laboratory, the samples were further examined and microstructural data were obtained by light microscopy. Reagents such as distilled water, Melzer's reagent, 5% KOH, H₂SO₄, Cotton blue, Congo red etc. were used for microscopic investigations. All specimens were deposited at Ankara University herbarium (ANK).

Results: As a result of the field and laboratory studies, totally 104 species belonging to 45 families, 12 order, 2 division have been identified. 21 species are belonging to *Ascomycota*, 83 to *Basidiomycota*. Taxa are given in alphabetical order and their systematic is presented in accordance with Index fungorum.

Keywords: Macrofungi, fungal diversity, Beşikdüzü (Trabzon), Turkey. *Basidiomycota*, fungal diversity, İzmit, Turkey

ORAL-BIOCON-OP263

Diversity of genus *Galanthus* in Georgia

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Aim of the study: Georgia is one of the richest region in Caucasus, which has been identified as one of the Earth's 34 biologically richness and most endangered terrestrial eco-regions by Conservation International World Bank. *Galanthus* is a small genus of family Amaryllidaceae with 20 species of bulbous perennial herbaceous plants. The following 10 species are distributed in Georgia: *Galanthus schaoricus* Kem.; *G. angustifolius* Koss.; *G. alpinus* Sosn.; *G. alpinus* Sosn subsp. *caucasicus*., *G. krasnovii* A. Khokhr.; *G. platyphyllus*; *G. woronowii*; *G. rizehensis*; *G. ketzkhovellii*; *G. lagodechianus*; *G. kemulariae*. It is also popular in cultivation in Europe, and valued for its bulb. Under CITES regulations, international trade in any quantity of *Galanthus*, its bulbs or leaves are illegal without a CITES permit.

Material and Methods: The main methods was expedition-excursion–observation of *Galanthus* population, mark the sample. Plant identification was using with book “The flora of Georgia”. There were difficult specimens, the vegetative features (leaves, needles) of plants were not very characteristic at higher levels of classification. I used the lines, to examine plants in transects; a metric ruler, to measure leaves and other small features; a metric tape measure, to measure the diameter of plant trunks; GPS.

Results: The results of the study was that, I have identified the natural area of genus *Galanthus* in Georgia. *Galanthus woronowii* is distributed in Imereti, Adjara, Kartli and Abkhazia region. *G. krasnovii* is in Abkhazia, Adjara and Lazeti regions, *G. rizehensis* is in Adjara region. *G. alpinus* is in Adjara, Kartli, Trialeti regions; *G. caucasicus* is in Abkhazia, Imereti, Adjara, Kartli, Javakheti regions; *G. angustifolius* is in Imereti and Racha regions; *G. platyphyllus* is in Svaneti, Abkhazeti, Racha and Kartli regions. *G. lagodechianus* is in Kartli and Kakheti regions. *G. ketzkhovellii* is in Kakheti regions and *G. kemulariae* is in Kartli region. Four species: *Galanthus lagodechianus*, *G. angustifolius*, *G. krasnowii*, *G. kemulariae* are endemic species for Georgia. In the first year of my study, I have measured covering of genus *Galanthus*. Some species: *G. krasnovii*; *G. schaoricus*; *G. woronowii*; *G. platyphyllus*; *G. rizehensis* are extremely in danger because of their commercial use. The collected materials will study genetically, which involves to study DNA structure.

Acknowledgements: I am very thankful for Prof. Natela Varshanidze, Batumi Shota Rustaveli State University, for her help and useful advises.

Keywords: Endemic plant. Red list. *Galanthus*.

ORAL-BIOCON-OP264

Potential of Dangerous and Poisonous Plants West Java in Agriculture and MedicineHarni Mutia SARA¹, Joko KUSMORO Drs. MP²¹Biology/Padjadjaran University, Indonesia²Biology/Padjadjaran University, Indonesia

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Aim of the study: The provincial government are prioritizing development in the southern region of West Java. High biodiversity of plants in West Java is a resource that should be researched, protected, and utilized. Plant fall into category of the dangerous and poisonous plant can provide information to increase alertness, management, utilization, and protection the role of a plant in the ecosystem.

Material and Methods: This research used observation method and study literature method.

Results: Dangerous and poisonous plants that can be used in agriculture and medicine namely *Barringtonia asiatica*, *Ceiba petandra*, *Cinnamomum sintok*, *Crinum asiaticum*, *Ficus ribes*, *Flacourtia rukam*, *Lantana camara*, *Terminalia cattapa*, *Vitex pinnata*, *Hernandia peltata*, *Mikania micrantha*, etc. Many of secondary metabolites substances contained on dangerous and poisonous plants were found, that is ethanol, saponin, alkaloid, cyanide acid, triterpene, flavonoid, kafeat acids, phenol, tannin, essential oil, bergenin, rotenon, resin, terpenoid, antosianida, caffeine, deoregin, anakordala acid, polyphenol, papain, mimosin that contained in the roots, stems, leaves, flowers, fruits, seeds, and tubers. Section dangerous organs were found is spines and trichomes. The dangerous and poisonous plants can cause dermatitis, dermal wounds, swelling, irritation, dizziness, hair loss, throat burn, nausea, indigestion, liver damage, enlarged spleen, hallucination, fetal miscarriage, paralysis, and death. The venom with correct dosage can be used as insecticide, nematicide, fungicide, herbaticide, viruses killer, bacteria killer, poison fish, etc.

Acknowledgements: The authors would like to thanks the support of Biology Department Padjadjaran University, and Kloroblas.

Keywords: Dangerous and Poisonous Plant, Agriculture, Medicine.

ORAL-BIOCON-OP265

Nesting Biology of Loggerhead Turtles on Dalyan Beach; Results from 2015 Nesting SeasonYakup KASKA¹, Eyup BAŞKALE¹, Doğan SÖZBİLEN², Çisem SEZGİN^{1,3}, Ahmet Yavuz CANDAN^{1,3}¹ Pamukkale University, Faculty of Arts and Sciences, Department of Biology, Denizli-Turkey² Pamukkale University, Vocational School of Acipayam, Department of Herbal and Animal Breeding, Denizli-Turkey³ Pamukkale University, Sea Turtle Research Centre (DEKAMER), Denizli-Turkeycaretta@pau.edu.tr

Aim of the study: We aimed to monitor the breeding and nesting activities of Sea Turtles and Soft Shelled Nile Turtle on Dalyan-İztuzu Beach, which take place in Köyceğiz-Dalyan Special Environmental Protection Area, were studied in 2015 nesting season.

Material and Methods: We monitored the beach and recorded any turtle activities on the beach at nights and in the mornings. Nests were screened against predation. We increased the screen size to a one meter, this helped us to reduce the predation rates up to 40%. We found the predators are still able to burrow from the sides of the screens.

Results: A total of 1231 emergences, all of which belongs to loggerhead sea turtles, occurred in 2015, of which 432 (35.1%) nests were deposited and the remaining 799 (64.9%) non-nesting emergences were recorded. A total of 92 new nesting females were tagged, 18 tagged turtles from previous years were reobserved. From new nesting females, 38 of them reobserved during their second nesting, 19 of them reobserved during their third nesting. A total of 23 (5.32%) nests completely and 60 (13.8 %) nests were partly predated mainly by foxes. The main predator was foxes in 80 nests, badgers in 3 nests. Hatching was observed in 401 (32.82%) nests. A total of 32531 eggs in 432 nests were counted. After excavating the intact nests, a total of 29975 (92.15 %) eggs were counted, of which 917 (2.82 %) of them were unfertilized, 4217 (12.96 %) dead in shell embryos, 2556 (7.85 %) predated eggs and 24841 (76.36 %) empty eggshells that produced hatchlings. These figures shows the effective conservation of the nests by caging and 92.15 % of the eggs were protected and the predation rate were decreased to 7.85%. From the total of 24841 hatchlings, 23881 (96.13%) of them were able to reach the sea.

Acknowledgements: We would like to thank Turkish Ministry of Environment and Urbanization, Natural Directorate of the Protection of Natural Assets for the financial support of the Project.

Keywords: *Caretta caretta*, Conservation, Dalyan, Mugla.

ORAL-BIOCON-OP266

Plant Richness of the Genus *Astragalus* in Kahramanmaraş / Turkey

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Aim of the study: Aim of this study to determine plant richness of the genus *Astragalus* in Kahramanmaraş and give updated knowledge as conservation point of view.

Material and Methods: We used country flora, recently published papers, check lists, regional floras and revision works.

Results: According to floristic surveys in the province of Kahramanmaraş, 98 plant taxa belong to *Astragalus* were documented. The number of endemic taxa in Kahramanmaraş is 36 (37 %). Within the flora, the largest sections are Sect. *Rhacophorus* (23 taxa), Sect. *Dasyphyllium* (9 taxa), Sect. *Proselius* and Sect. *Myobroma* (7 taxa), Sect. *Onobrychium* (6 taxa), Sect. *Malacothrix* (5 taxa), Sect. *Pterophorus* (4 taxa) and the rest have less than 4 taxa among 30 sections in terms of the number of species and subspecies included. The distribution of phytogeographical elements of the *Astragalus* flora in Kahramanmaraş is 54 % for Irano-Turanian elements (51 taxa), 40 % for Multi-regional or unknown (38 taxa) and the rest; 3 % for East Medit. element (3 taxa), 2 % East Medit. (mt.) element and (2 taxa), 1 % Euro-Siberian element (1 taxa). In addition, for all the endemic taxa, IUCN (2001) threatened category was defined. As a result, 3 endemic species are in Critically Endangered (CR) category, 2 endemic species in Endangered (EN), 3 endemic species in Vulnerable (VU), while 11 endemic species in Near Threatened (NT), 16 endemic plants in Least Concern (LC). Only one endemic species is in Data Deficient (DD) category.

Keywords: Richness, *Astragalus*, Endemic, Kahramanmaraş, Turkey.

ORAL-BIOCON-OP267

Re-evaluated Conservation Status of *Poa* L. in Turkey: The Mediterranean and the Aegean Geographic RegionsEvren CABI¹, Robert J. SORENG², Burçin ÇİNGAY¹Department of Biology, Faculty of Arts and Sciences, Namık Kemal University, TURKEY.²Department of Botany, National Museum of Natural History, Smithsonian Institution, USA³Nezahat Gökyiğit Botanic Garden TURKEY

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Aim of the study: The precise evaluation of the conservation status of endemic and rare species is necessary in order to prevent their extinction. According to our current taxonomic revision of Turkish *Poa* L., the Mediterranean and Aegean geographic regions of Turkey have 11 taxa, 4 of which are endemic (*Poa akmanii* Soreng, *P. davisii* Bor., *P. pseudobulbosa* Bor, *P. speluncarum* J.R.Edm.) 3 of which are non-endemic rare (*P. densa* Trositsky, *P. timoleontis* Heldr. ex Boiss.) and the remaining 5 taxa are widely distributed (*P. angustifolia* L., *P. annua* L., *P. bulbosa* L., *P. diversifolia* (Boiss. & Balansa) Hack. ex Boiss., *P. infirma* Kunth).

Material and Methods: Since 2013, as a part of a taxonomic revision of the genus *Poa* L. in the regions of Turkey, the authors have carried out extensive field studies and collected a large number of specimens and have examined many herbarium specimens at ANK, AEF, E, G, GAZI, HUB, ISTE, ISTF, K, and KNYA herbaria. In addition, population sizes and phenological and ecological properties were observed in the field. Afterwards, during the period 2013-2015, we visited the type and the other known localities of the species, as well as a number of other sites where they might occur. During the field studies, we aimed to visit as many as different habitats and populations to ensure representative geographical coverage. In the field, the specimens GPS coordinates, habitat, and relevant field observations were also recorded. Threat categories are proposed for all the taxa according to IUCN Red List Categories Version 3.1(2001) and the Application of IUCN Red List Criteria at Regional Levels (Gardenfors et al., 2001).

Results: The destruction of habitat through human encroachment such as urbanisation, land clearing, overgrazing, pollution, and road and dam constructions are the principal threats for the study area. Based on our field and population observations and the obtained data, were-evaluated their current conservation status at both regional and (inter)national level using recent IUCN Red List categories. According to the results, threat categories of species at international level are as follows: 2 taxon Critically Endangered (CR), 2 taxa Endangered (EN), 1 taxa Vulnerable (VU) and 2 taxa Least Concern (LC).

Acknowledgements: We wish to thank the Curators of Herbaria ANK, AEF, E, G, GAZI, HUB, ISTE, ISTF, K, and KNYA, who allowed us to study their *Poa* specimens, and to the Scientific and Technological Research Council of Turkey (TÜBİTAK-212T113) for their financial assistance for the study.

Keywords: Aegean, Mediterranean, Red List, *Poa*, Conservation Status, Turkey

ORAL-BIOCON-OP268

DNA Barcoding of Herbarium Specimens of *Buxus sempervirens* and *B. balearica*Banu AVCIOĞLU¹, Necmi AKSOY²¹R&D Department/Biyans Biological Products R&D Ltd, Turkey²Forest Botanics/Department of Forestry Engineering/Düzce University, Turkey
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Aim of the study: DNA barcoding is used for taxonomic identification of unknown samples of any species. It is also useful to survey plant biodiversity quickly for conservation, forensic sciences and customs. The aim of this study is to find out DNA barcode sequences of some herbarium specimens of *Buxus sempervirens* and *B. balearica* collected for Gazi University Herbarium (GAZI) by several researchers.

Material and Methods: Gazi University Herbarium has a collection of *Buxus sempervirens* and *B. balearica* specimens Turkey collected by several botanists throughout years. This study concerns identification of DNA barcoding sequence of seven samples. DNA extracted from leaves via CTAB buffer and phenol chloroform isoamyl alcohol extraction. For DNA barcoding, PCR amplification of chloroplast ribulose 1,5-bisphosphate carboxylase/oxygenase (RuBisCo) large subunit (*rbcL*) via universal primer set (*rbcLa F* and *rbcLa R*) was performed. After running agarose electrophoresis, single PCR products about 600 bp size were observed. The product bands were excised from the gel, cleaned by Macherey Nagel NucleoSpin® Gel and PCR Clean-up Kit. Products are to be sequenced and sequence data will be evaluated by BLAST analysis.

Results: PCR amplification of *rbcL* gene via universal primer set produced single bands about 600 bp on the agarose gel. Products are to be sequenced and sequence data will be evaluated by BLAST analysis. DNA barcode sequences will be submitted to NCBI and barcoding databases.

Acknowledgements: The authors thank to Gazi University Herbarium for supplying specimens.

Keywords: *Buxus sempervirens*, *B. balearica*, herbarium specimens DNA barcoding, *rbcL* gene.

ORAL-BIOCON-OP269

Preliminary Research on Distribution and Genetic Diversity of *Buxus sempervirens* in Euxine Sub-Flora Region of TurkeyNecmi AKSOY¹, Banu AVCIOĞLU², Zeynep ÖZKESERLİ³¹ Forest Botany/Department of Forestry Engineering/Düzce University, Turkey² R&D Department/Biyans Biological Products R&D Ltd, Turkey³ Medical Biotechnology/ Institute of Health Sciences/ Acıbadem University, Turkey
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Aim of the study: Knowledge about genetic diversity of a species is necessary for conservation efforts. Euro-Siberian Flora Region is one of the broadest natural distribution area of *Buxus sempervirens* (boxwood). Its distribution ranges from Sakarya to Bartın and to western Kastamonu's stream valleys. *B. sempervirens* stands in Sakarya, Düzce, Bolu, Bartın and Kastamonu are unique to Euxine sub-flora region of Turkey. The aim of this study is to assess the genetic diversity of *B. sempervirens* in these unique stands from these five different region's samples.

Material and Methods: A collection of *B. sempervirens* specimens from Euxine sub-flora region of Turkey have been established in Düzce University Faculty of Forestry Herbarium (DUOF) via several floristic and vegetation investigations. This study concerns identification of *B. sempervirens* genetic diversity of five different region's samples, namely, Sakarya, Düzce, Bolu, Bartın and Kastamonu. Molecular marker analysis using RADP (random amplified polymorphic dna) for genetic profiling is useful for determining several genetic parameters including population level and species-level genetic variation as well as measurement of genetic diversity ((Stewart et al., 1995; Chapparo et al., 1994; Iqbal et al., 1997). DNA extracted from leaves via CTAB buffer and phenol chloroform isoamyl alcohol extraction are being screened by various RAPD primers. Haplotypes will be constructed from polymorphic RADP markers. This RADP data will be analyzed via Arlequin and Phylip software to find out genetic diversity within and among these five populations and their phylogenetic relationship.

Results: The natural distribution area and ecosystem of *B. sempervirens* have been destroyed because of unmanaged utilization, excessive cultivation and dam constructions in Euxine sub-flora region. In this study, RAPD method will not only investigate the genetic diversity and phylogenetic relationship between *B. sempervirens* populations, but also will be useful to determine unique stands for conservation as biogenetic reserve and genetic heritage for the future.

Acknowledgements: The authors thank to Düzce University Faculty of Forestry Herbarium (DUOF) and The Research Association of Rural Environment and Forestry (Kırsal Çevre) for supplying specimens.

Keywords: *Buxus sempervirens*, Euxine sub-flora region, genetic diversity, RAPD.

ORAL-BIOCON-OP270

The Determination Genetic Diversity and Differentiation of *Psephellus aucherianus* complex based on sequence variation of *matK* (chloroplast DNA)Meryem BOZKURT, Tuna UYSAL, Kuddisi ERTUĞRUL*Science Faculty, Selçuk University, Turkey**mbozkurt@selcuk.edu.tr*

Aim of the study: Turkey is one of the most important gene center for *Psephellus* genus and the genus includes many regional and local endemic species. Besides this, there is very less knowledge about their populations and conservation statuses as well as the interactions among populations. While making a study over any population, the most important step is to determine the boundaries of the taxa for species conservation. An example of this condition is *Ps. aucherianus* complex that consists of three close taxa taxonomically and their determination is not easy morphologically. To determine the genetic variation level and the limitations of the taxa of *Ps. aucherianus* complex, *matK* gene regions (chloroplast DNA) were amplified and sequenced.

Material and Methods: A total of 171 individuals, which corresponds to 6 populations of *Ps. aucherianus* complex, were collected across 3 provinces in Turkey; Erzincan, Erzurum, and Artvin Provinces and sampled leaves dried in silica gel. Total genomic DNA was extracted by the 2X CTAB method. Double-stranded DNA from the *matK* region was amplified using *matKF1* as the forward primer and *matKR1* as the reverse primer. DNA sequences were aligned with the Bioedit and MEGA 7 programme. Arlequin and DnaSP were used to calculate statistical values, such as AMOVA, number of polymorphic sites (S), haplotype diversity (Hd) and nucleotide diversity (Pi), gene flow (Nm) and genetic differentiation (G_{ST} , F_{ST}). Moreover, the degree of relatedness among cpDNA haplotypes was also estimated using Network.

Results: The patterns sourced from maternal heritability indicated that each taxa has specific haplotypes in their populations. Moreover, the haplotypes determined showed that the genetic variation and differentiation levels were fairly variable amongst themselves. Interestingly, population Eriç belonging to *Ps. aucherianus* had one ancestral haplotypes that is seen very related to other haplotypes by having common patterns in network analysis. Apart from this, *Ps. aucherianus* is a species that includes high genetic variation and many haplotypes. Unlike of this taxa, *Ps. yusufeliensis* and *Ps. sintenisii* have relatively lower genetic variation and haplotype. Our findings concluded that *matK* sequences was effective in determination of species boundaries of *Ps. aucherianus* complex. Additionally, the genetic variation and differentiation levels had informed us about the development of appropriate conservation strategies.

Acknowledgements: We thank to the Scientific Investigation Project Coordinator of Selçuk University (Project No: 11101036) for their financial support.

Keywords: cpDNA haplotype, endemic, genetic diversity, Turkey.

ORAL-ENGBIO-OP271

Optimization of extraction of quercetin from green tea by using Response Surface MethodologyGülşen YILMAZ¹, Sibel YIGITARSLAN¹^{1,2}Chemical Engineering Department, Suleyman Demirel University, ISPARTA
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Aim of the study: Quercetin is a type of flavonoid and highly effective antioxidant. This chemical pigment is present in various kind of plants including green tea. Anticarcinogenic, antiinflammatory, antibacterial and antioxidant characteristics of quercetin was dedicated in the literature studies. Although all of the studies in the literature had been using single parameter optimization technique for the production of maximum yield of quercetin, in the reality this yield would be affected on all of the parameter combinations. In this respect, the aim of the study was determined as to specify the combined effects of extraction parameters with the use of response surface methodology.

Material and Methods: Green tea was obtained from ÇAYKUR. Single parameter optimization was realized by using the following parameters; temperature, mixing rate, solvent type and extraction time. At the end of the extraction the samples were analysed with spectrophotometric methods. In that, 1ml of samples were diluted with 4 ml of distilled water, and then mixed with 0,3 ml NaNO₂ (%5 w/v) and 0,4 ml AlCl₃ (%10 w/v). The adsorbances were measured at 425 nm of spectrophotometer Simple Reads Mode. The maximum quercetin production conditions were chosen as optimum conditions. Multiple parameter experiments were done with methanol as a solvent and temperature, solid/liquid ratio and the extraction time were used as selected parameters for this section. Optimization was achieved by using response surface methodology with Box-Behnken experimental design procedure consisting of fifteen experiments. The amount of quercetin in samples was measured gravimetric analysis. 1 ml of samples were reacted with 2 ml of cadmium nitrate solution (0,02 M) including 2 ml of acetic acid-sodium acetate buffer (pH 4.4) in an incubator at 25°C during 2 hours. At the end of this period, they were filtrated and the weight of each filtrate was measured after drying them at the same temperature.

Results: At the end of the spectrophotometric analysis, optimum conditions were determined as follows; solvent type as methanol, extraction temperature as 60°C and extraction time as 40 minutes. According to the results of single parameters and levels determined, in the sight of quercetin amounts obtained by Box-Behnken design containing fifteen sets; the surface representing the extraction yield was determined as reduced cubic model ($R^2=0,9958$). In the analysis, extraction temperature and temperature-time combination were found as the most effective parameters for quercetin yield in single and multiple parameter optimizations, respectively. The highest amount of quercetin was achieved in conditions of 40°C and at the end of 40 minutes extractions of green tea. As a result of the study, 2,6 mg/g of quercetin was produced at the determined optimum conditions from green tea.

Keywords: Green Tea, Quercetin, Extraction, Response Surface Methodology, Flavonoid.

ORAL-ENGBIO-OP272

Screening of quercetin content of *Rosmarinus officinalis* with response surface methodologyMerve KAS¹, Sibel YIGITARSLAN¹¹ *Chemical Engineering Department, Suleyman Demirel University, Turkey*
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Aim of the study: Flavonoids are large group of antioxidant materials and there are approximately 4000 kind of flavonoids found in fruits, tea, plants and red wine. Quercetin is one of the flavonoid material used for wide spectrum of diseases; especially for cancer treatment. They are named as 2-(3,4-dihydroxyphenyl)-3,5,7-trihydroxy-4H-chromen-4-one and have formula of C₁₅H₁₀O₇. The purpose of this study was optimization of quercetin extraction from *Rosmarinus officinalis* by using response surface methodology.

Material and Methods: In this study, *Rosmarinus officinalis* was chosen as raw material and it was obtained from herbalist. For extraction of quercetin from *Rosmarinus officinalis*, microwave extraction was used with methanol as solvent and parameters were optimized with Box-Behnken design. Chosen parameters were microwave power, solid/liquid ratio and extraction time. At the end of the extractions, in order to create a quercetin precipitate, 2 ml buffer solution (pH 4.4) consisting of acetic acid and sodium acetate, 2 ml of cadmium nitrate (0.01M) and 1 ml sample were mixed and left to react in the incubator for 2 hours at 25°C. At the same time, filter paper was measured. After the reaction step, solutions filtrated by using filter paper and left for drying in the incubator for 2 hours at 25°C. The amount of quercetin precipitate was determined from the differences in weight of filter papers.

Results: As a result of study, reduced cubic model was developed by using Design Expert and at this model R-squared value was found 0.9999. According to the experimental results and model, microwave power was found as the most effective single parameter and microwave power vs. time was determined as the most effective interrelated multiple parameters on the yield of extraction. According to solutions of numerical optimization, 22.851 mg/g quercetin could be obtained if the values of parameters were chosen as 2.726 kW, 1/43.215 g/ml, 10.78 second.

Keywords: Quercetin, Flavonoid, Response Surface Methodology, Microwave Extraction.

ORAL-ENGBIO-OP273

Examination of gallic acid content of *Prunus laurocerasus*Kubra POTUK¹, Sibel YİĞİTARSLAN¹¹ *Chemical Engineering Department, Suleyman Demirel University, Turkey*
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Aim of the study: One of the well-known antioxidant, gallic acid, neutralizes free radicals that are capable of harmful to normal cells of organisms. It is known that it shows cytotoxicity to cancerous cells without affecting normal ones. *Prunus laurocerasus* is usually used for treatments of several different diseases because of its high amount of antioxidant content. In this study, the effects of extraction temperature, solid/liquid ratio and extraction time on the yield of gallic acid was examined. Ultrasonic extraction was applied with the methanol as a solvent for the extraction.

Material and Methods: In the experimental section single parameter approach was used in batchwise. The extraction temperature (35-75⁰C), solid/liquid ratio (10/50-10/200 g/ml), ultrasonic application procedure and extraction time (1-21 min) were chosen as the parameters. All of the extractions were carried out in an ultrasonic bath (S80H Elmasonic). At the end of the extraction, the samples were obtained by filtrating the extraction medium immediately. Samples were diluted with distilled water and analysed with folin-cioceltea reagent containing 1.5 ml of sodium carbonate during two hours in an incubator at room temperature. Then spectrophotometric analysis was applied at 765 nm. Absorbance values obtained were converted into gallic acid concentrations by using the calibration curve prepared with known concentrations of pure gallic acid (Abs = 0.01532 x concentration; R²=0.9661).

Results: According to the analysis of the study, single-parameter optimum conditions were determined as follows; ultrasonic application method as "degas", 50ml methanol as solvent and 21 minute as the extraction time. It was concluded that, extraction yield was increasing with the increasing time, and the most important parameter for the extraction was found as the solid/liquid ratio. However, the exact value of the temperature on the extraction yield of gallic acid cannot be determined by single parameter optimization technique. The reason might be the interrelations between the temperature and the other extraction parameters. Thus, multiple-parameter optimization techniques should be applied for determination of its value. As a result of the study, 3.38 mg gallic acid was obtained per each gram of plant material at the optimum conditions determined.

Keywords: *Prunus laurocerasus*, gallic acid, ultrasonic extraction

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Analysis of gallic acid content of microwave extracts of *Capsicum annuum*Murat YILDIRIM¹, Sibel YİĞİTARSLAN¹¹ *Chemical Engineering Department, Suleyman Demirel University, Engineering Faculty, TURKEY*
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Aim of the study: Because of its neutralizing effect of free radicals and cytotoxicity on the cancerous cells, gallic acid is one of the well-known antioxidant material. *Capsicum annuum* is a plant material containing lycopene and due to that characteristics it is used for cancerous treatments. In the light of these knowledge, the effects of the microwave extraction parameters on the yield of gallic acid were investigated. In the extraction experiments, the optimum values for microwave power, solid/liquid ratio and extraction time were determined by response surface methodology.

Material and Methods: The raw material, *Capsicum annuum*, used in the experiments were bought from a herbalist. All of the chemicals are obtained from Sigma-Aldrich in analytical grade. Extraction experiments with microwave were done by using multiple parameter optimization method. The microwave power was applied within three levels. 1g *Capsicum annuum* was mixed with methanol (1g/30mL-1g/60mL) in an erlenmeyer and extraction was carried out under different microwave powers (0.3-0.9 kW). The levels of the last parameter were set at 10-40s. At the end of the extraction, the samples were filtrated and stored in test tubes. In order to determine the gallic acid amount, the mixture of 0.5 mL folin-ciocalteu, 400µL sample, 100µL distilled water, 1.5 mL sodium carbonate in a 5 mL distilled water, as it was stated in the literature. The samples were set at rest in an incubator at 25°C during 2 hours. Calibration curve was prepared with known concentrations of gallic acid solutions. After absorbance scanning in the spectrophotometer, the samples were analysed in the UV-Vis spectrophotometer at 765 nm. Gallic acid amounts were calculated by absorbance-concentration relation of the calibration curve prepared.

Results: Experimental section was designed according to Box-Benken multi-parameter method. 15 sets of coded gallic acid measurement experiments was realized in test tubes. Obtained results of gallic acid values were entered into the corresponding sections of the Design-Expert program. The reduced cubic model was found to be the best function that describes the extraction conditions. At the end of the statistical analysis the regression coefficient of the model produced was determined as $R^2=0.9993$. According to the results, microwave power-time in two parameter combinations, and extraction time in single parameter were determined as the most effective parameters for this process. Optimum extraction conditions were determined by using the numerical solution section of the same program as follows; microwave power of 0.9 kW, 1g/45mL methanol, and extraction duration of 40s. At those conditions, 354 mg gallic acid was produced in 1g *Capsicum annuum*. As a result, it was concluded that gallic acid obtained from *Capsicum annuum* could be used for the production of drug for cancer after purification.

Keywords: *Capsicum annuum*, Antioxidant, Gallic acid.

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Examination of gallic acid of *Cinnamomum zeylanicum* with microwave- assisted extraction by response surface methodologyEmirhan HESAP¹, Sibel YIGITARSLAN¹^{1,2}Chemical Engineering Department, Suleyman Demirel University, Turkey
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Aim of the study: Gallic acid is one of the mostly used types of flavonoid especially for cancer treatment. It can be extracted from plant materials including *Cinnamomum zeylanicum*. Of course the extraction conditions are the affected parameters on the yield of gallic acid from any plant material. In order to produce the cancerous drug the first important operation will be the extraction. Within this respect, the aim of the study was chosen as determination of microwave assisted extraction conditions of gallic acid production from *Cinnamomum zeylanicum*.

Material and Methods: In this study; *Cinnamomum zeylanicum* was chosen a raw material and obtained from a herbalist. In order to extract gallic acid, microwave-assisted extraction was applied with the methanol as a solvent. Parameters of the study were chosen as follows; temperature (30° C; 40° C; 50°C), solid-to-liquid ratio (1/10 g/ml; 1/30 g/ml; 1/50 g/ml), microwave power (0.3kW; 0.6kW; 0.9kW), while the mixing rate of waterbath, microwave execution time and extraction time were set at constant values of 10 for each. Three-centered Box-Behnken design consisting of fifteen experiments was used in the batch experimental section. Gallic acid measurements of the samples were realized by UV_Vis spectrophotometer at 765nm at the end of the reaction duration of 2 hours at 25°C. Reaction medium contains 0.5 mL of Folin-Ciocalteu reagent, 50 µL sample, 1.5 mL of Na₂CO₃ solution (1.9 M), and 5.4 mL distilled water. Gallic acid concentrations were calculated from the calibration curve prepared by using pure gallic acid at different known concentrations.

Results: In this study; multiple-parameter optimization procedure was used to determine the single and interrelated effects of the parameters chosen. According to the analysis done by a computer program (Design Expert), the quadratic model was found to the best describing function describing the surface of the extraction (R-squared value of 0.9988). According to the model and experimental results, the solid-to-liquid ratio was found as the most effective parameter of the microwave-assisted extraction, whereas microwave power and the extraction temperature have nearly equal significance. The solid-liquid ratio was determined to be independent of temperature but it was dependent on microwave power. As it was expected, the microwave power and temperature was found as interrelated parameters. At the end of the numerical optimization of the program, it was found that 111mg gallic acid obtained from *Cinnamomum zeylanicum* with the microwave power of 0.93 kW by using 28ml of methanol at 41°C.

Keywords: Gallic acid, response surface methodology, microwave-assisted extraction

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Leaching of quercetin from *Plantago lanceolata*Batuhan ALKAYA¹, Sibel YIGITARSLAN²^{1,2}*Chemical Engineering Department, Suleyman Demirel University, Turkey*
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Aim of the study: Quercetin (2-(3,4-dihydroxyphenyl)-3,5,7-trihydroxy-4H-chromen-4-one) is a special flavonoid found in various plant materials including apples, tea, onion etc. It has special characteristics like antioxidant, anti-inflammatory, anti-cancerous activity. Because recent studies proved that its glucuronides prevent lung tumor cells, nowadays it is a preferred material for drug production used in cancer treatment. In order to produce efficient drugs, the highest amount of quercetin should be extracted. Thus, the leaching of quercetin from *Plantago lanceolata* with the aid of ultrasound-assisted extraction was achieved in this study.

Material and Methods: In the experimental section, the optimum ultrasonication time was determined by using all the other parameter values set at constant. After the spectrophotometric analysis, the optimum time was specified and this value is used for multiple-parameter optimization section. In the second part, batch leaching was realized with methanol as a solvent at specified values of temperature, ultrasound application type, time, and solid/liquid ratio. At the end of the leaching, the extracts were filtered and used for quercetin analysis. In that, the gravimetric method was used based on the precipitation of quercetin with metal ions at different pH values. In order to produce a precipitate, 2 ml of acetic acid-sodium acetate buffer (pH 4.4) containing 1 ml of sample was mixed with 2 ml of cadmium nitrate solution (0.02M). Reactions were carried out at 25°C during 2 hours. The amounts of quercetin precipitates were calculated by using the values obtained from the weight of the filter papers before and after filtration.

Results: In the study, the computer program coded with three-level, three-centered Box-Behnken design technique was used for optimization of the leaching process. The reduced cubic model was found excellent function for the description of the extraction ($R^2=1.000$). According to the model, solid-to-liquid ratio was determined the most effective parameter, followed by leaching time. The temperature was found strongly interrelated with other parameters selected. At the end of the analysis, it was found that 80g quercetin was produced at the optimal conditions determined by the numerical optimization section of the computer program.

Keywords: Ultrasound-assisted extraction, quercetin, leaching, optimization

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Optimization of quercetin extraction from *Syzygium aromaticum*Husein SHARIF¹, Sibel YIGITARSLAN¹^{1,2}Chemical Engineering Department, Suleyman Demirel University, Turkey
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Aim of the study: The symptoms of colon cancer as well as are being appeared, directly treatment is being used by surgery on tumour area, however in this study the *Syzygium aromaticum* its effective used like drug. Drugs used for chemotherapy enter the bloodstream and attack any colon cancer cells that were shed into the blood or lymphatic systems prior to the operation, attempting to kill them before they set up shop in other organs. The purpose of this study reduce up the surgery operations average by chemotherapy. The reason of using natural material and extract it to reach out the mentioned aim.

Material and Methods: In this study, dried *Syzygium aromaticum* was chosen like raw material obtained from the herbalist, in order to get extraction quercetin the process passed through different operations, the parameters (Solid/Liquid ratio, extraction time and temperature) were obtained by Box-Behnken Design. Ultimately to get the quercetin precipitate; 1 ml of sample, 2 ml of cadmium nitrate (0.01 M) and 2 ml of buffer solution (pH 4.4) which is already been made of acetic acid and sodium acetate consisting the solution which is being kept in the incubator for 2 hours at 25°C to react while the filtration papers were weighted. After the reaction period has done the solution been filtrated then re-sent to the incubator at 25°C for 2 hours to be dried. The quercetin was determined by getting into consideration the difference weight between filtration papers before and after the reaction.

Results: Cubic model which is given by Design-Expert, the model represented R-squared value as 0.9995 while the most effective parameter was the temperature, the experimental results were very well clarified by the model. According on the numerical optimization solutions 16.9004 mg quercetin/g could be obtained with the following values of parameters; 53.0232 min for time, 41.354°C for temperature and 1/33.32 g/ml of Solid/Liquid ratio.

Keywords: *Syzygium aromaticum*, Extraction, Response surface methodology, Cancer, Quercetin, Optimum Values.

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Analyzing of total flavonoid from *Rosmarinus officinalis* with Response Surface MethodologyKubra OZGUN¹, Sibel YIGITARSLAN¹¹ Chemical Engineering Department, Suleyman Demirel University, Turkey
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Aim of the study: *Rosmarinus officinalis* L. is inside of the family of Lamiaceae, it is an aromatic and medical plant species. *Rosmarinus officinalis* has powerful antioxidant effect thanks to the content of flavonoids in it. The general structure of flavonoids consists of fifteen-carbons and is soluble of water. Flavonoids make free radicals ineffective thus known as antioxidant activity. In this study, response surface methodology was used to measure total flavonoid of *Rosmarinus officinalis* in order to screen its powerful antioxidant activity.

Material and Methods: In the study, *Rosmarinus officinalis* was approved for scanning of flavonoid and it was bought from an herbalist. Surface area of *Rosmarinus officinalis* was minimized to increase the yield of extraction with garlic press and sifter. For extraction of total flavonoid from *Rosmarinus officinalis*, classical extraction was used with determined parameters. The Box-Behnken Design was used for determination of optimization of parameters. Studied parameters were solid/liquid ratio, extraction time and temperature. Also mixing speed was chosen at maximum level as a constant parameter. Filtration was applied to the extracts with the help of a filter paper at the end of extraction. 0.01 M AlCl_3 solution, buffer solution (pH 4) consisting of an acetic acid and sodium carbonate were prepared. Solution of analysis was prepared with mixing of 2 mL of AlCl_3 solution, 2 mL of buffer solution and 1 mL of sample. Absorbance of these solutions were analysed by UV-Spectrophotometer at 415 nm. Concentrations were calculated by derived equation of standard calibration curve with quercetin.

Results: In consequence of study, reduced cubic model was improved by using Design Expert. With this model, R-squared value was found 0.9992. According to classical extraction results and this model; temperature was found the most efficient single parameter and temperature-solid/liquid ratio was found the most efficient binary parameters. For this study, optimized parameters were determined; 88.90836 minutes to time, 89.33409 °C to temperature and 1g/45.27588 mL to solid/liquid. In the research, when these parameters were used in extraction operation, the concentration of total flavonoid value was found as 6.12819 mg/g of plant material.

Keywords: *Rosmarinus officinalis*, flavonoid, classical extraction, Box-Behnken design, antioxidant activity

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The multiple-parameter approach for determination of total flavonoid in turmeric (*Curcuma longa* L.)Demet DEMİREL¹, Sibel YIGITARSLAN²^{1,2} *Chemical Engineering Department, Suleyman Demirel University, Turkey*
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Aim of the study: Turmeric (*Curcuma longa* L.) is a dark yellow and a harsh-tasting plant. It has three important characteristics; anti-inflammatory, anticancer and antioxidant. Flavonoids responsible for these characteristics are secondary metabolites inside a category of phenolic with properties of antioxidant and chelate. The aim of the study is therefore determined as to extract much amounts of flavonoids as possible from turmeric powder.

Material and Methods: Turmeric which selected as a material for flavonoid screening was bought from a herbalist. Classical extraction was chosen for extraction procedure. Maximum mixing was selected as constant parameter of classical extraction with methanol. Experiments were performed with determined parameters by using Box-Behnken design. Working parameters were chosen as temperature, time and solid per liquid. At the end of the extraction samples were obtained by filtration. After filtration, 0.01 M AlCl₃ solution and buffer solution (pH=4) were prepared for determination absorbance values of samples. Buffer solution was consisting of acetic acid and sodium carbonate. Analysing solutions were prepared with 2 mL of AlCl₃, 2 mL of buffer solution and 0.01 mL of sample. These solutions were screened as reading of at 415 nm by UV-Spectrophotometer. Concentrations of flavonoid were calculated by the equation of standard calibration curve.

Results: In conclusion of study, reduced cubic model was improved by using Design Expert computer program. With this model, R-squared value was found 0.9999. According to classical extraction results and this model; time was found the most effective single parameter and temperature-solid to liquid ratio was found the mostly interrelated parameters. Optimum conditions of extraction of flavonoids from turmeric was found as follows; for temperature; 29.99976 °C, for solid to liquid ratio; 1g/20.00235 mL, and for extraction time; 58.529013 minutes. Thus, concentration of total flavonoid was achieved as 8.98649 mg/g of turmeric at the optimum conditions determined.

Keywords: turmeric, antioxidant, flavonoid, classical extraction

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Evaluation of Garlic Chive (*Allium tuberosum* Rottler ex Spreng) Plants Regenerated from Whole Flower Bud CulturesArzu KASKA¹, Fevziye CELEBI TOPRAK¹, Nahide DENİZ², Ramazan MAMMADOV², Ali Ramazan ALAN¹¹Plant Genetics and Agricultural Biotechnology Application and Research Center
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Aim of the study: *Allium tuberosum* is an important perennial species cultivated in China, Southeast Asia, and North east part of India and grown for its flowers and leaves. It tastes like fresh garlic and known to be a good source of chemicals with antimicrobial and insecticidal activities. It is a tetraploid plant ($2n=4x=32$) with high nuclear DNA content. Improvement of this species through classical breeding is very difficult because of high heterozygosity and polyploidy levels. This study was designed to develop efficient systems for gynogenic and somatic plant production and evaluation of the regenerants for morphological properties and bioactive constituents.

Material and Methods: *In vitro* whole flower bud cultures were established using about ten thousand explants. Somatic shoots and gynogenic plantlets developed from the cultured buds were transferred to a growth regulator-free media to promote rooting and further development. Ploidy levels of some of the regenerants were determined using flow cytometry. Plants with known ploidy levels were acclimated and transferred to a greenhouse where morphological features such as length and width of the fully grown leaves, number of shoots, and number of leaves were observed and noted. Leaves of the greenhouse-grown *A. tuberosum* plants are harvested and dried for use in the extractions of bioactive compounds. Ethanolic extracts of donor *A. tuberosum* plants and plants obtained from *in vitro* cultures (somatic and gynogenic regenerants) were analyzed for free radical scavenging activity and antioxidant potential. In this experiment, a total of nine tetraploid plants (three donor, three somatic, and three gynogenic) were used. Total antioxidant activity was assessed by β -carotene/linoleic acid test. Free radical scavenging activity was tested with 2, 2-diphenyl-1-picrylhydrazyl (DPPH). The absorbances were measured at 470 nm in β -carotene and at 517 nm in DPPH methods.

Results: *In vitro* regeneration experiments provided many gynogenic and somatic *A. tuberosum* plants. Flow cytometry analyses showed that <1% of the gynogenic plants obtained were diploids, whereas the majority of gynogenic plants and all of the somatic regenerants were tetraploids. Overall, tetraploid plants grew more vigorous than diploid gynogenic plants. *A. tuberosum* materials showed substantial differences in many morphological characters. Tetraploid *A. tuberosum* materials were also compared for total antioxidant and free radical scavenging activities. The results of one-way analysis of variance (ANOVA) showed differences ($p<0,05$) in the means of DPPH scavenging activity but showed no differences ($P>0.05$) among the total antioxidant activities.

Acknowledgements: This research was supported by PAU BIYOM.

Key words: *Allium tuberosum*, Antioxidant, Somatic regenerants, Gynogenic regenerants, DPPH, β -carotene.

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Chitin Content and Some Physicochemical Properties of Cicadas (Hemiptera: Cicadoidea)Abbas MOL^{1,2}, Murat KAYA^{2,3}¹Healt Academy, Aksaray University, Aksaray/Turkey²Science and Technology, Application and Research Center, Aksaray University, Aksaray/Turkey³Department of Biotechnology and Molecular Biology, Faculty of Science and Letters, Aksaray University, Aksaray/Turkeyabbasmol19@gmail.com

Aim of the study: This study was aimed to isolate chitin from six common Turkish species of Cicadas and determine their physicochemical properties.

Material and Methods: Six different species of Cicada were collected from Mediterranean region of Turkey. After collection, the samples were fixed 70% ethanol and taken to the laboratory and the samples were dried at room temperature for 2 months. The chitin isolation from the six different species were done by following demineralization (2 M HCl solution at 40 °C), deproteinization (2 M NaOH solution at 80 °C) and decolorization at room temperature by chloroform and methanol (in the rate of 1:1). After each treatment, the samples were rinsed up to neutral pH by using distilled water. FT-IR, TGA and SEM analysis were used for characterization of the isolated chitin samples.

Results: Chitin contents on dry basis were determined as 6.7% for *Cicadatra atra*, 5.51% for *Cicadatra hyalina*, 4.97% for *Cicada lodosi*, 6.49% for *Cicada mordoganensis*, 8.84% for *Cicadatra platyptera* and 5.88% for *Cicadivetta tibialis*. FT-IR and TGA analysis was conducted and these analysis results showed that the extracted chitin isolates were in high purity. Scanning microscopy (SEM) analysis was used to show surface morphologies of the chitin isolates from the *Cicada* species. It was revealed that all the surface morphologies of chitin isolates consisted of nanofibers.

Acknowledgements: This study was funded by BAP, Aksaray University (Code number: 2014-016).

Keywords: Insect, biopolymer, isolation, characterization.

ORAL-ENGBIO-OP282

Theoretically investigation of the physical and chemical properties of some flavonolsİzzet KARA¹, Ramazan MAMMADOV², Soner ÖZGEN³¹Pamukküle Üniversitesi, Eğitim Fakültesi, İlköğretim Bölümü, Denizli, Turkey²Pamukkale Üniversitesi, Fen Edebiyat Fakültesi, Biyoloji Bölümü, Denizli, Turkey³Fırat Üniversitesi, Fen Edebiyat Fakültesi, Fizik Bölümü, Denizli, Turkey

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Aim of the study: Flavonols in plants is the group of flavonoids having the most widespread type. The flavonols having the crystalline or amorphous features are light yellow or yellow like flavones. These compounds are generally more unstable than flavones in an oxygenated environment. Flavonols, which is the most oxidized flavonoid class of the C ring. Flavonols can be grouped considering hydroxyl or methoxyl groups in their structures such as flavones. In the grouping, OH group in the C3 position is not taken into account. In this study, the physical and the chemical properties of mainly flavonols (Ishoramnetin, Kaempferide, Kaempferol, Myricetin, Quercetin and Ramnetin) were investigated theoretically. It is also important to understand the properties of the flavonols to develop new molecules.

Material and Methods: The geometric and electronic properties of the flavonols were investigated in gas phase at B3LYP/6-31+G(d,p) basis set. After optimizing the geometry of the molecules, the geometric and the electronic properties were calculated in the gas phase at room temperature.

Results: The *myricetin* molecule was identified to have the most stable geometry among these molecules. Also the chemical hardness (η) and electron affinity (A) of the molecules were calculated from the HOMO-LUMO orbitals. The electrostatic potentials of the flavonols changes from -0,08222 eV to 0,08222 eV. The energy gaps (ΔE) of the molecules ranged between 3,6134 eV and 3,7854 eV.

Keywords: Flavonol, Flavonoid, Homo-Lumo.

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A new method of obtaining medicinal resources based on herbal naphthoquinone and ether oils

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Aim of the study: Piumbagin (P) -2 methyl, 5-oxidant, 1.4 naphthoquinone have a high antibiotic activity and be utilized in biochemistry, medical practices and food products as preservatives to prevent deterioration of microbe in the food industry. This substance in concentration 2-4 mcg/ml, prevent the development of tuberculosis bacillus, in concentration 10 mkq ml effective to golden staphylococcus, streptococcus and a number of other pathogenic microorganisms. It is known that the high concentration P effects mutagenic but the lower concentration of P (70 mg/l) effects contrast and have high antibiotic activity and the lack of effects of the 2nd degree it has high interest. It is estimated that 40-60 mg/l concentration of P has optimal antibiotic effect but its aqueous solution of 29 mg/l is not over. In the present research is proposed to increase the concentration of the water solution of P.

Material and Methods: Various concentration of P water distillates is offered the restoration and strengthening of the hair follicles, oral cavity prevention and treatment, as well as the lungs and upper respiratory tract as for prevention and treatment. The test works make positive progress and the method was patented. Acquisition based on P and ether oils has not analogues in the world of eco-cleanly method. The receipt of method does not use harmful chemicals can be selected simple technology and applied easily.

Results: To consider that P is expelled with water vapor was implemented ether-oil feedstock plant and with P producent distillation. As a result, ether oils increased water-soluble P and accural of 50-60 mg/l of water distillates.

Keywords: Piumbagin, ether oils, antibiotic activity.

ORAL-FORBIO-OP284

Tolerant Elements in Structural Features of Conifers (Pinidae) in Azerbaijan

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Aim of the study: Conifers have presently 0,2% share in the flora of Azerbaijan. These species are *Pinus eldarica*, *P.hamata*, *Juniperus pugmaea*, *J.poluycarpus*, *J.foetidisma*, *J.rufescens*, *J.sabina*, *J.depressa*, *Taxus baccata*, *T. taluschensis*. These types showing high ductility and can withstand atmospheric pollution of the soil. As the result of ecological plasticity in the evolution, the high tolerant features have been obtained in the structural system. We can cite the following examples according to these features thick cuticle layer, the location inside of on stoma pit in the stoma depth, surrounding of controlling tissues of conductor system, mono and dual cuticle in the sexual dimorphism, appearing of hard hermetic skarotest in the seed structure, extension of orthotropic shoot and etc.

Materials and methods: We have studied the anatomical structure of the coating fabrics with complex cuticular of *P. eldarica* pine`s needles, resistant to industrial emissions, cultivated in the areas of the Ganja aluminum and gypsum plant. 20-22 years old crops of *P. Eldarica* within about 5-10 km zone around the emission sources are under constant exposure to intense industrial pollution. Studies were carried out on three test areas, two of which are located in 1-5 km zone of constant exposure of the aluminum and gypsum plant. For the analysis and forecasting of the air pollution degree as a source of information we used long-term data (2005 -2015 years) on the concentration of harmful impurities (CO₂ and NO₂) according to 8 observation points (0.20; 0.30; 0.50; 0.70 ; 1.00: 1.50: 2.00: 3.00 km). 2 stable (the best one growth and condition) and unstable (severely damaged) trees were selected on selected plots by. For anatomical study it was used the needles of two-year`s growth. Anatomical analysis was performed according to the usual method, microphotography sections were performed by using light microscopes of series «MIXMED» and scanning electron microscope «ZEISS EVO-40. The terminology proposed by Esau 1980, Humbatov 2016 was used for the anatomical description of the structural elements.

Results: As is known, SO₂ enters the plant through the stoma in the form of gas. The researches conducted with the help of scanning electronic microscope (1989) of Humbatov revealed that in the most tolerant species against pollutants, conifers, the cuticular lumps on the depressed place up to the stoma play an initial role of barrier as a result of response of the stoma to the environmental conditions. The epicuticular layer plays a role of a barrier between the pollutants and the conifers. Stoma`s resistance against the atmospheric pollutants depends on the density of epicuticular layer and degree of erosion. The diameter of mesophyll cells of the coniferous exposed to pollution is reduced, however their assimilating surface is getting thicker on the contrary. Thus, the needle-leaves of a pine tree differ by a number of signs, including the cross-sectional shape of needle-leaves and veinlet, size and structure of tar roads, existence of sclerenchym in heap, the amount of heaps in veinlet. Different symptoms on epidermal holes, cells, endoderm, mesophyll, stoma cells, the structure and shape of the cells of up-stoma holes are observed in the structure of coniferous leaves. By judging all of these we can come to a conclusion that high thickness of mesophyll is characteristic feature of the leaves of coniferous trees in filthy conditions, as well as the bottom side of these leaves.

Acknowledgements: Work performed at the Department of Biology of Azerbaijan State Agrarian University. Also, electron microscope laboratory Institute of Botany of Russia (St. Petersburg). I express my sincere thanks to my graduate student Jeyhun Safarov and technicians of the department B. Ismayilovu and V. Agayev who gave me invaluable assistance.

Keywords: ecological, approximately, stoma, evolution, features, orthotropic.

ORAL-FORBIO-OP285

Features of sustainable criteria for environmental conditions of *Pinus* L. genus introduced in AbsheronH. H. ASADOV¹, I. B. MIRJALALLY¹, R. R. EFENDIYEVA¹, Sh. F. HUSEYNLY¹, R. H. KHALILOV¹¹ Institute of Dendrology of ANAS, Azerbaijanresmiye_efendiyeva@mail.ru

Aim of the study: There are propagated 21 different species of *Pinus* L. genus trees and shrubs in Azerbaijan. They are developed in spite of not demanding on soil, temperature and humidity. *Pinus eldarica* Medw. is an endemic plant in our flora. In our researches are studied in comparison of dry subtropical condition *Pinus* L. species anti cold, frost, water shortage, high temperature, salinity resistant degrees and adaptation criterions. As ecological factor influenced to conifers is an aridity. Absheron dry climate condition is not severe extreme condition for them. *Pinus halepensis* L. and *Pinus pinea* L. are the origin of the Mediterranean Sea areas, but *Pinus eldarica* Medw. is formed in rocky and slopes areas. Their introducing history in Absheron is more than 100 year old and they are adapted to certain dry climate.

Material and Methods: In researches are used 5-10 year old *Pinus eldarica* Medw., *Pinus halepensis* L. and *Pinus pinea* L. species and there are carried the growth measures. There is measured weight of wet and dry needles, there are determined the dose of saccharose in needles before frost and after freezing by using of Feling I decoction, amount of chlorophyll in "a" and "b" in mg/% by Godnev 1963 years method. Needles damages are estimated in %, species resistant degrees are evaluated by low, medium, high degrees. Plants resistance to minus temperature are evaluated according to physiological and biochemical indications (Klimov, 2001, 2009). The influence of cold and frost temperature is observed at most in annual needles, -15,8⁰C temperature in 72 hours conserved plants, ice crystals in cell room are observed at most in young needles. By S.V.Klimov, P.V.Mironov, Y.V.Alauddinova and by our researches are defined that the frost is negative influenced to a satisfactory system of photosynthesis, polysaccharides are split up to saccharose, lipids are split up to glyicides. Plant's water storage capacity and transpiration speeds are very different. Plants are begin to hydrolyze of proteins for protection in anti drought stress, produced amino acids, amides and ammonias have a toxic effect in leaf cells. In this period collected proline amino acids are increasing resistant effects, by influences of amides and ammonias the cell membrane are destroying and faded. Plants have different relations to salinity soils. Some species are indifferent to salt ions, some are salts collector and some are connecting them to metabolite after collection of salts and extract them to outside.

Results: Transpiration is regulated according to possessing of high water storage capacity in needles of *Pinus eldarica* Medw. The total water amount in both *Pinus halepensis* L. and *Pinus pinea* L. species's needles are more than 15-20%, transpiration is high according to weaken of water keeping abilities. - Water shortage and high temperatures are influenced to physiological and biochemical processes of coniferous trees, induced to hydrolyze protein connectives in cytoplasm, formed amino acids, amides and ammonia, asparagines and glutamines are acute impacts to cytoplasm and produced toxic side products are disturbing cells activities, needles are fast fallen. - In conifers are observed collection of proline amino acids in drought situation and it estimated an unigue indication and it gives an ability to resist anti extrime stress of outside factors.- Lack of fungus formed of mycorrhiza in salinity soil doesn't give an ability to grow fast in the root system; the root system is passed through groundwater to supply them with water. Analysis of resistant criteria in conifers is demonstrated that in Absheron condition *Pinus eldarica* Medw. has high resistance, *Pinus halepensis* L. and *Pinus pinea* L. species have medium resistant abilities to environmental factors.

Keywords: Introduction, environmental factors, resistant criteria, adaptation.

ORAL-FORBIO-OP286

Long-term responses of beetle communities in a post-fire successional gradient in *Pinus brutia* forest

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Aim of the study: Fire is one of the most important ecological factors for many ecosystem types. Many fire-induced ecosystems are recognized as resilient to fire as consequence of the high recovering ability of plant communities after fire such as Mediterranean basin. High resilience capability to fire was revealed for communities of some arthropod groups. The effects of fire on these groups were found minimal and short-term in many studies. In this study, it was aimed to study long-term changes in beetle community structure after fire in *Pinus brutia* Ten. forests.

Material and Methods: The study was carried out in several *Pinus brutia* forests located in the Marmaris region and its surrounding areas, which is situated on the Mediterranean coast of southwestern Turkey. The successional gradient consisted of five areas burned 3, 6, 9, 16, and 26 years previously and an area unburned for at least 50 years. The samplings were performed at three replication sites for every successional site and at two for the unburned forests. Beetles were sampled with four pit-fall traps that were placed along a transect at 10-m intervals. Four transects were used at every replication site. Sampling was carried out from March to October of 2006. At the end of each sampling period insects caught in the pitfall traps were removed and brought to the laboratory for preparation. All caught beetles were sorted into morphospecies according to their external morphology and identified to family level. Microhabitat variables such as height and total cover of vegetation, plant species richness, cover of plant functional types (tree, shrub, subshrub, and grass) and cover of biotic and abiotic surface components were analysed for each site. Data was evaluated with using community parameters and multivariate analysis.

Results: Post-fire age of stands has been known one of the most important that affected the arthropod fauna in Mediterranean ecosystems. The results obtained from our study are in agreement with this view that beetle communities displayed change depending on the successional gradient after fire. The earliest successional stage supported a greater number of individuals. At this stage, beetle abundance was the highest and it decreased depending on the successional gradient. On the other hand, middle and late successional stages were found important in terms of species richness, species diversity and evenness of beetles. The analysis about interaction between microhabitat variables and abundance of beetles revealed that changes in beetle community structure and dynamics in successional gradient substantially depend on characteristics of habitat. In the earlier stages, high abundancy values resulted from many groups of beetles in feeding habits benefitted from the fire-caused changes in availability of microhabitats and foods. Beside this, the middle and late successional stages are more complex habitats containing diverse microhabitats compared to the earlier ones because architectural complexity increases with vegetation height. The coexistence of sites in different successional ages in landscape increases the diversity of beetles.

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Keywords: Forest fires; Coleoptera; *Brutia* pine; resilience; autosuccession

ORAL-FORBIO-OP287

The immediate effects of fire on surface-dwelling arthropod communities in *Pinus brutia* forests of southwestern Anatolia

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Aim of the study: Fire is an integral part of many ecosystems in the world such as Mediterranean and it serves as a strong selective force on plant and animal communities. Its effects on biota can be considered in terms of immediate, short-term and long-term effects. Immediate effects of fire on forest arthropods may occur by the way of direct mortality, forced migration out of a habitat and attraction to post-fire areas. In this study, it was aimed to investigate immediate changes in a recently burned *P. brutia* forest in terms of the arthropod community.

Material and Methods: The study was carried out after a crown fire which occurred on 20-21 August 2004 in Marmaris National Park, Marmaris District, Muğla Province. Six study sites (total 12 sites) were chosen randomly in burned and unburned sites. In each site 3 pitfall traps were established with 5 m intervals. Trapping was conducted in two months long sessions after fire. The pit-fall samples were processed in the lab. In the laboratory; we recorded the number of individuals for each morphospecies of orders. In some orders identification in species level could be performed. Mean number of three pitfall traps for each sampling site was used for statistical calculations. Species richness, species diversity and evenness values were estimated as community parameters.

Results: The total catches of arthropods, belonging to three taxa Arachnida, Chilopoda and Insecta in the burned and unburned sites were 861 and 544 individuals respectively. The majority of the caught arthropods were insects. The insect abundance displayed similarity to arthropod abundance, with 832 and 505 individuals respectively in burned and unburned sites. In both sampling periods total abundancy values of arthropods and insects were high in the burned site than unburned site. Species diversity and evenness values in all pairwise comparisons showed that, burned sites had more diverse insect community than unburned sites. As a result, according to this study which was performed immediately after fire, although drastic changes in community parameters of arthropod groups were found, it was not determined direct destructive effects of fire on arthropods abundance. Although more comprehensive studies are needed for certain evaluation, these results give clue recovery capability of arthropod community in *Pinus brutia* forest ecosystems as known high resilient to fire.

Acknowledgements: The author thanks Çağatay Tavşanoğlu and Oksal Macar for their help during the fieldwork.

Keywords: Arthropods, East Mediterranean, Forest Fires, Insects, Recovery.

ORAL-FORBIO-OP288

Total Phenolic, Flavonoids, Tannin Contents and Antioxidant Properties of *Pleurotus ostreatus* Cultivated on Different Wastes and SawdustAyşenur YILMAZ¹, Sibel YILDIZ¹, Ceyhan KILIÇ², Zehra CAN³¹Faculty of Forestry, Karadeniz Technical University, Turkey²Eastern Karadeniz Forestry Research Institute, Turkey³Şebinkarahisar Technical Sciences Vocational School, Giresun University, Turkey
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Aim of the study: In this study, the possibility of using of wastes of peanut, potatoes farm wastes, walnut sawdust and orange tree sawdust in *Pleurotus ostreatus* cultivation was investigated. After a successful harvest, total phenolic, flavonoids, tannin contents and antioxidant properties of mushrooms' methanolic extracts were determined.

Material and Methods: Peanut wastes, potatoes farm wastes, walnut sawdust and orange tree sawdust moistened with water until %70-80 and sterilized in an autoclave at 121°C for 1.5 h. After cooling the substrates to 20°C, they were placed in nylon bags of 1 kg and inoculated by spreading spawn on the surface of the substrate with a weight percentage of about 3% of the wet weight of compost. Substrate condition was carried out in four replications. Each nylon bags were inoculated in mushroom growing laboratory (at 15-25°C, %70-80 relative humidity). Harvesting was started in fifth week and the fruit bodies' stipe and cap was calculated and weighed. Harvesting mushrooms divided into five samples and dried at 40°C before analysis. 5g dried sample was extracted with 50 ml methanol and shaken 150 rpm for 24h then filtered through filter paper. For the determination of the total phenolic contents, the Folin-Ciocalteu procedure was employed and gallic acid was used as standard. The concentration of total flavonoid present in the methanolic extracts was measured using a spectrometric assay. Condensed tannins were determined according to the method by Julkunen-Titto. The antioxidant capacity was determined using ferric reducing antioxidant power, free radical scavenging activity of DPPH.

Results: In this study, the highest total phenolic content (2,672±0,003 mgGAE/g) was found in mushroom cultivated on walnut sawdust. The highest total tannin (1,011±0,088 CEmg/g) and ferric reducing antioxidant power (12,332±0,017 µmolFeSO₄.7H₂O/g) were found in the same mushroom extract. The highest total flavonoid and free radical scavenging activity of DPPH were found in extract of mushroom cultivated on potatoes handle. It is concluded that peanut wastes, potatoes handle, walnut sawdust and orange tree sawdust can be use as substrate for *Pleurotus ostreatus* cultivation. Content of some component such as total phenolic, total flavonoid, tannin and antioxidant properties can be change according to substrate which mushroom cultivation on.

Keywords: Antioxidant, peanut wastes, potatoes handle, mushroom, sawdust, total phenolic.

ORAL-FORBIO-OP289

Relationships Between Some Soil Properties and Height Growth of Oriental Beech (*Fagus orientalis* Lipsky) in Plantation Areas in Different SitesAyhan USTA¹, Selvinaz YILMAZ², Murat YILMAZ¹, Esengül KENÇ¹¹Department of Forest Engineering, Karadeniz Technical University, Turkey²Trabzon Forest District Directorate, General Directorate of Forestry, Turkeyesen.benli1234@gmail.com

Aim of the study: Oriental Beech (*Fagus orientalis* Lipsky) is the most important species of broad-leaved trees that spread in our country. Oriental Beech, in addition to providing an important contribution to Turkey's economy is among the most important raw material for the forest products industry. Oriental Beech from broad-leaved species (1.96 million hectares) is placed on the top in terms of distribution area and growing stock. Aim of the study is to investigate correlations between some soil properties and height growth of Oriental Beech.

Material and Methods: Sample plots were chosen from unthinned Oriental Beech plantation areas which are within the boundaries of two forest sub-district directorates (Maçka–Yeşiltepe Trabzon-Vakfıkebir) of Trabzon Regional Directorate of Forestry. It was built Vakfıkebir plantation area in 1986 and Yeşiltepe plantation area in 1991. Physiographic characteristics (slope, aspect, elevation, etc.) of the sample plots obtained from sites are similar. In the study, height measures were made in Vakfıkebir (1849 trees) and Yeşiltepe (1671) sites. A total of 32 soil profiles were excavated in sites. A total of 160 soil samples were gained from 0-10, 10-20, 20-40, 40-60 and 60-100 cm depths of soil profiles. It was performed sand, silt, clay, soil organic matter, pH(in water, KCl) and EC analysis in soil samples. In this study, soil properties in the correlation analysis between soil characteristics and height growth of Oriental Beech were evaluated topsoil (0-10, 10-20 cm) and subsoil (20-40, 40-60 and 60-100 cm).

Results: In this study was evaluated relations between some soil properties and height growth of Oriental Beech (*Fagus orientalis* Lipsky) in unthinned plantation areas in different sites. In Vakfıkebir site was found significant correlations between height growth of Oriental Beech and sand ($p<0.01$, 0,517), silt ($p<0.01$, 0,559), pH(KCl) ($p<0.01$, -0,384) of topsoil, sand ($p<0.01$, 0,541), silt ($p<0.01$, -0,493), clay ($p<0.01$, -0,543), organic matter ($p<0.01$, 0,429) of subsoil. In Yeşiltepe site was found significant correlations between height growth of Oriental Beech and sand ($p<0.05$, -0,351), silt ($p<0.05$, 0,442), pH(in water) ($p<0.05$, -0,379), pH(KCl) ($p<0.05$, -0,357) of topsoil, sand ($p<0.01$, -0,399), silt ($p<0.05$, 0,304), clay ($p<0.01$, 0,390), pH(water) ($p<0.01$, -0,519), pH(KCl) ($p<0.01$, -0,461) of subsoil.

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Keywords: Oriental Beech, height growth, soil properties, different sites.

ORAL-FORBIO-OP290

Biodiversities of Carabidae, Elateridae and Cerambycidae Families in 3 Forest Type in Andırın (Kahramanmaraş-Turkey)Bülent LAZ¹, Sakine Serap AVGIN²¹ Faculty of Forestry, Kahramanmaraş Sutcu Imam University, Kahramanmaraş, Turkey

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Aim of the study: In current study, biodiversities of Carabidae, Elateridae and Cerambycidae families in three forest types (oak, cedar+oak, beech) was studied.

Material and Methods: The study was conducted in Kahramanmaraş Andırın province from April to October in 2013 and 2014 and Andırın province has a very rich flora. Window trap and pit-fall trap were used to collect the beetles.

Results: Total of 2036 adult beetles were collected from the set traps. The major characteristics including ecological features, host plants, phenology, collection records, genus and family names for all species were arranged and presented in alphabetical order. Cedar+oak forest with 31 beetle species demonstrated the highest diversity index according to Shannon-Weiner and Simpson index. Cedar+oak forest and oak forest found similar according to Bray-Curtis, Sorenson and Jaccard similarity test. The relict beech forest in the region demonstrated relatively high endemism in terms of beetle diversity.

Keywords: Coleoptera, Cedar, Oak, Beech, Carabidae, Cerambycidae, Elateridae.

ORAL-BIOGEO-OP291

Estimation of genetic diversity in the Turkish populations of *Cynips quercusfolii* using mitochondrial cytochrome b gene sequence dataSerdar DİNÇ¹, Serap MUTUN¹¹Department of Biology, Faculty of Science & Arts, Abant İzzet Baysal University, TR
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Aim of the study: *Cynips quercusfolii* is a gall wasp species with wide distribution in the Palearctic region. Asexual generation galls are produced in the late summer under leaves of white oaks. One of the major aims of this study was to disclose existing genetic diversity in the Turkish populations of *C. quercusfolii* through mtDNA cytochrome b gene sequence data. Previous studies on oak gall wasps studied from Turkey have shown that the Turkish populations of various cynipid taxa display high amount of genetic variation. Our current study further tests the estimated level of genetic variation existing in this species across Turkey.

Material and Methods: A total of 284 specimens of *Cynips quercusfolii* were collected in the summer of 2010 - 2013 from 31 locations covering most of the distribution range of the species in Turkey. Total DNA was isolated from adults, and a 433 basepair of mtDNA cyt b gene was amplified by polymerase chain reaction as it was described in Moretto and Arias (2005). After alignment similar sequences were collapsed into haplotypes by GenAIEx 6.5 (Peakall and Smouse, 2012). Relevant population genetic parameters including the number of polymorphic sites (S), nucleotide (π) and haplotype (h) diversity (Nei, 1987) for each locality as well as the average genetic diversity estimates and the number of pairwise nucleotide differences (k) (Tajima, 1983) were calculated by Arlequin 3.5.2.2 (Excoffier et al., 2010) and DnaSP 5.10.1 programs (Librado and Rozas, 2009). Population expansion/ contractions, and any deviations from neutrality were also searched by calculating Tajima's D (Tajima, 1989b), Fu's and Li's D* (Fu and Li, 1993).

Results: Overall 117 cyt b haplotypes have been determined covering all specimens. Of the sequenced 433 bp of mitochondrial cyt b gene of *C. quercusfolii*, 64 characters were informative out of 92 characters polymorphic sites, and the remaining were parsimony uninformative. Average haplotype diversity across the whole distribution area was 0.7285 +/- 0.9022, and nucleotide diversity was 0.00306 +/- 0.00613 indicating that genetic diversity estimates for most *C. quercusfolii* populations were fairly high. Among the studied 31 populations the highest haplotype diversity was detected in Kütahya (h= 0.9778) followed by Balıkesir and İstanbul (each with h= 0.9556). On the other hand, the highest nucleotide diversity was determined in Konya (π = 0.0288) followed by Karaman (π = 0.0267). Compared with the genetic diversity estimates of other oak gall wasp species studied from Turkey *C. quercusfolii* has higher genetic diversity than *Trigonaspis synaspis* (Mutun and Atay, 2015), *Andricus gallaetinctoriae* (Mutun et al., 2013), and *Andricus lignicola* (Mutun and Karagözoğlu, 2015). Overall, current findings on *C. quercusfolii* revealed that genetic variation of this species either higher than some oak gall wasp species both in Turkey and Europe or it is as high as previously studied cynipid species in Turkey.

Acknowledgements: This study was financially supported by the Abant İzzet Baysal University with the grant project BAP 2011.03.01.380.

Keywords: *Cynips quercusfolii*, Cynipidae, genetic variation, Turkey, mtDNA.

ORAL-BIOGEO-OP292

Oak Gall Wasps: Molecular Diversity in Anatolia

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Aim of the study:Recent advances through using molecular markers, Turkish populations of different taxa showed the existence of remarkable level of genetic diversity. In this review, genetic diversity estimates in the form of haplotype and nucleotide diversity through the application of sequence data have been compared in an attempt to draw some general patterns on the genetic variation present in the Turkish populations of several oak gall wasp species.

Material and Methods:In this review, all the available data present for several oak gall wasp taxa including *Andricus quercustozae*, *A. gallaetinctoriae*, *A. curtisii*, *A. lucidus*, *A. lignicola*, *A. caputmedusae*, and *Trigonaspis synaspis* from Turkey obtained through using marker gene/regions in both mitochondrial and nuclear genomes were compared with respect to haplotype and nucleotide diversity as well as average genetic diversity. For this purpose, haplotype (h) and nucleotide diversity (π) estimates of *Andricus quercustozae*, *A. gallaetinctoriae*, *A. curtisii*, *A. lucidus*, *A. lignicola*, *A. caputmedusae*, and *Trigonaspis synaspis* were analyzed using DnaSp and Arlequin programs. Comparisons were used to draw some general conclusions on the genetic variation of oak gall wasp taxa from Turkey.

Results:Among the examined species, the highest average haplotype diversity was found in *T. synaspis* ($h = 0.8554$) followed by *A. lucidus* ($h = 0.8089$) and *A. curtisii* ($h = 0.7285$). On the other hand, average nucleotide diversity was highest in *A. lucidus* ($\pi = 0.1155$) followed by *A. caputmedusae* ($\pi = 1.1012$). *A. lignicola* displayed the lowest amount of both haplotypic ($h = 0.3251$) and nucleotide diversity ($\pi = 0.0087$). Compared with the reported European oak gall wasp genetic diversity estimates such as nucleotide diversity estimates of *A. quercustozae* ranged between 0.09-0.12 in Italy and 0.07-0.08 in Spain. However, in Turkey average nucleotide diversity was calculated as 0.4573. Likewise, in a study conducted on *A. coriarius* across the Palearctic area including Turkey nucleotide diversity was $\pi = 0.00529$ in Iran, $\pi = 0.00644$ in Lebanon, and $\pi = 0.03427$ in the main clade including the Turkish localities. Overall, high genetic diversity is displayed in the Turkish oak gall wasp species examined so far, and this general drawn conclusion may be due to all the reasons that make Turkey a very unique and valuable spot with respect to not only species diversity present in Anatolia but also with respect to the genetic diversity existing in those taxa.

Keywords: Turkey, oak gall wasps, genetic diversity, phylogeography.

ORAL-BIOGEO-OP293

Ponto-Caspian Invertebrates in Lake Sapanca and Its Ecological Status with Application of the Water Framework DirectiveNaime ARSLAN¹, Cansev Akkan KÖKÇÜ¹, Deniz Anıl ODABAŞI², Deniz MERCAN¹¹Department of Biology, Faculty of Arts and Sciences, Eskişehir Osmangazi University, Turkey²Department of Fisheries Engineering, Faculty of Marine Sciences and Technology, Çanakkale Onsekiz Mart University, Turkey
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Aim of the study: This study was carried out between June 2011-March 2012 on Lake Sapanca to determine; i- the species diversity and distribution of benthic macroinvertebrates, ii-ecological status of the lake based on various metrics (benthic macroinvertebrate based biotic indices namely BMWP and ASPT, biodiversity indices), and iii-the presence and distribution of the Ponto-Caspian species in the lake.

Material and Methods: Water and macroinvertebrate samples were taken from Lake Sapanca by Ekman grab (225 cm², two hauls per station) and hand dredge between June 2011-December 2013 as seasonally from 9 stations. In addition, some physicochemical variables of deep water (pH, temperature, dissolved oxygen, conductivity) were determined *in situ* using Multi-Parameter Measurement Device (HQ40d Portable Multiparameter Meter, Hach, US), NO₃-N, NH₄-N and Biological Oxygen Demand were measured in the laboratory by following the standard methods. BMWP, ASPT and three diversity indices (Simpson Diversity Index, Shannon-Wiener Diversity Index and Margalef Index) were also used to determine ecologic status. Unweighted Pair Group Mean Average (UPGMA) was also used to evaluate relationship among 9 sampling sites in the study.

Results: A total of 15121 specimens of macroinvertebrates were collected and 84 taxa recorded. The zoobenthos samples from Lake Sapanca contained the following invertebrate groups: It was found that the macroinvertebrate fauna consisted of 61,86% Oligochaeta, 26,39% Gastropoda, 3,84% Bivalvia, 3,43% Chironomidae larvae and in few numbers (4,48%) Bivalvia, Hirudinae, Nematoda, Copepoda, Gammaridae, Odonata, Ceratopogonidae, Simuliidae and Ephemeroptera. The gastropod *Borysthenia naticina*, tubificins *Potamothrix hammoniensis* and *Limnodrilus hoffmeisteri*, chironomid *Einfeldia carbonaria* were the most abundant species in Lake Sapanca (37,26%, 29,46%, 6,71% and 2,62%, respectively). The values of Simpson Diversity Index, Shannon-Wiener Diversity Index and Margalef Diversity Index varied between 0,53-0,84; 1-2,23; 1,34-3,42; ASPT and BMWP score values varied between 1-3,38, and 1-27, respectively. The modern pattern of some Ponto-Caspian species distribution in Europe and Turkey inquired and presence of some macroinvertebrate species (such as *Potamothrix* spp., *Lithoglyphus* sp. implies that the Southern corridor could have been the main routs of their migration. From the information provided, we can conclude that the Danubian and some lakes fauna of Turkey (at least in Marmara and Aegean region) associated.

Acknowledgements: This study was supported by ESOGU-BAP (Project number: 201119008) financially.

Keywords: Lake Sapanca, macroinvertebrates, BMWP, ASPT, WFD.

ORAL-BIOGEO-OP294

Bioclimatic tolerances of *Quercus robur* L. (pedunculate oak) subspecies in TurkeyOsman Yalçın YILMAZ¹, Hatice YILMAZ²¹ Department of Forest Engineering / Faculty of Forestry, University of İstanbul, Turkey² Ornamental Plant Cultivation Program, Vocational School of Forestry/ Faculty of Forestry, University of İstanbul, Turkeyyilmazhc@istanbul.edu.tr

Aim of the study: Pedunculate oak is a wide spreading species throughout Europe, Caucasus, and Anatolia. Two subspecies, *Q. robur* subsp. *robur* and *Q. robur* subsp. *pedunculiflora*, grow in Turkey and they can be easily distinguished through (by) morphology and geographic distribution. It is important to know the bioclimatic factors that influence the geographic distribution of a species to assess the ecological impact of climate changes. The aim of the study is to determine the bioclimatic variables affecting the two pedunculate oak subspecies in Turkey and their tolerances to these variables.

Material and Methods: We used presence records of two subspecies from ISTO Herbarium and Flora of Turkey. Climate conditions were represented by 19 bioclimatic variables obtained from the WorldClim database v1.4 (Hijmans et al., 2006; www.worldclim.org). These data are a set of global climate layers with a spatial resolution of approximately 1 km² grids (Hijmans et al., 2005). These data derived from long term (1950-2000) meteorological data using thin plate spline interpolation. The locality description of species presences was converted to point vector layer through geocoding with Google web services. All bioclimatic variables values uploaded to created location point vector layer. After bioclimatic values uploaded GIS file, it was imported to R environment. To explore relationship between subspecies and bioclimatic variables we used bivariate scatterplots of these variables. We calculated point biserial correlation coefficients between species and bioclimatic variables. To explain tolerance of these species in a better way we used multinomial logistic linear regression analysis to fit models between response and terms. We conducted our analyses using the R and QGIS software.

Results: The comparison between the characteristics of each subspecies bioclimatic niche has highlighted four major differences: (1) BIO11 (Mean Temperature of Coldest Quarter), BIO6 (Min Temperature of Coldest Month), BIO7 (Temperature Annual Range), BIO4 (Temperature Seasonality). BIO15 (Precipitation Seasonality), BIO3 (Isothermality), BIO1 (Annual Mean Temperature) are also important bioclimatic variables that effect the distribution of pedunculate oak subspecies. Although these variables give valuable information about these species bioclimatic preference, the correlation results showed similar results of bivariate scatterplots. Correlation coefficients higher than 0.6 between species presences and bioclimatic variables from highest to lowest were BIO4 (0.88), BIO7 (0.80), BIO11 (-0.8), BIO6 (-0.79), BIO3 (-0.69), BIO18 (-0.67), BIO1 (-0.66), BIO15 (0.65). Due to bioclimatic variables has correlation to each other we calculated multicollinearity and used remaining bioclimatic variables to fit logistic model. Logistic regression result showed that the BIO4 (Temperature Seasonality) has a strong association with the distribution of *Q. robur* subsp. *robur* and *Q. robur* subsp. *pedunculiflora*.

Keywords: bioclimatic tolerance range, pedunculate oak, subspecies, Turkey.

ORAL-BIOGEO-OP295

**Genetic structuring and diversification of *Bombus lapidarius* (Linnaeus, 1758) (Bombinae: Apidae):
the role of Anatolia as a glacial refugium**Burcu TEMEL¹, E. Mahir KORKMAZ², Mahir BUDAK², H. Hüseyin BAŞIBÜYÜK¹¹Department of Biology, Faculty of Science, Cumhuriyet University, Turkey² Department of Molecular Biology and Genetics, Faculty of Science, Cumhuriyet University, Turkey
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Aim of the study: The Anatolian peninsula has contributed to the European biodiversity as one of the main glacial refugium. *Bombus lapidarius* (Linnaeus, 1758) (Bombinae: Apidae), an economically and ecologically important pollinator, is an ideal organism to study the effect of glacial for its cold-loving nature. Here, the phylogeography and landscape genetics of *B. lapidarius* are reassessed by including a new data from Anatolia. The potential role of Anatolia in origin and diversification of the species is tested.

Material and Methods: A total of 133 specimens were collected from 22 different localities. DNA was extracted from hind leg of the alcohol-preserved specimens using the salting-out method. The partial COI gene (~750 bp) was amplified and sequenced. The sequences were aligned by using CodonCode Aligner v3.5.6. Morphologically identified *B. lapidarius* specimens were tested under COI barcoding approach. Barcoding analyses were performed constructing a NJ tree under K2P model and homology-based searching of BOLD database. Genetic diversity indices were calculated using DnaSP v5.0 and Arlequin v3.11. Pairwise F_{ST} values were estimated to quantify the level of genetic differentiation among regions. To define the number of genetic clusters and calculate individual membership probabilities, a discriminant analysis of principal components (DAPC) was applied using ADEGENET package implemented in R. MJ network of the specimens was produced under the Network v4.5.1.6. Phylogeny of *B. lapidarius* complex was inferred from the ML and BI tree(s). Molecular dating was performed using a proposed separation time of *B. sichelii* and *B. lapidarius* and an average mutation rate for COI in *Bombus* species under BEAST v1.8.

Results: The barcoding approach indicated the presence of 49 *B. lapidarius* specimens in our dataset. This data is combined with the sequences present in GenBank resulting in 287 sequences representing 32 regions across the whole range of species. Overall, 16 COI haplotypes are identified with a high diversity index. A strong genetic differentiation was observed in the East Anatolia ($P < 0.001$), while West Anatolia exhibits a relatively low but significant level of differentiation from other regions ($P < 0.001$). Phylogenetic and landscape genetic analyses were mostly consistent producing the following clades: West Anatolia, East Anatolia, Balkans-South Italy, Northern Europe, and Europe. Molecular dating suggested a split of *B. lapidarius* from *B. sichelii* at around ~5.65 Ma in the late Messinian. The oldest split in *B. lapidarius* is the East Anatolia clade (~1.14 Ma) in the late Calabrian. The diversification within the European-Anatolian clade took place very recently, during the middle Pleistocene. The splitting time between the West Anatolian and the European subclade is estimated as ~0.67 Ma. Multiple diversifications of all existing haplotypes frequently correspond to the late Pleistocene at ~50–140 ka.

Acknowledgements: The financial support was provided by Cumhuriyet University (CÜBAP) via projects F-301 and F-391.

Keywords: Anatolia, centre of origin, genetic structuring, bumblebee, phylogeography, Western Palaearctic.

ORAL-BIOREM-OP296

The Investigation of the Treatment of Potatoes Processing Wastewater by Hybrid Constructed Wetland SystemsArda YALCUK¹, Gamze Dogdu OKÇU¹, Ayşenil SENCAN¹¹ *Depth. of Environmental Engineering, Faculty of Architecture and Engineering, Abant İzzet Baysal University, BOLU*
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Aim of the study: Wastewaters of potatoes processing industry are called as considerably pollutant wastewater due to their high solid, protein and starch contents. Besides, in recent years, potatoes production has been decreased in Turkey and treatment of potatoes processing wastewater might not be an additional financial burden to the facilities. In this study, wastewater of potatoes processing facility was treated by economical, simple and easy to operate constructed wetland system called “green technology”. Lab-scaled, different types of constructed wetland systems were combined with each other to make hybrid treatment system and whose treatment performances were evaluated for organic matter removal.

Material and Methods: The study was performed by combination of horizontal (H) and vertical (V) flow, circular and rectangular constructed wetland reactor systems. For this purpose, H1 planted horizontal flow reactor, V1 planted vertical flow reactor, H2 unplanted horizontal flow reactor and V2 unplanted vertical flow reactors were designed and used in the experiments. While soil/silt mixture, gravel and pumice stone were used at vertical flow reactors, only zeolite was used as a filling material at horizontal flow reactors. Hydraulic retention times (HRT) were determined as 1.6 and 3.2 days for horizontal and vertical flow reactors, respectively. The systems were operated for 100 days with acclimation periods of plants. “*Cyperus alternifolius*” was used as wetland plant in the planted reactors. Samples were taken from the inlet and outlet of the reactor systems to investigate the parameters which were COD, NH₄-N, NO₂-N, NO₃-N, PO₄-P, pH, turbidity, electrical conductivity and oxidation reduction as regards standard methods, APHA.

Results: In the study, organic matter removal of potatoes processing wastewater was observed by two lab-scaled hybrid constructed wetland systems. Carbon removal is occurred by the combination of physical and microbial mechanisms in the constructed wetlands. Although, COD removal was obtained as 87% at planted, hybrid system, and approximately 85% COD removal was investigated at unplanted hybrid system. Nitrogen reactions in constructed wetlands are occurred by inorganic nitrogen nitrification, denitrification, ammonification, plant and microbial uptake. NH₄-N removal was obtained as 88.25%, 88%, 87.25%, and 89% for (H1) and (V1), (H2) and (V2) reactors, respectively. Average concentration changes of NO₂-N and NO₃-N were determined as 1.24 and 3.4 mg/L for 100 days operation period, respectively. NO₂-N effluent concentrations for H1, V1, H2 and V2 reactors were 0.188 mg/L, 0.609 mg/L, 0.228 mg/L, 0.635 mg/L, respectively. In addition, NO₃-N effluent concentrations for H-1, H-2, V1 and V2 reactors were measured as 1.30 mg/L, 1.57 mg/L, 1.43 mg/L and 1.47 mg/L, respectively. It is seen that effluent NO₃-N concentration was higher than NO₂-N concentrations which point out the nitrification process occurrence. Phosphorus is removed by four mechanisms in constructed wetlands: Chemical and physical adsorption, Precipitation, Plant-uptake and Sedimentation. Average PO₄-P removal that was taken from reactor effluents were 64%, 65%, 57% and 52% for H1, H2, V1 and V2, respectively.

Acknowledgements: This project was financially supported by AIBU-BAP Project Number: 2015.09.02.919

Keywords: Potatoes wastewater, *Cyperus alternifolius*, Constructed wetland, Hybrid system

ORAL-BIOREM-OP297

Palladium adsorption from waste printed circuit board onto modified orange peel

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Aim of the study: Electrical and electronic equipment has been increasing proportionally with the technology, and this causes tons of waste electrical and electronic equipment (WEEE) generation. Printed circuit boards (PCBs) are components of WEEE devices and mainly composed of 0.01% palladium (Pd), 0.04% gold (Au), 0.16% silver (Ag), and 18.4% copper (Cu). The natural sources of these metals are extremely limited, and the recovery is essential to have enough raw materials and decreasing environmental impact. Therefore, this study focused on the palladium adsorption from PCB onto biosorbents derived from orange peels because palladium is a precious and rare element.

Material and Methods: In the study, orange peels (OP) were modified by different methods including saponification with NaOH (OP-S), acidification with citric acid (OP-A), hydroxypropylation with propylene oxide (OP-H) and crosslinking with sodium trimetaphosphate and sodium tripolyphosphate (OP-C) in order to increase the adsorption capacity. Firstly, adsorption tests on the Pd model solutions were carried out by using the native/modified orange peels to determine the optimum adsorption conditions (biosorbent type, temperature, pH, duration). Then, PCB was pyrolyzed in a fixed bed stainless steel reactor to obtain only metal containing solid product. After then, metals were leached from the solid product. At the last stage, Pd adsorption studies were realized from leach solution under optimum adsorption conditions.

Results: According to analysis results, best adsorption efficiency for Pd model solution, 88%, was obtained with OP-S at 25°C and pH 5 for 120 minutes. Under these conditions, Pd is substantially recovered from solid product of PCB.

Acknowledgements: This study was supported by the Anadolu University Scientific Research Projects Commission under grant no: 1503F143.

Keywords: Biosorption, E-waste, Orange waste, Palladium, Printed circuit board.

ORAL-BIOREM-OP298

Curve-Fitting Modelling for the Estimation of Silver Adsorption onto BiosorbentKemal ÖZKAN¹, Aysun ÖZKAN², Şahin IŞIK¹, Zerrin GÜNKAYA², Müfide BANAR²¹Computer Engineering Department, Eskişehir Osmangazi University, Turkey²Environmental Engineering Department, Anadolu University, Turkeykozkan@ogu.edu.tr

Aim of the study: The motivation behind the curve fitting is constructing a mathematical function that captures the trend in data. With this way, the relationship between the factors (independent) and outcomes (dependent) variables are investigated. For this purpose, the parameters of the fitted function are adjusted as yielding the 'best fit' of the model. One strategy for fitting a "best" line through the data would be to minimize the sum of the residual errors for all the available data. In determining the characteristic of data and obtaining the best fitted model, two types of curve fitting functions, namely, linear and nonlinear functions can be preferred based on the processed task. In the present study, the concept of *exponential model* curve fitting functions is adopted for silver adsorption onto biosorbents derived from orange peels. It was used to quantify the "goodness" of our fit is the magnitude of the residual error associated with the dependent variable prior to regression.

Material and Methods: In this study, orange peels (OP) were modified by different methods including saponification with NaOH (OP-S), hydroxypropylation with propylene oxide (OP-H) and crosslinking with sodium trimetaphosphate and sodium tripolyphosphate (OP-C) in order to increase the adsorption capacity. Adsorption tests on the Ag model solutions were carried out by using the native/modified orange peels to determine the optimum adsorption conditions (biosorbent type, temperature, pH, duration). Freundlich and Langmuir isotherm models and pseudo-second-order model were fitted to experimental data. To solve the constrained linear and nonlinear optimization, the *lsqcurve fit* function that implemented in Matlab optimization toolbox, was carried out. The referred function was utilized to solve nonlinear curve-fitting (data-fitting) problems in least-squares sense. To comment the performance of proposed system, the Root Mean Square Error (RMSE) and Sum of Squared Error (SSE) metrics were chosen as statistical residual evaluation metrics.

Results: According to analysis results, best adsorption efficiency for Ag model solution, 89%, was obtained with OP-C at 25°C and pH 5 for 120 minutes. The other efficiencies for OP-S and OP-H were obtained as 79% and 82%, respectively. After performing the regression, it can compute the sum of the squares of the residuals around the regression line and find the coefficient of determination. Experimental result is show that our fitting model is better than previous works.

Acknowledgements: This study was supported by the Anadolu University Scientific Research Projects Commission under grant no: 1503F143.

Keywords: Adsorption, Curve fitting, Orange waste, Silver

ORAL-BIOREM-OP299

Restoring Overgrazed and Semi-Dry Grassland in Southern Turkey With Forage CropsGülcan DEMİROĞLU TOPÇU¹, Mohammad Ali KHALVATI²¹Ege University, Faculty of Agriculture, Department of Field Crops
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Aim of the study: The aim of this study was to restoration a native old semi-dry pasture like Kilis region introduced by C₄ forage crop Sorghum (*Sorghum bicolor* L.) and Bermudagrass (*Cynodon dactylon*) in Turkey during 2011-2012. Also, our scientific and business management team state objective was the restoration of the native grassland plant community to its historic climax or desired plant community and to re-establish adapted, native perennial vegetation such as grasses, or short term dry resistant plant.

Material and Methods: We tested seasonal grazing by livestock in winter, combined with organic fertilization (manure), as a restoration tool for modifying the competitive dynamics among herbaceous plants to restore semi-dry pasture communities in southeastern Turkey. We also investigate soil born microorganisms such as N₂ fixer and mycorrhizal fungus communities. Azotobacter as well as some beneficial fungus like mycorrhizal fungi was identified using taxonomic method. *G. intraradices* was whispered based on its spore density in this pasture. A chronosequence measuring system was applied in this pastures that were winter-grazed from 1 yr to 2 yr. After each rotation livestock (around 200 cattle) was allowed to pass over the pasture to use their manure to mix with soil. However, the last harvest was achieved at the end of November 2012 after 4 times cultivation of the plants: sorghum and bermudagrass. Soil nutrients content and physio-chemical characters were analysed.

Results: The results of this study were determined soil organic content by 0.59% which was indicated this pasture as poor soil organic matter content. Our finding was including improvement of soil biological life by increasing organic matter content from 0.05% to 1-1.2% after 2 years constantly cultivation and rotation. Bermudagrass 26% and 33% in sorghum where total sorghum coverage made up 9–25% of total aboveground biomass in year-round grazed pastures and 10–40% in bermudagrass in this pastures. This project was financially supported by Canadian firma (Green Hope LTD.) and scientific support by EGE University, Faculty of Agriculture, Departments of Pasture and forage Sciences faculty members for measuring, collecting data, analysing materials and final reporting.

Keywords: grassland, overgrazed, azotobacter, bermudagrass, sorghum.

ORAL-BIOREM-OP300

Expression of an Olive Metallothionein in *E. coli* BL21(DE3) exerts tolerance through bioaccumulation of heavy metalsFaysal YILMAZ¹, Ekrem DÜNDAR²¹Balıkesir University, Institute of Science, 10145 Çağış-Balıkesir²Balıkesir University, College of Arts and Sciences, Department of Molecular Biology and Genetics,
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Aim of the study: The expression of metallothioneins or metallopeptides to increase the affinity and biosorptive capabilities of bacterial cells for heavy metals is a promising technology for the development of bacterium-based biosorbents. Olive (*Olea europaea* L.) metallothionein 2 (OeMT2) has been reported to accumulate metals when expressed in bacteria. In this study, cells of a genetically engineered *E. coli* strain, BL21(DE3), which express OeMT2 were evaluated for their bioremediation potential for the metal based textile dye (Remazol blue-Rb), Cr (VI) and Ni (II) ions. Expression of OeMT2 in BL21(DE3) cells can be developed as an attractive strategy for metal tolerance through bacteria. Therefore, the metal tolerance of recombinant cells to Fe, Cu, Zn and Cd heavy metal salts and bioaccumulation of nano ZnO metal particles into the cells were investigated.

Material and Methods: The maximum bioremediation of Rb dye were determined as 75.3% in liquid media containing 27.8 ppm Rb, whereas no significant changes were found for the biosorption of Cr (VI) and Ni(II) metal ions. Tolerance experiments were conducted by cell viability on FeSO₄, CuSO₄, ZnCl₂ and CdCl₂ (1 mM for each) containing LB agar media. The optimum growth for recombinant cells was obtained from all type of heavy metal enriched media, except the FeSO₄ containing media, at the end of 72 hours. The speed of bioaccumulation of nano ZnO metal particles in cells was found as the same with the control group (150 fL/min).

Results: The recombinant (OeMT2 expressing) *E. coli* BL21(DE3) used as a biosorbent may be able to treat industrial wastewater containing high concentrations of Rb, Cu, Zn and Cd ions. First in the literature, we also focused on the interaction between nano metal particles and metallothioneins. According to the results olive metallopeptides are located in cytoplasm, and so, recombinant cells cannot control the flow of nano metals via membrane into cytosol. Thus, the potential for expression of membrane binding metallopeptides in other organisms need to be studied for further development in nano level bioremediation.

Acknowledgements: This work was supported by TÜBİTAK with grant number 110O108.

Keywords: *Olea europaea* L., Metallothionein, Nano Zinc Oxide, Remazol blue.

ORAL-EDUBIO-OP301

Recycling and Level of Consumer Awareness in Environmental Issues and Attitudes (Case of Denizli Province)Bilge GÖZENER¹, Murat SAYILI², Eda PAÇ²¹*Department of Agricultural Economics, Faculty of Agriculture, Gaziosmanpaşa University, Tokat, Turkey.*²*Department of Economic and Administrative Sciences, Faculty of Business Administration, Gaziosmanpaşa University, Tokat, Turkey.*bilge.gozener@gop.edu.tr

Aim of the study: In this study; awareness of environmental problems where people live, general information about environmental problems and susceptibility to this problem and also to determine the state have sufficient information about recycling.

Material and Methods: Data obtained with two 259 questionnaires conducted in 2013 were used in the study. Data were collected in September-October. Sampling method for easy was used in determining the sample size. groups were formed taking into consideration the age of the consumer. Results are summarized in the table it has been reviewed by frequency and percentage values. In addition, the age of the consumer, the environment sensitive to the problems and recognition of the mark recycling with other variables to be the in order to determine whether the relationship between the chi-square analysis was used.

Results:According to the survey; It was determined that 62,55% of the families consumer newspapers and information about the environment they learn from television, he knows the recycle sign 91,51% of the families consumer, 83,01% of the families consumer the presence of recycling facilities in the neighbourhood.Know the concept of sustainability by recognizing, number of family members, the presence of recycling facilities in the neighborhood, a statistically significant relationship between the know recycling sign of. In addition, marital status, education, occupation, income with many variables such as a statistically significant relationship between the age of the consumers.

Keywords: environment, recycle, Chi-square analysis

ORAL-EDUBIO-OP302

The Knowledge Level of Early Childhood Teacher Candidates about BiodiversityAsiye PARLAK RAKAP¹, Fatma Nisa ERİMEZ²¹*Department of Elementary Education/College of Education, Yüzüncü Yıl University, Turkey*²*Nature Conservation and National Parks XIV. Regional Office/ Van/ Turkey*asiye.parlak@gmail.com

Aim of the study: Studies conducted with teacher candidates are important since they create a chance to reach teachers of future generations during their pre-service training. Such studies support implications by making attitude change possible. Thus, behaviour change may occur. According to Social Learning Theory, children learn from models. Therefore, being effective adult models will have impact on children's behaviour. Based on this perspective, the aim of current study is to assess candidate early childhood teachers' knowledge level about biodiversity and to compare their beginning knowledge level with practice of their educational plans after taking training about biodiversity.

Material and Methods:*Participants:* For this study, researchers studied with five junior teacher candidates. All of them were female and were studying early childhood teacher education. They were willing to be a part of this research. *Data Collection Tools:* In order to collect data, researchers used word association activities related to biodiversity as pre-test. By using such activities, knowledge levels of teacher candidates were tried to be analysed. After analysis, education about biodiversity was given them on weekly basis. Then, they were asked to develop activity plans related to biodiversity for preschool age children. Those activity plans were analysed as post-test. *Design:* The design of this study is one type of experimental research: pre-test post-test single group design. *Data analysis:* Content analysis was used to analyse qualitative data and results were categorized under pre-developed categories.

Results: Results from the data showed that early childhood teacher candidates' knowledge level about biodiversity was low at the beginning. It was found that they related biodiversity more with species diversity. After each training session, they developed an educational plan in relation to that week's topic and those plans were analysed in order to examine the development. Analysis of those plans showed that specific training with small group had positive effect on the development of knowledge level. Results are found to be parallel with related literature.

Acknowledgements: Current study was carried out by two organizations: Yüzüncü Yıl University and Nature Conservation and National Parks XIV. Regional Office.

Keywords: early childhood teacher candidates, biodiversity, educational plan.

ORAL-EDUBIO-OP303

Environmental Awareness and Attitudes of Agriculture Faculty Students (Gaziosmanpaşa University Sample)H. Sibel GÜLSE BAL¹ Güngör KARAKAS¹, Kürşat AYDIN¹¹Gaziosmanpaşa Üniversitesi Ziraat Fakültesi Tarım Ekonomisi Bölümü,
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Aim of the study: The concern we name as environmental problem means the perishing of the bases of life as air, soil, plant, and animal. Unless protective precautions are taken for the place we live, the world will end as being a life area. The aim of this study is to investigate the agriculture faculty students' sensitivities of environmental attitudes and environmental risk perceptions. It was important to measure the environmental awareness of students and determination of attitudes toward the environment, Awareness of this students about the environment is important in terms of diversity related to agriculture and sustainable agriculture.

Material and Methods: The study data were obtained from surveys conducted with students. Survey was conducted in February 2016. Survey was done with 160 students studying in the 1th and 4th grade of various departments of the Agriculture Faculty of Gaziosmanpaşa University in Tokat. Survey has been involved in questions relating to socio-demographic status of students, socio-cultural environment in which they came, environmental courses they received during their education, training on environment and nature protection, participation in environmental activities. It was also given "environmental awareness scale" and "environmental attitudes and behaviour scale" in the survey. It has investigated whether there is a relationship between students' environmental behaviour and characteristics of students.

Results: 50 % of the participating students are male students, 50 % of them are female students. The average age of students 22,18. Mother of 58.75% of the students surveyed are primary school graduates. The most important information source of the student about the environment is radio and television. Although the university level, 17.5% of students had never heard of the concept of sustainability. 17.50 percent students has found sufficient lessons about the environment. 13.5% of the students are members of the organizations concerned with the environment. 40,62's% of students said that increase environmental awareness of environmental courses taken at the university, the courses are not effective in 60.38%. According to the students waste pollution is the most important pollution in Turkey. significant number of students aren't aware of climate change. In addition, environmental awareness and behavior scales were evaluated. Results showed that university students have information about and aware of environmental issues, but they do not behave cautious to the environment.

Keywords: Environmental Attitude, environmental awareness, environmental education.

ORAL-EDUBIO-OP304

Women's Attitudes and Purchase Intention of Eco-friendly Products: A Case from TurkeyMeral UZUNOZ¹, Esen ORUC²,¹*Department of Economics, Yıldız Technical University, TURKEY*²*Department of Agricultural Economics, Gaziosmanpasa University, TURKEY*³*Department/Research Institute, University, Country*muzunoz@yildiz.edu.tr

Aim of the study: Eco-consciousness means that a consumer is more cognizant about environmental problems and follows more environmentally friendly lifestyle that results unmitigated environmental problems in the purchase, use or disposal of goods. With the emergence of environmental problems and development of environmental consciousness, eco-friendly products have become a highly attractive subject. There are a few studies on women's attitudes and purchase intention of eco-friendly products. We aimed to put forward the women's point of view, to study the women behavior towards purchase of eco-friendly products and to focus on the women's attitudes and purchase intention of eco-friendly products.

Material and Methods: A questionnaire provided to obtain the views of the living 160 women in Tokat Province, Turkey. The data was analyzed with the help of statistical tools like percentage, average and Likert Scale Technique. We analyze how the factors influence the attitudes of the women to make purchases of the eco-friendly products and what is the consciousness level of women.

Results: Below the average environmentally consciousness level of the interviewed women is 62, 5%. The women Indicating ideal behaviour have a share 3,13%.

Keywords: Eco-friendly Products, Attitudes, Women's intention.

ORAL-EDUBIO-OP305

Student Teachers' Perception of Biodiversity: A Case Study From Sultan Marshes Natural ParkSelahattin AKSIT¹, Fisun AKSIT²¹*Department of Geography, Pamukkale University, Turkey*²*Department of Geography, Pamukkale University, Turkey*aksit@pau.edu.tr

Aim of the study: This descriptive study aims to determine the perceptions of the social studies student teachers about biodiversity with a fieldwork organized to Sultan Marshes Natural Park in Kayseri/Turkey.

Material and Methods: The sample of the study consists of 25 social studies student teachers at a state university. The fieldwork is organized for the research with active learning activities. The data were collected via student teachers' drawings before and after the fieldwork. Assessing students' drawing, we decided to focus on questions that regarding what the students know and what he/she intended for them to learn. The geographical questions used a starting point for the analysis. Also in this study, we provide an easy method for sorting and summarizing student teachers' drawings which have been relatively neglected as an evaluation tool, despite their potential utility for assessing geographic knowledge.

Results: According the findings, before fieldwork student teachers were unfamiliar about wetlands of the world maintain biologically diverse communities of ecological and economic value, and their drawings were superficial. The findings indicated that comparison of student teachers' drawings beginning and end of the fieldwork informed the educator about how students' perception changed about the biodiversity of wetland ecosystem over the fieldwork of instruction. In conclusion, student teachers should be educated about biodiversity by fieldwork that involves connecting theoretical concepts with real-world scenarios and learning through first-hand experience.

Keywords: Biodiversity, Environmental Education, Fieldwork, Wetland Ecosystem, Student Teacher.

ORAL-EDUBIO-OP306

Student Teachers' Misconceptions About BiodiversityFisun AKSIT¹, Selahattin AKSIT²¹*Department of Geography, Pamukkale University, Turkey*²*Department of Geography, Pamukkale University, Turkey*aksitf@pau.edu.tr

Aim of the study:The science education community generally accepts the idea that students enter the classroom with their own understandings of the world. These understandings are often at odds with the scientifically accepted view of the world. Research into the student's naive interpretations of the world shed insight and provide guidance for teachers and teacher educators. Therefore, this study aimed to assess student teachers' misconceptions about understanding of the distribution and loss of biodiversity.

Material and Methods:The sample of the study consists of 40 social studies student teachers. The data were collected via five open ended questions and analyzed qualitatively through content analysis.

Results:The results show that student teachers unfamiliar with the scientific concept of biodiversity and had misconceptions about losing a species does not affect humans and species have always gone extinct so we do not need to worry about a few animals or plants disappearing. Such a study would help to address the problems of misconceptions in teaching biodiversity and this would increase the awareness of teachers/educators about students' misconceptions.

Keywords:Biodiversity, Misconception, Student Teachers.

ORAL_GENRES-OP307

Species and Chromosome Number Diversity of Seyhan and Ceyhan River SystemsSevgi UNAL¹, Muradiye KARASU AYATA², Muhammet GAFFAROGLU²¹*Department of Biology, Faculty of Science, Gazi University, Turkey*²*Department of Biology, Faculty of Science and Arts, Ahi Evran University, Turkey*sevgiunal@ymail.com / sevgiunal@gazi.edu.tr

Aim of the study: The main objective of the current study is to determine species and chromosome number diversity of Seyhan and Ceyhan River Systems. The high diversity of freshwater fish species in Turkey depend on habitat diversity among different water systems and various isolation such as geographical and genetic.

Material and Methods: Species were collected from June 2011 to September 2014 by electrofishing in different localities from Seyhan and Ceyhan River Systems, Turkey. Captured specimens were transported as alive to laboratory with well-aerated carrying aquaria.

Results: In this study a total of 132 fish specimens belonging to five families, 12 genera and 17 species were determined. More than half of the existing species were member of Cyprinidae family. Nemacheilidae, Cobitidae, Cyprinodontidae and Blenniidae were also identified families. However, several species were not observed in the same localities which known from previous studies. Diploid chromosome numbers of obtained species were determined.

Acknowledgements: We would like to thank Dr. S. Cevher ÖZEREN (Ankara University) and Dr. Salim Serkan GÜCLÜ (Süleyman Demirel University) for contribution to identifying species.

Keywords: Seyhan, Ceyhan, species diversity, chromosome number.

ORAL_GENRES-OP308

Evaluation on the Peripheral Blood Cell Morphology of *Cyprinus carpio* Linnaeus, 1758Muhammet GAFFAROGLU¹, Aysun GÜLER KANTER²¹*Department of Biology, Faculty of Science and Arts, Ahi Evran University, Turkey*²*Department of Biology, Institute of Science, Ahi Evran University, Turkey*mgaffaroglu@yahoo.com

Aim of the study: The aim of this study is to obtain a basic knowledge of the hematology of *Cyprinus carpio* Linnaeus, 1758.

Material and Methods: Blood cells were obtained as modified according to Blaxhall and Daisley (1973) and stained with Wright fluid. The morphological features of blood cells were described according to the observation made by light microscopy.

Results: Erythrocyte, thrombocyte, lymphocyte, monocyte, neutrophil, and eosinophil cells were determined and characterized in examined specimens. Five adult specimens used in this study were captured from Kızılırmak River, Kırşehir, Turkey. According the the data received in the study, erythrocyte cells were oval-shaped, and had oval nucleus. Monocyte cells were also oval in the species. The nucleus gathering on one side of the cell were either oval, similar to the shape of a kidney. Lymphocyte cells were circular. Nucleus was suitable for the shape of the cells, and they almost cover all the cells. Neutrophil cells were circular in all the specimens examined. Eosinophil cells were circular. Their nucleus was cumulated on one side of the cell and were circular. In the specimens examined, thrombocyte cells were observed either oval or circular.

Acknowledgements: This study was supported by the Ahi Evran University Scientific Research Projects Coordination Unit. Project Number: FEF.E2.16.006

Keywords: Cyprinid, Kızılırmak, *Cyprinus carpio*, Blood Cells.

ORAL-GENRES-OP309

Why Specimens of *Pseudophoxinus ninae* and *Pseudophoxinus maeandricus* (Teleostei, Cyprinidae) Could Not Found?Muradiye KARASU AYATA¹, Sevgi ÜNAL², Muhammet GAFFAROĞLU¹¹Department of Biology, Ahi Evran University, Turkey²Department of Biology, Gazi University, Turkey

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Aim of the study: Unlike to richness of the Anatolian endemic fish diversity, the chromosomal studies of these species are very limited. It was intended to reveal chromosomal properties of the endemic leuciscine cyprinids *Pseudophoxinus maeandricus* (Ladiges, 1960) and *Pseudophoxinus ninae* Freyhof & Özulug, 2006 from Turkey. In this context, it is aimed to collect specimens of *P. maeandricus* and *P. ninae*.

Material and Methods: Three fieldworks were arranged for collecting the specimens of *P. ninae* from Onaç drainage (Burdur Province) in 2012-2013. Also, three fieldworks were arranged for collecting the specimens of *P. maeandricus* from Küfi Creek (Denizli Province), Karadirek Stream (Afyon Province) and Karasandıklı Village (Afyon Province) in 2012-2013. Above mentioned areas were performed with electro shocker for collecting the fish specimens. But no specimens of *P. ninae* and *P. maeandricus* could be collected.

Results: Chromosomes of *P. ninae* and *P. maeandricus* have not been analyzed because of any specimens could be collected. It was observed that the populations of *P. ninae* and *P. maeandricus* have been critically affected especially with the anthropogenic effects. Firstly, the pollutions on the waters have been caused to declining of the populations which are very sensitive fish to pollution effects. On the other hand, the two dams along the Onaç Stream have been caused to water retention. Additionally, water abstraction and the reduced rainfall in the last years are affected the Onaç Stream. According to above mentioned effects the population of *P. ninae* has been declined. Besides pollution, the opening of the marble quarries along the Küfi Creek and water abstraction, also reduced rainfall in Küfi Creek and Karadirek Stream were caused to decline of the population of *P. maeandricus*. In conclusion, the populations of two species of the genus *Pseudophoxinus* have been seriously affected. In order to continue the generation of the species, these areas should be urgently protected.

Acknowledgements: The authors are thankful to Ali AYATA for helping in the field.

Keywords: Leuciscine cyprinid, *Pseudophoxinus*, fish biodiversity.

ORAL-GENRES-OP310

Population Structure and Patterns of Geographic Differentiation of Olive Fly, *Bactrocera oleae*

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Aim of the study: The olive fruit fly, *Bactrocera oleae* (Diptera: Tephritidae), is the most destructive pest of olive trees worldwide that cause significant production losses of olives and derivatives in the Mediterranean area where 95% of the world's cultivated olive trees are grown. The fundamental aim of the present study was to obtain new information about population structure and genetic variation of olive fly populations in the Mediterranean region.

Material and Methods: The genetic variability was determined by sequencing 2200 bp of the mitochondrial genome of olive fly in field collected samples from Turkey, a representative of Eastern Mediterranean region and the putative source of the observed olive fly invasion. Obtained mtDNA haplotypes were integrated and comparatively analyzed together with the previously reported sequences across the species worldwide range.

Results: We have two main conclusions; (i) olive flies from western Turkey are closely related to Italo-Aegean flies of the Mediterranean basin supporting to previously expressed hypothesis, a westward expansion of the species; and (ii) we did not observe a clear split between the eastern Mediterranean and Aegean populations in our study.

Acknowledgements: This study was financially supported by Mugla Sitki Kocman University Scientific Research Funds (project numbers MSKUBAP-2015/004 and 2015/161). We are grateful to Dr. Belgin GOCMEN TASKIN and Dr. Ersin DOGAC for their assistance.

Keywords: Olive fly, *Bactrocera oleae*, mitochondrial DNA, haplotype, Turkey.

ORAL-GENRES-OP311

Perspectives of using *Triticum monococcum* in wheat breeding programs

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Aim of the study: Wheat is widely cultivated throughout the world due to the unique characteristics of its proteins and genetic diversity. Wheat provides a significant amount of carbohydrates and proteins and is a source of lipids, antioxidants and minerals. Wheat contains fiber, which is necessary for the regulation of different human physiological processes. The expanding interest in the nutritional characteristics of food products and current trends in the requirements for the product strengthened the special role of cereals in human nutrition and increased attention to some species that are not used in the food industry. The cultural einkorn is one of such species.

Material and Methods: In this work we have analyzed publications about the cultivation of einkorn (*Triticum monococcum*) and prospects for its use as a donor of agronomic traits in breeding programs for the hard and soft wheat.

Results: Cultural einkorn (*Triticum monococcum* L. subsp. *monococcum*) is diploid wheat form, directly related to soft and hard wheat. *T. monococcum* regarded as a heavy feeder, especially rich in protein and antioxidants. Thus, einkorn can make an ideal model for the most important traits study of the variety and genetic diversity after domestication. According to some studies it was concluded that einkorn is a promising candidate for the development of new special food of high nutritional characteristics (bakery products and baby food). The various breeding programs for development of new einkorn lines with high yield, good baking properties, as well as lines, suitable for modern cultivation techniques, conducted in Canada, Germany, Italy and some other European countries. There are also negative characteristics in einkorn, such as highly active polyphenol oxidase, the low level of combined polyphenols, spike brittleness, low seed production, late maturation and thresh complexity. However, *T. monococcum* is a good donor of useful traits associated with resistance to various diseases, chemical composition, etc., and can be used in breeding programs to improve the properties of soft and hard wheat.

Keywords: einkorn, *Triticum monococcum*, wheat, plant breeding, valuable traits.

ORAL-GENRES-OP312

Molecular Analysis of “on year” and “off year” in olive: Exploiting Genetic Diversity to Explore Solutions for Periodicity

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Aim of the study: Periodicity or alternate bearing in olive is a serious problem that causes significant economic losses for olive growers. Although it substantially associated with biotic and abiotic factors, periodicity is not the same for all the cultivars. Some cultivars display very little periodicity while some others do it very strongly. This clearly suggests there are genetic factors associated with periodicity. The aim of this study was to isolate and characterise genes that are associated with alternate bearing in olive through constructing multiple cDNA libraries and isolating genes that are potentially associated with alternate bearing.

Material and methods: cDNA were constructed using leaves of “on year” trees and of “off year” trees that grew side by side at the same location, in July and November along with control cDNA library from November fruits. Several hundreded arbitrary colonies from each these libraries were selected separately and sequenced. After bioinformatic analyses and sequence comparisons, the cDNAs that were specific to each library were determined and further characterised with respect to biochemical function, polymorphism, allele diversity, genomic copy number and temporal / spatial expression patterns.

Results: Most of the insert sequences were found to be organelle originated. Ribosomal DNA sequences were also significantly abundant while the base composition of nuclear sequences and organelle sequences were different. In July and in November, leaf samples from “on year” trees and “off year” trees and fruits were used to construct cDNA libraries (5 libraries). Randomly picked 200 colonies from each library were analyzed and mostly full - length cDNAs were isolated. Further detailed analyses revealed cDNAs specific to each library. These specific cDNAs were then characterized with respect to biochemical function. One of these cDNAs were determined as a metallothionein and biochemical characterization confirmed its metal accumulating function. Another library specific gene had very interesting cDNA sequence that can produce multiple open reading frames that generate completely opposing polipeptides with respect to amino acid composition and properties. Detailed functional analysis of these genes, and isolating their transcription control mechanism will greatly help devising a genetic solution against alternate bearing that causes significant losses to olive growers.

Acknowledgements: This study was supported by TÜBİTAK with grant number 110O108.

Keywords: Olive, *Olea europaea* L., periodicity, fruit detachment, on year, off year.

ORAL-GENRES-OP313

Characterization of Olive Temperature Induced Lipocalin (TIL) GeneFaysal YILMAZ¹, Ekrem DÜNDAR²¹Balıkesir University, Institute of Science, 10145 Çağış-Balıkesir²Balıkesir University, College of Arts and Sciences, Department of Molecular Biology and Genetics,
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Aim of the study: Lipocalins have been characterised in animals, insect, plants and bacteria. Considering the plant lipocalin properties, *Temperature Induced Lipocalin (TIL)* gene expression level is associated with abiotic stress response and is correlated with the plant's capacity to develop freezing tolerance. This study deals with molecular characterization of olive *TIL* gene (*OeTIL*) with respect to intron and bioinformatics analyses including cellular location, hydropathy, amino acid composition and predicted three dimensional structure of *OeTIL* protein.

Material and Methods: *OeTIL* gene was inspected with BLASTn and BLASTp to find proximity to other organisms. ExPASy portal analyzing tools were used to search for amino acid composition, cellular localization, hydropathy and predicted three dimensional function of *OeTIL* protein. Primers to amplify the full length genomic region of *OeTIL* gene via PCR were designed through Primer3 software.

Results: A full length clone was first isolated from a cDNA library prepared from leaf tissues and named *OeTIL* for *Olea europaea* temperature induced lipocalin. This gene has since been renamed *OeTIL*. The open reading frame encodes a protein of 185 amino acids (aa) with a calculated molecular mass of 21.4kDa and a theoretical pI of 5.97. Because of high amount of Lysine amino acid, *OeTIL* protein has a hydrophobic character like other plasma membrane *TIL* proteins in plants. Search in the GenBank ESTs database revealed homology (81% identity, 91% similarity) with a predicted putative protein from *Nicotiana tabacum*. Analyses to uncover the detailed function and location of the gene are continuing.

Acknowledgements: This work was supported by TÜBİTAK with grant number 110O108.

Keywords: Olive, *Olea europaea* L, TIL, Bioinformatics methods, RT-PCR.

ORAL-GENRES-OP314

Genetic variation in *Phoenix theophrasti* populations in Turkey and relations of the species with other palm species revealed by SRAP markers

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Aim of the study: *Phoenix theophrasti* (Theophrastus's Date Palm) is one of the two palm species native to continental Europe. The aim of this study is to characterize *P. theophrasti* populations, which are rare for Turkey and endemic to this region of the world with its presence in the Girit Island, on molecular level by using SRAP markers and also to detect the relations of *P. theophrasti* with 9 different palm species which are *P. dactylifera*, *P. reclinata*, *P. rupicola*, *P. roebelenii*, *P. canariensis*, *P. laureiri*, *P. acaulis*, *P. sylvestris* from *Phoenix* genus and *C. humilis* from *Chamaerops* genus by the same marker system. *C. humilis* was included in the study as the second natural palm species of the Europe, having a close natural distribution area with *P. theophrasti*, to determine the genetic relations among them.

Material and Methods: Five *P. theophrasti* populations from Datça-Hurmalıbük, Datça-Dimitri Bay, Datça-Eksera Valley, Patara and Kumluca-Karaöz, and one *P. theophrasti* ssp. *Gölköy* population from Bodrum-Gölköy were sampled and used in the study. Five individuals from each palm species were obtained from Köyceğiz-Palm Center by the direction of the Directorate of Forestry of Muğla Province. Genomic DNA was extracted from young leaves using a protocol optimized according to Doyle and Doyle (1987), Cullings (1992) and Sharma et al. (2003). For SRAP analysis 12 polymorphic combinations of EM forward primers (EM1 to EM17) and ME reverse primers (ME1 to ME14) of Li and Quiros (2011) were used. SRAP binomial data were analyzed by scoring the presence (1) or absence (0) of polymorphic bands in individual lanes. Only clear and reproducible bands were scored for genetic variation analysis performed by different population genetics programs.

Results: For 6 *P. theophrasti* populations the genetic differentiation coefficient (G_{ST}) was found as 0.36, and the level of gene flow (Nm) among populations was calculated as 0.90. A high proportion (65%) of total variation was due to within-population genetic variation (H_S). The lowest genetic distance value ($D_N = 0.0383$) was detected between Datça-Hurmalıbük and Datça-Dimitri Bay populations while the highest genetic distance value ($D_N = 0.1798$) was detected between Datça-Dimitri Bay and Patara populations. For 10 palm species the genetic differentiation coefficient (G_{ST}) was found as 0.57, and the level of gene flow (Nm) among them was calculated as 0.38. The lowest genetic distance ($D_N = 0.0999$) was detected between *P. dactylifera* and *P. canariensis* and the highest genetic distance ($D_N = 0.3353$) was detected between *P. rupicola* and *P. acaulis*. Even though *C. humilis* belongs to a different genus, genetic distances between *C. humilis* and *Phoenix* species were found not too different from the genetic distances among *Phoenix* species themselves. Although their geographic distribution areas are close to each other, no special genetic closeness was detected between *C. humilis* and *P. theophrasti*. Results of this study indicated that *P. theophrasti* must be included in the Red List of IUCN under the critically endangered (CR) category. It is recommended that "insitu" combined with "ex situ" conservation precautions should be taken urgently. It seems to be not proper to classify Bodrum-Gölköy Population as a subspecies of *P. theophrasti*. Also, it seems there is an important need for re-evaluation of the taxonomy of palm species by using molecular data.

Keywords: *Phoenix theophrasti*, Genetic variation, Genetic relations, Palm species, SRAP markers.

ORAL-PLTBIO-OP315

Anti-Helminth properties of some plants in Azerbaijan: A survey on Ethnobotanical MaterialsS.J. IBADULLAYEVA¹, G.Sh. SHIRALIYEVA¹, S.H. GULIYEVA¹, H.A. MAMMADOVA¹, A.A.ASGEROVA¹, L.A. NOVRUZOVA²¹Botany Institute of the ANAS, Azerbaijan State Agrarian University, Azerbaijan²Nakhchivan State University, Azerbaijan

Aim of the study: In the article, it was provided information on the anti-helminth influenced species of treatment plants used by Azerbaijani in the veterinary medicine on wild flora. Ethno-botanical research showed that even 1.000 years ago Azerbaijani physician-researchers 724 plant species, 150 animal species, minerals of 115 nominations of cure significance and medicines consisted of mixtures in 800 assortments in their research works. Ethno-biological cure ways of Azerbaijanis spread among the people that developed on scientific bases; more than 500 plants used in the folk medicine have been found out 30 species of which belong to 14 families are effective plants rich with vitamins. And more than 450 plants are widely used in the folk medicine. Bio-ecological features of each species and spreading areas. Moreover, it was ascertained that 360 species of medicinal plants in the cure of domestic animals were used.

Material and methods: Investigations carried out by the doctoral candidates of the Etnobotany lab have covered years of 2014-2015. Trips to different botanical & geographical regions of Azerbaijan have been carried out; ethno-biological, floristic and methodical expeditions implemented; especially inquiries concerning to ethnic usage of plants in the villages and region centers were carried out as well as new data been acquired. It was realized that prophylactic has had prevalence in the ancient Azerbaijan before cure activities. So, plants of medical significance added to meals as additives and diseases were stopped. It was specified from the analysis of the investigations that medical history of the people has developed beginning from simple to complex since the ancient times; this mostly started from the habitants of provincial diasporas and was described in the animals and plants' images and plots of the people written on stones and rocks.

Results: Species structure of the plants used in folk veterinary was ascertained in the process of the ethno-botanical researches and an experiment analysis is provided from the point of view of present-day botanical resource study. Proposes on use of unique folk knowledge about ecological properties of plants in veterinary have been worked out. According to therapeutic effect plants at helminthiasis. The complex analysis of the ethno botanical material presented in the research allows returning to discussion of ethno cultural history of one of the largest and important regions of Transcaucasia once again. The research on the following extracts of anthi-helminth influenced plants over animals were held and positive results were made: *Punicaceae-Punica granatum*; *Rosaceae- Amygdalus fenzliana*; *Asteraceae- Artemisia vulgaris, A. absinthium, A. scoparia, Tanacetum millefolium, Achillea wilhelmsii, Anthemis tinctoria, Inula helenium, Pyrethrum silaifolium, Matricaria recutita, Lepidotheca aurea, Arctium lappa*; *Hypericaceae-Hypericum perforatum*; *Lamiaceae-Thymus kotschyanus, Ziziphora serpyllacea, Satureja hortensis, Origanum vulgare*; *Iridaceae- Gladiolus italicus*; *Alliaceae- Allium ursinum, Allium sativum, Allium cepa*; *Cruciferae - Alliaria petiolata, Raphanus rostratus*; *Polygonaceae- Rumex acetosa*; *Ranunculaceae- Ranunculus acutilobus*; *Caryophyllaceae- Saponaria cerasroides*; *Leguminosae- Lotus angustissimus, Lupinus albus, Trifolium repens*; *Apiaceae -Ferula persica, Daucus carota*; *Chenopodiaceae-Anabasis aphylla, Betamaritima macrorhiza, B.lomatogona*; *Corylaceae -Corylus avellana*; *Elaegnaceae- Hippophae rhamnoides*; *Melanthiaceae- Veratrum lobelianum*; *Linaceae - Linum catharticum, Linum usitatissimum*; *Rutaceae- Dictamnus caucasicus*.

Keywords: ethnobotany, phytotherapy, anthi-helminth, veterinary medicine

POSTER PRESENTATIONS

PP-101

**New Nucleopolyhedroviruses from *Malacosoma* spp. (Lepidoptera: Lasiocampidae) in Turkey:
Isolation, characterization, phylogeny, and virulence**İsmail DEMİR¹, Remziye NALÇACIOĞLU¹, Zihni DEMİRBAĞ¹¹ Karadeniz Technical University, Faculty of Sciences, Department of Biology, Trabzon, TR
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Aim of the study: Nucleopolyhedroviruses (NPVs), members of the family Baculoviridae, are one of the most promising biological control agents of insects. They are enveloped viruses that have double-stranded, circular DNA genomes ranging in size from 80 to 180 kbp.

Material and Methods: NPVs were isolated from diseased larvae of the lackey moth, *Malacosoma neustria* and *M. franconicum*, collected from the northeastern part of Turkey. Electron microscopic observations showed that the polyhedra of the new isolates contain several virions with multiple nucleocapsids packaged within a single viral envelope. Restriction endonuclease analysis of viral DNAs indicated that they have different profiles compared to the previous isolates. The phylogenetic analysis of the amplified *polh* sequence of new NPVs showed their relation to the other NPVs from *Malacosoma* species.

Results: Our results indicate that the new viruses are different both from each other and from previously known *Malacosoma* NPV isolates. Therefore, they were named ManeNPV-T2 and ManeNPV-T3. Mortality values of ManeNPV-T2 for third instar *M. neustria* larvae ranged from 48% to 100% depend on the concentration of PIB. The virulence of ManeNPV-T3 which was tested against the third instar of *M. franconicum* and *M. neustria* larvae, indicated that 0.6×10^5 PIB per larvae caused 100% mortality within 10 days.

Acknowledgements: This study was supported by the Karadeniz Technical University Research Foundation (KTU 2005.111.004.5).

Keywords: *Malacosoma*, nucleopolyhedrovirus, characterization, phylogeny, virulence

PP-102

Fungal Pathogens of the Pine Processionary Moth, *Thaumetopoea pityocampa* (Lepidoptera: Thaumetopoeidae) in Turkeyİsmail DEMİR¹, Zihni DEMİRBAĞ¹, Ali SEVİM²¹ Karadeniz Technical University, Faculty of Science, Department of Biology, Trabzon, Turkey² Department of Genetic and Bioengineering, Faculty of Engineering and Architecture, Ahi Evran University, Kirsehir, Turkey
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Aim of the study: The pine processionary moth *Thaumetopoea pityocampa* is one of the most harmful pests to pine species in Mediterranean countries. They are also responsible for various allergic reactions in humans and animals. In order to determine fungal pathogens of the pest and find a more effective and safe biological control agent against *T. pityocampa*, we investigated its fungal pathogens in the Black Sea Region of Turkey and tested their pathogenicity on it.

Material and Methods: According to their morphological and molecular characteristics including ITS and partial sequence of EF1- α , four isolates were identified as *Beauveria bassiana* cf. Clade C (Rehner and Buckley in Mycologia 97: 84-8, 2005) and one isolate was identified as *Beauveria bassiana*. Insecticidal activity tests were conducted with 1×10^5 conidia ml⁻¹ concentration at 20°C temperatures and 55% relative humidity on the pine needles.

Results: Among these isolates, *B. bassiana* KTU-24, *B. bassiana* cf. Clade C KTU-66 and KTU-67 showed the highest virulence with 100% mortality within 10 days after application. *B. bassiana* isolate KTU-24 produced the highest mycosis value with %100. In conclusion, *B. bassiana* KTU-24 seems to be a significant candidate for further investigation as a possible biological control agent against this pest.

Acknowledgements: We would like to thank Dr. Richard Humber for his kind help with the morphological characterization of fungi.

Keywords: *Thaumetopoea pityocampa*, entomopathogenic fungi, virulence

PP-103

New Entomopathogenic Nematodes in the Eastern Black Sea Region of Turkey: Isolation, characterization, phylogeny, and virulenceİsmail DEMİR¹, Zihni DEMİRBAĞ¹, Zeynep ERBAŞ¹¹ Karadeniz Technical University, Faculty of Science, Department of Biology, Trabzon, TR
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Aim of the study:Entomopathogenic nematodes (EPN) in the families Steinernematidae and Heterorhabditidae are obligate parasites of insects and possess many attributes of the ideal biological control agents.

Material and Methods:During a few surveys of EPNs in various agricultural fields from distinct geographic areas in the Middle and Eastern Black Sea Region of Turkey in 2006-2012, some steinernematid and heterorhabditid species were isolated using the *Galleria*-baiting method.

Results:These isolates were identified as *Steinernema carpocapsae* (HY1, HY2, HY3), *S. affine*, *S. feltiae* (HY4, ZET31 and ZET76, *Heterorhabditis bacteriophora* (HY5, HY6, HY7, ZET02, ZET04, ZET09, ZET28, ZET35) and *H. megidis*, *Steinernema kraussei*, *Steinernema websteri* based on their morphometrics, and molecular properties including ITS sequences of isolates. *H. megidis*, *S. kraussei*, *S. websteri* are the first records from Turkey. In order to find an effective and safe biological control agent against *Melolontha melolontha*, *Leptinotarsa decemlineata*, *Agelastica alni*, and *Agrotis segetum* which are serious pests, isolates were tested on the pests, and the mortality rates reached 100% were provided depend on the concentration. According to all tests results, isolates have a good potential for controlling the pests, and the future studies should be concentrated on the use of these isolates at the pest management.

Keywords: Entomopathogenic nematodes, surveys, insecticidal activity

PP-104

The biological diversity of the coastal vegetation of the north-eastern part of the Smaller CaucasusZ.M. İSMAYILOVA¹, G.M. QULIYEVA¹¹Ganja State University, Azerbaijan
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Aim of the study: Intrazonal plants does not form free zone, but the zone is located within vegetation. Given the urgency of the problem of the North-East of the Smaller Caucasus the study of coastal vegetation was generated. The studies covered Ganjachay, Kurekchay, Goshgarachay riverbasins in 2015-2016. The study was carried out in the coastal vegetation over 100 geobotanical description. It was revealed that the cenophyc composition of water plants is limited. Compliance with the laws of the land falls down due to the reduced thermal regime. Water coastal flora total of 7 families, 80 species belonging to 36 generas. The river valleys of the grain - is widespread grass. For the 1st time 13 associations has been defined for the north-eastern part of the Smaller Caucasus water coastal.

Material and the methods: The river bank, water, wetlands, floodplain meadows, water, coastal, freshwater plants in different forms are intrazonal plants. Intrazonal plants does not form free zone, but the zone is located within vegetation. Given the urgency of the problem of the North-East of the Smaller Caucasus the study of coastal vegetation was generated. The studies covered Ganjachay, Kurekchay, Goshgarachay riverbasins in 2015-2016. The study was carried out in the coastal vegetation over 100 geobotanical description. It was revealed that the cenophyc composition of water plants is limited. Compliance with the laws of the land falls down due to the reduced thermal regime. During the studies more than 100 geobotanical description of water basin vegetation were carried out. It was revealed that the cenophyc composition of water plants is limited. It decreased naturally due to the reduced thermal energy. Fitocenopyc methods that were adopted for description of vegetation groups were used. "Flora of Azerbaijan" (1950-1961), "The concept of Azerbaijan flora"(2014), "The concept of the Caucasus flora"(2003-2014) were used, also "International code of botanical nomenclature " (2006-2011) was taking into consideration in naming species that participate in vegetation groups.

Results: Water coastal flora total of 7 families, 80 species belonging to 36 generas. The river valleys of the grain - is widespread grass. The basic families for the water coastal flora are Poaceae, Cuperaceae, Rosaceae, Fabaceae. Typical water, coastal and wetland plants are *Bromus inermis*, *Agropyron repens*, *Medicago falcata*, *Dactylis glomerata*, *Phleum rgatense*, *Agrostis tenuis*, *Anthoxanthum odoratum*, *Alchemilla caucasica*, *Potentilla argentea*, *Ledum palustre*, *Eriophorum vaginatum*, *Drosera rotundifolia*, *Carex caespitosa*, *Phragmites communis*, *Typha latifolia*, *Iris pseudacorus* and others. For the 1st time 13 associations has been defined for the north-eastern part of the Smaller Caucasus water coastal. Going up coastal highlands the growth of the species of *Polystichum paculeatum*, *Equisetum arvense*, *E. palustre*, *E. ramosissimum*, *Typha latifolia*, *T. angustifolia*, *Potamogeton pusillis*, *P. nodosus*, *P. lucens*, *Setaria verticillata*, *S. viridis* increases. The floodplain meadows lie like a wide stripe across the river banks and water basins rarely replaced with flood-lands forests. *Sanguisorba officinalis*, *Fritillaria meleagroides*, *Gentiana pneumonanthe*, *Gladiolus tenuis*, *Arenaria roduntifolia*, *Moehringia trinervia*, *Chenopodium botrus*, *Ch. album*, *Polygonum amphibia*, *Salix caprea*, *S. cinerea* and many other plants grow here. Though the banks of the rivers are the nearest places to the river-bed they are the driest parts and are consisted of empty sandy soil. The vegetation cover on universal consists of awnless brome, creeping couch-grass, cane. They have fleecy creeping root. In this condition awnless brome (*Bromus inermis*) exceeds.

Keywords: Smaller Caucasus, intrazonal, species, plant associations, vegetation

PP-105

Prevention of Toxic Rat Liver Damage by Natural Compounds: Cranberry Flavonoids and Melatonin¹E.A. LAPSHINA, ²T.N. BUDKO, V.I., ²KONDAKOV, ²A.M. KHOKHA, ¹L. B. ZAVODNIK¹ Y. Kupala Grodno State University, 230010, BLK 50, department of biochemistry, Grodno, Belarus² Grodno State Agricultural University, 230023, Volkovich str. 1, department of pharmacology and physiology, Grodno, Belarus
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Aim of the study:The present study was undertaken for further elucidation of the mechanisms of flavonoid and melatonin biological activities, focusing on the antioxidative and protective effects of cranberry flavonoids in free radical-generating systems and those on mitochondrial ultrastructure during carbon tetrachloride - induced rat intoxication. Daily melatonin (3 mg/kg b.w.) and cranberry flavonoid (7 mg/kg) administrations to rats during chronic carbon tetrachloride-induced intoxication (30 days) led to prevention of mitochondrial damage, including fragmentation, rupture and local loss of the outer mitochondrial membrane. Similarly, melatonin and cranberry flavonoid treatments of intoxicated animals reduced both plasma aminotransferase activities and urea level. In radical-generating systems, cranberry flavonoids effectively scavenged nitric oxide (IC₅₀ = 4.4±0.4 µg/ml), superoxide anion radicals (IC₅₀ = 2.8±0.3 µg/ml) and reduced 1,1-diphenyl-2-picrylhydrazyl radicals (DPPH) (IC₅₀ = 2.2±0.3 µg/ml), but the interactions with hydroxyl radicals were weaker (IC₅₀ = 53±4 µg/ml). Flavonoids prevented to some extent lipid peroxidation in liposomal membranes and glutathione oxidation in erythrocytes treated with UV irradiation or organic hydroperoxides as well as decreased the rigidity of the outer leaflet of the liposomal membranes. The hepatoprotective potential of cranberry flavonoids could be due to specific prevention of rat liver mitochondrial damage. The mitochondria-addressed effects of flavonoids might be related both to radical-scavenging properties and modulation of various mitochondrial events.

Material and Methods:Cranberry fruits (1 kg) were dried, crushed, blended in water (1l) at 25°C and filtered for preparation of cranberry extract. As is known, flavanol monomers (catechin, epicatechin, epigallocatechin gallate), proanthocyanidins (polymers of flavanols) and anthocyanin glycosides are the main components of cranberry flavonoids extracted from cranberry hulls. Other notable active components include phenolic acids, benzoates, hydroxycinnamic acids, terpenes and organic acids. For preparing stock solution the cranberry flavonoids were dissolved in PBS to a final concentration of 300 µg/ml. Rat model. The experiments were carried out on 40 male albino Wistar rats weighing 200-250 g. They were sacrificed according to the rules defined by the European Convention for the Protection of Vertebrate Animals Used for Experimental and Other Scientific Purposes. The rats were subdivided into 4 groups. The first group served as controls. The second group (CCl₄ - intoxication) received a subcutaneous injection of CCl₄ (1.6 g/kg b.w., 30 days, twice a week, as a 50% solution in olive oil, s.c.) and a physiologic solution. The third and fourth groups were given injections of CCl₄ and melatonin (3 mg/kg b.w., 30 days, i.g.) and CCl₄ and cranberry flavonoids (7 mg/kg b.w., 30 days, i.g.), respectively. The animals were sacrificed by decapitation 24 hours after the last injection. Mitochondrial ultrastructure analysis was performed on mitochondria isolated of each group using the method of electron microscopy. Measurements of liposomes membrane fluidity. The steady-state fluorescence anisotropy measurements of TMA-DPH and DPH probes incorporated into liposomal membranes were performed in the absence and in the presence of cranberry flavonoids (1-5 µg/ml) at 37°C using a Perkin-Elmer LS-55B spectrofluorimeter. The superoxide anion radicals were determined according to the method described by Nakagawa and Yokozawa [Nakagawa T, Yokozawa T. 2002] with minor changes. The concentrations of •OH radicals were measured using the spin trap DMPO according to Jang et al. [1967]. The free radical scavenging activity of cranberry flavonoids was measured by DPPH reduction. Reactive oxygen and nitrogen species were measured by oxidation of DCFH-DA to fluorescent DCF. The reduced glutathione content (GSH) in the erythrocytes treated with the oxidants was measured according to Ellman (1959), using the molar extinction coefficient $\epsilon_{412} = 13600 \text{ M}^{-1} \text{ cm}^{-1}$. The accumulated products of membrane lipid peroxidation (TBARS) in liposomes were monitored assuming that the molar absorption coefficient $\epsilon_{532} = 1.56 \cdot 10^5 \text{ M}^{-1} \text{ cm}^{-1}$.

Results: Prevention of rat liver mitochondrial ultrastructure damage by cranberry flavonoids during intoxication. In our experiments, after 30 days of CCl₄ treatment, the animals showed typical signs of intoxication. Daily melatonin and cranberry flavonoid administrations to intoxicated animals reduced both plasma aminotransferase activities and urea level. The ultrastructural analysis by electron microscopy showed that isolated mitochondria from livers of chronically CCl₄-treated rats displayed different sizes, a substantial enlargement of intracristae space with vacuolation up to detachment of the inner mitochondrial membrane and large vacuole formation and a more condensed matrix in comparison with those of control rat livers. The average surface area of a mitochondrion in this group decreased. We also demonstrated mitochondrial fragmentation, outer membrane rupture and local outer membrane loss for a large number of organelles in this group. Melatonin administration under intoxication considerably prevented mitochondrial fragmentation and markedly reduced the number of damaged mitochondria with substantial enlargement of intracristae space and detached inner mitochondria membrane. Treatment of intoxicated rats with cranberry flavonoids also led to prevention of mitochondrial fragmentation. In this group, mitochondria had an oval shape and a condensed matrix, as well as a moderately expanded intracristae space. However, various mitochondria displayed enlargement of the intracristae space with vacuolation followed by detachment of the inner mitochondrial membrane and large vacuole formation. Radical-scavenging activity of cranberry flavonoids in vitro. In cell-free radical-generating systems, cranberry flavonoids effectively scavenged free radicals, including nitric oxide and the superoxide anion radicals, but they had diminished scavenging activity towards hydroxyl radicals, as was measured by EPR assay. The flavonoids effectively reduced DPPH radicals. Melatonin increased the rate constant of DPPH reduction by the flavonoids. A control experiment in the absence of the flavonoids showed that melatonin at the concentrations used did not reduce the DPPH radical. However, as was measured by DCF fluorescence during oxidation of DCFH-DA in erythrocytes treated with UV-irradiation or organic hydroperoxides, the total RONS scavenging activity of the flavonoids was lower. Using a probe fluorescence anisotropy method, we showed a direct interaction of cranberry flavonoids with the membrane. The flavonoids decreased the anisotropy of fluorescence of the probe TMA-DPH incorporated into the outer leaflet of the liposomal membrane and did not change the anisotropy of the fluorescence of the probe DPH incorporated into the inner membrane leaflet. Therefore, the flavonoids increased the fluidity of liposome surface and did not incorporate into the inner hydrophobic part of the membrane.

Keywords: mitochondria, liver, cranberry flavonoids, melatonin, radical scavenging activity

PP-106

Population and Microbiological Studies of the Essential Oil of *Artemisia dracunculus* L. species in Azerbaijan Flora

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Aim of the study: *Artemisia dracunculus* (Asteraceae) is widely distributed in the Azerbaijan flora which is rich in essential oils. The flora location, flora genetics and biocological and morphological properties and essential oils of *Artemisia* L. genus species were determined in this study. *Artemisia dracunculus* are introduced in Absheron condition in relation to its ontogenetic structure.

Material and Methods: Scientific studies about *Artemisia* L. genus about its biocological features, life cycles, productivity monitoring of definite development phases and essential oils have been carried out for many years in Azerbaijan flora. Many young species senopopulation structures and reserves are studied during the researches. *Artemisia* L. species fitocenoses are studied by natural propagation of different senopopulations. Materials are collected according to general accepted population methodics researches. Collection of materials are performed in fields and transections dissipated by regular and scattering way. Transections are placed according to described facts: They should exaggregate of places, must characterize some selected species relatively high and low abundances. There are characterized the development phases of plants individuals using of T.A.Rabotnov and A.A. Uranov ontogenesis discreet description conceptions. Essential oil is obtained by hydrodistillation methods and dried in anhydrous sodium sulfate. Essential oil physical-chemical contrast determination are led by state standards. Characterization and identification of essential oil components were determined by GC.

Results: The observations were carried out 4-5 times in May-July 2013 and 2015, Talish zone, Diabar-Zuvand. They are not included other plants to their locality of fitocenoses mainly they are playing as edificators, other plants are taken part in field sides. They are observed from botanical determination of minority subalpine tall plants that there are existed wheat plants, miscellaneous plants, poisonous and non-poisonous plants. The observed *Artemisia dracunculus* L. species was under the following species: *Artemisia dracunculus* L. species below species: *Doronicum macrophyllum* Fisch., *Rumex alpinus* L., *Dactylis glomerata* L., *Elytrigia repens* (L.) Nevski, *Mentha longifolia* L., *Pyrethrum roseum* (Adam) Bieb., *Lamium album* L., *Senecio othonnae* Bieb., *Cirsium hygrophilum* Boiss., *Rosa arvensis* Huds., *Ranunculus elegans* C. Koch. 14 essential oil components are identified using the GC and the major components which detected in essential oil are following: citral b, geraniol, citronelol, citranelilasetat, epinepetalactol and etc. The antibacterial and antifungal properties of new synthesized essential oil have been studied as a cultural-test via gram positive *Staphylococcus aureus* and gram negative *Eseherichia coli* and *Pseudomosa auriginosa* bacteria. *Candida albicans* is used for the determining antifungal activity.

Keywords: *Artemisia dracunculus* L., biocology, essential oil, microbiology.

PP-107

Fungal diversity associated to the Winter moth

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Aim of the study: Apple production is one of the main agricultural activities in Georgia and *Operophtera brumata* usually causes damage of economic importance to Apples. Many parasites, predators and pathogens have been reported attacking of winter moth and the resultant biological control caused by these biotic agents maybe major factor contributing to the secondary importance of winter moth. In order to evaluate the diversity of fungi on winter moth in apple orchards Gori region, Georgia were collected dead and infected larvae, pupae and Imago.

Material and Methods: The diseased and dead insects were collected in Apple orchards from Gori region, Georgia. The collection of larvae, pupae and imago was performed randomly chosen trees. Totally were collected 3000 (1000 each) materials. For researches the collected pathological material was inserted into test-tube. The tubes were sealed and maintained at 30 °C, 16/8 hours light/dark regime, for an average period of 10 days. Larvae and pupae were daily observed, in order to detect their death or evaluate the insect emergence. Each time a fungal agent was growing on the surface of dead larvae or pupae, they were isolated by inoculating Potato Dextrose Agar. The colony morphology, spore size and shape were used for the first identification and to group strains Spores were collected from each isolate and used for DNA extraction. Molecular identification was achieved using the universal primers ITS1 and ITS4. To control of winter moth in the laboratory condition were tested most common fungi *Beauveria bassiana* and *Metharizium anisopliae* against the 1st and 2nd instars larvae. The mortality percentage was converted by Abbott's formulae.

Results: Based on the analysis from 3000 larvae pupae and imago were collected 10 species of entomopathogenic fungi: *Batkoa apiculata* (Thaxt.) Humber, *Entomophaga tenthredinis* (Fres.) Batko, *Paecilomyces farinosus* Brown et Smith, *Zoophthora radicans* (Brefeld) Batko, *Beauveria bassiana* (Bals.) Vuill., *Metharizium anisopliae* Var., *Neozygites fresenii* (Nowak.) Remaud. & S. Keller, *Pandora dipterigena* (Thaxter) Humber, *Eryniopsis caroliniana* (Thaxt.) Humber, *Sesquicillium candelabrum* (Bonorden) W. Gams. From them 2 species (*Batkoa apiculata* (Thaxt.) Humber, *Neozygites fresenii* (Nowak.) Remaud. & S. Keller,) were isolated from imago, 7 species from larvae (*Entomophaga tenthredinis* (Fres.) Batko, *Paecilomyces farinosus* Brown et Smith, *Zoophthora radicans* (Brefeld) Batko, *Beauveria bassiana* (Bals.) Vuill., *Metharizium anisopliae* Var., *Pandora dipterigena* (Thaxter) Humber, *Sesquicillium candelabrum* (Bonorden) W. Gams.) and 4 species from pupae (*Beauveria bassiana* (Bals.) Vuill., *Metharizium anisopliae* Var., *Pandora dipterigena* (Thaxter) Humber, *Eryniopsis caroliniana* (Thaxt.) Humber). The most massive species were *Beauveria bassiana* (Bals.) Vuill. and *Metharizium anisopliae* Var. They were tested against Winter moth in the laboratory condition. At the highest concentration (1×10^{10} spores/ml) mortality of first larval instars were (70%) after 10th days. Comparatively medium concentrations were also effective. In general increasing trend in mortality was a linear positive association between mortality and days of observation. The present study indicated that biodiversity of entomopathogenic fungi is very rich and their effectiveness very high. Strategies for the use of entomopathogenic organisms for insect control are basically the same as that for other biological control agents. They may be used to augment naturally occurring pathogens, conserved or activated in nature, introduced into pest populations as classical biological control agents to become established and exert long-term regulation of the pest or are used for rapid short-term control.

Keywords: Entomopathogenic microorganisms, diversity, winter moth.

PP-108

Biodiversity in cereal fields of Constantine high plains (north-east, Algeria)

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Aim of the study: Agricultural land use is one of the key pressures on biodiversity around the world. The impact of agriculture on biodiversity is attributed to the conversion of natural ecosystems to crop fields. Three hundred fifty nine fields of cereals were surveyed by stratified sampling in the Constantine high plains (north-east, Algeria).

Material and Methods: Three hundred fifty nine fields of cereals were surveyed by stratified sampling, during seven growing seasons. In each field the level of infestation was scored on a homogeneous surface of 50 to 100 m². For each species we noted index of abundance - dominance (+ to 5) according to the scale of Braun-Blanquet (Guinochet, 1973). The importance of the species was estimated on the basis of the frequency and average of abundance. After transformation of abundance indices as a percentage: +(0.1%), 1(5%), 2(17.5%), 3(37.5%), 4(62.5%) and 5 (87.5%), the average infestation for each species is given by the division of the sum of a percentages by the number of fields where the species was present (Bensellam & al., 1997). Species were identified following the « Nouvelle flore d'Algérie » (Quezel & Santa, 1962-63).

Results: Two hundred and fifty four species belonging to 34 plant families were identified. The results indicated that five families the Asteraceae, Fabaceae, Poaceae, Brassicaceae and Apiaceae were prevalent and accounted for 54.71 % of the species. Favourable means of dissemination (Asteraceae), rich production of seeds (Brassicaceae), and very good adaptation to cultural cycles of cultivation (Poaceae), helped to promote these families (Guillerm & Maillet, 1982). Some families give few species, but very important (Convolvulaceae and Polygonaceae). Annual and broad leaved species represent, respectively, 70 % and 87 % of all species, 82 % and 85 % of main species. Taleb and Maillet (1994) reported that 250 species were associated with winter cereals in southern Chaouia (Morocco), of these, 87 % were broad leaved. As a region of Mediterranean area, the constantine high plains has a flora rich in species with a localised distribution (Mediterranean species *sensu stricto*). The Chorological spectra show the importance of Mediterranean elements (63%) and influence of Euro-Asia. This element is represented by 20 taxa (or 7.87% of total), three of which are considered as major species in crops of this region and species. Cosmopolite species represent 7 of all species and 8 of main species. The frequency and density of 34 species made them potentially harmful to cereals, especially *Bunium incrassatum* (Boiss.) B.T., *Carduncellus pinnatus* (Desf.) D.C. and *Convolvulus arvensis* L. with are perennials. The most frequent species were *Papaver rhoeas* L., *Vicia sativa* L., *Avena sterilis* L., *Bunium incrassatum* (Boiss.) B.T., *Vaccaria pyramidata* Medik., which occurred in 73, 66, 58, 56 and 50 %, respectively. This species are considered by Guillerm & al. (1990) as part of main weeds infesting or invading the cultivated fields in the Western Mediterranean Basin. *Avena sterilis* is common all over the Mediterranean region. The increasing cereal monocultivation and late machine harvesting are factors favouring *Avena* spreading.

Acknowledgements: Thank you to the team of Laboratory of Valorization of Biological and Natural Resources.

Keywords: Biodiversity, biogeography, cereal field, spontaneous vegetation

PP-109

Physicochemical properties, bioactive components, antioxidant and antimicrobial potential of some selected honeys from different provinces of Turkey¹Omer ERTURK, ¹Sefine KALIN, ²Melek COL AYVAZ¹ Department of Biology, Ordu University, 52200, Ordu, Turkey² Department of Chemistry, Ordu University, 52200, Ordu, Turkeyoseerturk@hotmail.com

Aim of the study: The aim of this study to assess the physicochemical (HMF content, diastase activity, moisture, ash, acidity, sucrose, and invert sugar) properties and mineral (Na, Mg, K, Ca, Fe, Cu, Zn, Mn and Cr) contents and prove the antioxidative and antimicrobial activity of different kinds of nine honey samples (monofloral (chestnut, lavender, sunflower, acacia) and heterofloral (major nectar source of which were thyme, clover and astragalus)) produced in different regions of Turkey (Rize, Yalova, Isparta, Ordu, Amasya, Gaziantep, Muş, Sivas and Niğde).

Material and Methods: Honey samples, provided by Apiculture Research Institute, were harvested in May-July of 2011 and stored at 4°C. For antimicrobial analysis, samples were extracted with 70% ethanol and they were filtered through a 45 µm membrane filter. Antimicrobial activity was measured using diffusion disk plates and agar dilution method was used to ascertain the minimum active concentrations of the samples against organisms (Vanden Berghe et al., 1996). Diastase activity, moisture, ash, acidity, sucrose, and invert sugar were determined according to AOAC method (1990). HMF was determined after the addition of sodium bisulphate to the clarified honey samples (White, 1979). Mineral contents were determined directly in the ash solution at the mg/kg level by atomic absorption spectrometry at a suitable wavelength (Silva et al., 2009). Aroma analysis was performed using GC-MS according to solid phase microextraction technique. Total phenolic contents (TPC) and ferric reducing antioxidant power of the honeys were determined according to the method based on Folin Ciocalteu reagent by using gallic acid (GA) as standard (Slinkard and Singleton, 1977) and method of Benzie and Strain (1996) by using trolox as standard, respectively. Furthermore, DPPH free radical scavenging activity of the samples was established.

Results: All honey samples had HMF, moisture, ash, acidity and sucrose values of the legal parameters within the established intervals (Turkish Food Codex, 2005) except for diastase activity and invert sugar. Potassium, which accounts on average for 81% of ash weight, was the most abundant of the elements determined with the mean content of 240 mg/kg. However, manganese constitutes an average 0.02% of ash weight, which was the lowest of the elements determined with the mean content of 0.06 mg/kg. 87 volatile compounds belonging to various compound classes: ethers, esters, alcohols, carboxylic acids, aldehydes, ketones, hydrocarbons and other compounds were detected. Monofloral honeys have more important antimicrobial inhibitory capacity than heterofloral honeys and *Yersinaenterocolitica* was the most sensitive microorganism, while *Clostridium perfringens* was the most resistant. Honey samples have also antifungal activity, moderately. The TPC values of the samples were ranged from 24.50 to 123.70 mg GAE/100 g honey. Based on the results of the FRAP assay, we conclude that honey samples have antioxidant capacity via electron donating reduction almost the same extent in the range of 1.00-5.49 µmol TE/100 g honey. SC₅₀ values for DPPH scavenging activity were ranged between 14.21-208.58 mg/mL.

Keywords: Honey, volatile compounds, antimicrobial, antioxidant capacity, physicochemical parameters, aroma profile

PP-110

The Importance of Plant Diversity in Turkey¹ Tuğba Bayrak ÖZBUCAK, ¹ Öznur ERGEN AKÇİN¹ Department of Biology Faculty of Arts and Sciences University of Ordu, Turkey
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Aim of the study: Biological diversity is the most important natural richness of a country. The conservation and maintenance of national biological diversity are of great importance for sustainable global biological diversity and natural balance. Turkey is one of the most important centers in the world with relations to the flora. The region is floristically rich and the gene center of many plants found around the world. Turkey is one of the richest areas in the middle latitudes in terms of plant diversity. Therefore, in this leaflet will be explain the importance, reasons and floristic work of plant diversity of Turkey. However, it will be mentioned phytogeographical importance of Black Sea Region which is geographically known as North Anatolia.

Material and Methods: This study was conducted as considering various scientific publications. The most important of these publications are Flora of Turkey (Davis, 1965-1988) and A Checklist of the Flora of Turkey (Vascular Plants) (Güner ve ark., 2012).

Results: In this flora, there are a lot of interesting species such as halophytic species (especially *Chenopodiaceae* sp.), semi-desert plants (*Anabasis aphylla*), carnivorous plants (*Drosera anglica*) and nickel hyper accumulators (*Alyssum* sp.). In Turkey, the rate of endemism (30%) is relatively high when compared with other European countries. However, this diversity and these endemic plants are under considerable threat. The habitats in mountainous areas and coastal dunes are under the threat of human beings due to the tourism activities. Especially, Turkey's mountains are center for collection of wild bulbs, and during the 1980s wild stocks of particular bulbous species were increasingly targeted by the horticultural trade. Wild harvesting is damaging the bulbous plant populations. Turkey has a coastline of over 1,500 km in this region. It is geographically known as North Anatolia and is divided into the western (from Edirne to Sinop), central (from Sinop to Ünye) and eastern (from Ünye to Georgian border) parts. *Phytogeographically*, this part is in the *Euro-Siberian* region. The Euro-Siberian floral region is divided into the Euxin and Hyrcanien. The Melet basin is an area rich in plant species with Euxin and Colchic flora is dividing, higrophilous- terrestrial species, the transition is observed exceptionally beautiful in a basin area. Most of the area was formed riparian zones. The riparian zones are important ecosystems due to numerous plant and animal communities with high biodiversity such as such as streams and rivers. However, they are important interfaces (eco- tones, transition zones) between streams, rivers and the surrounding terrestrial habitats.

Keywords: Plant Diversity, North Anatolia, Turkey

PP-111

Plants considered as non-wood products in Forests Around Eskisehir

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Aim of the study: The purpose of this study, which spread in Eskisehir forest, identification of medicinal plants can be regarded as non-wood forest products and draw attention on the situation of endemic taxa.

Material and Methods: Literature study was madeto determine themedical plants can be regarded as non-wood forest products, by using The Flora of Turkey, published articles, thesis and books about Eskişehir flora etc.

Results: It was found that there are 145 genera and 242 taxa (204 Dicotyledonae, 38 Monocotyledonae) belonging to 40 families under natural forest distribution in Eskisehir. 68 of these taxa were endemics and elements of different phytogeographic regions. 54 of these 242 plant taxa have medical importance. It is important to evaluate these taxa economically. Another important issue is that some of the endemic taxa have medical importance at the same time.

Keywords: Eskisehir, non-wood product, medicinal plant.

PP-112

Determination of phenolic compounds of *Nigella sativa* by ultrasonic extractionBatuhan DOLOGLU¹, Sibel YIGITARSLAN²^{1,2}Chemical Engineering Department, Suleyman Demirel University, Turkey
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Aim of the study: Gallic acid, 3,4,5- trihydroxybenzoic acid, is known as the organic acid. Gallic acid found to into mazi, sumac, witch hazel and tea leaves. Its chemical formula is $C_6H_2(OH)_3COOH$. Gallic acid has some preferred properties; e.g. anticancer, immunostimulant, and antiallergenic. Such kind of properties puts it for use in drug production processes into the first stage. According to the literature, the optimization by using response surface method is the most applicable way of maximizing the yield. Thus, the aim of the study is determined to optimize the extraction yield of gallic acid from *Nigella sativa*.

Material and Methods: The raw material of *Nigella sativa* was obtained from the herbalist. Other chemicals were at analytical grade supplied from Sigma-Aldrich. Ultrasonic extraction experiments were carried out by multiple-parameter optimization. In single parameter section, the most appropriate form of ultrasonic application type (degas, sweep and normal) was determined at the conditions; 30°C, 1g plant/40 ml methanol and 4 min. The samples were analysed spectrophotometrically at 765 nm to determine the optimum ultrasound recourse method. Other parameters affected on the extraction yield including temperature, extraction time and solid/liquid ratio were used for optimization of the extraction in multiple-parameter section. After the extraction, the samples were filtrated and stored in a tightly closed test tubes in order not to vaporize methanol. In the analysis, the diluted samples (400µl/10 ml) were reacted with 0.5 ml folin containing 1.5 ml sodium carbonate solution (1.8M) by preparing a total volume by distilled water. They were reacted in an incubator during 2 hours. The amount of gallic acid in the samples was determined by spectrophotometrically and calculated by using a calibration curve prepared with pure gallic acid at the same conditions.

Results: In the single parameter optimization, the most effective ultrasound application method was found as sweep. Then in the multiple-parameter section, selected experimental parameters were employed into Box-Behnken design. At the coded conditions, fifteen experiments were realized and the amounts of gallic acid obtained in each were entered in the related section of Design_Expert program. At the end of the statistical analysis, reduced cubic model was determined as the appropriate function to describe the extraction yield surface ($R^2=0.9986$). According to the results, the most effective parameter was determined as solid/liquid ratio comparing to the others investigated. In the case of two-parameter relations, it was found that solid/liquid ratio and ultrasonic extraction were interrelated. The optimum extraction conditions were determined by using numerical optimization part of the program as 30°C, 1g/40ml methanol and 30 min. At those optimum conditions 1.6 mg gallic acid was produced from each gram of *Nigella sativa*.

Keywords: Gallic acid, ultrasonic extraction, *Nigella sativa*, response surface method, phenolics.

PP-113

Regulation of Microclonal Reproductoin According to the Nutrient Medium Components of *in vitro* Culture of *Staphylea colchica*Nino MANVELIDZE¹, Nana ZARNADZE², Sofiko MANJGALADZE³, Ciala BOLKVADE⁴, Ketevan DOLIDZE⁵*Batumi Shota Rustaveli State University, Georgia*
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Aim of the study: Any cultivated plant possesses a number of abilities, the realization of which in selection can be carries out utilizing in vitro techniques. The researchers distinguish some spectra among which the most essential is the expansion of genetic basis by producing new initial material. The criterion of carrying out this process is the factor of nutrient medium and modification of its constituent components. The object of the study was *Staphylea colchica* spread in Batumi Botanical Gardens.

Material and Methods: For the in vitro cultivation we have isolated vegetation sprouts, and for callus genesis we have used 5-6mm fragments of leaves taken from sterilized cultures. The sterilization of primary material proceeded with 0,2% diocide water solution for 20 minutes of exposition. Explant cultivation proceeded on different modification nutrition areas of Gamborg (B₅), which were different mainly according to hormone nature, concentration and their correlation. Nutrition area pH was 5,8-5,9, for callus induction we have used auxines: indolebutyric acid, naphthoylacetic acid, and causing organogenesis proceeded by using cytokines – benzylaminopurine and 2-izopentiladinine, independently and in correlation with auxines as well. For callus induction, cultures incubated in thermostat, darkness, 26-27⁰C temperature, and for organogenesis realization light was required. 2-3 Klux of light, with 8/16 hour phytoperiod and 26-27⁰C temperature. We registered the results every 25-30 days, we determined the frequency of callusogenesis and regeneration in percents, the growth intensity of callus by 5-point system, in each variant we examined 20 explants two times.

Results: We put apical and axillary buds in nutrient mediums of different composition, and obtained different effect. Weak buds the average height of which didn't exceed 2.5-6 mm developed in the medium with B₅ and NN mineral salts. The leaves developed weakly and at the end of the passage turned yellow and fell down. In every case the morphogenic callus was developed in the basal end of the initial explant, but their buds were not characerized by stem morphogenesis. That's why we totally ignored NN nutrition and the composition of Gamborg nutrient medium was different according to the mineral salts and vitamins. The phase of bud development reduced, normal buds developed out of meristem buds diffused on the callus surface, which number was 12.4 units; leaf-formation was increased, apical dominancy also occurred. This process took place during two passages. At the end of the II passage the leaves again turned yellow and fell down. For the regulation of bud formation and development the explants were moved into Murasige-Skoog nutrient medium. The desirable effect was conditioned by the change of nitrogen food source and vitamins. In the II passage the buds with thick stem and dark green leaves were developed through the reproduction, the callus was well-developed in the basal part. The period of sprout-formation was reduced and consisted of 10-12 days. As a result of our research, the supply of explants with mineral food elements in the presence of cytokinin causes the production of well-developed conglomerate system of buds and sprouts and induction of axillary buds ploriferation on apical sprouts. Hence, in order to provide high efficiency of *Staphylea colchica* microreproduction, it's essential to use nutrient medium with cytokinins.

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Keywords: morphogenesis, hormone, nutrient medium, callus.

PP-114

Preservation of Caucasian Persimmon (*Diospyros lotus* L.) in Gene Fund of Lankaran-Astara Region of Azerbaijan

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Aim of the study: Recently there are so many species that are about to disappear in their natural conditions. Therefore the question rises about variety in adaptation mechanisms of plant species. Under the current ecological conditions, the problem is how to preserve rare plant species because the biodiversity is very important from theoretical and practical aspects. Taking into consideration in Lankaran-Astara region, the aim of the study is to investigate the preservation of *Diospyros lotus* in line with its biological features and the biochemical component of its fruits. The location of Caucasian persimmon (*D. lotus* L.) in biodiversity of the region, different ways of gene fund conservation and sustainable utilization of the species were investigated and positive results were obtained.

Material and Methods: The research was based on the materials collected during the observations in field routes and expeditions within 2013-2015 years. Monitorings (observations, field experiments, expeditions) have been carried on to study of the position of this species in the regional flora and its bioecological specifics. For studying the productivity and the chemical compositions of the crops biochemical researches were conducted and *in situ* investigations were carried out. The active collections for maintaining and continuous utilization of the genetic stocks were made. Various methods have been used to study the chemical composition of the plant. Vitamin C and other vitamins in the fruits have been determined with the help of Tilmates method. This is a specific method to define the amount of vitamins in a plant and characterized for its accuracy. Alongside with that, the method of iodometrics has been applied. Vitamin K has been defined with the spectral method.

Results: Different forms of morphological, biological and agricultural qualities of Caucasian persimmon (*D. lotus* L.) of the Ebenaceae family in different populations have been met throughout the study in the regional biodiversity. The Lankaran-Astara region provides a chance for spreading of Caucasian persimmon in different ecosystems for its mild climate, the majority of rainfall and sunny days, the existence of the humid air mass. This type has spread about 1500 m above the sea level with oak-tree (*Quercus*), iron tree (*Parrotia persika*), hornbeam in upland and foothill areas. Ripe fruits are used in fresh or dried forms. It is found that 24% sugar, 1,6% protein, 0,83 fat, about 54% vitamin C, 0,32% organic acids, 0,15% vaccine items and others in ripe fruits. There exist about 0,004-61 mg different elements, including aluminium, barium, copper, chrome, iron, nickel, silica, strantium, vanadium, phosphorus, magnesium, natrium (sodium), potassium, calcium etc. per 100 gr of dried fruits. For preservation of the gene fund of Caucasian persimmon which has a rich biochemical content and pharmacological importance, traditional and modern methods have been used.

Keywords: Caucasian persimmon, biodiversity, gene fund.

PP-115

Bio-Ecological and Modern Features of Eastern-Asia Introducents in Azerbaijan Climate ConditionZ.H.ABBASOVA¹, E.Kh.SALAHOVA², F.N.RUSTAMOVA³, K.G.AGALARLI⁴^{1,2,3,4} *Institute of Dendrology Azerbaijan National Academy of Sciences**Baku, Mardakan, S. Yesenin 89**zemfira_abbasova@mail.ru*

Aim of the study: The collection funds Dendrology of ANAS Institute had been introduced more than 600 species of trees and shrubs, of which about 220 species of East Asian flora (EA). The aim of research work is contained on study of bio-ecological features and modern condition of Eastern Asia Flora (EA) trees and shrubs species, give an ecological assessment of dry-subtropical condition of Azerbaijan.

Materials and methods: Absheron peninsula is located on western shore of Caspian Sea in bordering with middle and south parts of Main Caucasus ridge. During last year we have carried out phenological observation on 200 introduced trees and shrubs species, noticed the start and the end of vegetations, flowering and fruiting phases, growing of shoots. Before vegetations are observed phase of buds swelling, after end of beginning mass of leaf fallen. Research rhythm of phenological observations allows us to define the association between the beginning and the end of the vegetation species of trees and shrubs in the dry subtropics and therefore clarifying the timing of agro-technical measures by improving the adaptability of plants from botanical and geographical areas of Eastern Asia Flora (EA).

Results: In collection of Institute of Dendrology are introduced more than 600 trees and shrubs species – from them 220 species are from EA flora. Most of EA flora representatives are found in Azerbaijan flora in solitary forms. In climatic condition of EA floristic area is heterogeneous, which successful introduced species are: *Lonicera japonica*, *Ligustrum japonicum*, *Lycium chinense*, *Broussonetia papyrifera*, *Berberis julianae*, *Berberis thunbergii*, *Buddleia davidii*, *Petunia* sp., *Eriobotrya japonica*, *Firmiana platanifolia*. Heat-lover species from China and Japan flora especially trees and shrubs of central and south regions are well adapted in Azerbaijan climate condition. The noticeable species are: *Abelia chinensis*, *Cryptomeria japonica*, *Chaenomeles japonica*, *Eriobotrya japonica*, *Pittosporum heterophyllum*, *Chamaecyparispisifera*. Some species are not resistant to hard winter and dry period of yearas *Firmiana platanifolia*. There are well adapted in our Institute of Dendrology trees and shrubs from The Central China and Japan-Korean floristic areas: *Euonymus japonicus*, *Celtis bungeana*, *Securinega suffruticosa*, *Juniperus chinensis*. In dry subtropical condition of Absheron are cultivated some of south China humid subtropical plants as – *Lagerstroemia indica*, *Viburnum*. The study of seasonal rhythm of development and dynamic growth of EA plants are important by introduction and revealing of new perspective species in this environmental condition. An intensive growth is occurred in most trees and shrubs from EA flora by humidity of soil and air in 85-90%, air temperature in 22-23^o and soil temperature in 18-24^o (as in *Chaenomeles japonica*, *Broussonetia papyrifera*, *Ginkgo biloba*, *Labirnum anagyroides*, *Ligustrum japonica*, *Lagerstremiya indica*). The most intensive growth is observed in May and June and last 65-80 days. The vegetation period is fluctuated among 168 to 210 days. Researched trees and shrubs from EA flora are grouped into 3 sections of prospects: I group (more perspective) - II group (medium perspective) - III group (less perspective). Control of the viability of the seed group of EA flora species is shown that 90% of fruit-bearing species are formed developed seeds with viable germinations (laboratory germination from 40 to 100%). Currently are used in street side greening, park building, in landscape design typical subtropical tree plants from EA flora.

Keywords: East Asian flora, eco-biological features, landscape architecture, introduction and acclimatization, assessment of adaptation, prospects.

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Gallic Acid Determination of *Plantago lanceolata* with Ultrasonic Extraction by Response Surface MethodologyGizem EMNIYET¹, Sibel YIGITARSLAN¹^{1,2}Chemical Engineering Department, Suleyman Demirel University, Turkey
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Aim of the study: Today's generally used approach for treatment of diseases is the production drug components from a plant. One of those plants is *Plantago lanceolata* that can growth in almost every place. It is not used in daily life but has reported beneficial properties; like treatments for chest aches, throat infections, skin problems etc. Maybe the most important application area of those is the treatment of cancer, the widely distributed disease in the world. Thus, the aim of the study was determined as to investigate the gallic acid content of *Plantago lanceolata* by using ultrasonic extraction with a multiple parameter optimization method.

Material and Methods: Dried *Plantago lanceolata* was obtained from herbalist. Then the material was crushed and sieved. Temperature, Solid/Liquid ratio and ultrasonic application time were experimental parameters. The temperature values were 30-50°C; solid/liquid ratio values were 1/30-1/50 g/ml; ultrasonic application times were 4-12 minutes. In order to find the most effective sound waves type, experiments were done at each level of waves (Normal, Sweep, Degas) and then with this measured material was extracted by ultrasonic extraction process using 30 ml methanol at 30 °C during 3 minute. After extraction step, absorbance values were read from UV Spectrophotometer at 415 nm. According to values, the most effective wave type was determined as "Sweep". Thus, experiments continued at this level. Then 15 probabilities were produced from them and samples were prepared. Box-Benkhen design was used and spectrophotometric measurements were applied for determination of total flavonoid as quercetin equivalent. In the analysis, 0.5 ml folin-ciocalteu, diluted samples and 1.9 M NaCO₃ mixtures were prepared. All of the tubes were closed with parafilm in order not to vaporize methanol. The test tubes were reacted in an incubator during 2 hours. The absorbance values were obtained spectrophotometrically at 765 nm. Gallic acid amounts were calculated from the calibration curve.

Results: In the experimental section, the results showed that the best application method for ultrasounds was "sweep" mode. According to this result, the Box-Behnken design was applied to selected parameters at this mode. Different model were tried for representation of the surface of the extraction, and reduced cubic model was found to be acceptable ($R^2=0.9951$). According to the model derived, the most important parameter on the yield of gallic acid was found as ultrasonication time, followed by solid/liquid ratio, and then extraction temperature. Contour graphs and three-dimensional surface plots were obtained. It was determined that at the optimum conditions (40⁰ C; 1g/50 ml, 9 min), 1635 mg gallic acid was found to be produced, by using the numerical optimization of the computer program.

Keywords: *Plantago lanceolata*, gallic acid, ultrasonic extraction, response surface methodology

PP-117

Traditionally Used Wild Plants in Azerbaijan: In An Example of Tovuz-Gazakh RegionsVafa ABBASOVA¹, Mahila SHAHMURADOVA¹, Sayyara IBADULLAYEVA¹¹ *Azerbaijan State Agrarian University*

Aim of the study: Since ancient times, plant species included to Azerbaijani flora have been used for both food and medicine, but also for technical purposes by people. These are exacted with a peculiar ways in some regions. In all regions, wild food crops of flora are being gathered spontaneously and sold by people in the markets, substantial research was conducted on them in Tovuz-Gazakh regions, ethnic-use features of vegetables, fodder, technical and medicinal plants were studied. During studies it was revealed that, useful plants more than 300 species belonging to the 151 genus united in 63 families representing the flora in the region are being used for various purposes by people since ancient times.

Material and Methods: Research were conducted in the years of 2015-2016 in various natural geographical zones on Tovuz and Gazakh regions of Azerbaijan, forest, grassland, mountain xerophyte natural floristic complexes, as well as, agrofytocenosis has been studied. During studies, plant reserves, density, their role in plant groupings and generally all bothanical drawings were obtained. 50 routes implemented on research regions in 8 areas that is 25 m² of each, 100 m in length, 10 m in width in order to learn plant reserves and density. Ethnobiology gaze of both rural and urban populations was considered. Data collection was in the form of personal conversations with the older generation having the best knowledge of the methods of traditional medicine and using them in the kitchen, as well as cabinet makers, carpenters, musical instruments makers, also as well as scientific papers prepared by scientists in this field were reviewed. Etnobotanic research methods were carried out by ways of field ethnography, observation, questionnaires, surveys, interviews, comparative and historical methods and component analysis. Most of the time, technical writing tools have been used in the supervisory process: voice recorder, movie cameras (ipad) and camera.

Results: Wild vegetable crops constitute the vast majority of edible wild plants. Thus, 5000 edible plant species distributed in the world that, 1200 species of these belonging to 78 families are vegetable plants, 59 families (861 species) included in Faboideae class, 19 families (336 species) included in Cypridioideae class. 700 species of these vegetable crop types are in wild flora and 500 species are in the cultural flora. Currently, these plants are being used in raw or cooked forms by the population of the village. Approximately 500 thousand plant species is known to the science that, up to a total of 290 plants described in atlas of medicinal plants. However it does not meant that the rest of the plants are useless. That is why, ethnobotany started to be studied in different regions of Azerbaijan. During studies it was revealed that, useful plants more than 300 species belonging to the 151 genus united in 63 families representing the flora in the region are being used for various purposes by people since ancient times. Systematic analysis of the useful plants were carried out in Tovuz and Gazakh regions. These plants have been distributed with five branches. Equisetophyta from high spores are represented with 3 species, and Polypodiophyta are represented with 2 species. In the region, Gymnosperms are represented with 8 species belonging to 4 genus united in 4 families. And angiosperms are combined in two classes (Magnoliales-Magnoliopsida and Apocynaceae-Liliopsida). Angiosperms was ranked on 50th place with domination in 11 subclasses, on 31 overrow in 300 species belonging to the 151 genus united in 63 families. Life forms of species has been appointed by taking into account winter adaptation signs of surface bodies, placement of plant buds with regard to surface on unfavorable conditions, and the principle of renewal. It was revealed that, the adaptation of plants to residential areas having a different degree of humidity, adaptation signs acquired in connection with the adaptation allocates them to different ecological groups.

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Influence of Erosion Process on Vegetation Cover in Shamkir-Yevlakh (Azerbaijan) DistrictNarmin SADİGOVA¹, Gasimzade TUBUKHANİM²¹Azerbaijan State Agrarian University²Department of Agrarian Sciences of ANASlbadullayeva.sayyara@mail.ru

Aim of the study: In this study, vegetation cover on irrigated areas of Shamkir water reservoir and farms of Yevlakh districts affected by erosion was shown. Rate of the index of erosion sensitivity has been found that high value of erosion index in Shamkir reservoir as results of water increasing, respectively in Yevlakh district as results of regular irrigation: the angle of inclination a-maximum of 60°, for each area has 45° as also all another parameters have maximum level.

Material and methods: Erosion and degradation affected sampling sites of Shamkir and Yevlakh territories of Azerbaijan have been visited in 2014-2015. Index of erosion and topographic relative humidity were determined for this territory. Vegetation cover was studied by Mirkin method.

Results: For mapping of land territory determination of plant communities is one of the most important specification. At first in determination of RTHI - Relative topographical humidity index are important parameters of decreases in plant communities and formation not typical for these territory plants. The maximum value of Relative topographical humidity index – 60.

Volatility index was calculated as 77,7. The value of the low-risk method 0-33, the average risk-34-67, 68-100 is considered high risk according by method. So after study 7 volatility in population SEI consist 77,7. This indicates the destruction of 70% of plant communities of the flora. Influence of antropogenical, technological and another ecological factors in modern conditions on phytosenosis have been changed in biotopes (regeneration and digression) and as results took place succession. As a result, in modern vegetation of both regions formed wormwood semi-desert with warmwood-ediphicator (*Artemisia fragrans*). Earlier this hole in the steppe and grassland dominated by plants, but now are found in the spots or interzonal way. Determined that the productivity of the aboveground part of domination phytosenosis of wormwood semi-desert is changing between 9,9 c/h -29,2 c/h depends from soil musture. It was revealed that the total weight of the semi-desert phytocenosis reduced in every year depends from ecological factors. So, for protection of nature genofound must create reserves and also sowing the seeds of valuable forage crops for prevention of degradation and succession and spent surface soil improvement.

Keywords: erosion, erosion rate, flora, vegetation.

PP-119

Study Results of Some Spicy Plants Belonging To Apiaceae Lindl. Family in the Flora of AzerbaijanS.T. AKHUNDOVA¹, S.R. RAFIYEVA², N.A. ASGAROVA², S.J. IBADULLAYEVA²¹Azerbaijan State Agrarian University²Department of Agrarian Sciences of ANASsayyarajamshid@yahoo.com

Aim of the study: *Heracleum trachyloma* Fisch. & CAMEy., *Pastinaca armena* Fisch. & CAMEy. and *Prangos ferulaceae* (L.) Lindl. from *Apiaceae* Lindl. family has perspective as both medicines and food, as well as forage. 1-1,9% essential oil obtained from seeds of *H. trachyloma*. *Pastinaca armena* Fisch. & C.A.Mey is one of the most important species for food and medicine. Its fruits has spicy smell and a weak astringent taste. The young scion and the roots are eatable. 0,3-1,3% essential oil exists in its content. *Prangos ferulaceae* (L.) Lindl. can be found on mountainous zones of Nakhichevan Autonomous Republic and Lesser Caucasus of Azerbaijan flora. Immature fruits have spicy smell and bitter taste. In the mountain - meadow phytocenosis of Azerbaijan widespread, it is discovered that 0,29-0,31% of the essential oil exist plant's dry mass.

Material and Methods: Researches were conducted in 2014-2015 on various Lesser Caucasus foothills of Nakhchivan highlands, Ganja-Kazakh natural florious districts. The scope of research was from 1000 m to 2500 m sea level. During studies, plant reserves, density, their role in plant groupings and generally all botanic drawings have been obtained. 15 routes were conducted on research districts each of the area was 25 m², 100 m of length and 10 m of width in order to know plant reserves and density, the abundance of plant and reserves were calculated. Essential oil was obtained on the basis of hydrodistillation method. The composition of the component of essential oil has been determined through mass spectrometry.

Results: 181 species of *Apiaceae* family occur in the flora of Azerbaijan. 78 of them are spicy aromatic plants. Biological reserve of *H. trachyloma* is 2850t for Shahbuz district, and 514t in the foothills of Murovdagh, Goygol region. Annual plant reserve in the research area have been set as 620 s/ha. and 420 s/ha. Shahbuz district of the Nakhchivan AR (1700-2500 m.) *H. trachyloma* essential oil was 5,62-9,41% in seed, and 2,91-3% in floral; Murovdagh slopes of Goygol region (2200 m. from s.l) *H. trachyloma* essential oil was 4.49% in seed, and 1.65% in floral. There are mainly esters (50-70%) and terpenes (35-40%) in the composition of the essential oil. Taking into account all of these given, plant has been introduced in different years in Azerbaijan. Its transition to the culture is recommended for the wide range usage. *Pastinaca armena* is available in the Nakhchivan AR only – in Azerbaijan. Its fruits have spicy smell and a weak astringent taste. Its young scion and roots are eatable. Essential oil in its leaves (0.3%), fruit follicles (1.3%) and seeds (1.9%) gives it aromaticity. Its fruit follicles contains of vitamins (vitamin C), B₁, B₂ and sugar. *Prangos ferulaceae* (L.) Lindl. type can be found in mountainous regions of the flora of Azerbaijan. Immature fruits have spicy smell and bitter taste. Plant improves the digestive system, therefore, it is regarded as a relaxing in dinner among the people. *Prangos ferulaceae* include to the culture is recommended. According to our studies it was discovered that dry mass of the plant has 0,29-0,31% essential oil. We recommend growing *Heracleum trachyloma*, *Pastinaca armenica* və *Prangos ferulaceae* in culture as they are learned enough perspective spicy types from the point of essential oil. Some other types of *Apiaceae* family are also interesting for future research and selection process.

Keywords: *Heracleum trachyloma*, *Pasternaca armenica*, *Prangos ferulaceae*, wild vegetables, essential oil, vegetable reserves, introduction

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Antimicrobial Features of Essential Oils of Some Species in Apiaceae FamilyP.V. ZULFUGAROVA¹, H.Z. GASIMOV²¹*Dendrology Institute of the ANAS, Azerbaijan*²*Nakhchivan State University, Azerbaijan*

Aim of the study: Essential oils were received from different organs of the *Zosima orientalis* Hoffm. species and *Johrenia paucijuga* (DC) Hoffm. (Apiaceae Lindl.). In different years, essential oils in all of the plants seeds were as follows: *Zosima orientalis* 1.89 – 2.01%, *Johrenia paucijuga* 0.19 – 0.35%. Essential oil amount in the flowers and leaves were inessential. As a test specimen was taken *Staphylococcus aureus*, *Escherichia coli*, *Pseudomonas aeruginosa*, and as a representative of fungus was taken *Candida albicans*. Antimicrobial properties of the essential oils of the species *Zosima orientalis* and *Johrenia paucijuga* have been studied as well as it was ascertained that essential oils can be used as antifungal means. Thus, the essential oil received from the species *Zosima orientalis* may be applied as an antifungal agent in the preparation of drugs.

Material and Methods: The investigated by us species are widely spread mostly in forests, bushy, forest glades, steppes, orchards, meadows and gardens of Azerbaijan as. *Zosima orientalis* Hoffm. and *Johrenia paucijuga* (DC) Hoffm. in the low and middle belts of the Nakhichevan Autonomous Republic. The phenological observations were held on the base of Beydman Methods during the whole season. Output rate of the essential oil was defined by the Ginsberg Method. Essential oils were defined by means of disk diffusion and purification series method applied against microbes.

Results: Some from 800 plant species with essential oil have formed in Azerbaijan's rich and colourful vegetation. Among them, species related to *Apiaceae Lindl* family are of significance in terms of their essential oil features. Essential oils were received from different organs of the species *Zosima orientalis* Hoffm. and *Johrenia paucijuga* (DC) Hoffm. In different years, essential oils in all of the three plants' seeds were as follows: *Zosima orientalis* 1.89 – 2.01%, *Johrenia paucijuga* 0.19 – 0.35% essential oils. Essential oil amount in the flowers and leaves were inessential. The studied species are high importance in terms of medicine. In the species *Zosima orientalis*, coumarins such as *zozimin*, *deltoin*, *bergapten*, *imperatorin*, *izobergapten*, *izopimpinellin*, *pimpinellin*, *sfondin*, *umbelliferon* etc. were found. Oil with 20.1% fat was found in the seeds. From the species *Johrenia paucijuga* were received crystalline *crocaton* with the composition $C_{11}H_{12}O_4$, β -*sitosterin*, *furocoumarin bergapten*, aromatic complex ethers etc. Taking all these into account, essential oils received from the abovementioned plants were subjected to microbiological examination. Antimicrobial features of the essential oils received from the aforementioned plants were studied by a disk-diffusion method. As a test specimen was taken *Staphylococcus aureus*, *Escherichia coli*, *Pseudomonas aeruginosa*, and as a representative of fungus was taken *Candida albicans*. Bacteria were maintained in meat infusion agar at 37°C in the course of 1 day, and with funguses in the environment of *Saburo* at 28°C, 2-3 days. The results of the examined species' microbiological tests indicates that the diameter of the sterile (without germ) zone created in the bowl with *Candida albicans* planted was 32 mm in the essential oil received from the species *Zosima orientalis*, which testifies to the species' having active fungicidal effect. Sterile zones in diameters 18 mm and 16 mm were created in *E.coli* and *staphylococcus* respectively. And the essential oil received from the species *Johrenia paucijuga* has manifested a selective effect on *staphylococcus* – 17 mm-zone. Thus, the essential oil received from the species *Zosima orientalis* may be applied as an antifungal agent in the preparation of drugs.

Keywords: Essential oil, Apiaceae, antimicrobial features

PP-122

Insect species damaging on medicinal plants in AjariaNato JABNIDZE, Giorgi JABNIDZE
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Medical plants play great role in keeping a person's health in a good condition and the spectrum of their usage is high enough. About 4000 species of plants have been recorded in Ajaria. Among them-about 400 kinds of medical plants, and many of them are used for preparing phytodrugs in traditional and alternative medicine. Although, nowadays, there are high effective fusionable drugs, plants still are of great importance in medicine. According to Health Protection International Organization data, the need in phytodrugs is very high in the whole world. They rarely cause allergy, are less toxic, do not have accumulation feature etc. Medical plants are damaged by insects that are one of the main tasks of our studying.

Medical plants are highly damaged by different species of insects and this is the reason of plants decreasing and the quality of products obtained from them is poor. Medical plants are damaged by different species of insects. Namely: Black Bean Aphid (*Aphis fabae* Scop.), Black Beet Weevil (*Sphalidium maxillosum* L.), Darkling Beetle (*Opatrum sabulosum* L.), Light Trapping of Turnip Moth (*Scotia segetum* Schiff.), Flat-faced Longhorn Beetle (*Aypanthia violaceae* L.), Maybug (*Melolontha melolontha* L.) etc. Among all the mentioned insects the most damaging one is the Black Bean Aphid – *Aphis fabae* Scop., that by sucking damages plants, and also, Valeriane and causes a less weight of their roots and decreases the quality. Because of Black Bean Aphid wide distribution, its intensity, negative results, we decided that it was necessary to study the Black Bean Aphid on Valeriane in details and work out such controlling methods that would help us to minimize the quantity of them and assist their natural enemies which decrease the number of insects that quarantees to get ecologically pure product. Studying the insects damaging Valeriane plant, especially the Black Bean Aphid, in Georgian conditions, and the reasons of its distribution, working out the modern controlling methods is a question of great importance.

Entomofauna distributed on medical plants in the conditions of Georgia has been published in this thesis for the first time; Black Bean Aphid has been studied in details, its negative impact on Valeriane, western and eastern Georgia climatic conditions influence on the insect distribution has been studied for the first time, on quantity dynamics and development according to this or that phase duration, plant tincture toxics towards the Black Bean Aphid has been studied and their influence on useful entomofauna; ecologically safe controlling methods have been worked out and the implementation of which will decrease insect distribution and provide to obtain ecologically pure product in farms.

Implementation of the worked out controlling events will improve general condition of medical plants and help to prepare medical drugs of a better quality, that will have a positive impact on people health and economic condition.

Keywords: Medical plants, Insects, Entomofauna, Georgia.

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Aspect of Stable and Safe Development of Farmers

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Stable and safe development of farmers in Georgia mainly depends on the climate changeability, which is determined by the existence of the woods as well as the water factor and pollution of the environment. In order to regulate these factors, I consider that it would be important to found scientific-research centres for experts of species in every region of Georgia, with corresponding seeding and nursery manufactures. This way, the climate changeability and its influence on farmers will be regulated systematically. All these will be reflected on the improvement of the species of plants that will be possible with the help of scientifically well-founded approach. This factor is one of the powerful mechanisms for stable and safe development of agricultural, farmers.

The use of the natural resources of subtropical zone of the Georgia and critical state of food safety of farms were considered in the article. Low sufficiency of water supply of irrigated areas as a consequence of the fall of productivity of agricultural crops.

The work represented covers the modern strict conditions of subtropical zone agriculture and some ways of establishment, also it deals with the role of farmers in this point. Here also eros processes caused because of wood cutting in humid subtropical zone.

The scientific work deals with analysis of present situation in agriculture of Georgia: The structure of Georgia land fund, production indices according different branches, populations feeding volume according to their physiological norms and parameters.

For any state, food safety means the major factor of economic well-being and national safety. Food safety a priority direction of politics of the state because it includes an extensive spectrum of national – economic, social, democratic and ecological factors. Social and economic system of the state is connected to food safety, which from its part, is based on mobilization of internal resources. Such logic model means carrying out the vitally important changes at the development of strategy of national – economic reforming by rising the standards of living of the population and use of effective norms of legislative characters. The achievements of the maximal balanced food stuffs are the greatest national and international problem.

The achievement of food safety is practically impossible without adapted intensive, steady and safe development as a food complex, that should be achieved by the state support with use of economic-financial, organizational and other levers.

Keywords: farmers, Georgia, food, plants, agriculture, development.

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Global Warnings and Agro-Ecological Problems of Georgia's Subtropical Agriculture

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The paper dwells on agro-ecological problems existing in subtropical agriculture of Georgia, factors of adverse human impacts on the environment and its negative consequences. There are defined the measures and given recommendations with a view to developing agrarian field in the region and increasing profitability of agricultural sector. In the article we discuss the importance of tea and citrus cultivation in the development of economy within the country. By offered an exemplary diagram of a possible ratio of cultures and considered by predictive analysis of the ratio of cultures.

In connection with the high food, medical and big economic importance citrus takes a due place in agriculture of Georgia. Unfortunately, in recent time the branch has undergone notable degradation – is used 20-23% of potential possibilities. The early rehabilitation of citrus growing in Georgia. In article examined pressing questions modern state citrus. There are present the medical and nourishment worth of fruit of Grapefruit and Pompelmoss; The possibilities of the use of its branches and wood; some agricultural character of diffused introduction implants and local hybrids in the subtropics moisture of Georgia. There is discussed the matters about the modern crises conditions of citruses and some consideration to uproot them. During establishing of market economy the government must promote those sectors of agriculture industry, which are potentially competitive and capable to use effectively whole national resources and export possibilities, at the same time to obtain resonable feedback incoming with minimal expenses in the nearest future.

Under the today's information, high growth of tea manufacture is almost impossible, because the reserve of tea plantation is very limited; therefore tea for Georgia becomes a possible business of the state value. On our presentation farmers state farms would become one of the sources for testoration of tea authority. Tea culture should become competitive, then Georgia probably provides first of all the need of tea and the certain quantity would be taken out abroad.

The article discusses climate change and are some reasons of biodiversity loss. Agricultural production is closely linked to climate change, which increases the risks and negatively displayed on the economic and social well-being of farmers, on this basis, is of great importance climatic reasonable assistance to agriculture, which to answer simultaneously to three intersecting call: 1) providing security products by increasing of income; 2) Adapting to climate change; 3) promoting climate change mitigation. Biodiversity loss for causes considered: a) environment degradation, b) the excess extraction, c) environmental pollution, and d) a new species invasion. In addition to Georgia, there are major risk factors, which are enrolled in an impact on biodiversity in terms of climate change.

Keywords: subtropical, agriculturs, citrus, Tea, biodiversity, Georgia, agro-ecological problems.

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Impact of Global Warming on the Forage Crops in Georgia

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Climate change will increase the number of extreme weather events, an increase in periods of drought and high summer temperatures in Georgia, which affects the current state of breeding of perennial forage plants. Studies on the introduction and breeding of wild perennial forage plants growing in dry arid regions of Georgia have been widely developed. The article provides a brief description of the grades of forage crops approved for use in the Republic of Georgia.

The study examined the impact of living conditions in which young pigs were on feed on their live weight, energy distribution coming from food in animal's bodies and indicators of economic efficiency of pork production. The results revealed that young pigs' fattening is more successful when it is done using fully slatted area and deep unchangeable straw litter in climate-controlled barns compared with animals fattening using partially slatted area. Generalization of separate components of feed is resulted in the existent norms of feeding of sapling of beef cattle and the results of researches are presented on the study of features of the use of exchange energy of forages by animals at the different types of feeding. One-sided approach to the rationing of energy nutrients in the diets of young beef productivity correctly for proper organization of full feeding should take into account a set of factors, including type of feeding, animal welfare and the like.

Swiss and Holstein-Friesian breeds of cows introduced in Georgia reveal clearly expressed reaction to high temperature and high radiation of the sun. The breathing rate of these breeds increases by 57-75%, their pulse by 4.4-11% but their body temperature by 4.8% in the period of peak temperature comparing with the morning indexes. The difference is fixed among the breeds according to the physiological indexes during thermal loading. The physiological status of Swiss breed of cows is stronger than Holstein breeds. The increase of the number of eosinophils is noted in the blood of experimental cows by 12.9%, monocytes by 25.7%, total protein of blood serum by 5.9% and globulins by 2.2% because of immune complex changes caused by temperature stress. The breach of microclimate parameters causes abrupt decrease of fat content in milk.

Keywords: Forage crops, Climate, Georgia, caused.

PP-126

Scientific and Practical Fundamentals of Hairless Liquorice Cultivation (*Glycyrrhiza glabra*)R.M. NURIYEV¹, A.GASİMOVA²^{1,2}Ganja State University

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Aim of the study: In this study, we aimed to show practical fundamentals of *Glycyrrhiza glabra* cultivation in Azerbaijan conditions.

Material and methods: Plant materials were prepared with collected seeds and rhizomes from natural and cultivated areas for practices with regard to propagate biochemistry of hairless liquorice. Cultivated from hairless liquorice seed in warm breeding-ground 4-5 months old seedlings with being planted in the irrigation condition of food area 50x50cm, in Absheron and Shirvan zones, in summer, phenology of their ripening, growth was studied. Root and rhizomes of hairless liquorice in 2-3 meters length were excavated, pens were sawed in 10 cm length from their throat root to the tip parts, their root ability was studied with them being planted in spring and autumn, in irrigation condition, in horizontal and vertical position in 7 cm depth. It was experimented, that the sticks in a length of 10 cm cut from various parts of the trunk in every 10 days, grow in inclined position in the 7 cm depth for learning of root parcel of trunk sticks of hairless liquorice in closed position. It was experimented for preserved pole of roots and rhizomes sticks, shaved part of length of 10 cm is above in the first variant, their basis part in the second variant, reverse side, in the third, they planted on their sides in 3 cm depth. Supplied root and rhizomes from different depths, in the area of hairless liquorice while the restoration of plants, the new plant roots or their forming from roots and rhizomes, just say, in connection with the cultivation rhizomatous pens in plantations, rhizomatous pens in 3-5-10 and 15 cm length were planted for saving plant materials in horizontal position of 3-5 and 7 cm depth, in spring and autumn. While the seeds of hairless liquorice were sowed, they sprout 10-13.

Results: Two square meters were separated for each depth in the face of depth in every seasons (25, 50 and 75 cm) for learning of reproduction, increasing plants, and again productivity in these areas, have been used for raw materials of hairless liquorice, which extracted their roots and rhizomes from depths in various times. The stems are registered, counted for each square meters of the area, after extracted roots and rhizomes. One of the 2 square meters of land for a depth was re-completed, one of those was kept in order to experience without filling. At the same time, the underground part was registered, for its productivity to learn in the different depths. Methods of how and how much going to the deeper of the root and rhizomes, their drainage and their preservation were studied, too. Counting stems being in different square meters, was registered and was learned their increasing, for learning of plants reproductions, at the end of each year of vegetation, in the areas, which extracted underground parts. After 3 years, stems were cutting in the appropriate square meters, the underground parts were extracted from the depth, it was observed that, calculated productivity, in these reproductive areas, for learning again productivity. The amount of hay production was recorded, after harvesting gathering haystack time in every regions surface portion, in Azerbaijan experimented regions, under natural conditions, in surface portion of hairless liquorice cultivated areas (şirəli və qaba yem), thus, reproduction of stems was under observed in this area. By this way, having the mowing ability of surface portion of hairless liquorice was learned in a vegetation year.

Keywords: Biochemistry, wood flooring, control, rust remover paper, sulfuric acid, phenology, vegetative, generative, morphological, collection

PP-127

Desert Fitocenosis of the Absheron Peninsula

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Aim of the study: Desert (halofit type) fitocenosis spread in saline, saline gray-brown, contaminated soils in the Apsheron Peninsula area. Desert plants of the region formed in the local form in the surrounding of semi-desert plants.

Material and methods: Desert plants in Azerbaijan undertaken as «step» (steppe) and semi-desert by mistake in previous century. However, later *Artemisietum fragransale* spread in plain, and *Artemisietum fragransale* in desert and foothill areas involved in semi-deserts. Though before I.N.Beydeman involved *Artemisietum fragransale* formation in Kura-Araz lowland, later the author involved the *Artemisietum fragransale* to desert type. A.A. Grossheym named that Halophyted desert as “salty”. It was discovered from the researches that, desert plants in the region completely differs from Ancient Mediterranean and Central Asia-style deserts due to geographical and ecological natural habitat. Along with this, desert formed in Absheron peninsula is suitable to East Transcaucasia version. L.I.Prilipko and V.J.Hajiyev mentioned edificators of xerophytes in ephemeral-subtropical, pure saline and etc., fitocenosis on desert plants of Absheron peninsula. Conducted researches based on methods of abovementioned authors.

Results: Sarsazan-Salsla dendroides- Petrosimonia brachiata formation in shrub-salsla formation class is consisted of one association only. Halocnemum strobilaceum is a type being edificator in species. It spreads 25-40% relevant to project. Number of species is less (6 species) (the abundance is 2 points). In annual salsla formation class efemeral-saline Salicornietum europaca- Petrosimonia brachiata formation spread in dry and wet saline lands of peninsula and saline lake surroundings. The top or first layer of these kinds of lands is saline. Species of formation consists of 16 species. 2 species (12,5%) belong to shrubs, 1 specy (6,3%) belongs to semi-shrubs, 3 species (18,7%) belong to perennial plants and 4 species (25,0%) belong to annual plants and 5 species (31,2%) belong to efemerals. Petrosimonia brachiata is a dominant of fitocenosis, Salicornia europaea and efemerals are subdominants of fitocenosis. In semi-shrubs salsla formation class Salsla dendroides- Petrosimonia brachiata- Ephemeeto formation spread in in gray-brown (saline) lands. Suaeda dendroides and Salsola dendroides contane edification in this formation. 10-12 plant types is mentioned in the composition of fitocenosis. Project cover reaches to 25-45%. In Salsla dendroides-Petrosimonia brachiata formation Petrosimonia brachiata contane edification and is taken as indicator of saline lands. 15 species of flowering plants can be met in species of formation. 6 species (40%) is xerophyte, 8 species (53,3%) is halophytes and 1 specy is mezoxerophyte. 3 (20%) species from the same number species belong to shrubs, 1 (6,7%) specy belong to semi-shrubs, 2 species (13,2%) belong to perennial plants and 6 species (40%) belong to efemerals. Saline or mountain Salsola nodulosa is a dominant of plant cover, Artemisia lerchiana; Lolium rigidium, Anisantha ruben and other efemerals are subdominants of plant cover. However due to land reforms implemented in our country winter pasture is not being privatized, also that pastures rented or was given to usage. Though, fertility of the area decreased, forage quality worsened, load and capacity of pastures decreased due to inefficient use of winter pastures and implementation of mitigation measures without scientific bases. That is why, erosion accelerates and digression continues in pastures because of overpasturing herds of cattles in studied desert and etc. fitocenosis.

PP-128

Biodiversity of the Genus of *Crataegus* L. (*Rosaceae*) in the Flora of Nakhchivan Autonomous Republic (Azerbaijan)Tariyel TALİBOV¹, Anvar İBRAHİMOV²

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Aim of the study: Nakhchivan Autonomous Republic is a specific mountainous region; it is in contradiction with other regions of the Caucasus due to rich plant cover and flora diversity. The species of the genus of *Crataegus* L. are different specially importance inside wealthy plant cover. Hawthorns have not gained adequate importance in Nakhchivan Autonomous Republic. There are 22 species of the *Crataegus* L. (*Rosaceae*) in Nakhchivan Autonomous Republic. 17 species of them come across as wild case and 5 species come across in cultured condition. The data on habitats and distribution of hawthorns were adduced in Nakhchivan Autonomous Republic.

Material and Methods: The material of our study is the *Crataegus* L. in taxa growing naturally in Nakhchivan Autonomous Republic. Between 2004 and 2015 years, approximately 85 hawthorn specimens were collected from the mountainous areas of Nakhchivan Autonomous Republic with the aim of study their systematic and ecological characteristics. The diagnosis of all the specimens with following process were converted into valuable materials in accordance with the herbarium techniques and were placed in the Herbarium Bioresource Institute of Nakhchivan Section of ANAS. The purpose of the study is the whole of Nakhchivan Autonomous Republic. The study determined the localities with great diversity, due to their richness in species, hybrids, ecotypes and forms. Afterwards, for each locality the coordinates and the altitudes were determined by using GPS. The herbarium copies have been investigated with comparatively of existing in the herbarium funds of the Institute of Botany of ANAS and Bioresource Institute of Nakhchivan Section of ANAS and Nakhchivan State University for to clarify present situation of *Crataegus* L. genus in the flora of Nakhchivan Autonomous Republic.

Results: During expedition in 2004-2014 years investigation of gathered herbarium materials and according to information of literature determined that at present there are 22 species of genus are exist in flora of Nakhchivan Autonomous Republic. 17 species of them (*C. atrosanguinea* Pojark., *C. armena* Pojark., *C. caucasica* C.Koch, *C. cinovskisii* Kassymova, *C. eriantha* Pojark., *C. meyeri* Pojark., *C. monogyna* Jacq., *C. orientalis* Pall. ex Bieb., *C. pallasii* Griseb., *C. pentagyna* Waldst. & Kit., *C. pojarkoviae* Kossyck, *C. pontica* C.Koch, *C. pseudoheterophylla* Pojark., *C. rhipidophylla* Gand. (= *C. curvisepala* Lindm.; *C. kyrtostyla* Pojark.), *C. szovitsii* Pojark., *C. zangezura* Pojark., *C. tournefortii* Griseb.) come across as wild case. These species of *Crataegus chlorocarpa* Lenne et C. Koch, *C. ferganensis* Pojark., *C. sanguinea* Pall., *C. songarica* C.Koch, *C. turkestanica* Pojark. have been introduced and used for planting of greenery of parks and gardens in cultural situation. The result of climate changes and antropogen factors, danger of destruction of some valuable species genofond of wild hawthorn had been determined during the recently years in the area of Autonomous Republic. Species of *C. orientalis* and *C. pontica* have been included in the Red Book of Nakhchivan Autonomous Republic due to rare and endangered generation and protection ways have been shown.

Keywords: *Crataegus* L., wild and cultivated species, Red Book of Nakhchivan Autonomous Republic.

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The induction of callusogenesis and morphogenesis of *Staphylea colchicain* to *in vitro* cultureNino MANVELIDZE, Nana ZARNADZE², Natela VARSHANIDZE², Inga DIASAMIDZE², Sophio
MANJGALADZE², Tsciala BOLKVADZE²¹Department of Biology, Batumi Shota Rustaveli State University, Georgia²Department of Biology, Batumi Shota Rustaveli State University, Georgia

Aim of the study: The object of our study was one of the relict and endemic species -*Staphylea colchica*. *Staphylea colchica* is a representative of *Staphylea* type family. It is a bush or a small tree (up to 5 m height). It is a vulnerable plant from the red list and thus, because of biotechnological method advantages, studying its reproduction peculiarities using nontraditional ways is expedient in order to create sapling material.

Material and Methods: The object of the study was *Staphylea colchica* spread in Batumi Botanical Gardens. For the *in vitro* cultivation we have isolated vegetation sprouts, and for callus genesis we have used 5-6mm fragments of leaves taken from sterilized cultures. The sterilization of primary material proceeded with 0,2% diocide water solution for 20 minutes of exposition. Explant cultivation proceeded on different modification nutrition areas of Gamborg (B₅), which were different mainly according to hormone nature, concentration and their correlation. Nutrition area pH was 5,8-5,9, for callus induction we have used auxines: indolebutyric acid, naphthoylacetic acid, and causing organogenesis proceeded by using cytokines – benzylaminopurine and 2-izopentiladinine, independently and in correlation with auxines as well. For callus induction, cultures incubated in thermostat, darkness, 26-27⁰C temperature, and for organogenesis realization light was required. 2-3 Klux of light, with 8/16 hour phytoperiod and 26-27⁰C temperature. We registered the results every 25-30 days, we determined the frequency of callusogenesis and regeneration in percents, the growth intensity of callus by 5-point system, in each variant we examined 20 explants two times.

Results: According to the conducted study we have determined that for callus induction and further growth and development, it is essential to add auxine phytohormones to the nutritious area, as on hormoneless areas explants not only did not callus but badly increased. The analysis of growth intensity has shown that callus induced on any studied concentration of indolebutyric acid and naphthoylacetic acid (5; 8; 12; 15; 20 mkm) but the intense proliferation was noted on nutritious area consisting naphthoylacetic acid (4-5 points). The best one appeared to be the nutritious area with 15-20mm concentration. Callus formation frequency was 82,6-93.2%. At the end of the second sub-cultivation there formed callus tissue of large classical morphology, which consisted of well-dedifferentiated cells. Strengthened induction of shoot morphogenesis was noted on the nutritious areas with 2-IP and IBA, (photo 2) where the correlation was 12:3mm; 15:3mm accordingly. Mentioned concentrates represented optimal amount of hormones. Regeneration frequency was 75-94%, the general number of regenerated buds on 20-25 diametre callus tissue - 57.5%, concentration increase of 2-IP (18-20mm) strengthened regeneration on callus, i.e. development of already generated organostructures and buds. Regeneration frequency was 82-100%. And the total amount of buds was 59,7-164,0. By the influence of 2-IP, on the callus tissues there formed new morphogenetic knots.

Acknowledgements: The work is made under the GNSF project N15MR_2.1.6_51 "Some relict species bioecology and propagation peculiarities in south colcheti"

Keywords: *in vitro*, explant, morphogenesis, callus tissue, regeneration.

PP-130

Endemic Plant diversity of Adjara protected areas, GeorgiaInga DIASAMIDZE¹, Gia BOLKVADZE², Jana CHITANAVA³, Nazi TURMANIDZE³, Marina KORIDZE³¹Biology Department, Batumi Shota Rustaveli State University, Georgia²Biodiversity Research Institute, Batumi Shota Rustaveli State University, Georgia³Department of Biology, Batumi Shota Rustaveli State University, Georgiainga_diasamidze@yahoo.com

Aim of the study: The Caucasus, falling in the “Colch” section of the Euro-Siberian Floristic region has been identified as one of the Earth’s 34 biologically rich and most endangered terrestrial Eco-Regions. Ajara floristic region is located in the West Caucasus corridor of the world famous “Hotspot” of the Caucasus. It is distinguished by tertiary period relict flora as well as unique diversity of Colchis mountainous humid forest. One of the approved and important measures for *in situ* conservation of species and habitats is to create various types of protected areas and to develop protected areas network.

Material and Methods: The network of Ajara Protected Areas is distinguished by diversity of status: Kobuleti Strict Nature Reserve Ispani II, Kobuleti Managed Nature Reserve Ispani I, Kintrishi Strict Nature Reserve, Kintrishi Protected Landscape, Mtirala National Park, Machakhela National Park. They all together comprise a unique system of Ajara Protected Areas which, including a trans boundary protected areas, exceeds national scales. These areas are distinguished by floristic diversity and comprise ecosystems within the height of 0 -2000m above sea level. Main methods were expedition, observation and identification of Plants, analysed endemic and relict plants bioecology.

Results: Ispani I and Ispani II are the most inviolable habitats of world-distinguished unique dome-like bogs in which on the so called “cushions” of sphagnum moss together with boreal species (*Drosera rotundifolia*, *Osmunda regalis*, *Carex riparia*, *Molinia littoralis*, etc.) The number of endemic species on the given area is 4 including 2 Colchis (*Solidago turfosa*, *Rhamphicarpa medwedewii*), 1 Caucasian (*Solidago virgaurea*) and 1 Georgian (*Quercus imeretina*) species. 123 endemic species are spread in Kintrishi protected areas that comprise 13,7% of total flora. Among the endemic species: Caucasian endemic – 64 species, Colchis - 34, Georgian-17, Ajara-Lazeti - 8. Mtirala National Park is represented by the world specific Colchis type plants rich in well preserved and totally original tertiary relicts. 66 species (11,12 %) from the total floristic composition of the National Park are endemic ones, including: Caucasian -26, Georgian - 9, Colchis-25, Ajara-Lazeti - 6. Machakhela National Park comprises Machakhela Gorge and partially forest ecosystems of the Chorokhi right bank situated along the Turkish-Georgian trans boundary zone. Out of plant species spread in the area 55 are endemic ones, including: Caucasian - 21, Georgian - 5, Colchis - 25, Ajara-Lazeti - 4.

Keywords: Endemic Plant, Conservation, Protected areas.

PP-131

ICP-OES analysis of a series of metals (Namely: Mg, Co, Pb, Cr, Ni, Fe, Cu, Zn and Cd) in black and green olive samples from Aydın, TurkeySerdal ÖĞÜT¹¹*Department of Nutrition and Dietetics/Health School, Adnan Menderes University, Turkey.
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Aim of the study: The present study was designed to evaluate heavy metals in black and green table olive samples.

Material and Methods: Samples of black and green olives were obtained from local markets in Aydın, Turkey. Hundred and five black and green table olive samples from the Aydın, Turkey were analyzed. The concentration of Zn, Pb, Cd, Fe, Cu, As, Co, Sn and Mg were measured by inductively coupled plasma optical emission spectroscopy (ICP-OES).

Results: While the most concentrated element was Zn (103.24 ± 4.09 mg/kg), Fe (2.45 ± 0.18 mg/kg), Mg (138.24 ± 6.35 mg/kg) had the lowest concentration in tested olive samples. The levels of the nine metals studied are within safe limits. The data here obtained will be valuable in complementing available food composition data, and estimating dietary intakes of heavy metals in Turkey.

Acknowledgements: The metals Mg, Fe, Zn presented significant differences ($p < 0.05$) in content between two types, hence processing method, brand and packing material must influence their content.

Keywords: Heavy metal, ICP-OES, olive.

PP-132

**The Measurement of Pesticide Residues and Paraoxonase Enzyme Activity in Blood of Workers
Agriculating Apples and Cherries**Serdal ÖĞÜT¹, Erdoğan KÜÇÜKÖNER², Fatih GÜLTEKİN³¹Department of Nutrition and Dietetics/Health School, Adnan Menderes University, Turkey.²Food Engineering, Faculty of Engineering, Süleyman Demirel University, Turkey.³Department of Biochemistry, Faculty of Medicine, Alaaddin Keykubat University, Turkey.serdalogut@yahoo.com

Aim of the study: It is aimed, in this study, to determine pesticide residues on apples and cherries grown in Isparta and their farmer. In this research, paraoxonase (PON) levels also were determined in the blood of farm workers.

Material and Methods: The gas chromatography (GC) equipment with nitrogen phosphorus detector (NPD) has been used to seek for various organophosphate and synthetic *pyrethroid* pesticide residues on apples and cherries and in the blood of workers. PON levels in workers' blood have been determined with UV-Vis spectrophotometer.

Results: As a result of the study, dichlorvos residue (average 0.3 ppm) on some apple samples and diazinon residues (average 0.3 ppm) on some cherry samples have been discovered. When compared with the control group (239.5±45.3) PON levels in the blood of farm workers (181.6±38.7) have turned out to be significantly low ($p<0.001$). It is a well known fact that pesticides have adverse effects on human health and environment. These adverse effects have been proved once more within the scope of this study. Low PON enzyme values, in particular, can show that farm workers are adversely affected by pesticides. Pesticide residues detected on apples and cherries that are grown in the region provide us an opinion as to the reliability of crops. Therefore, those who apply pesticides should be careful and take necessary measures for the safety of both themselves and crops and consumer health. Antioxidant capacities detected in apples and cherries show the importance of these fruits for the region once

Keywords: Apple, Isparta, cherry, pesticide residue, farm worker, paraoxonase (PON).

PP-133

The Development and The Growth Features of Sprouts of *Malus orientalis* Uglitzk. Species introduced in AbsheronCeyran NAJAFOVA¹, Aynur ARABZADE¹, Aygun HUSEYNOVA²¹Central Botanical Garden of ANAS, Baku, Azerbaijan²Baku State University, Baku, Azerbaijanceyrann@rambler.ru

Aim of the study: The study of biomorphological features of species sprouts' introduced in Absheron is one of the significant factors shown the adaptation to a new soil-climate condition. At this point is expedient the research of *Malus orientalis* Uglitzk. species sprouts' growth and development features from Azerbaijan flora.

Material and Methods: As a research object was taken the *Malus orientalis* species introduced in Central Botanical Garden. The biomorphological features of sprouts was studied referenced to the general accepted methods.

Results: The conducted experiments shown that the seeds' first sprouts sown in autumn of *Malus orientalis* species were formed in the third decade of March. In germinal stage of ontogenesis the first grows the embryo root which gives the beginning to the primary root, after stretches the hypocotile and the under lobe protuberance and the simultaneously grows the bud giving beginning to the primary stem and to the epicotil. The juvenil stage was started in the third decade of March and in the first decade of April were formed the lobed leaves. In the second decade of April was observed the first true leaves in virginil stage. Thus was revealed that the normal development of all stages of *Malus orientalis* species in Absheron condition gives the prosperity to use it as a fruit and as in greenery.

Keywords: introduction, sprout, germinal, ontogenesis, juvenile.

PP-134

Evaluation of coenopopulations of the species of *Vicia sativa* L., *V. croceae* Desf., *V. alpestris* Stev. and *V. sepium* L.Zulfiyya MAMMADOVA¹, Elshad GURBANOV²¹ Botany Department, Baku State University, Baku, Azerbaijan² Institute of Dendrology, Baku, Azerbaijan**elshad_g@rambler.ru**

Aim of the study: Species of *Vicia* genus are the important plants in improving of natural fodder and sowing areas. During 2007-2015 years when evaluating the coenopopulations of *Vicia sativa* L., *V. croceae* Desf., *V. alpestris* Stev. and *V. sepium* L. of the *Vicia* L. genus of *Fabaceae* Lindl. family at various plant groups in different region of Azerbaijan the age period and ontogenetic age condition were studied.

Material and Methods: During conducting researches the productivity of *Vicia* genus species, giving the vegetation types to formation and association ranks were studied on Prilipko, Hajiyev, Musayev and Hatamov. In the evaluating of the coenopopulations of researched species when studying the age period and ontogenetic age condition we were based on A.A. Uranov, T.A. Rabotnov and most contemporary technologies.

Results: When studying age period and groups virginal period- germination, juvenile and young vegetative plants; immature period; generative period- young, mean-age and mature generative plants, senile period- senile plants were determined. At *Vicia sativa* L. species the immature period was observed that in other species depends on their biological features we couldn't define this period. In researched associations their coenopopulation were observed at all age conditions. It was defined that all individuals spent full life period. For evaluation of the coenopopulations of researched species the reproductive strength of individuals, potential seed productivity, individuals' biomass, inflorescence biomass, plant's height, individuals' frequency, portion of young individuals were taken into consideration. By cultivating of the species of *Vicia* L. genus which presented at coenopopulation level it is possible to create highly productive and qualitative hayfield that it has a great significance in agriculture and developing of cattle-breeding.

Keywords: ontogenesis, coenopopulation, immature, association, formation

PP-135

On the Orthoptera (Insecta) Fauna of the Derik, Kızıltepe and Mazıdağı Mountain (Mardin, Turkey)Abdullah DOĞAN¹, Ali SATAR¹, Musafa İLÇİN¹¹Dicle University, Science Faculty, Department of Biology, Diyarbakır Turkey.
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Aim of the study: Samples were collected during April-October 2011-2013 in the Derik, Kızıltepe and Mazıdağı Mountain (Mardin, Turkey). On the study area 4 families belong to Orthoptera order and, 28 genus and 38 taxa (species and subspecies) were determined. The samples were identified and listed. The results obtained were evaluated zoogeographically and some observations and recommendations were made on the species which can be harmful for crops

Material and Methods: This study was carried out in two stages: 1. Collection of the material from the field of work by net trap. 2. Preparation of the samples for determination the samples were left to dry. Copulation organs were removed especially in Tettigonia for identification. In order to clean copulation organs from chitin parts and tissues, sample were kept in 70 % alcohol for 1-2 hours followed by 1 % KHO at room temperature for one day. This prefixed samples were then exposed by arise with distilled water. The samples were then put in a small glass vessel. Later, they were put in the collection cupboards. The samples collected through this study have been kept at zoological museum Biology Department of the Science-Literature Faculty of Dicle University.

Results: A total of 28 genus and 38 taxa were determined and listed. Orthoptera fauna contains many harmful species for some cultivated plants. We have also determined some harmful species in this study. As a result, Tettigonidae 9 genus, 10 species, and 3 subspecies, Gryllidae 3 genus and 3 species, Gryllotalpidae 1 genus, and 1 species, Pyrgomorphidae 1 genus and 1 subspecies, and Acrididae 14 genus, 9 species and 11 subspecies of weredetermined.

Acknowledgements: This project was supported by the Dicle University Research Fund. (Project No: 12-FF-19).

Keywords: Orthoptera, Kızıltepe, Derik.

PP-136

Investigation of the Pomegranate Flowers (*Punica granatum*) Effects on Blood Sugar Level of Diabetic RatsYeşim KARA¹, Kerem KILIÇ¹, Begüm PARLAK¹¹Pamukkale University, Science and Art Faculty, Department of Biology, Denizli, Turkey
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Aim of the study: In our day, alternative treatments are needed to control diabetes and reduce its complications. Also many medicinal plants are used for treatment and prevention of diabetes. In this study, flowers of Pomegranate (garnet) extract was observed on blood sugar level of rats which were diabeted through streptozotocin (STZ). 18 rats were used in the experimental study. The rats were separated into three groups as control group, diabeted rat group and diabeted rat group when were injected pomegranate flower extract.

Material and Methods: Diabetes was generated through the intraperitoneal doses of 50 mg/kg STZ which is solved in the citrate tampon. Diabeted rats with high blood glucose level over the 250 mg/dL were observed in the study. *Punica granatum* flower extract was prepared by using solvent (Methanol).

Results: Studies showed that the flowers and seeds of pomegranate plant was used as a unique subsidiary against the metabolic disorders of diabetes. The juice, fruit and peel extracts, seeds, seed oils, seed extracts and flowers of *Punica granatum* (pomegranate) and fruit form of Punicaceae family are increasingly curative with its antioxidant effects on diabetic disorders. Our study showed that the materials in the content of pomegranate regulate the glucose metabolism and diabetic disorders. This reason is very important for controlling the blood sugar level.

Acknowledgements: This study was supported by Pamukkale Scientific Research Unit (BAP Turkey) Project No: 2015HZL002.

KeyWords: *Punica granatum*, STZ (streptozotocin), Diabetes, Blood sugar, Plant extract.

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The Effects of Water Hardness on Lead (Pb) Uptake in Fish (*Oreochromis niloticus*) gill TissuesAhmet Turan ALADAĞ¹, Hikmet Y. ÇOĞUN², Ferit KARGIN¹¹Department of Biology, Faculty of Science and Letters, Cukurova University, Adana, Turkey²Department of Physiology, Faculty of Ceyhan Veterinary, Cukurova University, Ceyhan, Adana, Turkey
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Aim of the study: The uptake of lead (Pb) (1.0 mg/L) onto *Oreochromis niloticus* was studied under different water hardness (total hardness 600 or 60 mg CaCO₃/L) at 10 and 20 days.

Material and Methods: Lead levels of *O. niloticus* gills were analyzed by spectrophotometric methods with IPC-MS (Perkin Elmer).

Results: In this study, fish gills compared to control fish were decreased in high hardness (35%) at 10 days, but this decreases occurs 60% at 20 days. And also, in low hardness Pb uptake were 15% and 30% at 10 and 20 days, respectively. This reduced tolerance and resistance in fish appeared to result from increased intrinsic toxicity of lead. These results show that metal uptake was affected by water hardness in the *O. niloticus*.

Key words: *Oreochromis niloticus*, lead, gill, accumulation

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The Effects of Nitrilotriacetic acid (NTA) on Plasma Enzymes (ALT and AST) of *Oreochromis niloticus* in Acute Lead ExposureHikmet Y. ÇOĞUN¹, Ahmet Turan ALADAĞ², Özge TEMİZ², Ferit KARGIN²¹Department of Physiology, Faculty of Ceyhan Veterinary, Cukurova University, Ceyhan, Adana, Turkey²Department of Biology, Faculty of Science and Letters, Cukurova University, Adana, Turkey
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Aim of the study: The objective of this study was determined to the biochemical effects of Nitrilotriacetic acid (NTA) on the toxicity of Lead (Pb) in fish (*Oreochromis niloticus*). Nitrilotriacetic acid (NTA) is extensively used in different industries because of its excellent chelating properties. NTA into the natural environment is a concern because of mobilization of heavy metal species that may be otherwise bound to natural particulate matter. Lead is a highly toxic metal whose widespread use has caused extensive environmental contamination.

Material and Methods: Fish were exposed to 1.0 mg/L Pb and 1.0 mg/L Pb + 1.0 mg/L NTA at 2, 4 and 6 days. The biochemical parameters such as ALT and AST were determined by spectrophotometric method.

Results: In this study, lead was increased plasma enzymes (ALT and AST). NTA in combination with Pb, caused an decreasing for the toxic effect of Pb on plasma enzymes parameters. The present results indicate that NTA has a decreasing effect against toxicity induced by Pb.

Keywords: *Oreochromis niloticus*, lead, plasma enzymes

PP-139

Nitrogen and Phosphorus Resorption Proficiency of Different Lianas on the Same Host PlantAhmet DOĞAN¹, Erkan YALÇIN¹, Abdullah Furkan TOY¹¹ Department of Biology / Faculty of Science And Arts, Ondokuz Mayıs University, TURKEY
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Aim of the study: Nutrient resorption is one of the most important strategies developed by plants to save nutrients. In particular, nitrogen and phosphorus are withdrawn from the leaves before abscission. Because this two elements limits plant growth in the forest ecosystems. The aim of study is to determine and compare the limits of nitrogen and phosphorus resorption proficiency in four lianas which climb on the same host plant.

Material and Methods: This study was conducted in Samsun. Four host tree (*Quercus cerris* var. *cerris*) were selected at least 2.5 m from the stems of neighbouring canopy trees to avoid potential microsite variation in the study area. Leaf samples were collected for *Hedera helix* L., *Clematis vitalba*, *Periploca graeca* L. var. *graeca* and *Smilax excelsa* from the same tree's canopy. Leaf samples were temporally collected senescence period, which in November for deciduous *Clematis vitalba*, *Periploca graeca* L. var. *graeca*, *Smilax excelsa* and in May for evergreen *H. helix* L. After harvesting, petiols were removed and leaf area was determined by BenQ Scanner 7650T. Leaves were dried in an oven at 70°C to a constant weight; and dry weight was measured. They were grinded and nitrogen and phosphorus analyses were done by standart procedures. Nitrogen and phosphorus resorption proficiency were calculated as the lowest nutrient concentrations (%) in the senesced leaves. Statistical analysis was performed using a SPSS. Data were analysed for normality by using Kolmogorov-Smirnov test before performing the ANOVA tests. NRP and PRP values of species compared by One-way ANOVA. Tukey's significant difference (HSD) test was used to rank means following the analysis of variance.

Results: *Smilax excelsa* (1.07%) and *Hedera helix* (1.8%) could be considered as the most efficient species among of the other species for nitrogen resorption proficiency. Killingbeck (1996) stated for evergreen and deciduous species that resorption is incomplete if nitrogen concentration of senesced leaves are above 1%. According to these results, nitrogen resorption of all studied species incomplete because nitrogen resorption proficiency values were obtained above the benchmark level in all species. *Smilax excelsa* (0.1%) and *Periploca graeca* L. var. *graeca* (0.7%) could be identified as the most efficient species among of the other species for phosphorus resorption proficiency. But Killingbeck (1996) stated that phosphorus resorption is complete if phosphorus concentration of senesced leaves are below 0.04% and 0.005%, in evergreen and deciduous, respectively. Therefore, phosphorus resorption of all studied species is also incomplete in terms of phosphorus resorption proficiency. We discussed that these result detailed in the text regard to site and species variation.

Keywords: Evergreen, Deciduous, Liana, Nitrogen, Phosphorus, Resorption proficiency.

PP-140

**Caves as Subterranean Habitats of
the Striped Hyena (*Hyaena hyaena* L.) in Izmir, Western Anatolia**Ismet Ceyhan YILDIRIM¹¹Vocational School of Büyükorhan, Uludağ University, Turkey
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Aim of the study: This study is comprised of several surveys conducted on subterranean habitats of endangered striped hyenas in Western Anatolia (Izmir). The striped hyena is a bone-hoarding, cave dwelling member of the family Hyaenidae. Its populations are presumed decreased and extirpated in many localities due to habitat destruction and poaching and most likely to be exposed to genetic deterioration. Therefore, an assessment of their remnant habitats and populations survived in human-dominated environments is initially critical for effective conservation practices. This study aims to determine characterization and inhabitation indicators of hyena caves recently discovered in İzmir province.

Material and Methods: Caves formed in calcareous substratum in the survey area and contiguous habitats in the countryside of Selçuk in addition to hyena signs such as coprolite heaps, bone mounds, bells of sheep or goat constitute the study material. Interviews with locals are applied as an initial step in documenting general status and local distribution of the striped hyena and its caves. Following notifications obtained through interviews, caves which have hyena lairs were visited to confirm site occupation. The caves are surveyed by using clinometer, laser range finder and details of passage dimensions, shape, gradual or sudden changes in elevation, the location of notable features and biological materials on the floor are recorded by means of a sketch map. The recorded data is analyzed converting them into two-dimensional measurements by way of geometrical calculations to derive complete plans and profiles, then line-plots; a scaled geometrical representation of the path through the caves is created and details around the line-plot is drawn using the additional data of passage dimensions, floor/wall topography recorded at the time. Diagnostic hyena traces such as skulls, bones and coprolites are identified by dental formula, chewing marks and shape/colour respectively and aboveground habitat suitability is determined based on landscape attributes by referencing worldwide habitat preference.

Results: In this study, a historical location of the distribution in the western part of Turkish range of the striped hyena is spotted. Surveys showed that aboveground and underground characteristics and components of the study area have a high coincidence with general description of global habitat preference of the species topographically and vegetationally. Furthermore, it is understood that lateral caves have been utilized by the striped hyenas as a site for food storing, feeding and resting. Horns, toes, skulls, bells of goats or sheeps and numerous broken bone are typical predator signs in galleries and along corridors. Resting, feeding and defecation sites are separately positioned. No fresh material was obtained to support actual hyena presence as far as can be seen cave-specific surveys. Similarly, people claimed that the species extirpated locally. However, caves contain some evidences showing prolonged space usage of the species in the past. A huge number of skull/skeleton(s), bone fragments from consumed prey, hyena coprolites provided a scientific basis to the interpretation. Nowadays, porcupines are current dwellers of the caves.

Acknowledgements: I am grateful to my caving companions Emrah Sınmaz, Yenal Yazıcıoğlu (Bursa Branch of Turkish Cave Research Association) in their motivational and technical contributions cannot be ignored.

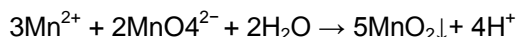
Keywords: Cave, subterranean habitat, bone-hoarding, *Hyaena hyaena*, Izmir, extirpation

PP-141

Investigation of dye removal potential of manganese oxide coated alunite (MOC-alunite)Sibel TUNALI AKAR¹, Sevcin ASLAN¹, Tamer AKAR¹¹Department of Chemistry, Eskişehir Osmangazi University, Turkey,
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Aim of the study: In this study, a geosorbent was prepared by coating alunite surface with manganese oxide to enhance dye (Reactive Orange 13, RO13) adsorption ability of the natural mineral. Adsorption characteristics of the geosorbent were explored by means of optimization studies, isotherm and kinetic model applications.

Material and Methods: MnO₂ was coated on the alunite surface through a redox process using 25 g alunite was suspended in deionized water and MnCl₂·2H₂O was added into this suspension. After stirring vigorously, 250 mL of 0.1 mol/L KMnO₄ solution was added. Then, MnO₂ precipitate formed according to following equation.



MnO₂/alunite solid was filtered, solid was washed with deionized water several times and then dried in an oven for 24 h. It was stored in a glass bottle and used for RO13 adsorption studies. RO13 (C.I.: 18972) was used as target pollutant. It was obtained from local textile factory. Batch adsorption experiments were conducted on a multipoint magnetic stirrer at ambient temperature. pH optimization studies were carried out by using 25 mg of MOC-alunite in 25 mL of dye solution at the initial concentration of 100 mg L⁻¹ at a pH interval of 2.0-8.0. Contact time was changed between 5 and 60 min at 10, 20 and 30°C and kinetic evaluation was made using time-dependent data.

Results: The present study indicated the feasibility of MOC-alunite as a good geosorbent with a noticeable adsorption potential for the removal of RO13 in batch system. Initial pH and geosorbent dosage affected the adsorption performance of MOC-alunite. The maximum adsorption of RO13 was observed at pH 2.0 and the adsorption yields were 1.70 and 98.48 % for natural alunite and MOC-alunite, respectively. The adsorption of MOC-alunite rapidly takes place and an equilibrium was reached within 5 min. The kinetics of RO13 adsorption onto MOC-alunite well fitted the pseudo-second-order model rather than the pseudo-first-order model. The equilibrium adsorption capacity values are also close to the experimental values. Appropriateness of equilibrium data to Langmuir isotherm demonstrated the monolayer adsorption of RO13 onto homogeneous surface of MOC-alunite.

Keywords: MOC-alunite; adsorption; manganese oxide; Reactive Orange 13

PP-142

Environmentally-friendly composite for the biosorption of AR1 dyeSibel TUNALI AKAR¹, Elif SAN, Tamer AKAR¹¹Department of Chemistry, Eskişehir Osmangazi University, Turkey,
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Aim of the study: The aim of this study was to design a composite sorbent by active immobilization of alunite with chitosan. The decolorization performance of the composite sorbent was studied in the batch system.

Material and Methods: Acid Red 1 (AR1) dye was purchased from Sigma-Aldrich and used without further purification. The concentrations of working dye solutions were obtained by diluting a stock solution at a concentration of 100 mg L⁻¹. Alunite mineral was provided from Kütahya, Turkey and crushed, ground using a laboratory mill and sieved to particle size of 150 µm. The powdered alunite was calcined at different temperatures of 400, 500, 600, 700 and 800 °C. Calcined alunite powders were ultrasonically dispersed in 60 mL of 5% (v/v) acetic acid solution. Alunite-chitosan (mass ratio: 1:2) solutions were injected into 500 mL of 0.50 M NaOH solution. In order to remove the excess NaOH, the wet beads were rigorously washed with distilled water, separated from the aqueous phase by filtration and dried in an oven. In batch adsorption studies, 25 mL of dye solutions was treated with a known amount of composite powder. During the adsorption experiments, the dyes were contacted with composite at room temperature and stirred at 200 rpm. The optimum adsorption conditions (initial pH, adsorbent dosage, contact time) were determined in the batch system. The dye concentrations in the solutions were determined by UV spectrometry.

Results: The effect of calcination temperature of alunite on the sorption performance of chitosan-alunite composite (CAC) was investigated. The highest sorption yields are obtained at 105, 400 and 500°C. 105°C was chosen as optimum calcination temperature of alunite in terms of the energy conservation. The maximum sorption yield of CAC was 91.40±0.16% for AR1 with the adsorbent amount of 5 mg at pH 3.0. The adsorption yield of CAC decreased from 86.47±0.14 to 45.50±0.42% ($p<0.05$) by increasing ionic strength from 0.01 to 0.08 mol L⁻¹. The kinetic results indicated that the pseudo-first-order model is the best kinetic model for explaining the sorption of AR1 onto CAC. The calculated q_e value from this model (456.22 mg g⁻¹) is in agreement with the experimental q_e values (448.20 mg g⁻¹ for AR1 and 220.83 mg g⁻¹ for RR2). Thus, the sorption of both AR1 and RR2 onto CAC is a first-order reaction. R^2 value for the Langmuir isotherm model is higher than for Freundlich and D-R models. This finding indicated the monolayer adsorption of AR1 onto CAC surface. Consequently, CAC could be considered as an effective and ecofriendly sorbent material toward the implementation of adsorption process in environmental clean-up.

Keywords: Alunite, Bioremediation, Chitosan, AR1, Composite, Sorption

PP-143

**Optimization by Box-Behnken Experimental Design for the Biosorption of Reactive Violet 1 on
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Aim of the study: In this study, we aimed to apply the experimental design, modelling and optimization techniques for the batch biosorption process. Process variables were screened using response surface methodology (RSM) coupled with a Box-Behnken design (BBD) matrix. Solution pH, biosorbent dosage, reaction time and temperature were considered as key factors. The interactive effects of factor variables on the biosorption of RV1 by *Pisum sativum* peels (PSP) biomass were discussed.

Material and Methods: *Pisum sativum* was provided from local markets in Eskişehir, Turkey, and peels were separated from their edible peas. They were cut into small pieces, washed with deionized water, oven-dried at 60°C overnight, ground and sieved to particle size range of 212 to 149 µm. RV1 was provided from a local textile company in ~100% pure form and working dye solutions were obtained by suitable dilution procedures. Twenty-nine experiments designed by RSM were performed in a batch system to investigate the influences of initial pH, biosorbent amount, contact time and temperature. For these experiments, 25 mL of RV1 solutions at specific pH values was placed into 100-mL beakers, and weighed amounts of PSP were added to each flask. The mixtures were stirred at 200 rpm, and the biosorbent was separated by centrifugation. The supernatant was analyzed for its residual RV1 concentration. A Box-Behnken design with four-factors is performed to investigate the effects of significant factors on the response variable(s) and to achieve the optimum conditions of experimental design. Design-Expert Software trial version 8.0 was used to design the number of experiments to be applied, evaluate the results of experiment design and optimize the process.

Results: To examine the effects of factor variables (pH, biosorbent amount, time and temperature) on RV1 removal efficiency (%), 29 runs of experimental data and observed results are used for the optimization of the chemical process. According to results of multiple regression analysis, an empirical relationship between the factor variables can be expressed by the following model:

$$\text{RV1 biosorption yield (\%)} = 62.18 + 8.91x_1 + 28.13x_2 + 3.72x_3 + 7.40x_4 + 9.02x_1x_2 + 0.09x_1x_3 + 6.72x_1x_4 + 5.96x_2x_3 + 7.57x_2x_4 + 0.54x_3x_4 + 8.76x_1^2 + 27.95x_2^2 + 3.96x_3^2 + 4.00x_4^2$$

The value of the determination coefficient (R²=0.9746) revealed that the regression model was the best model for predicting the performance of RV1 biosorption. In addition, adjusted R² value (adj. R²=0.9493) indicated that 94.93% of total variations were explained by the model provided in above equation. The *F*-value (38.42) with a very low *p*-value (<0.0001) of the model indicated that the quadratic model was statistically significant for RV1 biosorption on PSP. The optimum predicted point of maximum RV1 biosorption (%) onto PSP obtained by means of the Box-Behnken method was approximately 83.22%. The independent variables of the biosorption process were as following: pH= 2.0, biosorbent amount= 0.62 g, contact time= 56.94 min and temperature= 27.33°C.

Keywords: Biosorption, Box-Behnken design, *Pisum sativum*, Reactive violet 1 (RV1)

PP-144

Taxonomical contributions to Turkish *Vincetoxicum* Wolf (Apocynaceae: Asclepiadoideae) taxa based on fruit characteristicsSeher GÜVEN¹, Serdar MAKBUL¹, Kamil COŞKUNÇELEBİ²¹Department of Biology, Faculty of Sciences and Arts, Recep Tayyip Erdogan University, Rize, Turkey²Department of Biology, Faculty of Sciences, Karadeniz Technical University, Trabzon, Turkey
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Aim of the study: This study aim to evaluate the taxonomic implications of fruit properties belong to *Vincetoxicum* Wolf. inferred from anatomical and morphological studies.

Material and Methods: Samples used in this study were collected from wild populations belong to the examined taxa. Morphological observations were performed on fruit samples obtained from herbarium materials by using a stereomicroscope. The material for anatomical study was fixed in FAA (Formaldehyde: Acetic Acid: Alcohol) for 24 hours and then preserved in ethanol (70 %). All observations were made on transverse sections taken by a freezing microtome. Selected sections were stained with hematoxylen, mounted with aqua witrexia in order to obtain permanent slides and photographed with a light microscope equipped with a digital camera.

Results: Fruits are ovate or lanceolate in shape, glabrous or covered with hairy indumentums in all examined taxa. Pericarp consisted of a monolayer exocarp with thick-walled parenchymatic cells, multilayered mesocarp with collenchymatic, sclerenchymatic and parenchymatic cells and one or two layered endocarp with thick-walled sclerenchymatic cells. This study is the first report dealing with fruit features of Turkish *Vincetoxicum* taxa. Results indicated that fruit size, shape, pubescence and pericarp thickness should be useful in delimiting the examined taxa at interspecific level.

Acknowledgements: The authors extend their thanks to RTEUBAP (Project number 2013.102.03.1) for the financial support.

Keywords: Anatomy, fruit, morphology, pericarp, *Vincetoxicum*, Turkey.

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Fruit Characteristics of Turkish *Epilobium* L. (Onagraceae) taxaSeda OKUR¹, Kamil COŞKUNÇELEBİ², Serdar MAKBUL³, Seher GÜVEN³¹PazarVocational School, Recep Tayyip Erdogan University, Turkey²Department of Biology, Faculty of Science, Karadeniz Technical University, Turkey³Department of Biology, Faculty of Sciences and Arts, Recep Tayyip Erdogan University, Turkey

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Aim of the study: Present study aim to examine the morphological and anatomical properties of fruits of Turkish *Epilobium* taxa to elucidate the taxonomic value for the genus.

Material and Methods: Plant materials belong to 26 *Epilobium* taxa were collected from the natural localities of Turkey. Morphological observations were performed on fruits obtained from herbarium materials by using a stereomicroscope. The material for anatomical study was fixed in FAA (Formaldehyde: Acetic Acid: Alcohol) for 24 hours and then preserved in ethanol (70 %) in the field. Transverse sections of the fruits were taken by freezing microtome. Selected sections were stained with hematoxylen, mounted with aqua witrexia in order to obtain permanent slides and photographed with a light microscope equipped with a digital camera.

Results: Fruits (capsules) are green or dark purple, cylindrical in shape and exhibit dense or sparse indumentums with glandular and non-glandular trichomes. Pericarp consists of single layered exocarp with parenchymatic cells, multilayered mesocarp composed of collenchymatic and parenchymatic cells containing raphid idioblasts, monolayered endocarp with parenchymatic cells. This study is the first report on fruit properties of Turkish *Epilobium* taxa. Results showed that the size, color, indumentum type and density of capsule, and pericarp thickness can be used to distinguish the examined *Epilobium* taxa at especially sectional level and in some case interspecific level.

Acknowledgements: This study was supported by Scientific and Technological Research Council of Turkey (TUBITAK, Project number: 113Z782).

Keywords: Anatomy, *Epilobium*, capsule, morphology, Anatolia

PP-146

Biodiversity of Insects of Wetlands of Region of Setif (North-east of Algeria)M. BOUNECHADA¹ and D. MOUHOUBI²¹ *Department of Biology and Animal Physiology, Faculty of life and Natural Sciences, Laboratory (LADPVA), University of Setif1, Setif, Algeria*² *Department of Biology and Animal Physiology, Faculty of life and Natural Sciences, , University of Setif1, Setif, Algeria*
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Aim of the study: The aim of this study is to inventory the insects present in different environments of Wadi Boussellam valley which is considered as wetlands.

Material and Methods: The samples were taking from July 2012 to June 2013. Six collecting sites were chosen. The results were analyzed and treated by many ecological indexes and analytical methods.

Results: The study of the qualitative and quantitative composition revealed the presence of 289 species of insects divided into 08 orders, 89 families and 232 genera. The highest number of species is Coleoptera. The 6th site is the richest in species compared with other stations. The study shows a monthly variation. The most increased species richness is noted during June.

Key words: Biodiversity, Wetlands, Wadi Boussellam, Insects, Ecological indexes, Algeria.

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Histopathological Changes in the Liver of *Anabas testudineus* Exposed to CypermethrinElif İpek SATAR¹, Babu VELMURUGAN², Senthil KUMAAR²¹Department of Pharmaceutical Toxicology, Faculty Pharmacy, Dicle University, Diyarbakir, Turkey²Department of Zoology, P.G and Research and Biotechnology, Sir Theagaraya College, Old

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Aim of the study: The present study was undertaken to assess the toxicity of sublethal concentrations (0.015, 0.030 and 0.045 ppm) of cypermethrin (a pyrethroid pesticide) in the liver of *Anabas testudineus* for 7, 14 and 21 days.

Material and Methods: On 7th, 14th and 21st days, liver tissues were removed and dropped in Bouin's fluid. After fixation for 24-30 hours, the liver samples were dehydrated with increasing concentrations of ethanol, transparented into xylene, embedded in paraffin. Sections of 5 µm were prepared from paraffin blocks using a rotary microtome. These sections were then stained with hematoxylin-eosine. The histopathological changes in the liver were observed using light microscope.

Results: On 7th day, hemosiderine granules were observed at 0.015 ppm and 0.030 ppm, at 0.045 ppm concentration cloudy swelling was diagnosed in addition to the hemosiderine granules in the liver tissues. On 14th day, the determination of hemosiderine granules and vacuolar degeneration at 0.015 ppm concentration, hypertrophy of hepatocytes and hemosiderine granules at 0.030 ppm concentration, and granular degeneration and hemosiderine granules at 0.045 ppm concentration were recorded. On 21st day, hemosiderine granules and pycnotic nucleus at 0.015 ppm concentration, vacuolar degeneration and pycnotic nucleus at 0.030 ppm concentration and focal necrosis, hypertrophy of hepatocytes, pycnotic nucleus and congestion at 0.045 ppm concentration were observed in the liver tissues.

Acknowledgements: This study was financially supported by Jawaharlal Nehru Memorial Fund (SU/1/192/2006-2007/646).

Keywords: Histopathology, liver, cypermethrin, *Anabas testudineus*

PP-148

Microalgae - potential raw material for biodiesel fuel production

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Aim of the study: Currently the interest in the application of microalgae for food and technical purposes is growing. The use of algae for biofuel production is advantageous because microalgae rapidly grow and accumulate oil, and growing algae utilise carbon dioxide. Some strains of microalgae can accumulate the oil therefore the possibilities to produce the biodiesel fuel by applying microalga oil are attractive from environmental point of view. Microalgae biomass is attractive raw material for biogas production and removal of pollutants from liquid phase of digestate – residual of biogas production. The aim of our research was to evaluate the possibilities of application of the enzymatic transesterification of algae oil with ethanol for the production of biodiesel fuel.

Material and Methods: Microalgae were cultivated in photobioreactors equipped with mixing tools. The cultivation conditions were: temperature 22 ± 2 °C, illumination from white fluorescent lamps ($\sim 250 \mu\text{mol m}^{-2} \text{s}^{-1}$), a duration of 20 to 30 days. The microalgae biomass was centrifuged and dried. Oil from the microalgae biomass was extracted with hexane in a Soxhlet apparatus. The following industrial Novozymes© lipases were used to select the most effective biocatalyst for biodiesel synthesis: Lipozyme 435, Novozym 435, Lipozyme TL IM, Lipozyme RM IM, Lecitase Ultra, Resinase A2X, Lipolase 100L. The transesterification process with ethanol was optimised by applying response surface methodology (RSM). The transesterification reaction was performed in a laboratory reactor equipped with a stirrer and a water-cooled glass condenser. The ethanol was used for microalgae oil transesterification. In each case, specified amounts of ferment preparation and ethanol were added to the oil, which was heated to the required temperature. At the end of the synthesis reaction, the product was separated from the glycerol and lipase by decantation. The biodiesel was washed twice with distilled water, was dried at 105-110 °C and additionally with silica gel, and was purified by filtration.

Results: It was found that the liquid enzyme preparation Lipolase 100L is an effective biocatalyst for the transesterification of microalgae oil with ethanol. The interactions of the molar ratio of ethanol to oil, the process duration, the lipase concentration and the temperature were evaluated by response surface methodology (RSM). The most important variables were the reaction time and the biocatalyst amount, which had a high positive effect on the algae oil ethyl ester yield. Conversely, the effect of the ethanol to oil molar ratio and the process temperature on ester formation was negative. The optimal reaction conditions predicted by the model were a temperature of 30 °C, a lipase amount of 10 % and an ethanol to oil molar ratio of 3:1. The actual experimental transesterification yield under these conditions was 92.3%. To increase the ester amount, the duration of the reaction was extended under optimal conditions, and after a 26-h reaction duration, the transesterification yield was increased to 96.9%, which meets the requirements of the European standard for biodiesel fuel (EN 14214).

Acknowledgements: The authors sincerely appreciate the assistance of the Research Council of Lithuania. This research was funded by a grant (No MIP 68/2015).

Keywords: microalgae oil, ethanol, enzymatic transesterification, optimisation.

PP-149

Phylogenetic relationships between species of *Anatololacerta* (Squamata, Lacertidae) and taxonomical reconstruction considering molecular markers, with description of the new genetically lineages

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Aim of the study:We searched the evolutionary relationship of *Anatololacerta* genus based on both mitochondrial (16S rRNA and cyt b) and nuclear markers (Rag-1 and cmos). The current phylogenetic and phylogeographic information can be added to the knowledge of their morphology and distribution, producing a more accurate taxonomy for *Anatololacerta*.

Material and Methods:A total of 163 *Anatololacerta* specimens were used in this study. For all specimens, total genomic DNA was extracted using the Invitrogen DNA extraction kit. Partial segments of mtDNA (16S rRNA and cyt b) and nuclear (cmos and Rag-1) genes were targeted as markers. All DNA sequences were aligned separately for each gene using MAFFT v7 with default parameters and FFT-NS-2 algorithm. The number of haplotypes, haplotype diversity, and nucleotide diversity were calculated in DnaSP v5. For nuclear DNAs, RDP4 v4 was used to detect recombination within the sequences. The genetic distances among the major phylogenetic clades that have high statistical values in terminal nodes in our phylogeny were calculated based on the TrN model of evolution in MEGA v6. The most suitable model of DNA substitution was chosen using jModelTest v2, under the BIC. Neighbor-joining was performed in MEGA using the calculated TrN genetic distances. Maximum Likelihood and Maximum Parsimony were performed with RAXML v7 and PAUP v.4, respectively. Bayesian Inference was conducted in MrBAYES v3 using the suitable models of evolution for each gene regions. The analysis was run four times with eight chains, each run for 5×10^6 generations, and sampling from the chain every 100 generations.

Results:In total, 1078 bp of 16S rRNA, 998 bp of cytochrome b, 559 bp of cmos and 956 bp of Rag-1 were obtained. For 16s, 85 haplotypes were detected and parsimony informative sites were 130. For cyt b, 96 haplotypes were detected and parsimony informative sites were 227. We did not find any evidence of recombination for nDNAs. The highest value of the genetic distances has reached to 11.0% among lineages for cyt b (mtDNA). Phylogenetic analyses (NJ, ML, MP and BI) produced trees with similar topologies. According to the produced trees, *Anatololacerta* populations are assigned to six very-well supported clades in Anatolia. With the extensive genetically data, it can be considered as the genus are represented by 6 species rather than current position which has 3 species.

Acknowledgements:This study was supported by TÜBİTAK (The Scientific and Technological Research Council of Turkey) with Project number 112T269.

Keywords: *Anatololacerta*, Phylogeny, Systematic, Lizard, Anatolia.

PP-150

Genetic lineages and diversification of *Phoenicolacerta laevis* (Gray, 1838) (Squamata, Lacertidae) in southern TurkeyKamil CANDAN¹, Çetin ILGAZ¹, Yusuf KUMLUTAŞ¹, Salih Hakan DURMUŞ², Nurettin BEŞER³, Elif YILDIRIM¹¹Department of Biology, Dokuz Eylül University, İzmir, Turkey²Department of Biology Education, Dokuz Eylül University, İzmir, Turkey³Department of Biology, Adnan Menderes University, Aydın, Turkeykamilcandan@yahoo.com

Aim of the study: It aims to evaluate the genetic structure and investigate biogeography of this species in southern Turkey. In this context, we reconstructed the phylogenetic relationships of *P. laevis* populations (from the east to the west) and we aimed to following the routes of dispersal.

Material and Methods: A total of 34 *Phoenicolacerta* specimens from 17 localities were used in this study. For all specimens total genomic DNA was extracted using the Invitrogen DNA extraction kit. Partial segments of 16S rRNA and Cytochrome b (mtDNA) genes were targeted as markers. All DNA sequences were aligned separately for each gene using MAFFT v7 with default parameters and FFT-NS-2 algorithm. The genetic distances among the major phylogenetic clades were calculated based on the TrN model of evolution in MEGA v6. The number of haplotypes, haplotype (Hd) diversity, and nucleotide (π) diversity were calculated in DnaSP v5. The most suitable models of DNA substitution were chosen using jModelTest v2, under the Bayesian Information Criterion. Phylogenetic analyses were performed with the Neighbor Joining (NJ), Maximum Likelihood (ML), Maximum Parsimony (MP) and Bayesian Inference (BI) methods using MEGA v6, RAxML v7, PAUP v.4 and MrBAYES v3, respectively. The genealogical relationships among the 16S and cyt *b* haplotypes, separately, were constructed using TCS v.1.21 with statistical parsimony and a connection limit of 95%.

Results: In total, 502 bp of 16S rRNA and 360 bp of cyt *b* were obtained. For 16S, 10 (1.9%) and 8 (1.5%) were variable and parsimony informative sites, respectively. The corresponding values for cyt *b* were 39 (10.8%) and 33 (9.1%), respectively. Nine haplotypes with $H_f=0.84$ and $\pi=0.007\pm 0.0003$ were found for 16S and 17 haplotypes with $H_f=0.91$ and $\pi=0.031\pm 0.0024$ were estimated for cyt *b*. The genetic distances among the major clades ranged from 0.8% to 1.2% for 16S and 3.9% to 5.9% for cyt *b*. According to the phylogenetic results, *Phoenicolacerta laevis* populations are assigned to three very well supported clades which were produced by phylogenetic analyses. Three independent Cyt *b* haplotype networks were identified from the statistical parsimony analysis, corresponding to these clades. The results showed that populations from southwestern costs of Turkey can be originated from east, especially, around Adana and Osmaniye.

Keywords: *Phoenicolacerta laevis*, Phylogeny, mtDNA, Biogeography, Turkey.

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The herpetofaunic diversity of Turkey: Taxonomy, distribution and conservation status of the speciesÇetin ILGAZ¹, Yusuf KUMLUTAŞ¹, Kamil CANDAN¹¹Department of Biology, Dokuz Eylül University, İzmir, Turkey
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Aim of the study: In the present study, updated check lists of Turkish amphibian and reptile species is given with the recent taxonomy, conservation status and chorotypes characteristics.

Material and Methods: The data in the present study includes most scientific literature up to 2015 and ZDEU museum records. In order to give information, the current IUCN Red List conservation status for all species (IUCN, 2015) was used. Zoogeographical assessments were carried out in consideration of the species' origin by classifying them into major chorotypes according to Sindaco et al. (2000).

Results: We present species accounts for a total 32 amphibians and 132 reptiles. Species of amphibians and reptiles include 15 frogs, 17 salamanders, 3 worm lizards, 64 lizards, 55 snakes, 2 tortoises and 8 turtles. Turkey has 13 endemic amphibians and 21 endemic reptile species. Of the 32 amphibian species, 27 have different types of conservation status according to IUCN data. Also of the 132 reptile species, 102 have different types of conservation status according to IUCN data. The amphibian and reptile species including into the Turkish herpetofauna can be grouped into 37 chorotype categories. The most common chorotype in Turkey is SW-Asiatic (32 species, 19.3%) and then respectively, Anatolian endemic (26 species, 15.7%), E-Mediterranean (26 species, 15.7%), Turano-Mediterranean (10 species, 6%), Armenian endemic (9 species, 5.4%), Mediterranean (6 species, 3.6%), European (4 species, 2.4%), Mediterraneo-Sindian (4 species, 2.4%). Based on its position and geology, Turkey acted in the past as a bridge or as a barrier for species' dispersal between Asia, Europe, and the Ethiopian region via the Middle East, providing a natural pathway or acting as a vicariant agent so Turkey has a fauna that might be stated to be nearly as rich as the animal fauna of Europe.

Keywords: Amphibians, Reptiles, Distribution, Conservation, Biodiversity, Turkey.

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Helminth fauna of Lebanon lizard, *Phoenicolacerta laevis* (Gray, 1838) (Sauria: Lacertidae) from southern TurkeySezen BİRLİK¹, Hikmet Sami YILDIRIMHAN¹, Nurhan SÜMER¹, Yusuf KUMLUTAŞ²,Çetin ILGAZ², Salih Hakan DURMUŞ³, Kamil CANDAN²¹Department of Biology, Uludağ University, Bursa, Turkey²Department of Biology, Dokuz Eylül University, İzmir, Turkey³Department of Biology Education, Dokuz Eylül University, İzmir, Turkey
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Aim of the study: Recently, studies of helminth parasites from lizards have been started to increase gradually in defined geographical areas but studies on helminth fauna of lizards of the genus *Phoenicolacerta* are partial and scarce, none for *P. laevis*. Thus, this work represents an opportunity to know for the first time helminth communities parasitizing *P. laevis* from Turkey.

Material and Methods: 54 *P. laevis* mean snout-vent length = $68,57 \pm 11,46$ mm, with a range from 46.0 to 87.0 mm, were collected by hand from Hatay and Adana, Turkey. The body cavity was opened, and the digestive tract removed. The oesophagus, stomach, small and large intestine and lungs were opened and examined for helminths under dissecting microscope. Nematodes were killed in hot saline solution, fixed in 70% ethanol, and mounted in glycerol. For the morphological examination, the helminth species were cleared gradually in glycerin. Digeneans and cestodes were fixed in 70% ethanol, stained with iron-carmine as described by Georgiev et al. (1986), cleared in clove oil, and mounted in Entellan. Parasites were identified, when possible, to species, and the number and location of individuals of each species were recorded. Helminth identification was based on keys given by Schmidt (1986), Yamaguti (1961), Baker (1987), Bray et al. (2008). Helminth voucher specimens were deposited in the Uludağ University, Department of Biology, Bursa, Turkey.

Results: Nine species of helminth parasites were detected in Lebanon Lizard. These species were 3 species of Digenea, *Sonsionotrema tacapense*, *Prosthodendrium chilostomum*, *Brachylaima* sp. (metacercaria); 2 species of Cestoda, *Oochoristica tuberculata* and *Mesocestoides* sp. and 4 species of Nematoda, *Skrjabinodon medinae*, *Spauligodon* sp., *Thubunaea* sp. and a larva of the Ascaridiidae (Ascarididae gen. sp.). Of 54 *P. laevis*, 33 (61%) were infected with 1 or more parasites. Of 54 host lizard, 21 (38%) were infected by any parasite species. Total 278 individuals of 9 parasite species were collected from 33 Lebanon Lizard. *Sonsionotrema tacapense* (Digenea) and *Thubunaea* sp. (Nematoda) are recorded for the first time from Turkey.

Keywords: Helminth, *Phoenicolacerta laevis*, Biodiversity, Turkey.

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Life history of *Iranolacerta brandtii* (De Filippi, 1863) (Squamata, Lacertidae) in a high population from eastern AnatoliaSerkan GÜL¹, Çetin ILGAZ², Yusuf KUMLUTAŞ², Kamil CANDAN²¹Department of Biology, Recep Tayyip Erdoğan University, Rize, Turkey²Department of Biology, Dokuz Eylül University, İzmir, Turkey
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Aim of the study: Population of *Iranolacerta brandtii* in Turkey is 230 km far from Iranian populations and there are no data available on biology, especially age structures, of this species. This study aimed to know longevity and growth rates of *I. brandtii* from eastern Turkey population using skeletochronological method.

Material and Methods: 23 *I. brandtii* specimens (4♀♀ and 19♂♂) captured from Karadulda village of Çaldıran in Van at altitudes of 2363 m a.s.l. were used for skeletochronological analysis. Considering protocol, a portion of the second phalanx from the third toe of the hind-foot of all specimens was clipped at first. Later, these phalangeal bones were kept in water for 24 hrs, and then were decalcified under 5% nitric acid for 2 hrs. After 2 hours, the phalangeal bones were kept in water for 12 hrs again. Cross sections (18 µm) of the middle part of phalangeal diaphysis were prepared using a freezing microtome and stained with Ehrlich's haematoxylin. The LAGs were detected on transverse sections of the middle part of phalangeal diaphyses. For test of normality, Shapiro-Wilk test was firstly performed. Mann-Whitney U test from two independent samples tests was used to form the comparative and superlative degrees of age and SVL between male and female individuals. Pearson's correlation coefficient (r) was used for the strength and direction of the relationship between age and SVL. The quadratic model that has the highest R² value in curve estimation was performed for regression analysis. All of analyses were carried out to using SPSS v.22.

Results: LAGs in cross sections of the middle part of phalangeal diaphysis were easily counted in all specimens. The distribution of age is not different between male and female in the population (Mann-Whitney U test, u= 33, z= -0.423, P= 0.725) whereas there is a significant difference between the sexes in terms of SVL (Mann-Whitney U test, u= 11, z=-2.190, P< 0.05). The age where a significant decrease in the growth took place was determined as age at sexual maturity. According to this statement, we made judgment that individuals of the population reach sexual maturity in 4 or 5 years. While the maximum age is 6 years for males, it is 5 years in females, and they had 67.9 mm and 66.1 mm SVL values, respectively. There is a strong correlation between age and SVL in males (r= 0.664, p< 0.05) based on Pearson correlation coefficients, but this relationship doesn't appear in females (p= 0.516). The quadratic model showing the best of correlation between age and SVL in males ($y = 16.985 + 16.392x - 1.49x^2$; R²= 0.525; p<0.05) was selected for regression analysis.

Keywords: *Iranolacerta brandtii*, Life history, Skeletochronological analysis, Anatolia.

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Genetic Diversity of *Rhododendron* spp. in Turkey

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Aim of the study: The *Rhododendrons* of Turkey are presented by 11 taxa and they grow naturally along the coast of the Black Sea region from Artvin province at the east to Istranca Mountains at the west. Although in many countries, cultivated natural forms or breeding varieties of *Rhododendron* genus are highly used in landscape planning and/or as ornamentals, in Turkey there is no cultivated local forms available and all commercial varieties are imported as potted plants. Recently, a national project has started with an objective to generate well documented ex-situ conservation of all naturally growing *Rhododendron* species of Turkey following a detailed morphological, molecular studies and tissue culture propagations. As partners of this project our aim is to analyze the genetic diversity by incorporating possible impacts of location and altitude to their diversity.

Material and Methods: The plant material have been collected from nature at different GPS locations and diverse altitudes along the cost of Black Sea region. Material included wild species, wild hybrids, populations of certain species and genotypes (morphologically defined species with uncharacteristic phenotypes). Leaf samples were collected and preserved in silica jel (1:10 gr/gr) containing ziplock bags to be used in molecular marker analysis. Total of 24 primers consisting of RAPD, ISSR and ITS markers were selected to study the genetic diversity and phylogenetic relationship among the samples. Genetic distance calculations of the data matrix to generate cluster analysis were performed by UPGMA using Pearson coefficient. The dendograms reflecting the genetic similarity were drawn using MATLAB.

Results: The preliminary molecular marker analysis were completed using 10 RAPD and 10 ISSR primers on the 16 plant material containing wild species, wild hybrids and some genotypes with uncharacteristic traits. All primers have shown more than 94% polymorphism, producing amplicons ranging between 200-3000bp. The average number of bands obtained for ISSR and RAPD primers were 17.8 and 18.7 respectively. Cluster analysis generated two distinct clusters (I and II) with genetic similarity ranging from 5.7%- 86%. Each of the cluster were further divided to two subclusters (Ia, Ib and IIa, IIb). The subclusters Ia and Ib mostly contained *R.luteum* Sweet and *R.ponticum* L. while the subclusters IIa and IIb contained the rest of the material. The impact of geographic range on the species genetic diversity were clearly observed in cluster analysis when highly wide spread wild species were clustered as separate groups from the other wild species which has very narrow range of natural growth locations.

Acknowledgements: We would like to acknowledge TUBITAK (112O500) (Turkish Scientific and Technical Research Council) and BAP 11140 (Bogazici Univ. Scientific Research Fund) for their financial support.

Keywords: *Rhododendron* species, genetic diversity, molecular markers.

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Anthocerotophyta and Marchantiophyta Flora of Ordu Province (Turkey)Turan ÖZDEMİR¹, Nevzat BATAN², Gökhan ABAY³¹Department of Biology, Faculty of Science, Karadeniz Technical University, 61080, Trabzon, Turkey²Maçka Vocational School, Karadeniz Technical University, 61750, Trabzon, Turkey³Department of Landscape Architecture, Faculty of Architecture Design and Fine Art, Recep Tayyip Erdoğan University, Rize, Turkey
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Aim of the study: This study aimed to investigate *Anthocerotophyta* and *Marchantiophyta* flora of Ordu province, which is one of the biggest province in Eastern Black Sea Region of Turkey and to make a contribution to the bryoflora of Turkey. This study can be used as a guide for future bryological studies in Turkey.

Material and Methods: The bryophyte specimens were collected by the authors during field work in Ordu Province (Turkey) from 01 October 2013 to 01 October 2015. Materials were collected from 186 localities. Identifications were determined using keys of (Smith, 1996; Paton, 1999; Frey et al., 2006). Latest status of the taxa for Turkey and Southwest Asia have been assessed using the related literature; Kürschner and Erdağ (2005), Özenoğlu Kiremit and Keçeli, 2009; Kürschner and Frey (2011); Abay (2014).

Results: The taxonomic survey of Ordu Province yielded 1 taxa belonging 1 family in division *Anthocerotophyta* and 51 taxa belonging 14 families in division *Marchantiophyta*. The dominant liverwort family is *Scapaniaceae* (11 taxa) and up to 21,56 % of the *Marchantiophyta* species identified in this study were in this family. The other families with the most number of taxa were *Frullaniaceae* (4 taxa), *Jungermanniaceae* (3 taxa), *Lophocoleaceae* (3 taxa), *Porellaceae* (3 taxa), *Plagiochilaceae* (3 taxa), *Metzgeriaceae* (3 taxa). Other families are represented by 2 or fewer taxa in the area. The most species-rich liverwort genera are as follows: *Scapania* (6 taxa), *Frullania* (4 taxa), *Jungermannia* (3 taxa), *Porella* (3 taxa), *Marchantia* (2 taxa), *Pellia* (2 taxa), *Leiocolea* (2 taxa), *Lophocolea* (2 taxa), *Diplophyllum* (2 taxa), *Plagiochila* (2 taxa), *Radula* (2 taxa), *Metzgeria* (2 taxa). Other genera are represented by 1 taxa in the area.

Acknowledgements: We gratefully acknowledge the financial support provided by the Scientific and Technological Research Council of Turkey (Project Code: 113Z228).

Keywords: Anthocerotophyta, Marchantiophyta, Flora, Ordu Province, Turkey.

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Bryophyta (Musci) Flora of Ordu Province (Turkey)Turhan ÖZDEMİR¹, Nevzat BATAN², Gökhan ABAY³¹Department of Biology, Faculty of Science, Karadeniz Technical University, 61080, Trabzon, Turkey²Maçka Vocational School, Karadeniz Technical University, 61750, Trabzon, Turkey³Department of Landscape Architecture, Faculty of Architecture Design and Fine Art, Recep Tayyip Erdoğan University, Rize, Turkey
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Aim of the study: The aim of the present study is to compile a list of *Bryophyta* (Musci) of Ordu province to make a contribution to the bryoflora of Turkey. This study can be used as a guide for future bryological studies in Turkey.

Material and Methods: The moss specimens were collected by the authors during field work in Ordu Province (Turkey) from 01 October 2013 to 01 October 2015. Materials were collected from 310 localities. Identifications were determined using keys of (Watson, 1981; Smith, 2004) (Nyholm, 1986; 1989; 1993; 1998; Hedenäs, 1992; Pedrotti, 2001; 2006; Casas ve ark., 2009; Frey et al., 2006), Irak (Agnew and Vondracek, 1975), Israel and its environs (Heyn and Herrnstadt, 2004), the former Soviet Union (Savicz-Ljubitzkaja and Smirnova, 1970), Northwest Pacific (Lawton, 1971), Japan (Noguchi and Iwatsuki, 1988; Noguchi et. al., 1991; Noguchi and Iwatsuki, 1987; Noguchi and Iwatsuki, 1989; Noguchi et. al., 1994), Mexico (Sharp et al., 1994), Central America (Allen, 1994, 2002) and North America (Crum and Anderson, 1981), Ireland (1982), Noguchi and Iwatsuki (1987, 1989), Lin and He (1999), Li et al. (2007) and Zhang and He (2011). Latest status of the taxa for Turkey and Southwest Asia have been assessed using the related literature; Uyar and Çetin (2004), Kürschner and Erdağ (2005), Kürschner and Frey (2011), Ros et al. (2013) and recent new records.

Results: As a result of the study, 364 taxa belonging 14 orders, 44 families and 129 genera in division *Bryophyta* were determined from 310 different localities, which is located in Ordu Province. The dominant family in the study area were *Pottiaceae* (53 taxa), *Brachytheciaceae* (46 taxa), *Grimmiaceae* (31 taxa), *Amblystegiaceae* (22 taxa), *Bryaceae* (22 taxa), *Orthotrichaceae* (18 taxa), *Hypnaceae* (18 taxa) and *Plagiotheciaceae* (15 taxa). Other families are represented by 14 or fewer taxa in the area. The most species-rich moss genera are as follows: *Orthotrichum* (15 taxa), *Brachythecium* (14 taxa), *Didymodon* (13 taxa), *Grimmia* (13 taxa), *Racomitrium* (11 taxa), *Hypnum* (11 taxa), *Bryum* (10 taxa), *Plagiothecium* (10 taxa), *Tortella* (9 taxa), *Tortula* (9 taxa), *Ptychostomum* (9 taxa), *Schistidium* (7 taxa), *Mnium* (7 taxa), *Plagiomnium* (7 taxa), *Syntrichia* (6 taxa), *Campylopus* (6 taxa), *Fissidens* (6 taxa), *Philonotis* (6 taxa), *Dicranella* (5 taxa), *Polytrichum* (5 taxa), *Sphagnum* (5 taxa), *Pohlia* (5 taxa), *Rhynchostegium* (5 taxa), *Sciuro-hypnum* (5 taxa), Other genera are represented by 4 or fewer taxa in the area.

Acknowledgements: We gratefully acknowledge the financial support provided by the Scientific and Technological Research Council of Turkey (Project Code: 113Z228).

Keywords: Biodiversity, Musci, Flora, Ordu Province, Turkey.

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Bryophyte Flora of Burdur Province (Turkey)Nevzat BATAN¹, Turan ÖZDEMİR², Gökhan ABAY³¹ Maçka Vocational School, Karadeniz Technical University, Trabzon, Turkey² Department of Biology, Faculty of Science, Karadeniz Technical University, Trabzon, Turkey³ Department of Landscape Architecture, Faculty of Architecture Design and Fine Art, Recep Tayyip Erdoğan University, Rize, Turkey
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Aim of the study: The aim of the present study to determine of the Bryophyte Flora of Burdur province and contribute to the exploration of the bryophyte flora of Turkey and be beneficial for future bryological studies in Turkey.

Material and Methods: The bryophyte samples were collected in 185 different localities between 25 June 2012 and 26 July 2014 in Burdur. Air-dried samples were examined with Carl Zeiss Stemi 2000-C stereomicroscope and Carl Zeiss Axio Imager A2 light microscope. Identifications were determined by consulting keys (Watson, 1981; Paton, 1999; Smith, 1996, 2004; Nyholm, 1986, 1989, 1993, 1998; Hedenäs, 1992; Cortini-Pedrotti, 2001, 2006; Casas et al., 2009; Schumacker and Váňa, 2005; Guerra et al., 2006; Brugués et al., 2007; Frey et al., 2006; Greven, 1995, 2003; Lewinsky, 1993; Bednarek-Ochyra, 1995; Blom, 1996; Zander, 1993; Heyn and Herrnstadt, 2004; Noguchi and Iwatsuki, 1987, 1988, 1989; Noguchi et al., 1991, 1994; Sharp et al., 1994; Allen, 1994, 2002; Crum and Anderson, 1981; Guerra et al., 2006; Guerra and Cros, 2007; Kürschner and Frey, 2011). The status of taxa was evaluated by reviewing the related literature for Turkey (Uyar and Çetin, 2004; Kürschner and Erdağ, 2005; Ros et al., 2007; Özenoğlu-Kiremit and Keçeli, 2009; Kürschner and Frey, 2011; Ros et al., 2013). Vouchers are deposited in the Biology Department, Faculty of Science, Karadeniz Technical University, Turkey (KTUB).

Results: A result of bryological exploration in the Burdur province (Turkey), a total of 254 bryophytes belonging to 99 genera and 47 families were determined from 185 different localities. The taxonomic survey of Burdur yielded 229 taxa belonging (82 genera) 31 families in division *Bryophyta* and 26 taxa belonging (18 genera) 16 families in division *Marchantiophyta*. The families with the highest number of species for bryophytes in this study are *Pottiaceae* (59), *Brachytheciaceae* (27), *Grimmiaceae* (25), *Orthotrichaceae* (20), *Amblystegiaceae* (14), *Bryaceae* (13), *Hypnaceae* (11), *Bartramiaceae* (9), *Encalyptaceae* (6), *Leucodontaceae* (5), *Plagiomniaceae* (4), *Fossombroniaceae* (4), *Frullaniaceae* (4), *Polytrichaceae* (3), *Funariaceae* (3), *Ditrichaceae* (3), *Dicranaceae* (3), *Mielichhoferiaceae* (3), *Fabroniaceae* (3), *Aytoniaceae* (2), *Marchantiaceae* (2), *Metzgeriaceae* (2), *Pelliaceae* (2), *Porellaceae* (2), *Timmiaceae* (2), *Fissidentaceae* (2), *Pterigynandraceae* (2), *Lembophyllaceae* (2) and *Lophocoleaceae*, *Cephaloziellaceae*, *Scapaniaceae*, *Arnelliaceae*, *Mesoptychiaceae*, *Hylocomiaceae*, *Pylaisiadelphaceae*, *Cryphaeaceae*, *Neckeraceae*, *Leptodontaceae*, *Myriniaceae*, *Thuidiaceae*, *Aulacomniaceae*, *Hedwigiaceae*, *Lunulariaceae*, *Radulaceae*, *Aneuraceae*, *Conocephaleaceae* families are represented by a taxon. The most common genera of bryophytes are *Orthotrichum*, *Grimmia*, *Bryum*, *Syntrichia*, *Didymodon*, *Schistidium*, *Brachythecium*, *Tortula* and *Hypnum*.

Acknowledgements: We are very grateful to the Scientific and Technological Research Council of Turkey TÜBİTAK (Project Number: 111T857) for financial support.

Keywords: Bryophyte, Flora, Turkey, Burdur Province.

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***Dicranella crispa* (Hedw.) Schimp. new to Turkey**Nevzat BATAN¹, Turan ÖZDEMİR², Gökhan ABAY³¹ Maçka Vocational School, Karadeniz Technical University, Trabzon, Turkey² Department of Biology, Faculty of Science, Karadeniz Technical University, Trabzon, Turkey³ Department of Landscape Architecture, Faculty of Architecture Design and Fine Art, Recep Tayyip Erdoğan University, Rize, Turkey
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Aim of the study: The aim of the present study contribute to of the bryophyte flora of Ardahan Province, Turkey and be beneficial for future bryological studies in Turkey.

Material and Methods: The moss specimen was collected from Ardahan Province on 02June 2014. Air-dried samples were examined with Carl Zeiss Stemi 2000-C stereomicroscope and Carl Zeiss Axio Imager A2 light microscope. Identifications were determined by consulting keys (Nyholm, 1986; Noguchi et al., 1987, Smith, 2004). The status of *Dicranella crispa* (Hedw.) Schimp. was evaluated by reviewing the related literature for Turkey (Uyar and Çetin, 2004, Kürschner and Erdağ, 2005, Kürschner and Frey, 2011; Ros et al., 2013). Voucher is deposited in the Biology Department, Faculty of Science, Karadeniz Technical University, Turkey (KTUB).

Results: During recent a bryological excursion in Ardahan province (Turkey), we sampled mosses from Ardahan province, Posof district, between Alköy village and Yeniköy village, Ilgar Mountain's edge, on wet soil near the stream, 41°28'42"N 42°46'54"E, 1660-1700 m, among which *Dicranella crispa* (Hedw.) Schimp. was determined as new to Turkey. Moreover, *Dicranella crispa* first time was reported from Southwest Asia.

Acknowledgements: We are very grateful to the Scientific and Technological Research Council of Turkey TÜBİTAK (Project Number: 113Z653) for financial support.

Keywords: Moss, Biodiversity, *Dicranella*, New record, Turkey.

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Medicinal and Food Weeds in Hazelnut Orchards in Ordu-TurkeyMihriban GEBECE¹ Onur KOLoren²¹Graduate School of Natural and Applied Sciences, Ordu University, Turkey²Department of Plant Protection, Agricultural Faculty, Ordu University, Turkey
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Aim of the study: The aim of the study was to investigate the economical usage areas of hazelnut orchards which are medicinal and food weeds in Ordu-Turkey. In addition, findings obtained in the results of research will share with agricultural organizations and people engaged in agriculture.

Material and Methods: The study was conducted in Ordu Center and its boroughs Persembe, Fatsa, Unye and Golkoy. The common and economically evaluated weeds were determined by performing surveys with different farmers and local people in the investigated area. Twenty questions concerning the specification, usage areas and ways of obtaining of economically valuable weeds were asked in the scope of the survey. The questions were; the names of most commonly weeds, growing seasons, if people consume any of them and if so, the way they do and medical uses. Fifty producers who owns gardens, sells and consumes weeds were interviewed in selected regions.

Results: Evaluating the survey results, the most commonly weeds and being used as food and medicinal plant; *Urtica dioica* L. (stinging nettle) 95%, *Trachystemon orientale* (L.) G. Don. (early-flowering borage) 80%, *Smilax excelsa* L. (catbriers) 70% and *Ornithogalum umbellatum* L. (grass lily) 65% were determined. According to survey, the ways to benefit from the weeds in hazelnut gardens were determined as; 36% as food, 16% as medical plant, 40% as animal feed and 8% no use at all. Weeds that are consumed as nutrients are eaten as pickle, roasting, toasting, salting, soup, wrapping and as a dish made with vegetable and eggs. Weeds that are used medically are detected as *Urtica dioica* L. (stinging nettle) 64%, *Trachystemon orientale* (L.) G. Don. (early-flowering borage) 16%, *Prunella vulgaris* L. (selfheal) 12%, *Fragaria vesca* L. (wild strawberry) 4% and 4% no use at all. The consumed portions of the weeds are found as leaf 48%, root 24%, stem 20% and none of it 8%.

Keywords: Weeds, Hazelnut, *Urtica dioica* L., *Trachystemon orientale* (L.) G. Don., *Smilax excelsa* L., *Ornithogalum umbellatum* L.

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Preventive Effect of Lycopene on Furan Induced Oxidative Damage in Diabetic Rat HeartGencay SARAÇOĞLU¹, Dilek PANDIR², Hatice BAŞ²¹ Program of Biology/ Graduate School of Natural and Applied Sciences, Bozok University, Turkey² Department of Biology/Faculty of Arts and Science, Bozok University, Turkeyhatice.bas@bozok.edu.tr

Aim of the study: Diabetes is characterized by hyperglycaemia, and affects nearly 5% of the population. It is increasingly common, because of increases in the prevalence of a sedentary lifestyle and obesity. Furan was detected in foods that had undergone thermal treatment. It is classified as a possible carcinogen. Lycopene is the most abundant carotenoid in human tissues. It may be biologically active by contributing to the antioxidative defense system. The aim of this study was to investigate the adverse effects of furan and protective role of lycopene on heart of diabetic rats by measuring antioxidant enzyme activities, MDA levels also light microscopic examination.

Material and Methods: The protocol was approved by the Çukurova Univ. Animal Experiments Local Ethics Committee. Procedures were formed in accordance with international guidelines for care and use of laboratory animals. Five groups (7 animals in each) were formed where the first was served as a control, second was served as a diabetic control, whereas the remaining diabetic groups were treated with lycopene (4mg/kg b.w.), furan (40mg/kg b.w.) and a combination of lycopene and furan. Diabetes induced by streptozotocin injection. The rats were sacrificed using combination of ketamin+xylazin and dissected after 28 days. The heart tissues were cleaned and washed with ice cold normal saline for examinations. Changes in malondialdehyde levels, activities of antioxidant enzymes and histopathology of heart were evaluated. Malondialdehyde levels and activities of antioxidant enzymes were measured by spectrophotometrically. Histopathologic examinations were detected by light microscope. All analyses were carried out using the SPSS software, version 20.0. A one-way analysis of variance (ANOVA; $P < 0.05$) and Tukey's test were used to determine significant differences between groups. The values were stated as mean \pm SD.

Results: Diabetes increased the level of MDA and decreased enzyme activities compared with control significantly. The MDA levels were decreased and SOD, CAT, GPx and GST activities increased in the diabetic lycopene group compared to diabetic control group. Animals treated with furan showed a significant increase in MDA levels, whereas, SOD, CAT, GPx and GST activities were found to decrease significantly. Lycopene supplementation caused increases in all antioxidant enzyme activities and decreases in MDA levels measured compared to diabetic furan group. The light microscopic investigation of hearts in control group have revealed normal structure. As for the pathological studies, they have proven changes caused by diabetes. In fact, diabetic control group showed several pathological changes. Lycopene treatment was partially protective against diabetes induced histopathological changes. Histological damages were more severe in diabetic furan group. Lycopene supplementation was protective against furan caused histopathological changes, too. But it not protect completely.

Keywords: furan, lycopene, heart, histopathology, lipid peroxidation

PP-161

Using Synthetic Seed Technic for Efficient *in vitro* propagation of *Thymus vulgaris* L.

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Aim of the study: *Thymus* species are well known as medicinal plants because of their biological and pharmacological properties. *Thymus* oils and extracts are widely used in pharmaceutical, cosmetic and perfume industry also for flavoring and preservation of several food products. On the other hand, natural *Thymus* populations are unfortunately far from being adequate to support such a great and even growing demand for its products. The present study was aimed to develop an effective *in vitro* propagation protocol using synthetic seeds for explants (shoot tips collected from mature plants) of *Thymus vulgaris* L. which were selected for their valuable content of bio-active compounds.

Material and Methods: Mature shoot segments of *T. vulgaris* L. (from nature) were soaked in 70% ethanol (10-15 sec), and disinfected via treatment with 2.5% commercial bleach (i.e., Domestos[®], containing 2% active chlorine, 20min), followed by three rinses (5 min each) in sterile distilled water. They were then cut into 1-1.5 cm-long shoot tip explants and transferred on MS medium, supplemented with 1 mg l⁻¹ kinetin and 0.3 mg l⁻¹ gibberellic acid (GA₃) (regeneration medium). Once established, shoot cultures were maintained at 23 ± 2°C, 16 h photoperiod (50 µmol m⁻² s⁻¹) by monthly subcultures to fresh medium of the same composition (standard culture conditions). For making synthetic seeds, shoot tips (from *in vitro* cultured as described above) were suspended in 3% Na-alginate solution (low viscosity, 200 cps) and dropped in 100 mM CaCl₂ solution by the use of a micropipette, each drop containing one explant. The capsules were kept for 25 min at room temperature in the CaCl₂ solution to ensure complete polymerization of calcium alginate. They were then collected on a sterile sieve and washed with sterile distilled water and then the synthetic seeds were transferred on regeneration medium (described above).

Results: Synthetic seed production was optimized by encapsulating shoot apices in 3% sodium alginate. The best shoot regeneration rate (96,4%), with eight shoots formed per explant and 100% rooting were obtained from encapsulated shoot apices comparing with directly cultured non-encapsulated mature shoot segments of *T. vulgaris* L. (81.1% regeneration rate with five shoots formed per explant and % 95 rooting). All rooted plantlets were transferred to 250-mL plastic pots and successfully acclimatized by gradually reducing the relative humidity.

Acknowledgements: The study was supported by Gebze Technical University, Molecular Biology and Genetics Department, Plant Biotechnology and Molecular Biology Laboratory (Kocaeli, Turkey).

Keywords: Medicinal plant, micropropagation, thyme.

PP-162

Cryopreservation of *Thymus vulgaris* L. shoot tips via droplet vitrification technique and Confirmation of Genetic stability using ISSR markers

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Aim of the study: *Thymus* is one of the most important genus of the Lamiaceae family, that serves as a natural source of phenolic oils, oleoresins, fresh and dried herbs, extensively used all around the world, both for medicinal and non-medicinal purposes. Furthermore, interests of the cosmetic, medical and food industries, focusing mainly on few selected chemotypes, lead to the loss of the others in nature, which indeed should be preserved to make available the access to a wide range of genetic diversity to be used as a possible source of natural products. The present study focused on long term conservation of *T. vulgaris* shoot tips via droplet-vitrification which is one-step freezing and PVS2-based technique. Furthermore, the other aim of the study was investigated genetic stability of cryopreserved shoot tips using ISSR markers.

Material and Methods: *T. vulgaris* shoot tips (cold-hardened and sucrose precultured) were placed into 3 µl PVS2 drops on sterile aluminium foil strips (~ 5 x 15 mm) placed in an open Petri dish, resting on a frozen cooling element (~ 0°C) and the shoot tips were treated with the solution for 15, 30, 45, 60, 75, 90, 105 or 120 min. After PVS2 treatment, the aluminium foils were transferred into chilled 2 ml-capacity cryovials (one aluminium foil per cryovial) and directly plunged into liquid nitrogen (LN). Thawing was performed at room temperature by removing the aluminium foils from the cryovials and immersing them in washing solution. When the explants were totally defrosted, they were transferred to MS medium supplemented with 1 mg l⁻¹ kinetin and 0.3 mg l⁻¹ gibberellic acid (GA₃) (regeneration medium) and incubated at standard culture conditions maintained at 23 ± 2°C, 16 h photoperiod (50 µmol m⁻²s⁻¹) for recovery. A group of samples, treated with PVS2 but not frozen in LN (control group, LN-), was washed accordingly and plated on medium for recovery. Genetic stability of cryopreserved shoot tips were assessed by Inter-Simple Sequence Repeat (ISSR) analysis using ten ISSR primers.

Results: Eight PVS2 exposure times (described above) were tested. The results showed high post cryopreservation survival and regeneration for *T. vulgaris* shoot tips evaluated. The best PVS2 exposure time was 45 min gave the best survival (78%) and regeneration (% 75) rates for the majority of the shoot tips. The droplet vitrification technique was highly efficient in cryopreserving shoot tips of different plant species, and was also less laborious than techniques previously reported. The confirmation of the genetic stability of *T. vulgaris* shoots regenerated from cryopreserved apices was investigated. The analysis of plants recovered from cryopreserved material was performed at molecular level (ISSR PCR). No genetic change was detected among the plantlets regenerated from cryopreserved shoot tips in comparison to the non-frozen material, including *in vitro* plantlets regenerated from non-frozen *T. vulgaris* shoot tips.

Acknowledgements: The study was supported by Gebze Technical University, Molecular Biology and Genetics Department, Plant Biotechnology and Molecular Biology Laboratory (Kocaeli, Turkey).

Keywords: Liquid nitrogen, long-term conservation, medicinal plant, molecular marker.

PP-163

Antioxidant Activity of Endemic *Ajuga xylorrhiza* Kit Tan.Nesrin HAŞİMİ¹, Veysel TOLAN², Ufuk KOLAK³¹Department of Nutrition and Dietetics/School of Health, Batman University, Batman, Turkey²Department of Biology/Faculty of Science, Dicle University, Diyarbakır, Turkey³Department of General and Analytical Chemistry/Faculty of Pharmacy, Istanbul University, Istanbul, Turkeynesrinhasimi@hotmail.com, nesrin.hasimi@batman.edu.tr.

Aim of the study: *Ajuga xylorrhiza* Kit Tan (Lamiaceae) is a rare endemic species located in a narrow area in Diyarbakır, Turkey. To determine the total phenolic/flavonoid contents and antioxidant activity of petroleum ether, acetone and methanol extracts of *A. xylorrhiza* aerial parts for the first time is the aim of this study.

Material and Methods: Total phenolic and flavonoid contents of the crude extracts were determined as pyrocatechol and quercetin equivalents, respectively. The antioxidant activity was performed by β -carotene bleaching method, DPPH free radical and ABTS cation radical scavenging activities. BHT and BHA were used as positive controls.

Results: Total flavonoid contents of petroleum ether and acetone extracts were found to be higher than their phenolic contents. On the other hand, the phenolic content of methanol extract was higher than its flavonoid content. The highest phenolic and flavonoid contents were determined as 39.06 ± 1.38 PEs/mg in methanol extract and 64.68 ± 2.85 μ g QEs/mg in acetone extract. The extracts exhibited strong antioxidant activity in all the test methods. The petroleum ether extract showed weak activity in DPPH and ABTS methods but showed the strongest activity in β -carotene bleaching method (78% inhibition at 100 μ g/ml concentration) among the tested extracts. The methanol extract exhibited highest activity in DPPH and ABTS methods (85% inhibition at 500 μ g/ml concentration and 86% inhibition at 1 mg/ml concentration, respectively).

Acknowledgements: This work was supported by the Scientific Research Projects Coordination Unit of Dicle University (Project numbers: 10-FF-113).

Keywords: *Ajuga xylorrhiza*, Antioxidant activity, DPPH, ABTS, β -carotene bleaching method.

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The diversity of chemical composition of the lipophilic extracts from Endemic *Abies cilicica* subsp. *isaurica* and *Abies nordmanniana* subsp. *equi-trojani*Ayse Sahin YAGLIOGLU¹, Muhammet Şamil YAĞLIOĞLU², Murat TEMİRTÜRK¹, Duygu GÜNEŞ¹, Emic SARAY¹, Ibrahim DEMİRTAS¹¹Department of Chemistry, Faculty of Science, Cankiri Karatekin University, 18100 Cankiri, Turkey²Chieftaincy of Cankiri, Directorate of Cankiri Forestry, 18100 Cankiri, Turkeyaysesahin1@gmail.com

Aim of the study: In Turkey, were known *Abies cilicica* subsp. *isaurica* (ACI) as Toros Göknarı, *Abies nordmanniana* subsp. *equi-trojani* (ANE) as Kazdağı Göknarı [1]. *Abies cilicica* subsp. *isaurica* cones are resinous [2] and the resin is used for treatment of acnes, ulcer, wounds and asthma by local inhabitants since it is supposed to have antiseptic, anti-inflammatory and antioxidant properties [3]. *Abies nordmanniana* subsp. *equi-trojani* extracts have antimicrobial and cytotoxic activities [4]. As a result of the current literature not been obtained a study on the identification of secondary metabolites of both species. Therefore is intended GC-MS analysis of lipophilic extracts of this species.

Material and Methods: ACI from Tarsus/Mersin and ANE from Edremit/Balıkesir were collected. These plants were separated as needles. Then, the parts were extracted with hexane and chloroform, respectively. The solvents were removed by a rotary evaporator. The extracts were analyzed by GC-MS.

Results: Three components were determined from ANE hexane extracts that were eicosane (65.90 %), stearic acid (20.45 %) and palmitic acid (8.04 %). ACI hexane extracts were identified five components by GC-MS analysis. The compounds were eicosane (69.86 %), stearic acid (11.12 %), caryophyllene oxide (5.66 %), palmitic acid (5.15 %) and oleic acids (5.12 %). Eleven components were determined from ANE chloroform extracts that eicosane (31.68 %), stearic acid (13.27 %) were main components. ACI chloroform extracts were observed eight components that stearic acid (23.18 %) and caryophyllene (22.78 %) were determined as major components.

Acknowledgements: This study was funded by the Project Support Unit of Çankırı Karatekin University (Project No: FF170215B35).

Keywords: *Abies cilicica* subsp. *isaurica*, *Abies nordmanniana* subsp. *equi-trojani*, GC-MS.

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Phytochemical Studies of the Hexane Extracts of *Abies nordmanniana* subsp. *bornmuelleriana* and *Abies nordmanniana* subsp. *nordmanniana* needlesAyse Sahin YAGLIOGLU¹, Muhammet Samil YAGLIOGLU², Murat TEMİRTÜRK¹, Duygu GÜNEŞ¹, Emic SARAY¹, Ibrahim DEMİRTAS¹¹Department of Chemistry, Faculty of Science, Cankiri Karatekin University, 18100 Cankiri, Turkey²Chieftaincy of Cankiri, Directorate of Cankiri Forestry, 18100 Cankiri, Turkey
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Aim of the study: In Turkey, were known *Abies nordmanniana* subsp. *bornmuelleriana* (ANB) as Uludağ Göknaarı, *Abies nordmanniana* subsp. *nordmanniana* (ANN) as Doğu Karadeniz Göknaarı [1]. The fatty acids that were obtained from *Abies* species were observed strong antifungal activity [2]. As a result of the current literature not been obtained a study on the identification of secondary metabolites of both species. Therefore is intended GC-MS analysis of lipophilic extracts of this species.

Material and Methods: ANB from Sabanozu/Cankiri and ANN from Akcaabat/Trabzon were collected. These plants were separated as needles. Then, the parts were extracted with hexane and chloroform, respectively. The solvents were removed by a rotary evaporator. The extracts were analyzed by GC-MS.

Results: Fourteen components were determined from ANB hexane extracts that were eicosane (39.77 %) and caryophyllene oxide (11.25 %). ANN hexane extracts were identified seven components by GC-MS analysis. The major compounds were eicosane (78.38 %), stearic acid (6.89 %). Seventeen components were determined from ANB chloroform extracts that palmitic acid (28.76 %), oleic acid (15.48 %) and stearic acid (14.12 %) were main components. ANN chloroform extracts were observed four components that stearic acid (41.68 %) and eicosane (40.68 %) were determined as major components.

Acknowledgements: This study was funded by the Project Support Unit of Çankırı Karatekin University (Project No: FF170215B35).

Keywords: *Abies nordmanniana* subsp. *bornmuelleriana*, *Abies nordmanniana* subsp. *nordmanniana*, GC-MS, Stearic acid, Palmitic acid, Eicosane.

PP-166

***Cyclamen pseudibericum* Extracts Inhibit Invasion ability of A549 NSCLC Cells**^{1,3}Hakan AKÇA, ¹Ege Rıza KARAGÜR, ²Ramazan MAMMADOV¹ Department of Medical Biology, School of Medicine, Pamukkale University, Denizli, TURKEY² Department of Biology, Faculty of Science and Literature Pamukkale University, Denizli, TURKEY³ Cancer Research Center, Pamukkale University, Denizli, TURKEYhakca@pau.edu.tr

Aim of the study: In this study we aimed to investigate potential inhibitory effects of endemic plant *Cyclamen pseudibericum* Hildebr on cellular invasion ability of NSCLC A549 cells.

Metarial and Methods: *C.pseudibericum* extract induced cellular cytotoxicity were analysed by the luminometric method. The potential inhibitory effects of plant extract on A549 cells invasion were determined by using boyden chamber. miRNA expression were determined by QRT-PCR. Potential targets for plant extract induced miRNA target genes were determined by using western blotting.

Results: Our results indicate that the *C.pseudibericum* extract has strong cytotoxic effects on A549 NSCLC cells, and also inhibit both cellular invasion of A549. We performed real-time PCR assays to determine the effects of *C.pseudibericum* extract on expression of invasion related several miRNAs in A549 cell lines. We observed that expression levels of miR-200c significantly increased after *C.pseudibericum* extract treatment. ZEB1 expression, which is a target miR-200c also decreased after *C.pseudibericum* extract treatment in A549 cells.

Conclusion: *Cyclamen pseudibericum* extract have great potential for inhibition of cellular invasion through on induction of miR200c expression and inhibition of its target ZEB1 expression in A549 cells.

Keywords: *Cyclamen*, Invasin, ZEB1, miRNA, A59 cells.

PP-167

The Histopathological Effects of Atrazine on Gills of *Oreochromis niloticus*Pelın UĞURLU¹, Elif İpek SATAR², Tark ÇİÇEK³, Yeter KAN KOÇ⁴¹Science and Technology Application and Research Center, Dicle University, Turkey²Pharmaceutical Toxicology, Faculty of Pharmacy, Dicle University, Turkey^{3,4}Biology Department, Science Faculty, Dicle University, Turkey

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Aim of the study: it is aimed to determine possible alterations in gill histology of *Oreochromis niloticus* individuals exposed to certain concentrations of atrazine technical formulation with light microscope.

Material and Methods: At 7th, 14th and 21st days fish exposed to 0, 935 mg/L atrazine were taken from the test solution. The gills were fixed with formalin, dehydrated with ethanol, cleared in xylene, embedded in paraffin. The sections were stained with hematoxylin-eosin and examined.

Results: At 7th, 14th and 21st days the most common histopathologic alteration was hyperplasia in epithelial cells. The severity of histopathological alterations were increased with the duration of exposure.

Acknowledgements: This study was supported by TÜBİTAK under grant number 114-Z-730.

Keywords: *Oreochromis niloticus*, atrazine, histopathological effect, gill, collapse of pillar cells.

PP-168

A Study of morphological, palynological, anatomical and ecological on *Malope malacoides* in Turkey

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Aim of the study: Turkish name known as “Köynik” *Malope malacoides* species belonging to the Malvaceae family, is an herbaceous plant. *Malope* contain 4 species in the world. *M. malacoides* and *M. anatolica* grows in Turkey. However we couldn't find *M. anatolica* specimen during the field works where the species was distributed since the fire in 1996. Our aim, we are studied taxonomical, ecological aspects it and to determine the distribution of *M. malacoides* in Turkey.

Material and Methods: Plant and soil (for ecological studies) specimens of *M. malacoides* were obtained from Bornova and Torbalı (Izmir) district. Seed and pollen samples were examined with scanning electron microscope SEM for analysis. Anatomical studies were carried out on fresh samples preserved in 70% alcohol.

Results: *Malope* is annual and perennial genus, including one in Turkey has stated that there are two species. *M. anatolica* probably is "ex" due to fire. Pollen grains are spheroidal and echinate. Anatomy of root, stem and leaf were researched of *M. malacoides*. Spongy paranchyme couldn't see in the leaf cross section.

Acknowledgements: We would like to thank Assoc.Prof.Dr. Güngör Ay and Mehmet Kuh for their helps.

Keywords: *Malope*, Malvaceae, Turkey.

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Cultural Characteristics of *Psathyrella* Species¹Hemen Gul ERASLAN, ²Perihan GULER¹ Kırıkkale University, Graduate School of Natural and Applied Sciences, Yahsihan, Kırıkkale, Turkey² Kırıkkale University, Biology Department, Sciences and Arts Faculty, Yahsihan, Kırıkkale, Turkey
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Aim of the study: The cultural characteristics of *Psathyrella* species and strains were examined. This study includes the first phase of the master thesis made for the genetic characterization of *Psathyrella* species. *Psathyrella* species: *P. candolleana*, *P. panaeoloides*, *P. spadiceogrisea*, *P. pseudogracilis*, *P. conopilus*. The mushroom fructification were collected from Kırıkkale region at Turkey. The mushroom samples are brought to the laboratory, tissue fragments are taken and they are cultured on the malt extract agar and are inoculated in the dark and 26°C. The spores and mycelium of *Psathyrella* species are investigated with the help of the light microscopy and scanning electron microscopy.

Material and Methods: *Psathyrella* species and strains-Psathyrellaceae familia- was used. *Psathyrella* was collected Kırıkkale and counties region at Turkey in 2011-2013. *Psathyrella* species and strains number were listed below: *P. candolleana*, 20, 270, 422, 482, 543, 549; *P. panaeoloides*, 240; *P. spadiceogrisea*, 245, 247, 250, 253, 259, 260, 279, 403, 437, 451, 493, 519, 522, 544; *P. pseudogracilis*, 429, 570 *P. conopilus*, 430, 432. The samples were numbered and brought the laboratory. They were dried under aseptic conditions. Mushroom samples were stored at Kırıkkale University Mushroom Application and Research Laboratory. Piece of tissue taken from the help of a scalpel *Psathyrella* strains were inoculated center of malt extract agar (MEA) plates separately and the primary mycelium was developed. Mycelial agar block that taken from the primary mycelium were inoculated in the center of MEA and incubated in the dark for a period of 26°C. The morphological structure of the development of secondary mycelium was examined. Light microscopy studies were maintained with Zeiss and Scanning electron microscope (SEM) examinations were performed with Electron Microscopy with the JEOL 5600 microscope presenting Kırıkkale University Electron Microscopy Laboratory.

Results: The spore dimensions of *Psathyrella* species were measured as 8.8-9.1 x 4.9-5.2 µm (100x) using Light microscopy images generally. They shaped like ellipsoid and surface is flat. The mushroom samples were brought to the laboratory, tissue fragments were taken and they were cultured on the malt extract agar (MEA) and were incubated in the dark for 10 days, at 26°C. Primary mycelium began to develop after 48 hours after inoculated into the center of agar medium. During the development, the mycelium has cottony and very intensive on the agar medium surface and white mycelium developed. No air hyphae. The spores were observed between mycelium. After 10 days of inoculation, mycelium was covered to Petri dishes completely and was finished colonization. According to Light and Scanning Electron microscopy investigations; *Psathyrella* mycelium has septa. Mycelium widths were measured as 1.24µm, 1.67µm, 1.92µm (5000x) using Scanning Electron microscopy

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Keywords: *P. candolleana*, *P. panaeoloides*, *P. spadiceogrisea*, *P. pseudogracilis*, *P. conopilus*, genetic characterization

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Cultural Characteristics of *Pleurotus* Species¹ İlim BAGCI, ² Perihan GULER, ³ Ayten CELEBİ KESKİN¹ Kırıkkale University, Graduate School of Natural and Applied Sciences, Yahsihan, Kırıkkale, Turkey² Kırıkkale University, Biology Department, Sciences and Arts Faculty, Yahsihan, Kırıkkale, Turkey³ Kırıkkale University, Bioengineering Department, Engineering Faculty, Yahsihan, Kırıkkale, Turkey
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Aim of the study: The cultural characteristics of *Pleurotus* species and strains were examined. This study includes the first phase of the master thesis made for the genetic characterization of *Pleurotus* species. *Pleurotus* species: *P. eryngii*, *P. ostreatus* mushroom fructification were collected from Kırıkkale region at Turkey. The mushroom samples are brought to the laboratory, tissue fragments are taken and they are cultured on the malt extract agar and are inoculated in the dark and 26°C. The spores and mycelium of *Pleurotus* species are investigated with the help of the light microscopy and scanning electron microscopy.

Material and Methods: *Pleurotus* species and strains-Pleurotaceae familia- was used. *Pleurotus* was collected Kırıkkale and counties region at Turkey in 2011-2013. *Pleurotus* species and strains number were listed below: *P. eryngii* 195, 243, 284, 440; *P. ostreatus* 123, 164, 178, 206, 261, 439, 460, 580, 584, 587, 592. The samples were numbered and brought the laboratory. They were dried under aseptic conditions. Mushroom samples were stored at Kırıkkale University Mushroom Application and Research Laboratory. Piece of tissue taken from the help of a scalpel *Pleurotus* strains were inoculated center of malt extract agar (MEA) plates separately and the primary mycelium was developed. Mycelial agar block that taken from the primary mycelium were inoculated in the center of MEA and incubated in the dark for a period of 26°C. The morphological structure of the development of secondary mycelium was examined. Light microscopy studies were maintained with Zeiss and Scanning electron microscope (SEM) examinations were performed with Electron Microscopy with the JEOL 5600 microscope presenting Kırıkkale University Electron Microscopy Laboratory.

Results: The spore dimensions of *Pleurotus* species were measured 20.4-30.3 x 8.1-10.9 µm (100x) generally using Light microscopy images. They shaped like cylindrical and narrowly kidney-shaped. The mushroom samples were brought to the laboratory, tissue fragments were taken and they were cultured on the malt extract agar (MEA) and were incubated in the dark for 10 days, at 26°C. Primary mycelium began to develop after 24 hours after inoculated into the center of agar medium. During the development, the mycelium has cottony on the agar medium surface and white mycelium develops in the center and light orange pigmentation were observed agar surface especially near the center. There were air hyphae. Mycelium was improved as quickly. After 10 days of inoculation, mycelium was covered to Petri dishes completely and was finished colonization. According to Light and Scanning Electron microscopy investigations; *Pleurotus* mycelium has septa. Mycelium widths were measured as 2.21µm, 3.00µm, 3.20µm (5000x) using Scanning Electron microscopy images.

Acknowledgements: This financial support by The Scientific and Technological Research Council of Turkey (TUBİTAK) via grant numbered TUBİTAK 210T083 is acknowledged gratefully

Keywords: *Pleurotus*, *P. eryngii*, *P. ostreatus*, genetic characterization

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Cultural Characteristics of *Phellinus* Species¹Dicle ERDOĞDU, ²Perihan GULER¹ Kırıkkale University, Graduate School of Natural and Applied Sciences, Yahsihan, Kırıkkale, Turkey² Kırıkkale University, Biology Department, Sciences and Arts Faculty, Yahsihan, Kırıkkale, Turkey
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Aim of the study: The cultural characteristics of *Phellinus* species and strains were examined. This study includes the first phase of the master thesis made for the genetic characterization of *Phellinus* species. *Phellinus* species: *P.hartigii*, *P.nigricans*, *P. igniarius*, *P. lundellii*, *P. trivialis*, *P. torulosus*. The mushroom fructification were collected from Kırıkkale region at Turkey. The mushroom samples are brought to the laboratory, tissue fragments are taken and they are cultured on the malt extract agar and are inoculated in the dark and 26°C. The spores and mycelium of *Phellinus* species are investigated with the help of the light microscopy and scanning electron microscopy.

Material and Methods: *Phellinus* species and strains-Hymenochaetaceae familia- was used. *Phellinus* was collected Kırıkkale and counties region at Turkey in 2011-2013. *Phellinus* species and strains number were listed below: *P.hartigii* 56, 68, 217; *P.nigricans* 301, 351; *P. igniarius* 19, 406, 435, 446, 486, 488, 489, 490, 498, 502, 511, 548, 569, 573, 577, 582, 597; *P. lundellii*, 291; *P. trivialis*, 105, 128, 130, 133; *P. torulosus*, 111. The samples were numbered and brought the laboratory. They were dried under aseptic conditions. Mushroom samples were stored at Kırıkkale University Mushroom Application and Research Laboratory. Piece of tissue taken from the help of a scalpel *Phellinus* strains were inoculated center of malt extract agar (MEA) plates separately and the primary mycelium was developed. Mycelial agar block that taken from the primary mycelium were inoculated in the center of MEA and incubated in the dark for a period of 26°C. The morphological structure of the development of secondary mycelium was examined. Light microscopy studies were maintained with Zeiss and Scanning electron microscope (SEM) examinations were performed with Electron Microscopy with the JEOL 5600 microscope presenting Kırıkkale University Electron Microscopy Laboratory.

Results: The spore of *Phellinus* species are shaped like ellipsoid and smooth. The mushroom samples were brought to the laboratory, tissue fragments were taken and they were cultured on the malt extract agar (MEA) and were incubated in the dark for 10 days, at 26°C. Primary mycelium began to develop after 1 day after inoculated into the center of agar medium. During the development, the mycelium has cottony to the agar medium surface. Mycelia were concentrated center to the edges and white mycelium developed in the center and yellowish pigmentation were observed. There were air hyphae generally. The plasma bridges were observed between mycelium. Mycelium was improved as slowly, weak and confuse. After 10 days of inoculation, mycelium was covered to Petri dishes completely and was finished colonization. According to Light and Scanning Electron microscopy investigations; *Phellinus* mycelium has septa. Mycelium widths were measured as 1.20 µm, 1.82 µm, 2.04µm (5000x) using Scanning Electron microscopy images.

Acknowledgements: This financial support by The Scientific and Technological Research Council of Turkey (TUBİTAK) via grant numbered TUBİTAK 210T083 is acknowledged gratefully.

Keywords: *Phellinus hartigii*, *P.nigricans*.

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Cultural Characteristics of *Agrocybe* Species¹Müge KARABOGAZ, ²Perihan GULER¹Kırıkkale University, Graduate School of Natural and Applied Sciences, Yahsihan, Kırıkkale, Turkey²Kırıkkale University, Biology Department, Sciences and Arts Faculty, Yahsihan, Kırıkkale, Turkey
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Aim of the study: The cultural characteristics of *Agrocybe* species and strains were examined. This study includes the first phase of the master thesis made for the genetic characterization of *Agrocybe* species. *Agrocybe* species: *A. aegerita*; *A. praecox*; *A. cylindracea*; *A. gibberosa*; *A. vervacti*. The mushroom fructification were collected from Kırıkkale region at Turkey. The mushroom samples are brought to the laboratory, tissue fragments are taken and they are cultured on the malt extract agar and are inoculated in the dark and 26°C. The spores and mycelium of *Agrocybe* species are investigated with the help of the light microscopy and scanning electron microscopy.

Material and Methods: *Agrocybe* species and strains-Strophariaceae familia- was used. *Agrocybe* was collected Kırıkkale and counties region at Turkey in 2011-2013. *Agrocybe* species and strains number were listed below: *A.aegerita* 181; *A.praecox* 233, 509; *A.cylindracea* 141, 222, 224, 228, 229, 257, 267, 269, 277, 283, 288, 296, 299, 321, 322, 581, 590, 604; *A.gibberosa* 348; *A.vervacti* 197. The samples were numbered and brought the laboratory. They were dried under aseptic conditions. Mushroom samples were stored at Kırıkkale University Mushroom Application and Research Laboratory. Piece of tissue taken from the help of a scalpel *Agrocybe* strains were inoculated center of malt extract agar (MEA) plates separately and the primary mycelium was developed. Mycelial agar block that taken from the primary mycelium were inoculated in the center of MEA and incubated in the dark for a period of 26°C. The morphological structure of the development of secondary mycelium was examined. Light microscopy studies were maintained with Zeiss and Scanning electron microscope (SEM) examinations were performed with Electron Microscopy with the JEOL 5600 microscope presenting Kırıkkale University Electron Microscopy Laboratory.

Results: The spore dimensions of *Agrocybe* species were measured 5.26-8.6 x 3.92-6.9 µm (2500x) generally using Scanning Electron microscopy images. They shaped like ovoid-ellipsoid. The mushroom samples were brought to the laboratory, tissue fragments were taken and they were cultured on the malt extract agar (MEA) and were incubated in the dark for 10 days, at 26°C. Primary mycelium began to develop after 2 days after inoculated into the center of agar medium. During the development, the mycelium has quite dense cottony to the agar medium surface. Mycelia were concentrated center to the edges. White mycelium developed in the center and light yellowish pigmentation were observed. No air hyphae. Especially mycelium developed to parallel on the agar surface. Mycelium improved as very slow. After 10 days of inoculation, mycelium was covered to Petri dishes completely and was finished colonization. According to Light and Scanning Electron microscopy investigations; *Agrocybe* mycelium has septa. Mycelium widths were measured as 6.89µm, 8.33µm, 9.81µm, 13.05µm (100x) using Light microscopy images.

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Keywords: *Agrocybe aegerita*; *A. praecox*; *A.cylindracea*; *A. gibberosa*; *A. vervacti*, genetic characterization

PP-173

Pollen, fruit and seed morphology of *Bornmuellera glabrescens* (Boiss. & Balansa) Cullen & T.R. Dudley from Turkey

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Aim of the study: The aim of this study to investigate detailed pollen, fruit and seed morphology of *Bornmuellera glabrescens* belong to Brassicaceae family in Turkey.

Material and Methods: The specimens of *B. glabrescens* were collected from Niğde province and were prepared according to standard herbarium technique. They were stored in Selçuk University Konya Herbarium (KNYA). For light microscopic investigations Wodehouse technique (1935) was used that in this technique pollen grains were obtained from mature anthers and were stained with glycerin-jelly with safranin, and were covered by coverslip. Pollen slides were photographed with Leica light microscope which attached to Canon EOS 450D camera. Punt et. al (2007) was followed for pollen terminology. Mature fruits and seeds were selected and measured by several qualitative and quantitative characters. Measurements of pollen, fruits and seeds were based on 20 or more per specimen. For scanning electron microscopy (SEM) studies, dried pollen grains, fruits and seeds directly were transferred on aluminium stubs and coated with gold and they were photographed with ZEISS EVO LS10 SEM.

Results: Pollen grains of studied taxon are monad, radially symmetrical and tricolpate. Pollen shapes are prolate-spheroidal. Exine and intine thicknesses are 1.64; 0.92, respectively. Exine sculpture of pollen is reticulate and the structure of exine is tectate. The shape of muri of exine is asymmetric. Colpus endings are acute and its length and width are 18.3; 2 µm, respectively. Amb shape is circular and approximately is 7.5 µm. Fruits of *B. glabrescens* are broadly elliptic in shape. Apex is rounded and the surface of fruit does not contain trichome, the surface detail is rugulate. The replum is present. The outline of seed is orbicular, both shapes of micropylar and chalazal poles are similar and are rounded. The color of seed is determined yellowish brown. Both seed and wing ornamentations are reticulate. The conclusion of our study showed that the pollen, fruit and seed morphology of *B. glabrescens* is useful for the taxonomy of genus.

Acknowledgements: We wish to thank the Selçuk University Scientific Research Unit for its financial support (Project No: 15201002).

Keywords: Brassicaceae, *Bornmuellera*, Fruit, Pollen, Seed.

PP-174

Flora of Sedir Island (Muğla-Turkey)

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Aim of the study:The country is encircled by seas on three directions. The coastal length is 7816 km. Located in the southwest of Anatolia. Muğla province with its coastal length of 1124 km is the longest coastal line of Türkiye. Located within Muğla provincial region, Gökova is about 56 km length in the direction of east west. According the square system of P. H. Davis's "Flora of Turkey and the East Aegean Island", it is in C2 square. Coastal areas reflecting the ecological features of terrestrial and sea living areas are ecological transition areas having diversity and high efficiency. Studies about protection of coastal areas and management, maintenance of living support systems and basic ecological processes on the coasts, protection of biological diversity and genetic inheritance, securing sustainable use are the subjects that many countries give importance. In the main coverage of the study, with more elaborate management plan, the protectability and maintainability of the natural and cultural richness of the region will be ensured.

Material and Methods:The field of study includes forests, sub-forest brushes (Macchie), draft brush trees, non-forest areas, roadsides, salty areas, sand dunes, reeds, field sides and inner sides, rocky places, covers, watersides and various biotopes. The studies of flora are the evaluation of the data obtained from biotopes.

The plants showing scattering in the region have been collected, and their pictures have been taken. Samples taken from the fields have been taken into laboratory, dried and examined. *Flora Of Turkey and the East Aegean Island* has been referenced for naming of the plant samples (Davis 1965-1988). The dry samples are now saved at the Muğla Sıtkı Koçman University herbarium.

Results: As a result of the evaluation of the plant specimens, 89 species, 14 subspecies and 9 varieties belonging to 112 genera and 33 families were determined. 1 taxa are endemic and rate of endemism is 0,89 %. *Phlomis bourgaei* Boiss (Lamiaceae) from these taxons is endemic. Tourism and residential use of the coastal shore in the project area triggered many changes in natural areas in time. Recreational plants on the coastal shore are used for beaches and camping. These sites incur changes in time by its vehicle roads opening to the coast and downways to the shore. Dust coming from these roads causes pollution on plants. This case kills the macchie appearance that nested along the coast and causes decrease of sub-flora growing in this habitat. The number of these utilities is increasing every year. Various activity and infrastructure on the coastal band need better planning for minimum harm to the environment. When glanced in view of human factor, the study area became the focus of silence and natural beauty. This interest caused the increase in the number of summer housing. Together with the increase in housing and people, natural beauty started deteriorating. This study will guarantee the sustainability of biological diversity, genetic inheritance and ecosystems in the region.

Acknowledgements:SMAP III European Union Gökova Project, in the coverage of the management of the natural flora and fauna of the Coastal Zone and Sedir Island, the information related to the flora and fauna studies periodically held during 2008 March-Sep have been obtained.

Keywords: Flora, Sedir Island, Muğla, Turkey.

PP-175

Micromorphological Properties of Turkish Endemic *Marrubium trachyticum* (Lamiaceae)Burcu CAMİLİ¹, Tülay AYTAS AKÇİN¹¹ Department of Biology, Faculty of Art and Science, Ondokuz Mayıs University, Samsun, Turkey
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Aim of the study: The main objective of this study was to explore the micromorphological properties of *M. trachyticum* Boiss. which is an endemic species to Turkey. Micromorphological characters of stem, leaf, calyx and nutlet of this species were examined by scanning electron microscope (SEM) in detail.

Material and methods: Plant material were collected at flowering stage during 2014 from Çorum located in Central Black Sea, Turkey. The specimens were dried according to standard herbarium techniques. For scanning electron microscopy, dried stem, leaf, calyx and fruit samples were directly mounted on stubs using double-sided adhesive tape and coated with 12.5-15.0 nm of gold. Coated samples were examined and photographed with a JEOL-JSM 7001 S scanning electron microscope.

Results: SEM observation showed that the stem of *M. trachyticum* had densely long eglandular and rarely glandular trichomes. The leaf was amphistomatic. The stomata were more abundant on the lower epidermis of leaf. Strongly sinuous walls in the leaf upper and lower epidermis were occurred in *M. trachyticum*. There were abundant long stellate trichomes and a few glandular trichomes on the both epidermises. The stellate trichomes on the lower epidermis of leaf were longer than the upper epidermis. There were densely stellate trichomes on the calyx throat, however these trichomes were more sparsely on the calyx teeth. The nutlets of *M. trachyticum* has a verrucate sculpturing.

Keywords: *Marrubium trachyticum*, endemic, micromorphology, SEM, Turkey.

PP-176

The Leaf Anatomy and Micromorphology of *Marrubium cephalanthum* (Lamiaceae), Endemic to TurkeyBurcu CAMİLİ¹, Tülay AYTAS AKÇİN¹¹ *Department of Biology, Faculty of Art and Science, Ondokuz Mayıs University, Samsun, Turkey*
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Aim of the study: The aim of this research was to investigate anatomical and micromorphological characters of Turkish endemic *M. cephalanthum* Boiss&Noe leaves and to determine the various types of trichomes and their distribution on the leaves.

Material and Methods: Plant samples were collected from natural populations in Central Black Sea Region, Çorum, Turkey in 2014 and were kept at the Ondokuz Mayıs University Herbarium. For anatomical analysis, samples were fixed in 70 % alcohol. Anatomical investigations were carried out on the cross-sections of the leaves as well as the surface sections of leaves. Their photographs were taken with a Nikon Coolpix 5200 digital camera. For scanning electron microscopy, dried leaves were mounted on stubs using double-sided adhesive tape. Samples were coated with 12.5-15.0 nm of gold. Coated leaves were examined and photographed with a JEOL-JSM 7001S scanning electron microscope.

Results: Leaf anatomical studies have shown that the leaf of *M. cephalanthum* was amphistomatic. The type of stomata was anomocytic. Stomata cells were present in both epidermises but the stomata on the lower surface were more abundant. The leaf was bifacial. SEM observation showed that the upper surface of leaf was covered by densely long eglandular trichomes and stellate trichomes. There were mostly a few branched stellate trichomes on the lower surface of leaf. Glandular trichomes were present generally more sparsely on the both surface of leaf and were hardly seen under the eglandular trichomes.

Keywords: *M. cephalanthum*, endemic, leaf anatomy, leaf micromorphology, SEM, Turkey.

PP-177

The Phytochemical Analysis Endemic *Dianthus ancyrensis* Hausskn. & Bornm. Extracts and Their Anticancer Activities

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Aim of the study: *Dianthus* sp. has been found to have many biological activities such as antifungal, antimicrobial, cytotoxic activity, anthelmintic. As a result of the current literature not been obtained a study on the identification of secondary metabolites and anticancer activity of endemic *Dianthus ancyrensis* (DA). Therefore, this analysis is intended to do.

Material and Methods: In this study, DA plants were collected forest area from Cankiri. The dried plants were extracted hexane, chloroform (CHCl₃), ethyl acetate (EtOAc), acetone and methanol (MeOH), respectively. The fatty acids of hexane extract were determined with GC-MS. Other extracts' phenolic compounds are determined with HPLC-TOF/MS. All extracts antiproliferative effects were determined by method of BrdU ELISA against HeLa ve C6 cells. 5-fluorouracil (5-FU) was used as positive controls.

Results: Palmitic acid (6.89%), heptacosene (30.30%), nonacosane (18:55%) and hentriacontane (26.65%) were identified as the main components in the DA hexane extract. In HPLC-TOF-MS analysis of the CHCl₃ extract was obtained gentisic acid (1), vanillic acid (2) and ferulic acid (3) as main components. 4-hydroxybenzoic acid (4), vanillic acid (2), p-coumaric acid (5) and ferulic acid (3) in the EtOAc and acetone extracts, gallic acid (6), gentisic acid (1), chlorogenic acid (7), 4-hydroxybenzoic acid (4), vanillic acid (2), rutin (8), p-coumaric acid (9), cichoric acid (10), ferulic acid (3) and quercetin (11) in the MeOH extract were determined as major compounds. According to antiproliferative activity against C6 and HeLa cells, EtOAc extract was shown to have highest activity compare with other extract and 5-FU.

Acknowledgements: This study was funded by the Project Support Unit of Çankırı Karatekin University (Project No: 2014L12).

Keywords: *Dianthus ancyrensis* Hausskn. & Bornm., HeLa cell, C6 cell, anticancer activity.

PP-178

Investigation of the secondary metabolites and anticancer activity of Endemic *Dianthus balansae* Boiss. Extracts.

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Aim of the study: *Dianthus* sp. has been found to have many biological activities such as antifungal, antimicrobial, cytotoxic activity, anthelmintic. But, it provided no studies in the literature about the *Dianthus balansae* Boiss. This is why, we worked with the plant.

Material and Methods: In this study, DB plants were collected forest area from Cankiri. The dried plants were extracted hexane, chloroform (CHCl₃), ethyl acetate (EtOAc), acetone and methanol (MeOH), respectively. The hexane extract with GC-MS and others with HPLC-TOF/MS were analysed. The extracts anticancer effects were determined by BrdU ELISA assay against HeLa ve C6 cells. 5-fluorouracil (5-FU) was used as positive controls.

Results: Palmitic acid (10.46%), Oleic acid (6.37%), heptadecanoic acid, 14-methyl, methyl ester (8.5%) and heptacosene (45.97%) were identified as the main components in the DB hexane extract. In HPLC-TOF-MS analysis of the CHCl₃ extract was obtained gallic acid (1), gentisic acid (2), 4-hydroxybenzoic acid (3), cichoric acid (4), ferulic acid (5) and quercetin (6) as main components. 4-hydroxybenzoic acid (3), vanillic acid (7), p-coumaric acid (8) and ferulic acid (5) in the EtOAc and acetone extracts, gallic acid (1), gentisic acid (2), chlorogenic acid (9), 4-hydroxybenzoic acid (3), vanillic acid (7), rutin (10), p-coumaric acid (8), cichoric acid (4), ferulic acid (5) and quercetin (6) in the MeOH extract were determined as major compounds. According to antiproliferative activity against C6 and HeLa cells, acetone and EtOAc extracts were shown to have higher activity compare with other extract and 5-FU.

Acknowledgements: This study was funded by the Project Support Unit of Cankiri Karatekin University (Project No: 2014L12).

Keywords: *Dianthus balansae* Boiss., anticancer, HeLa, C6, secondary metabolite.

PP-179

Phytochemical Analysis of Endemic *Dianthus zederbaueri* Vierh. Extracts and Their Anticancer Activities against HeLa and C6 cells

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Aim of the study: *Dianthus* sp. have antifungal, antimicrobial, cytotoxic activity, anthelmintic. However, there are no studies on *Dianthus zederbaueri* Vierh. (DZ). In the study, we worked the phytochemical analysis and anticancer activity of DZ.

Material and Methods: In this study, DZ plants were collected forest area from Cankiri. The dried plants were extracted hexane, chloroform (CHCl₃), ethyl acetate (EtOAc), acetone and methanol (MeOH), respectively. The hexane extract with GC-MS and others with HPLC-TOF/MS were analysed. The extracts anticancer effects were determined by BrdU ELISA assay against HeLa ve C6 cells. 5-fluorouracil (5-FU) was used as positive controls.

Results: Palmitic acid (35.02%), oleic acid (12.85%), linoleic acid (24.9%), linolenic acid (6.15%), and heptacosene (24.91%) were identified as the main components in the DZ hexane extract. In HPLC-TOF-MS analysis of the CHCl₃ extract was obtained gallic acid (1), 4-hydroxybenzoic acid (2), vanillic acid (3) and ferulic acid (4) as main components. 4-hydroxybenzoic acid (2), vanillic acid (3), p-coumaric acid (5) and ferulic acid (4) in the EtOAc and acetone extracts, gallic acid (1), gentisic acid (6), chlorogenic acid (7), 4-hydroxybenzoic acid (2), vanillic acid (3), rutin (8), p-coumaric acid (9), cichoric acid (10), ferulic acid (4) and quercetin (11) in the MeOH extract were determined as major compounds. According to antiproliferative activity against C6 cell, all the extracts (except MeOH extract) were shown to have higher activity compare with 5-FU. In addition to, the extracts were determined cell selective activity against C6 cell.

Acknowledgements: This study was funded by the Project Support Unit of Cankiri Karatekin University (Project No: 2014L12).

Keywords: Phytochemical analysis, *Dianthus zederbaueri*, Anticancer, HeLa, C6.

PP-180

The HPLC/TOF-MS Analysis of Endemic *Astragalus sigmoideus* Bunge extracts

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Aim of the study: The plant secondary metabolites such as saturated and polyunsaturated fatty acids and phenolic compounds have some biological effects that are antiproliferative, antidiabetic, anti-inflammatory and antioxidant. However, according to our research there is no study on endemic *Astragalus sigmoideus* Bunge. For this reason, in this study were investigated the the phenolic components of *A. sigmoideus* extracts.

Material and Methods: The plants were collected from Çankırı. These plants were seperated as aerial part, root and whole plant. Then, all parts were extracted with hexane chloroform, ethyl acetate and *n*-butanol, respectively. The quantitative phenolic components of the extracts were analyzed by HPLC/TOF-MS.

Results: In the chloroform extract of the root and whole plant parts of *A. sigmoideus* Bunge, 4-hydroxybenzoic acid (1) was obtained as main component. Ferulic acid (2) was major compound in the chloroform extract of the aerial part. At the same time, in the aerial part, root and whole plant parts of the plant ethyl acetate extracts, 4-hydroxybenzoic acid (1) was obtained as main component. Caffeic acid (3) from the *n*-butanol extracts of the plant roots, rutin (4) from the same extracts of the plant aerial part and whole plant were determined. In addition to, 4-hydroxybenzoic acid (1) from the methanol extract of the plant root and rutin from the same extracts of the plant aerial part and whole plant were observed.

Acknowledgements: This project is supported by Scientific and Technological Research Council of Turkey (TUBİTAK) (Project No: 114Z198).

Keywords: HPLC/TOF-MS Analysis, *Astragalus sigmoideus* Bunge, 4-hydroxybenzoic acid, Ferulic acid, Caffeic acid, Rutin.

PP-181

Identification and characterisation of phenolic compounds extracted from Endemic *Astragalus xylobasis* Freyn et Bornm. var. *angustus* (Freyn et Sint.) Freyn et Bornm.

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Aim of the study: *Astragalus* L. are represented in Turkey by 445 species, of which 224 are endemic. Some *Astragalus* ssp. have antimicrobial, antiperspirant, anti-inflammatory, diuretic and tonic effects. But, it did not find in the literature studies on endemic *Astragalus xylobasis* var. *angustus*. So, we aimed identification and characterisation of phenolic compounds of *A. xylobasis* extracts.

Material and Methods: The plants were collected from Çankırı. These plants were separated as aerial part, root and whole plant. Then, all parts were extracted with hexane chloroform, ethyl acetate and n-butanol, respectively. The quantitative phenolic components of the extracts were analyzed by HPLC/TOF-MS.

Results: Cinnamic acid (**1**) was major compound in the chloroform and ethyl acetate extracts of the aerial part, root and whole plant parts. In addition to, Hesperidin (**2**) from the n-butanol extract of the root parts and vanillic acid (**3**) from the same extract the aerial part and whole plant parts were determined. Apigenin-7-glucoside (**4**) was main component in the methanol extracts of all plant parts.

Acknowledgements: This project is supported by Scientific and Technological Research Council of Turkey (TUBİTAK) (Project No: 114Z198).

Keywords: *Astragalus xylobasis* var. *angustus*, Cinnamic acid, Hesperidin, Vanillic acid, Apigenin-7-glucoside, HPLC/TOF-MS.

PP-182

The Bioassay-guided Isolation of Secondary Metabolites of Endemic *Astragalus leucothrix* Freyn & Bornm.

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Aim of the study: *Astragalus* ssp. famed for their antimicrobial, antiperspirant, anti-inflammatory, diuretic and tonic effects. However, the studies on endemic *Astragalus leucothrix* Freyn & Bornm. no found in the literature. Therefore, aimed to the bioassay-guided isolation of secondary metabolites of endemic *Astragalus leucothrix* Freyn & Bornm.

Material and Methods: The plant was collected from Çankırı-Yapraklı and separated to small pieces. Then, the plant was subjected to extraction with methanol-chloroform (1:1). The crude extracts were dissolved with distilled water and extracted with hexane, chloroform, ethylacetate and n- butanol, respectively. Antiproliferative activity of all the extract against HeLa and C6 cells were performed. The highest activities against the cells were observed at the chloroform extract. Consequently, isolation studies were started from the extract. The extract was subjected to column chromatography. Similar fractions were combined by thin layer chromatography. The structure determination of pure molecules were elucidated by 1D and 2D NMR techniques, GC-MS, HPLC/TOF-MS analysis.

Results: The three compounds that were alalone (1), 3,5,7-tribromochromenylium (2), pentyl tritetracontanoate (3) were isolated from the chloroform extract.

Acknowledgements: This project is supported by Scientific and Technological Research Council of Turkey (TUBİTAK) (Project No: 114Z156)

Keywords: *Astragalus leucothrix* Freyn & Bornm, Alalone, 3,5,7-tribromochromenylium, Pentyl tritetracontanoate, HeLa cell, C6 cell.

PP-183

DNA Barcoding of Sea Cucumber Species *Holothuria tubulosa*, *Synapta reciprocans* and *Holothuria sanctori* in Gökova Bay (Muğla, Turkey)Ali TURKER¹, Ercüment GENÇ², Emre KESKİN², Sevan AĞDAMAR³, Esra Mine ÜNAL², Daniela GIANNETTO^{4*}¹Department of Aquaculture, Faculty of Fisheries, Mugla Sıtkı Kocman University, Turkey²Department of Fisheries and Aquaculture, Faculty of Agriculture, Ankara University, Turkey³Department of Basic Sciences, Faculty of Fisheries, Mugla Sıtkı Kocman University, Turkey⁴Department of Biology, Faculty of Sciences, Mugla Sıtkı Kocman University, Turkeydanielagiannetto@mu.edu.tr

Aim of the study: Genetic Biodiversity and haplotypes distribution of the Sea Cucumber Species *Holothuria tubulosa*, *Synapta reciprocans* and *Holothuria sanctori* in Gökova Bay (Muğla, Turkey) will be investigated by means of DNA Barcoding methods. The study represents the first DNA barcoding project on Echinodermata from Turkey waters.

Material and Methods: To investigate the genetic diversity and haplotypes distribution of *Holothuria tubulosa* Gmelin, 1791, *Synapta reciprocans* Forskål, 1775 and *Holothuria sanctori* Delle Chiaje, 1824, several sampling stations have been selected throughout Gökova Bay (Muğla, Turkey). The stations were chosen to be as remote or isolated from each other as possible and allow identifying the highest genetic biodiversity of the selected species. After collection by diving and catching, a small part of tissue (between 0.25 mg and 1 g) will be removed from each sample, put in 70-90% alcohol for the genetic analyses. DNA will be extracted using Qiagen DNeasy Kits and purified by NanoDrop ND-1000 spectrophotometer. Cytochrome c oxidase subunit I (COI) gene will be amplified by PCR with different combination of the primers: EchinoF1, HCO2198, Colin and EchinoR1. Editing and alignment of the sequences will be done by MEGA 6 and Sequencher 5.0 software. For each species intra-group and inter-group genetic distance analysis will be carried out using Kimura 2-parameter model on MEGA 6 and Arlequin 3.5 software. For the analysis of evolutionary relationships, MEGA 6, PAUP 4.0 and PHYLIP software will be used and the results will be validated by DNA barcoding standard Neighbour Joining (NJ) method.

Results: DNA barcoding methods have been widely used in last decade since they allow a fast and reliable species identification and assist to resolved the phylogenetic relationships between different groups.. Although this, no previous studies on DNA barcoding of Holothurians, or more generally on Echinoderms, have been yet carried on in Turkey. Then this study represents the first DNA Barcoding project of Echinoderms from Turkish waters. The project is still ongoing and will be finally concluded in September 2016. The achieved genetic sequences will be recorded in BOLD and NCBI GenBank international databases to become the first references for these sea cucumber species from Turkey. An additional value of the project will be to help to promote future studies and projects on this group in other areas of Turkey in order to increase the general knowledge on distribution and genetic biodiversity of these species.

Acknowledgements: The study is supported by the Muğla Sıtkı Koçman University Research Fund (No: 15/201).

Keywords: Sea Cucumbers, Gökova Bay, DNA Barcoding, Holothurians, Genetic biodiversity.

PP-184

Use of DNA Barcoding methods to study Sea Sponges Species Biodiversity in Gökova Bay (Muğla, Turkey)Ali TÜRKER¹, Ercüment GENÇ², Emre KESKİN², Sevan AĞDAMAR³, Esra Mine ÜNAL², Daniela GIANNETTO⁴¹Department of Aquaculture, Faculty of Fisheries, Muğla Sıtkı Koçman University, Turkey²Department of Fisheries and Aquaculture, Faculty of Agriculture, Ankara University, Turkey³Department of Basic Sciences, Faculty of Fisheries, Muğla Sıtkı Koçman University, Turkey⁴Department of Biology, Faculty of Sciences, Muğla Sıtkı Koçman University, Turkey
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Aim of the study: The main aim of the study is to investigate the genetic biodiversity of the Sea Sponges Species *Spongia officinalis*, *Ircinia variabilis*, *Sarcotragus spinosulus* and *Aplysina aerophoba* in Gökova Bay (Muğla, Turkey). A further aim is to investigate both the haplotypes distribution and the genetic population structures of these species throughout Gökova Bay. This study represents the first project on Porifera DNA barcoding from Turkey water.

Material and Methods: A small samples of tissue of *Spongia (Spongia) officinalis* Linnaeus, 1759; *Ircinia variabilis* (Schmidt, 1862); *Sarcotragus spinosulus*, Schmidt, 1862 and *Aplysina aerophoba*, Nardo, 1843 will be collected from different locations throughout Gökova Bay (Muğla, Turkey) by diving and catching. To detect the highest genetic differences between populations, the sampling stations were chosen throughout Gökova Bay to be as remote or isolated from each other as possible. After collection, the tissue sample (between 0.25 mg and 1 g) will be stored in 70-90% alcohol before to be sent to the Evolutionary Genetics Laboratory (Ankara University) for genetic analysis. There, DNA will be extracted using Qiagen DNeasy Kits and purified by NanoDrop ND-1000 spectrophotometer. Cytochrome c oxidase subunit I (COI) gene will be amplified by PCR with different combination of the primers: EchinoF1, HCO2198, Colin and EchinoR1. The sequences will be edited and aligned by MEGA 6 and Sequencher 5.0 software. For each species Intra-group and inter-group genetic distance analysis will be carried out using Kimura 2-parameter model MEGA 6 and Arlequin 3.5 software. Evolutionary relationships will be analysed by MEGA 6, PAUP 4.0 and PHYLIP software and then validated using DNA barcoding standard neighbour joining (NJ) method.

Results: The study started in September 2015 and will be finally concluded on September 2016. This project represents the first study on DNA Barcoding of Porifera from Turkish waters. The genetic sequences that will be obtained as a final result will be recorded both in BOLD and NCBI GenBank international databases and will be available for further comparisons with other populations of the studied species. The results of the study then will represent the first available reference for these sea sponges' species from Turkey. In addition to the expected results on genetic biodiversity of the populations and haplotypes distribution of Sea sponges from Gökova Bay, the project will encourage future projects and researches on these still less studied species that are fundamental for the whole marine ecosystem.

Acknowledgements: The study is supported by the Muğla Sıtkı Koçman University Research Fund (No: 15/200).

Keywords: Sea Sponges, Gökova Bay, DNA Barcoding, Genetic biodiversity.

PP-185

A morphological, palynological and ecological study of the *Glaucium cappadocicum* Boiss. in Turkey

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Aim of the study: *Glaucium cappadocicum* belonging to the Papaveraceae family, is an herbaceous plant. *G. cappadocicum* an endemic species for Turkey and its type specimen was collected from Euphratem in 1889 by Aucher. This species is very different from other *Glaucium* species in terms of taxonomy. Our aim, we are studied taxonomical, ecological aspects it and to enlarged description of *G. cappadocicum*.

Material and Methods: The research materials were collected from its growing habitats, their photos were taken and records of the species were kept. Soil (for ecological studies) specimens of *G. cappadocicum* were obtained from Erzincan district. The pollen grains and seeds of it were analyzed in SEM by being coated with gold through the Polaron SC 7620 brandlining machine. Stearn (1996) performed seed analysis, Punt et al. (2007) performed palynological analysis evaluations.

Results: The description of species was enlarged and a new treath category was proposed. Besides, a pollen description was composed for *G. cappadocicum* according to scanning electron microscopy (SEM) and light microscopy (LM) studies. Pollen grains are tree colpates, spheroidal and microechinate. Seeds reniform and seed surface alveolate-faveolate. Investiageted soil; slightly alkaline, salinity strongly saline-extremely saline, calcium carbonate, phosphorus, potassium, calcium, magnesium of our soil samples range between 7.40-7.42, 0.41-0.62 ppm, 131-137 ppm, 1545-1569 ppm, 23-28 ppm, respectively.

Acknowledgements: We wish to thank Scientific Investigation Project to Coordinate of Celal Bayar University (Project No. FEF 2013-018) for financial support. This study contains a part of PHD thesis prepared by Fatma Mungan in Celal Bayar University.

Keywords: *Glaucium*, morphology, palynology, ecology, Papaveraceae, Turkey.

PP-186

A New *Elaphomyces* Nees Record for the Macromycota of Turkey

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Aim of the study: This study aims to make a contribution to the mycobiota of Turkey by adding a new record.

Material and Methods: The *Elaphomyces* Nees samples were collected from Tonya (Trabzon-Turkey) district in 2015. Necessary morphological and ecological characteristics of the samples were recorded and they were photographed in their natural habitats. Then the samples were taken to the fungarium for further investigations. Microstructural data was obtained by using Nikon Eclipse Ci trinocular light microscope. The samples were identified by comparing the obtained macroscopic and microscopic data with the relevant literature. The specimens were deposited at Karamanoğlu Mehmetbey University, Kâmil Özdağ Science Faculty, Department of Biology.

Results: Using the data obtained from field and laboratory studies, the specimens were identified as *Elaphomyces citrinus* Vittad. Tracing the current literature it was found that 63 hypogeous macrofungi belonging to 7 orders (*Agaricales*, *Boletales*, *Eurotiales*, *Gomphales*, *Hysterangiales*, *Pezizales*, *Russulales*) within *Ascomycota* and *Basidiomycota* have so far been recorded from Turkey and *Elaphomyces citrinus* has not been recorded before.

Acknowledgements: The authors would like to thank to Karamanoğlu Mehmetbey University Research Fund (Project No: 02-M-15) for its financial support.

Keywords: biodiversity, macrofungi, hypogeous fungi, *Elaphomyces*, Turkey

PP-187

Gas Chromatography-Mass Spectrometry Analysis and Antimicrobial and Antioxidant Activities of Some Orchids (Orchidaceae) Growing in TurkeyÖmer ERTURK¹, Melek COL AYVAZ², Elif CIL³,¹Department of Biology, Ordu University, TÜRKİYE²Department of Chemistry, Ordu University, TÜRKİYEDepartment of Primary School, Division of Science Education, Ordu University, TÜRKİYE
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Aim of the study: Plants are well known for their medicinal efficacy around the world. *Orchidaceae*, the largest and most evolved family of the flowering plants comprises 25.000 to 35.000 species under 750 to 850 genera. Apart from their ornamental value, many orchids have apparent medicinal importance. In light of this information, in the present study, it was aimed to produce the antimicrobial and antioxidant activities of the plant and tuber sections of *some Orchidaceae* species harvested from Bartın-Orduyeri. Furthermore, the chemical compositions thought to contribute to biological activity of these plants were elucidated.

Material and Methods: Fresh leaves and tubers of plants separated from soil were dried at 23-35°C for 3 to 4 weeks. The powdered plant materials were extracted using 95% ethanol in the ratio of 1:5 (w/v) at room temperature. The extracts were kept at 4°C for 5 days, and then filtered through 0.45 µm membrane filter. The solvent was evaporated. The crude extracts were stored at -20°C until used. Antimicrobial activity and minimum inhibition concentrations (MIC) were measured using disc diffusion and agar dilution methods, respectively. Plus these minimum bactericidal concentrations were determined. Total phenolic contents (TPC) and ferric reducing antioxidant power (FRAP) of the extracts were determined as gallic acid and FeSO₄ equivalents according to the method based on Folin Ciocalteu reagent (Slinkard and Singleton, 1977) and method of Benzie and Strain (1996), respectively. Furthermore, DPPH free radical scavenging activity of the samples was established at 517 nm after the incubation period of an aliquot of the samples with DPPH solution in methanol. GC-MS analysis of the samples was performed according to solid phase microextraction (SPME) technique.

Results: Investigated orchids species had very good inhibition against all tested organisms. *Yersinia enterocolitica* was the most sensitive microorganism, while *Klebsiella pneumoniae* was the most resistant. The highest antimicrobial activity was observed for *Ophrys oestifera* subsp. *oestifera* tuber extract. Unlike this, *Ophrys sphegodes* subsp. *caucasica* whole plant extract had minimum antimicrobial activity. TPC values of the extracts were in the range of 0.5-14.1 g GAE/g sample. The highest and lowest TPC values were calculated for the *Ophrys sphegodes* Mill. subsp. *caucasica* and *Orchis laxiflora* subsp. *laxiflora* Lam. tuber extracts, respectively. Just like TPC results, the highest (1.35 mg/mL) and the lowest (26.9 mg/mL) SC₅₀ values for DPPH radical scavenging activity were obtained for the same extracts. A high correlation as 0.918 was also observed between FRAP and TPC values. At the end of the GC analysis numerous compounds were identified for samples. Either one or all the identified compounds may be responsible for the antimicrobial activity of the samples. An organic acid 1,2-Benzenedicarboxylic acid, diethyl ester which is known as antimicrobial plasticizer in a wide variety of consumer goods was detected for all studied orchid samples. Besides this, 1H-Purin-6-amine, [(2-fluorophenyl)methyl]- and eicosamethylcyclodecasiloxane were identified almost all extracts.

Keywords: *Orchidaceae*, antimicrobial, antioxidant, GC-MS.

PP-188

Biotechnology for Conservation of Plant BiodiversityYonca SURGUN¹, Betül BÜRÜN²¹Department of Molecular Biology and Genetics, Bartın University, Turkey²Department of Biology, Muğla Sıtkı Koçman University, Turkey

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Aim of the study: Different plant preservation strategies have been introduced against threats of biodiversity and these approaches are mainly grouped as *in situ* and *ex situ* conservation. *Ex situ* conservation techniques includes botanical gardens, field collection/gene banks, *in vitro* techniques/*in vitro* gene banks and cryopreservation. Due to significant advantages about conservation of biodiversity, the importance and use of *in vitro* culture techniques is increasing day by day.

Material and Methods: In this review, current literatures on biodiversity conservation are overviewed using the *ex situ* conservation methods, *in vitro* culture and cryopreservation techniques.

Results: *In vitro* culture techniques and applications are frequently used for conservation of rare and endangered plant species, elite genotypes, recalcitrant seeds, vegetative propagated species and genetically engineered materials. It is possible to perform medium-term conservation by reducing growth of plant material in *in vitro* conservation. On the other hand, cryopreservation provides long-term conservation by maintaining plant material in liquid nitrogen (-196°C). Slow growth storage protocols have been performed routinely on a large number of plant species. However, routine use of cryopreservation is still limited.

Keywords: Biodiversity, *ex situ*, *in vitro* culture, cryopreservation.

PP-189

Multi-parameter optimization of extraction of total flavonoids in *Capsicum annuum* L.

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Aim of the study: Flavonoids are natural antioxidants found in different plant species. Quercetin is the most important flavonoid due to its antiseptic, anticancer and antiallergic properties. *Capsicum annuum* L., raw material of the study, have been investigated in several researches due to its flavonoid content. But, the difference in this study was the determination of interrelated parameters and their effect on the yield of the extraction process which is very important point for exporting laboratory investigations to the industry. To achieve this goal, Box-Behnken design of multi-parameter investigation was applied. The results were processed with Design-Expert program to plot three-dimensional response surfaces.

Material and Methods: Extraction with methanol as a solvent was applied to *Capsicum annuum* L. obtained from a herbalist. In the classical extraction experiments, temperature (35-45-55°C), time (30-60-90 min.) and solid/liquid ratio (1/30-1/40-1/50g/ml) were chosen variables, whereas mixing rate was set constant at its maximum value. At the end of the extraction, the samples were placed in closed tubes after filtration. The absorbances of total flavonoids as quercetin equivalent were determined by analyzing the solution containing sodium acetate-acetic acid buffer (pH=4,0; 2ml); aluminium chloride (2ml) and sample (1ml) at 415 nm. The quercetin equivalents of the samples were calculated by using the calibration curve prepared by using known concentrations of pure quercetin.

Results: In this research, Box-Behnken multi-parameter optimization design aided with Design-Expert program was used to determine optimum parameters and their levels that producing the highest flavonoid content extracted from *Capsicum annuum* L. The analysis showed that the best function was quadratic and the most effective parameters of the extraction were solid/liquid ratio, time and temperature, respectively. Regression coefficient of the function was found as 0.9984 showing well fitness of the experimental data. In the extraction of 1 g of raw material with nearly 40 ml of methanol at 47°C during 85 minutes, 18.791 mg total flavonoids as quercetin equivalent was produced at the optimum conditions of the study.

Keywords: Flavonoid, extraction, lichen, optimization, response surface.

PP-190

Vegetable green crops interaction with *Pseudomonas* sp. *in vitro*A.A. OVOD¹, G.V. GODOVA¹, E.A. KALASHNIKOVA²¹Department of Microbiology and immunology/ Faculty of Soil science, Agrochemistry and Ecology
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Aim of the study is the observation of the vegetables green crops interaction with *Pseudomonas* sp. *in vitro* conditions on cellular and popular level.

Material and Methods: To study the interaction between plants and the studied microorganism used: a 3-week plant lettuce and Basil (obtained *in vitro*) infected with the bacteria *Ps. fluorescens* at a dose of 10^6 m. p./ml (optical turbidity standard) the introduction into a nutrient medium under the plant. For the quantitative accounting of microorganisms in the dynamics of the plant homogenized in sterile water and sown on nutrient medium (MPA) at 3,5,8,10 and 13 days after infection. The total content of soluble phenolic compounds was determined in the same terms as in the study of the dynamics of phytobacteriology. This plant tissue was extracted with 96% ethanol and determined the content of soluble phenolic compounds by a spectrophotometric method at a wavelength of 725 nm.

Results: When examining the interaction between *Ps. fluorescens* c lettuces and Basil found that *Ps. fluorescens* easily penetrates into all organs of the plant through the root system and population dynamics of *Pseudomonas* in most embodiments is a parabolic curve with a maximum in the middle of the experience. In the bottom of the sheets detected by 1-2 orders of magnitude more pseudomonads than the upper. In parallel, the dynamics of the accumulation of soluble phenolic compounds. Typically, the amount of Khurplants increases in response to stressful conditions, such as infections. We found that during the experiment the number of protective phenolic compounds in lettuce and Basil grows in 1,5-2 times.

Acknowledgements: The work was carried out on the basis of the Russian State Agrarian University. Used strains from the collection of the research Institute of human ecology and environmental hygiene.

Keywords: *Ps. fluorescens*, vegetable crops, population dynamics, phenolic compounds.

PP-191

Determination of Weed Species in Kiwifruit Orchards in Ordu-TurkeyHikmet YONAT¹, Onur KOLOREN²¹Graduate School of Natural and Applied Sciences, Ordu University, Turkey²Department of Plant Protection, Agricultural Faculty, Ordu University, Turkey
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Aim of the study: This study was conducted to increase the quality and the yield in kiwifruit production by determining coverage (%) and frequency (%) of weed species and performing effectively weed control.

Material and Methods: Materials of the study was weeds of kiwifruit in Ordu and its boroughs. Ordu was divided into 4 parts of research area (Altınordu-Gülyalı, Ulubey-Kabadüz, Perşembe-Fatsa-Çamaş, İkizce-Ünye-Çaybaşı). The study was carried on in two different periods (April-May and September-October) in 2015. It was started from center of Ordu and stopped for every 5 kilometers to determine weed species, coverage (%) and frequencies (%) in 1 da area in randomly selected kiwifruits. At the end of the survey, weed species coverage (%), and weed frequencies (%) was calculated according Odum (1971) and they were classified as Flora of Turkey (Davis, 1965-1988), Ackerunkraeuter Europas (Hanf, 1990).

Results: General weed coverage (%) was found 82.27 % in the first period (April-May) and 80.12 % in the second period (September-October) in kiwifruit orchards. In addition, 86 weed species belonging to 33 families were identified in 26 kiwifruit orchards. The largest family was found Asteraceae having 18 species among this families. In the first period (April-May), 71 species were identified belonging to 31 families and the most frequently encountered weed species was *Convolvulus arvensis* L. (field bindweed) by 69.23 %. In the second period (September-October) 67 species were identified belonging to 31 families and the most frequently encountered weed species was *Convolvulus arvensis* L. (field bindweed) by 53.85 %. *Poa trivialis* L. (rough stalk bluegrass) was found to have the largest general coverage area by % 10.37 in the first period and *Setaria glauca*(L.) P. Beauv (yellow foxtail) was found to have the largest general coverage area (%) by %11.37 in the second period. With respect to frequencies (%) *Convolvulus arvensis* L. (field bindweed) was the first species by 69.23 %, *Stellaria media* (L.) Vill. (chickweed) was the second by 65.38 % and *Artemisia vulgaris* L.(mugwort) was the third by 65.38 % for the first period whereas *Convolvulus arvensis* L. (field bindweed) was the first by 53.85 %, *Amaranthus retroflexus* L. (redroot pigweed) was the second by 50.00 % and *Urtica dioica* L. (stinging nettle) was the third by 46.15 % during the second period.

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Keywords: Weeds, Kiwifruit, *Convolvulus arvensis* L., Ordu-Turkey

PP-192

Helminth Parasites of *Myotis daubentonii* (Vespertilionidae: Chiroptera) from Turkey, with DNA Sequencing of Helminths Nuclear LsrDNA

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Aims of the study: Determine helminth parasites of *Myotis daubentonii*, present the first records of helminths from *M. daubentonii*, provide DNA sequencing of the helminth species found in this study and contribute to EuroAsian biodiversity.

Material and Methods: Twenty three individuals of *Myotis daubentonii* (3 females, 20 males) from Bursa province, Turkey were examined for helminth parasites. And then helminth parasites used as a material for DNA sequencing. First of all were used classical taxonomic rules and than molecular methods (DNA isolation, Polymerase Chain Reaction, agarose gel electrophoresis, sequencing PCR, clean-up, Multiple Sequence Alignment and Basic Local Alignment Search Tool) for helminth fauna of bats.

Results: *Myotis daubentonii* found to harbour eight species of Digenea (*Prosthodendrium chilostomum*, *Prosthodendrium longiforme*, *Prosthodendrium hurkova*, *Lecithodendrium linstowi*, *Plagiorchis koreanus*, *Plagiorchis muelleri*, *Plagiorchis elegans*, *Plagiorchis vespertilionis*) and two species of Nematoda (*Capillaria moravecii*, *Molinostrongylus skrjabini*). According to results that obtained from this study, morphological and molecular data were confirmed each other. *Myotis daubentonii* represents new host and locality records for 5 species of helminths in the World. 28s rDNA partial sequences of eight helminth species from them new records for Gene Bank. All results that were obtained this bat species are new data for Turkey too.

Acknowledgements: We thank the Uludag University Scientific Research Council of Turkey for their financial support with UAP (F) – 2011/77 project number.

Keywords: Turkey, Bat, Digenea, Nematoda, DNA sequencing.

PP-193

Morphological and molecular diversity of wild fruit *Cerasus prostrata* (Lab.) Ser. genotypes collected from natural sites of Central Anatolia, TurkeyAydin UZUN, Mehmet YAMAN, Hasan PINAR, Batuhan Durmus GOK, Isa GAZEL, Kadir Ugurtan YILMAZDepartment of Horticulture, Erciyes University, Turkey
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Material and Methods: In this study, 30 *C. prostrata* genotypes collected from the mountainous sections of Ali Dagi and Hacilar regions located at foothills of Erciyes Mountain of Central Anatolia, Turkey were used as the plant material. For fruit and leaf analyses, ripened fruits and normal-size leaves were sampled from each genotype (30 samples) at the beginning of August. Fruit samples were subjected to fruit weight (g) and fruit flesh ratio (%) analyses and leaf samples were subjected to leaf blade length (cm), leaf blade width (cm) and petiole length (cm) analyses. The width and length values of each leaf were measured with a digital caliper. Young leaves were used for genomic DNA extraction through CTAB method as described by Doyle and Doyle (1990). For PCR processes, 17 ISSR primers were used. PCR components and cycles were arranged in accordance with the method specified by Uzun et al. (2009). PCR products were run in 2% agarose gel at 110 volts for 2-3 hours. Data on fruit and leaf characteristics were subjected to statistical analyses and means were grouped through Tukey test ($P < 0.05$). Molecular analyses were performed using NTSYS pc 2.11 software (Rohlf, 2000).

Results: Significant differences were observed in fruit weight (g) and flesh ratio (%) of the genotypes. The prominent genotypes in terms of this parameter were the genotype 17 (0.66 g) and 2 (0.56 g) and genotype 14 had the least fruit weight (0.23 g). Flesh ratio also exhibited a significant variation among the genotypes. The values varied between 84.59% and 63.11%. Significant differences were also observed in leaf traits of the genotypes. The greatest leaf widths were observed in genotypes 6 (1.61 cm) and 2 (1.58 cm) and the least leaf width was observed in genotype 10 (0.68 cm). The greatest leaf lengths were observed in genotypes 17 (4.02 cm) and 2 (3.68 cm) and the least leaf length was observed in genotype 10 (1.82 cm). With regard to leaf petiole lengths, the greatest values were observed in genotypes 12 (0.60 cm) and 19 (0.55 cm) and the least value was seen in genotype 16 (0.28 cm). For molecular analyses, 17 ISSR primers were used. A total of 115 net readable bands were obtained and 98 of them were polymorphic. Similarity levels among 30 *C. prostrata* genotypes varied between 0.70 - 0.95. All genotypes were genetically distinguished from each other.

Keywords: Diversity, genetic resources, mountain cherry, wild fruit.

PP-194

Sambac jasmine cultivation and the bioecological features in covered condition in Absheron.

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Aim of the study: Long-term observations show that the Sambac jasmine is the light-sensitive plant. In a little shady conditions in a cultivated area the shoot's growth zone becoming yellow and stop its development. However, during the summer months, especially in the afternoon hours the direct sunlight puts negative impact on the plant. Mild - hot (25-30^o t) temperature conditions has developed the most rapidly growing. Our observations have shown that plant's growth under temperature above 35^o fall down. Our research shows that in high -65-75% relative air humidity of the environment the plant blossoms intensively. When humidity is low, the intensity of flowering is reduced, and the formed flowers quickly fall. To keep the regime of air humidity the plants should be often sprinkling in spring and summer months. Simultaneously the moisture of the cultivating soil should be normally. Sambac jasmine's breeding way is vegetative propagation- to bury stooped shoot by the pens. In stooped shoot burial breeding the one of the side shoots are selected and the burial part is cleaned from the leaves. At the same time the nourishing soil and the sand (1:1 ratio) filled pot is placed next to the mother plant cultivated pot and the cleaned shoot stooping to bury in the same pot. The newly planted plants are often watered and after 25-30 days they separated and grown independently. It should be noted that in such breeding more effective results are obtained when the room temperature is between 20-25^oC.

Material and Methods: In pen breeding method, in spring are used woody and in summer both the woody and the green pens. The pens are planted in 12-15 long. It means the pens are cutting to the 3-4 internode and planted in the leaf humus mixed with the grained soil in 1:1 ratio. In both green and woody pens on the apical part the leaves are revealed. The box in which are planted pens is covered by the glass and watered regularly by keeping in the rooms with the temperature 18-20^oC. In this circumstance the pens are rooted during the 40-45 days. And after this the pens can be transferred. The care to Sambac jasmine in its standing place are consist: the setting of support system for the plant, regularly irrigation, the giving of feeding fertilizers and the pruning depending on given shape.

Results: During our research in Sambac jasmine were not observed any parasites. However, some pest species, which significantly damaged the plant. The most effective and environmentally clean struggle method with the massive blights is the use of walnut leaves, pepper fruits and the thorn-apple's leaves and the fruits soapy solution in boiled water. For this point the kilogram of walnut or thorn-apple leaf or the 200 g of pepper fruit are boiled in 10 l water for 20 minutes and then is added 200 g of crude soap. After cooling the 1 l solution is mixed with the 10 l of water and splashed on the plants. The main solution keeps its quality for the month in dark cool place.

Key words: Sambac jasmine, cultivation, Absheron, bioecological, leave.

PP-195

S-genotype profiles of Some Foreign and Turkish Apricot GenotypesKadir Ugurtan YILMAZ, Busra BAŞBUG, Kahraman GURCAN

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Material and Methods: Total of 48 foreign and local accessions were used in this study from the Apricot Research Institute in Malatya, Turkey, which is the entire apricot collection of the research institute. 5 of 48 accessions were foreign obtained from different countries. Genomic DNA was extracted from full expanded apricot leaf samples using the Cetyltrimethyl Ammonium Bromide (CTAB) method (Doyle and Doyle, 1987) for S-genotype profiles study. For first intron region, SRC-R (Vilanova et al., 2005) and SRC-F (Romero et al., 2004) primer pair were used to determine Sc allele which yielded band at 353 bp at apricot cultivars (Vilanova et al., 2005). PCR products were separated on an ABI 3500 capillary electrophoresis instrument (Applied Biosystems, Foster City, CA, USA) at the core laboratory of the Genome and Stem Cell Centre (GENKOK) in Erciyes University, Kayseri, Turkey. AprFBC8-F and AprFBC8-R were used for detecting *SFB_{C/8}* allele (Halász et al. 2007). The amplification was carried out using a temperature profile according to Halász et al. (2010). For second intron, PCR was conducted according to Sutherland et al. (2004) using the degenerate primers EM-PC2consFD and EM-PC3consRD.

Results: Results of this study, self-compatibility status of 48 local and foreign apricot genotypes was identified through molecular markers. SRC-F and SRC-R, EM-PC2consFD and EM-PC3consRD, AprSC8-R and PaConsl-F, AprFBC8-F and AprFBC8-R primer pairs were used to identify self-compatibility (Sc) alleles. To determine band widths, gel band readings were performed for some primers and PCR products taken from some other primers were analyzed in ABI sequence analysis device. Current findings revealed for certain that 35 apricot genotypes were self-incompatible and 13 genotypes had self-compatibility allele (Sc).

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Keywords: Apricot, *Prunus armeniaca*, Self-(In)Compatibility, S-genotype.

PP-196

Pollen and fruit micromorphology *Lecokia cretica* (Apiaceae) from TurkeyMustafa ÇELİK¹, Ahmet DURAN², Özlem ÇETİN¹¹ Department of Biotechnology, Selçuk University, Turkey² Department of Biology, Selçuk University, Turkeymstfclk.54@gmail.com

Aim of the study: The genus *Lecokia* DC. a member of Apiaceae is represented by *Lecokia cretica* DC. in Turkey. In the present study, pollen and fruit micromorphology of *Lecokia cretica* were investigated by light and scanning electron microscopy.

Material and Methods: Plant samples were collected from Bingöl (Turkey) in 2015. The collected specimens were marked with research's number, dried according to standard herbarium methods. Flora of Turkey and the East Aegean Islands was used to identify the plant samples. The fruit and pollen micromorphology of *Lecokia cretica* are studied using light microscopy (LM) and electron microscopy (SEM). For LM pollen grains were prepared following the Wodehouse method. For SEM investigations, fruit and pollen grains were mounted on stubs using double-sided adhesive tape and coated with gold for SEM studies. Photographs were taken with a Zeiss LS-10 after coating with a Polaron SC7620 sputter coater for SEM studies.

Material and Methods: The results of our study have shown that the pollen grains of the *Lecokia cretica* have radial symmetry, isopolar, 3-zonocolporate. Polar axis (P) is 25.04 µm and equatorial axis (E) is 16.28 µm. P/E ratio is 1.55 µm. The shape of pollen grain is prolate. The ornamentation of pollen grains are rugulate. The fruit of *Lecokia cretica* is oblong, laterally compressed, 12-20 x 4-6 mm, calyx teeth 1-1.5 mm, mericarp coat surface crinkled and densely covered with hooks.

Keywords: *Lecokia*, Umbelliferae, Turkey.

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An Investigation on Endemic *Delphinium davisii* Munz (Ranunculaceae)Ersin MİNARECİ¹, Canan ÖZDEMİR¹¹Faculty of Science and Letters, Department of Biology, Celal Bayar University, Turkey,
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Aim of the study: *Delphinium* L. (Ranunculaceae), is important in Turkey's plant biodiversity, is represented approximately by 32 taxa, 17 of which are endemic in Turkish flora. Investigated *Delphinium davisii* Munz is endemic in Turkey's western Black Sea Region. In this study; the root, stem and leaf anatomy of *D. davisii* were studied in order to understand the usefulness of these characteristics for systematic purposes. The anatomical characters observed in this study will show the way to other studies in the future.

Material and Methods: Plant samples were collected from Karabük province in 2015 during the flowering period from natural populations. Some of dried and fresh plant samples were used for taxonomic identification. Herbarium samples of *D. davisii* are conserved in the Herbarium of CBU. Anatomical studies were carried out on fresh samples kept in ethanol of 70%. Cross-sections were prepared using the Leica RM2125RT rotary microtome according to paraffin method. Hand-cut sections were taken from fresh samples, too. The sections were stained with safranin-fast green. The samples that became constant preparations were examined using a Leica DM3000 motorized microscope. Anatomical measurements were made by using ocular micrometer. Minimum, maximum, mean values were recorded and standard deviations calculated.

Results: Anatomical results of the studied taxon were revealed for the first time with this study. In transverse section of the root, the periderm layer on the outermost surface is thick and its cells are squashed or breaking up. There is a multi-layered parenchymatic cortex under the periderm and its cells are approximately 28-56 µm x 10-22 µm. Xylem cells are located in a wide area on the other hand phloem cells are clustered in a smaller area. In transverse section of the stem, the epidermis covered by a thick cuticle consists of 1 layer oval, squarish or rectangular cells. Cortex parenchyma layer is stuck in a narrow place. Sclerenchyma cells were observed on the collateral vascular bundle and trachea cells have approximately 5-30 µm width and 4-33 µm length in size. There are secondary metabolites in some parenchymatic cells. In transverse section of the leaf, the mesophyll is composed of elongated rectangular palisade parenchyma and isodiametric spongy parenchyma cells. Measurements of the trachea cells are approximately 2-10 µm width and 3-11 µm length. Obtained data were compared with the other members of *Delphinium*. This study is important, as the anatomical characters can be useful to identify this species.

Keywords: Anatomy, *Delphinium davisii*, Ranunculaceae.

PP-198

Indicator values of *Notonecta viridis* (Hemiptera: Notonectidae) and Chironomid species along Van Lake coastline

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Aim of the study: A species that is living naturally in a certain habitat is native born of that habitat and adapted to. It is a good data to understanding of indicator value of species that are known of their presence and densities in a certain habitat. The aim of this study has been to determine the value of the indicator *Notonecta viridis* and species that belonging to chironomid family who live in a certain habitat.

Material and Methods: In this study the population densities of *Notonecta viridis* and species that belonging to Chironomidae family were determined in 22 different sampling point where located at the coastal band of Van Lake which has 430 km distance between may-october 2011. The sampling points were consist of settlement, river entries and natural places and samplings were made of by sweepnet which has 35 cm diameters and plankton dipper whose net opening was 153 mesh. In the monthly samples numbers of every species were recorded and additionally, pH, temperature, salinity, nitrogen, ammonium, iron, copper, manganese, potassium values of water were measured.

Results: At the end of the study *Notonecta viridis* was observed almost all coastal band and *Microchironomusderibae*, *Halocladiusfucicola*, *Cricotopus* spp. and *Chironomid* sp. were recorded at the some sampling points only. Among these species, *Microchironomusderibae*, *Halocladiusfucicola* species are new record for Van Lake. Relatively high nitrogen proportion was affected the population density of *Notonecta viridis* and *Microchironomus deribae*, ammonium and salinity were also affected importantly the population distributions of *Microchironomusderibae*, *Halocladiusfucicola*, *Cricotopus* spp. ve *Chironomus* sp.

Keywords: Van Lake, *Notonecta viridis*, Chironomidae, Indicator value.

PP-199

Assessment of the oxidative stress in the livers and the neurochemicals in the brains of mice subject to intraperitoneal injection of aspartame (ASP) within their neonatal periodAysen Cetin KARDESLER¹, Yagmur OZYILMAZ², Eyup BASKALE²¹ Pamukkale University Faculty of Medicine Department of Medical Biochemistry, Denizli, Turkey² Pamukkale University Faculty of Science and Letters Department of Biology, Denizli, Turkeyaysencetin@yahoo.com

Aim of the study: Aspartame (ASP) is an artificial sweetener which currently has a widespread usage in many commercial products. Past scientific studies indicate that aspartame has a negative effect on the oxidative stress of mice liver and the neurochemical levels of mice brain. The objective of this study is to investigate the effects of the ASP on the liver and the brain of mice which were subject to injections at specific dosages in a daily scheduled program.

Material and methods: Male mice in their neonatal period were subject to ASP injections and the levels of some neurochemicals in their brains and the oxidative stress parameters of their livers are inspected. In order to implement the study, MDA (malondialdehyde), GSH (glutathione), SOD (superoxide dismutase) as oxidative stress parameters of the liver are measured and dopamine, glutamate, catecholamine and GABA levels as the brain's neurochemicals are measured.

Results: Compared to the control group, malondialdehyde, glutathione and superoxide dismutase levels measured in the livers of the mice which are subject to ASP are at relatively higher values. The levels of dopamine and glutamate in the brains of the mice which were subject to the injection of ASP displayed an increase while the levels of GABA and catecholamine decreased with respect to the control group.

Acknowledgements: This study is supported by the Scientific Research Fund of Pamukkale University under project number FBE021-2014.

Key words: Aspartame, mice, liver, oxidative stress, brain, neurochemicals.

PP-200

The secondary metabolite profiles of *Hylocomium splendens* (Hedw.) Schimp. extractsAyse Sahin YAGLIOGLU¹, Serhat URSAVAS², Murat TEMİRTÜRK¹, Muhammet OREN³¹Department of Chemistry, Faculty of Science, Cankiri Karatekin University, 18100 Cankiri, Turkey²Forest Engineering Department, Faculty of Forestry, Cankiri Karatekin University, 18200 Cankiri, Turkey³Department of Biology, Science and Art Faculty, Bülent Ecevit University, 67100 Zonguldak, Turkeymurattemirturk@gmail.com

Aim of the study: The plant secondary metabolites such as saturated and polyunsaturated fatty acids and phenolic compounds have some biological effects that are antiproliferative, antidiabetic, anti-inflammatory and antioxidant. However, according to our research there is no study on *Hylocomium splendens* (Hedw.) Schimp. For this reason, in this study were investigated the secondary metabolites of *H. splendens*.

Material and Methods: *Hylocomium splendens* (Hedw.) Schimp. was collected from Sinop. The mosses were separated as aerial part and root. Then, the aerial parts were extracted with hexane, chloroform, ethyl acetate, n- butanol, methanol, respectively. The profiles of hexane and chloroform extracts were performed by GC-MS analysis. The quantitative phenolic components of the other extracts were analyzed by HPLC/TOF-MS.

Results: In the ethyl acetate extract of the aerial parts of *H. splendens*, syringic acid and protocatechuic acid, ethyl ester were obtained as main components. Gentisic acid and vanillic acid were major compounds in the n- butanol of the aerial part. In addition to, 4-hydroxybenzoic acid, diosmin and fumaric acid from the methanol extract of the mosses aerial parts were observed. The twenty-six components were determined from the hexane extract of the aerial parts of *H. splendens*. octacosanol (17.25%), stearic acid (8.15%), palmitic acid (7.03%) and lignoceric acid (7.01 %) were main components in the extract. However, in the chloroform extract of the aerial parts of *H. splendens* were observed twenty-eight components. Diploptene (17.26 %), oleic acid (9.82%) and lignoceric acid (8.64 %) were major components in the extract.

Keywords: *Hylocomium splendens* (Hedw.) Schimp., phenolic compound, fatty acids, HPLC/TOF-MS, GC-MS, secondary metabolite.

PP-201

The Extraction and Analysis of Phenolic and Lipophilic Compounds of *Anomodon viticulosus* (Hedw.) Hook. & Taylor.Ayse Sahin YAGLIOGLU¹, Serhat URSAVAS², Muhammet OREN³, Murat TEMİRTÜRK¹¹Department of Chemistry, Faculty of Science, Cankiri Karatekin University, 18100 Cankiri, Turkey²Forest Engineering Department, Faculty of Forestry, Cankiri Karatekin University, 18200 Cankiri, Turkey³Department of Biology, Science and Art Faculty, Bülent Ecevit University, 67100 Zonguldak, Turkey
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Aim of the study: Although mosses are one of the oldest land plants in earth, the use areas and benefits of this plant are unknown to most people. Today, mosses are used in horticulture, in the construction industry in several domestic areas, in the determination of air pollution, as erosion control purposes, in the production of commercial products, medicine, pharmacy and food. In this study, we aimed to determine the chemical composition of *Anomodon viticulosus* (Hedw.) Hook. & Taylor that is mosses.

Material and Methods: *Anomodon viticulosus* (Hedw.) Hook. & Taylor was collected from Sinop. The mosses were separated as aerial part and root. Then, the aerial parts were extracted with hexane, chloroform, ethyl acetate, n- butanol, methanol, respectively. The profiles of hexane and chloroform extracts were performed by GC-MS analysis. The quantitative phenolic components of the other extracts were analyzed by HPLC/TOF-MS.

Results: In the ethyl acetate extract of the aerial parts of *A. viticulosus*, fumaric acid, 4-hydroxy benzaldehyde and 4-hydroxybenzoic acid were obtained as main components. Ferulic acid, neohesperidin and syringic acid were major compounds in the n- butanol of the aerial part. In addition to, vanillic acid, syringic acid and 4-hydroxybenzoic acid from the methanol extract of the mosses aerial parts were observed. The four components were determined from the hexane extract of the aerial parts of *A. viticulosus*. The compounds were diploptene (55.5%), palmitic acid (22.43%), oleic acid (16.65%) and 1-undecanol (5.37%). However, in the chloroform extract of the aerial parts of *A. viticulosus* were observed fifteen components. Manool oxide (39.13 %), diploptene (7.97%) were major components in the extract.

Keywords: *Anomodon viticulosus* (Hedw.) Hook. & Taylor, moss, syringic acid, 4-hydroxybenzoic acid, diploptene, Manool oxide.

PP-202

The Phytochemical Analysis of *Thamnobryum alopecurum* (Hedw.) Nieuwl. ex GanguleeAyse Sahin YAGLIOGLU¹, Serhat URSAVAS², Murat TEMİRTÜRK¹, Muhammet OREN³¹Department of Chemistry, Faculty of Science, Cankiri Karatekin University, 18100 Cankiri, Turkey²Forest Engineering Department, Faculty of Forestry, Cankiri Karatekin University, 18200 Cankiri, Turkey³Department of Biology, Science and Art Faculty, Bülent Ecevit University, 67100 Zonguldak, Turkeymurattemirturk@gmail.com

Aim of the study: Mosses have been used in many fields such as basketry, bedding, wound dressing, diapers, and menstrual fluid absorption. But there is no the study on phytochemical analysis of *Thamnobryum alopecurum* (Hedw.) Nieuwl. ex Gangulee moss. In this study; we aimed to determine the chemical composition of *Thamnobryum alopecurum* (Hedw.) Nieuwl. ex Gangulee moss.

Material and Methods: *Thamnobryum alopecurum* (Hedw.) Nieuwl. ex Gangulee was collected from Sinop. The mosses were separated as aerial part and root. Then, the aerial parts were extracted with hexane, chloroform, ethyl acetate, n- butanol, methanol, respectively. The profiles of hexane and chloroform extracts were performed by GC-MS analysis. The quantitative phenolic components of the other extracts were analyzed by HPLC/TOF-MS.

PP-203

The secondary metabolites of *Alleniella complanata* (Hedw.) S. Olsson, Enroth & D. Quandt extractsAyse Sahin YAGLIOGLU¹, Serhat URSAVAS², Emiç SARAY¹, Muhammet OREN³¹Department of Chemistry, Faculty of Science, Cankiri Karatekin University, 18100 Cankiri, Turkey²Forest Engineering Department, Faculty of Forestry, Cankiri Karatekin University, 18200 Cankiri, Turkey³Department of Biology, Science and Art Faculty, Bülent Ecevit University, 67100 Zonguldak, Turkey
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Aim of the study: Secondary metabolites such as saturated and polyunsaturated fatty acids and phenolic compounds are used in anti-feeding activity, toxicity or acting as precursors to physical defense systems. However, according to our research there is no study on *Alleniella complanata* (Hedw.) S. Olsson, Enroth & D. Quandt. For this reason, in this study were investigated the secondary metabolites of *A. complanata*.

Material and Methods: *A. complanata* was collected from Sinop. The mosses were separated as aerial part and root. Then, the aerial parts were extracted with hexane, chloroform, ethyl acetate, n- butanol, methanol, respectively. The profiles of hexane and chloroform extracts were performed by GC-MS analysis. The quantitative phenolic components of the other extracts were analyzed by HPLC/TOF-MS.

Results: In the ethyl acetate extract of the aerial parts of *A. complanata*, 4-hydroxybenzoic acid and protocatechuic acid, ethyl ester were obtained as main components. Protocatechuic acid, ethyl ester, p-coumaric acid and caffeic acid were major compounds in the n- butanol of the aerial part. In addition to, protocatechuic acid, ethyl ester and f vanillic acid from the methanol extract of the mosses aerial parts were observed. The fourteen components were determined from the hexane extract of the aerial parts of *A. complanata*. Diploptene (45.84%) and stigmastan-3,5-diene (17.93%) were main components in the extract. However, in the chloroform extract of the aerial parts of *A. complanata* were observed sixteen components. Oleic acid (41.73%) and diploptene (11.42%) were major components in the extract.

Keywords: *Alleniella complanata* (Hedw.) S. Olsson, Enroth & D. Quandt, phenolic compound, fatty acids, HPLC/TOF-MS, GC-MS, Diploptene, Oleic acid.

PP-204

Analysis of the Fatty Acids and Phenolic Compounds in *Abietinella abietina* (Hedw.) M. Fleisch.Ayse Sahin YAGLIOGLU¹, Serhat URSAVAS², Muhammet OREN³¹Department of Chemistry, Faculty of Science, Cankiri Karatekin University, 18100 Cankiri, Turkey²Forest Engineering Department, Faculty of Forestry, Cankiri Karatekin University, 18200 Cankiri, Turkey³Department of Biology, Science and Art Faculty, Bülent Ecevit University, 67100 Zonguldak, Turkeyaysesahin@gmail.com

Aim of the study: The saturated and polyunsaturated fatty acids and phenolic compounds are the plant secondary metabolites that have biological effects such as antiproliferative, antidiabetic, anti-inflammatory and antioxidant. But there is no the study on secondary metabolite analysis of *Abietinella abietina* (Hedw.) M. Fleisch. In this study; we aimed to determine the chemical composition of *A. abietina*.

Material and Methods: *A. abietina* was collected from Sinop. The mosses were separated as aerial part and root. Then, the aerial parts were extracted with hexane, chloroform, ethyl acetate, n- butanol, methanol, respectively. The profiles of hexane and chloroform extracts were performed by GC-MS analysis. The quantitative phenolic components of the other extracts were analyzed by HPLC/TOF-MS.

Results: In the ethyl acetate extract of the aerial parts of *A. abietina*, diosmetin (1) and wogonin (2) were obtained as main components. Apigenin (3) and protocatechuic acid, ethyl ester (4) were major compounds in the n- butanol of the aerial part. In addition to, fumaric acid and 4-hydroxybenzoic acid from the methanol extracts. The twenty-five components were determined from the hexane extract of the aerial parts of *A. abietina*. Palmitic acid (15.10%), Lignoceric acid (13.36%) and Oleic acid (12.09%) were the components in the extract. However, in the chloroform extract of the aerial parts of *A. abietina* were observed five components. Palmitic acid (28.18 %) and oleic acid (18.43 %) were major components in the extract.

Keywords: *Abietinella abietina* (Hedw.) M. Fleisch., Phytochemical analysis, Diosmetin, Apigenin, Protocatechuic acid ethyl ester, Wogonin.

PP-205

Critical Endangered *Scutellaria brevibracteata* subsp. *pannosula* (Rech.f.) Greuter & Burdet (Lamiaceae)

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Aim of the study: In this study root, stem and leaf anatomy of *Scutellaria brevibracteata* Stapf subsp. *pannosula* (Rech.f.) Greuter & Burdet were studied. There are accepted 4 taxa of *Scutellaria brevibracteata* of worldwide. Investigated taxon is endemic to Mersin province of Turkey and under critical endangered. That is very important in terms of Turkey's plant biodiversity. Aim of this study was to determine the anatomical characteristics of the taxon and provide the resource for the future researches on the related subjects. The study to be contribute the taxonomic description of the taxon as anatomically.

Material and Methods: Plant samples were collected from Mersin province, which are natural population in 2005 and 2006 during the flowering period. Some of dried and fresh plant samples were used for taxonomic identification. Herbarium samples of *S. brevibracteata* subsp. *pannosula* are conserved in the Herbarium of CBU. Anatomical studies were carried out on fresh samples kept in ethanol of 70%. Cross-sections were prepared using the Leica RM2125RT rotary microtome according to paraffin method. In addition hand-cut sections were taken from fresh samples. The sections are made with safranin-fast green. The samples that became constant preparations were examined using a Leica DM3000 motorized microscope. Anatomical measurements were made by using ocular micrometer. Minimum, maximum, mean values were recorded and standard deviations were calculated.

Results: Anatomical results of the studied taxon were first have been revealed in this study. The peridermis layer was observed as multi-layered and fragmented in the root and cells of the peridermis layer has approximately 16-46 µm width and 6-26 µm length size. Sclerenchyma tissue clustered was observed between the cortex parenchyma cells and on the phloem cells in the root. Radial vascular tissue is developed asymmetrically in the root. Stem is four cornered and collenchyma cells were observed in each corner of the stem. In addition, cells of the epidermis layer has approximately 6-23 µm width and 8-16 µm length size. Cortex parenchyma cells which are stuck in a narrow space are chlorenchymatic structure. Sclerenchyma cells were observed on the collateral vascular bundles in the stem. Mesophyll layer of the leaf are separated as palisade and spongy parenchyma. Upper epidermis cells are larger than the lower epidermis cells in the leaf. Glandular and aglandular hairs were observed on both surfaces of the leaf. The obtained data were compared with other taxa of the *Scutellaria* L. Consequently, anatomical features of investigated taxon have similarities and differences with other taxa. This is significant in terms of taxonomic identification of investigated taxon.

Acknowledgements: The authors wish to thank Scientific Investigation Project to Coordinate of Celal Bayar University (Project No. FEF 2014-073) for financial support. This study contains a part of Master dissertation prepared by Okan KOCABAŞ in Celal Bayar University.

Keywords: Anatomy, Lamiaceae, *Scutellaria brevibracteata*.

PP-206

An Anatomical Investigations on *Valeriana sisymbriifolia* Vahl (Caprifoliaceae)

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Aim of the study: *Valeriana* L. belonging to Caprifoliaceae family is represented approximately 300 species worldwide. *Valeriana* has 15 taxa in Turkey, 4 of them are endemic. *Valeriana* taxa are important in terms of economic value. Because, these taxa are used in folk medicine for many years. It is also used in the pharmaceutical industry nowadays. Investigated *Valeriana sisymbriifolia* Vahl is generally distributes in East and Southeast Anatolia. In this study root, stem and leaf anatomy of *V. sisymbriifolia* were studied. The aim of this study is to detailed anatomical features of *V. sisymbriifolia* and contribute to the taxonomic distinction of *V. sisymbriifolia*.

Material and Methods: Plant samples were collected from Bitlis province in 2015 during the flowering period from natural populations. Some of dried and fresh plant samples were used for taxonomic identification. Samples of *V. sisymbriifolia* are conserved in the Herbarium of CBU. Anatomical studies were carried out on fresh samples kept in ethanol of 70%. Cross-sections were prepared using the Leica RM2125RT rotary microtome according to paraffin method. In addition hand-cut sections were taken from fresh samples. The sections are made with safranin-fast green. The samples that became constant preparations were examined using a Leica DM3000 motorized microscope. Anatomical measurements were made by using ocular micrometer. Minimum, maximum, mean values were recorded and standard deviations calculated.

Results: Anatomical results of the studied taxon were first have been revealed in this study. Cells of the epidermis layer has approximately 14-33 μm width and 9-36 μm length size in the root. Secondary metabolites were observed in cortex parenchyma cells from developed roots. Endodermis and pericycle which are mostly single row were observed on the radial vascular tissue in the root. Cuticle layer is clearly observed the outside of the stem. In addition, cells of the epidermis layer has approximately 16-34 μm width and 12-20 μm length size. Cortex parenchyma cells which are the space between cells are chlorenchymatic structure and collateral vascular bundles are arranged regularly in the stem. The pith cavity which occupies very large region was observed in the center of stem. Leaf is bifacial structure. Mesophyll layer of the leaf are separated as palisade and spongy parenchyma. Trachea cells has approximately 6-20 μm width and 5-28 μm length size in the leaf. The obtained data were compared with other taxa of the *Valeriana*. Consequently, anatomical features of investigated taxon have similarities and differences with other taxa. This is significant in terms of taxonomic identification of *V. sisymbriifolia*.

Acknowledgements: This study contains a part of master dissertation prepared by Esra KAYACAN in Celal Bayar University.

Keywords: Anatomy, Caprifoliaceae, *Valeriana sisymbriifolia*.

PP-207

An Anatomical Investigations *Aethionema iberideum* (Boiss.) Boiss. (Brassicaceae)
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Aim of the study: *Aethionema* Aiton belonging to the Brassicaceae family has approximately 60 taxa in the world. In Turkey, it is represented by 43 taxa of which 20 are endemic. Turkey is accepted as a gene center for this genus. That is very important in terms of Turkey's plant biodiversity. In this study root, stem and leaf anatomy of *Aethionema iberideum* (Boiss.) Boiss. were studied. The aim of this study is to detailed anatomical features of *A. iberideum* and contribute to the taxonomic distinction of *A. iberideum*.

Material and Methods: Plant samples were collected from Çorum province in 2015 during the flowering period from natural populations. Some of dried and fresh plant samples were used for taxonomic identification. Samples of *A. iberideum* are conserved in the Herbarium of CBU. Anatomical studies were carried out on fresh samples kept in ethanol of 70%. Cross-sections were prepared using the Leica RM2125RT rotary microtome according to paraffin method. In addition hand-cut sections were taken from fresh samples. The sections are made with safranin-fast green. The samples that became constant preparations were examined using a Leica DM3000 motorized microscope. Anatomical measurements were made by using ocular micrometer. Minimum, maximum, mean values were recorded and standard deviations calculated.

Results: Anatomical results of the studied taxon were first have been revealed in this study. Cells of the epidermis layer has approximately 9-35 µm width and 4-23 µm length size in the root. The center of the root is covered by the xylem cells. The stem is shaped nearly round and there are protrusions formed by the epidermis and cortex cells in the stem. Cells of the epidermis layer has approximately 7-27 µm width and 8-24 µm length size in the stem. Cells of the cortex parenchyma which are close to the epidermis layer are chlorenchymatic structure in the stem. Cuticle layer whose thickness is approximately 7 µm was observed on the both layers of the leaf. Vascular bundles which are arranged at certain intervals were observed in the mesophyll layer of the leaf. In addition, trachea cells has approximately 4-10 µm width and 5-11 µm length size in the leaf. The obtained data were compared with other taxa of the Brassicaceae family. Due to, there aren't an anatomical study about this genus in literature. Consequently, anatomically of *A. iberideum* were found to have similarities and differences with other taxa. This is significant in terms of taxonomic identification of *A. iberideum*.

Keywords: *Aethionema iberideum*, Anatomy, Brassicaceae.

PP-208

A Comparative Anatomical Study of *Puschkinia scilloides* Adams and *Puschkinia bilgineri* Yıldırım in TurkeyKadriye YETİŞEN¹, Hasan YILDIRIM², Canan ÖZDEMİR¹¹Celal Bayar Üniversitesi Fen-Edebiyat Fakültesi Biyoloji Bölümü, Muradiye, Manisa,²Ege Üniversitesi Fen Fakültesi Biyoloji Bölümü, Bornova, İzmir,

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Aim of the study: *Puschkinia* Adams have three species in Turkey (*P. scilloides* Adams, *P. peshmenii* Rix & Mathew and *P. bilgineri* Yıldırım). The genus have very much intra-species variations. In the present study *P. scilloides* and *P. bilgineri* are compared anatomically and aimed to contribute to the taxonomic separation of the species.

Material and Methods: The species collected from Van, Kavuşşahap Mountain, Karabet Gateway. For anatomical studies plant specimens were fixed in 70 % ethanol. The paraffin method (Algan 1981) was used for preparing a cross-section of root, scape and leaves of the species. Slides were photographed with motorized Leica DM 300 microscope. The measurements of root, stem and leaf cell size of the species were taken using ocular-micrometer. Minimum, maximum, mean and standart deviation were determined.

Results: In the present study, single row epidermis was protrude outwardly in skapus of the both species. Vascular bundles arranged in three rows in the both species. Also some differences such as skapus cortical thickness, number of vascular bundle in skapus, vascular bundle arrangement of the leaves, the number of protruding epidermis cells in the leaves have been found. These differences useful to distinguish taxonomically among these species.

Key Words: Anatomy, *Puschkinia*, Taxonomy

PP-209

A Comparative Anatomical Study of *Scilla* (Scilloideae) Section *Chionodoxa* (Boiss) and *Scilla bifolia* in TurkeyHasan YILDIRIM¹, Kadriye YETİŞEN², Canan ÖZDEMİR²¹Ege University, Faculty of Science, Department of Biology, İzmir-Turkey²Celal Bayar University, Faculty of Art and Science, Department of Biology, Manisa-Turkey
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Aim of the study: In the present study *Scilla luciliae*, *S. forbesii*, *S.sardensis*, *S siehei*, *Scilla x allenii* and *S. bifolia* are compared micromorphologically. Some differences have been found present in root, scape and leaf anatomy of the taxa are commented. *S. luciliae*, *S. forbesii*, *S. sardensis* and *S. siehei* a metaxylem at the center of the root others have 3-4 number metaxylem. Vascular bundles in two row in *S. luciliae* and *S. forbesii* in a single row in *S. sardensis*, *Scilla x allenii* and *S. bifolia* though in three rows in *S. siehei*. Aerenchyma tissue is present in mesophyll of five taxa leaf except *S. sardensis*.

Material and Methods: In this study, a total of 30 individuals obtained from subpopulations at different altitudes. For anatomical studies plant specimens were fixed in 70 % ethanol. The paraffin method (Algan 1981) was used for preparing a cross-section of root, scape and leaves of every taxa. Transverse sections 15-20 µm were made using a sliding microtome. Root cross section prepared 3 mm distance to the root tip. Slides stained with safranin-fast green. Slides were photographed with motorized Leica DM 300 microscope. The measurements of root, stem and leaf cell size of the species were taken using ocular-micrometer. Minimum, maximum, mean and standart deviation were determined.

Results: In the present study *Scilla luciliae*, *S. forbesii*, *S.sardensis*, *S siehei*, *Scilla x allenii* and *S. bifolia* are compared anatomically. Some differences have been found in root, scape and leaf anatomy of the taxa and commented. *S. luciliae*, *S. forbesii*, *S. sardensis* and *S. siehei* a metaxylem at the center of the root others have 3-4 number metaxylem. Vascular bundles in two row in *S. luciliae* and *S. forbesii* in a single row in *S. sardensis*, *Scilla x allenii* and *S. bifolia* though in three rows in *S. siehei*. Aerenchyma tissue is present in mesophyll of five taxa leaf except *S. sardensis*. Consequently *Scilla* section *Chionodoxa* and *S. bifolia* thought to have originated of the section are similar in many anatomical characters. At the same time some characters such as metaxylem vessel number in roots, vascular bundle row number in scapes, mesophyll structure in leaves are useful to distinguish taxonomically among these taxa.

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Keywords: Anatomy, *Chionodoxa*, *Scilla*, Taxonomy.

PP-210

Non-Triglobitic Species *Trechus asiaticus* Jeannel, 1927 (Carabidae: Coleoptera) Records from 3 Different Caves in Eskişehir, TurkeyE. Ceren FİDAN¹, D. Ümit ŞİRİN¹, Hakan ÇALIŞKAN¹¹Department of Biology, Eskişehir Osmangazi University, Turkey
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Aim of the study: The aim of this work to contribute taxonomical and ecological information about the fauna of caves in Turkey with records of rare non-troglobitic *Trechus asiaticus* species which collected from three different caves from Eskişehir between 2001-2002.

Material and Methods: Our material composed of *Trechus asiaticus* specimens which are collected from 3 different caves in Eskişehir, Mihallıççık. These caves are as follows; Tütüncüni cave (39° 58'N 31° 17' E), Sarıkaya cave (39° 58' N 31° 16' E) Kayalı-Gürleyik cave (39° 59' N 31° 22' E). Specimens were collected with hand and aspirator and stored in 75% alcohol. Identification were confirmed with specialist of group (Dr. Ingo Brunk from Technical University Dresden). All of the specimens are conserved in Entomology Laboratory of Department of Biology, Eskişehir Osmangazi University.

Results: As a result of this study 7 specimens from 3 different caves in Eskişehir has collected and identified as *Trechus asiaticus* Jeannel, 1927. This species is widespread and common in many other parts of Turkey, especially in the west and southwest of Turkey. This species are recorded various altitudes and habitats but there is no record from cave habitat. Because of that, this research is important for contribution for this species ecological information. Species World and Turkey distribution, habitus of both gender and aedeagus figures and ecological informations are given.

Acknowledgements: We are thankful to Dr. Ingo Brunk from Technical University Dresden for his valuable helps about confirmation of species.

Keywords: Trechus, Carabidae, Cave, Eskişehir, Turkey

PP-211

Effect of Nitric Oxide on the Leaf Anatomy of Two Wheat Genotypes Under Salinity StressYurdanur AKYOL¹, Okan KOCABAŞ², Mehmet HAMURCU³, Ali ÖZDEMİR⁴, Esra KAYACAN², Canan ÖZDEMİR²¹Hasan Türek Anatolian High School, Manisa, Turkey²Department of Biology, Science and Art Faculty, Celal Bayar University, Manisa, Turkey³Department of Soil Science and Plant Nutrition, Faculty of Agriculture, Selçuk University, Konya, Turkey⁴Department of Mathematics, Science and Art Faculty, Celal Bayar University, Manisa, Turkey
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Aim of the study: Salt stress is one of the major abiotic stresses limiting crop growth and productivity worldwide. In case of threat caused by environmental stress created by abiotic and biotic factors nitric oxide can be produced in different plant species and organs. In studies conducted in abiotic stress conditions, nitric oxide was determined to increase the plant's stress tolerance levels in different plant groups (peas, beans, corn). In this study, effects of nitric oxide on the leaf anatomy changes of two bread wheat (*Triticum aestivum* L.) genotypes grown under salinity conditions were investigated and evaluated statistically.

Material and Methods: In study, two bread wheat (*Triticum aestivum* L.) genotypes with different salinity responses, G 5907 (Australian origin) and Bayraktar 2000 (Turkish origin) were used. Plants were grown in a growth room with conditions of 45-55 % humidity, 16 h light and 8 h dark photoperiod, 21 ± °C temperature and 10,000 lux/day light intensity. The seeds of bread were treated with 5% sodium hypochlorite for 10 min and thoroughly rinsed 3 times with sterile deionized water. After surface sterilization, seeds were exposed to 0, 50 mM NaCl and 100 mM NO. For anatomical studies, treated plant samples were fixed in 70 % alcohol. The paraffin method was used for preparing a cross-section of leaves. Transverse sections were made using a sliding microtome and stained with safranin-Fast Green. Anatomical measurements were made with the help of micrometric ocular using sections from the different parts of the plant. Results were presented by photographs and tables. Photographs were taken with Leica DM 3000 microscopy. In addition, the results were evaluated statistically by ANOVA test.

Results: Salinity has led to the narrowing in the leaf sclerenchymatic tissue of Australian and Turkish origin varieties. Mesophyll has highly variable and consists of a larger cells in 100Mm+NO application. This case may be evidence that the cells show sudden changes in size so that effect of nitric oxide under salt stress. Trachea cells have narrowed in 100Mm application. In C+NO application, upper epidermis layer has thickened and mesophyll region enlarged at Australian and Turkish origin varieties. In this application, NO may have triggered the thickening of the cell walls and the storing water.

Keywords: anatomy, leaves, nitric oxide, salinity stress, wheat

PP-212

Effect of Nitric Oxide on the Leaf Anatomy of Bread Wheat Species Under Drought Stress
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Aim of the study: In the twenty-first century, World will be faced with threats, including mainly drought caused by global climate change. Drought stress, affecting the growth and development of plants is one of the most widespread environmental stress. Nitric oxide is known to take place in the plant defense mechanism against some stress conditions. In this study, impacts of the nitric oxide application on leaf anatomy of *Triticum* L. genotypes under drought stress conditions were investigated and evaluated statistically.

Material and Methods: In study, three cultivars of bread wheat *Triticum aestivum* L. (1. variety: Improved for aqueous conditions Göksu 99, 2. variety: Improved for dry conditions Karahan 99) and *Triticum monococcum* L. (3. variety: Kaplıca) were used. Plants were grown in growth room. Nitric oxide treatment on drought tolerance of wheat genotypes were examined. Applications were made as follows: Control (Hoagland) groups, Nitric oxide control (Hoagland+100 µm Nitric oxide) groups, drought (%15 PEG 6000) groups, Drought (%15 PEG 6000+100 µm nitric oxide) groups. For anatomical studies plant samples were fixed in 70 % alcohol. The paraffin method was used for preparing a cross-section of leaves. Transverse sections were made using a sliding microtome and stained with safranin-fast green. Anatomical measurements were made with the help of micrometric ocular using sections from the different parts of the plant samples. Results were presented by photographs and tables. Photographs were taken with Leica DM 3000 microscopy. In addition, the results were evaluated statistically by ANOVA test.

Results: Nitric oxide applications of leaf tissue in vascular bundle caused by an increase in the diameter of the trachea and reduced mesophyll cell diameters in Peg 6000 groups. It has also been found to prevent the thickening of the upper and lower epidermis.

Acknowledgements: This study was financed by TÜBİTAK (Proje No: 113O810).

Keywords: anatomy, drought stress, leaves, nitric oxide, wheat.

PP-213

Investigation of Silver Nitrate (AgNO₃) and Gibberellic Acid (GA₃) Effect on *in vitro* regeneration of *Thymus vulgaris* L. Shoot Tips

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Aim of the study: Shoot regeneration and rooting are important in the realization of the potential of the cell and tissue culture techniques for plant improvement. Silver ions in the form of nitrate, such as AgNO₃, play an important role in influencing somatic embryogenesis, shoot formation and efficient root formation. Gibberellins (GAs) can promote a wide range of physiological activities in plants, including dormancy breakage, seed germination, flowering, fruit development and stem elongation through the increase of cell division, cell wall formation and expansion. GA often interacts with other plant growth regulators. The aim of this study is to critically analyze the role of silver nitrate (AgNO₃) and gibberellic Acid (GA₃) effect on *in vitro* growth and development of *Thymus vulgaris* L.

Material and Methods: *T. vulgaris* shoot tips were obtained from *in vitro* cultures and transferred on MS medium, supplemented with 1 mg l⁻¹ kinetin and 0.3 mg l⁻¹ gibberellic acid (GA₃) (basic regeneration medium for *T. vulgaris*) and variable concentrations (1, 2, 4, 6, and 8 mg l⁻¹) of silver nitrate (AgNO₃). Once established, shoot cultures were maintained at 23 ± 2°C, 16 hours photoperiod (50 µmol m⁻² s⁻¹) by monthly subcultures to fresh medium of the same composition (standard culture conditions). 30 shoot tips were used for each *in vitro* proliferation treatment, and each experiment was repeated at least twice. Data of *in vitro* proliferation were recorded 4 weeks after culture initiation and consisted of the percentage of shoot tips that generated at least one elongated shoot, the mean number of shoots formed per regenerating explant (no ± SE), the mean length of elongated shoots (cm ± SE), and the SFC (shoot-forming capacity) index, which was calculated as follows: SFC = (average number of shoots per regenerating explant x % of regenerating explant) / 100. The experiments were organized with three replications per treatment and with 30 explants for each replication. All data were subjected to analysis of variance (ANOVA), and comparisons of the means were made by LSD test at P<0.05.

Results: Addition of AgNO₃ to the basic regeneration medium greatly improved the regeneration of *T. vulgaris in vitro* cultures. The medium supplemented with 2 and 6 mg l⁻¹ AgNO₃ provided the best *in vitro* proliferation conditions for *T. vulgaris* shoots, with an almost 98,3% regeneration rate, respectively 4,81 and 4,59 shoots per explant and an SFC index of 4,72 and 4,51.

Acknowledgements: The study was supported by Gebze Technical University, Molecular Biology and Genetics Department, Plant Biotechnology and Molecular Biology Laboratory (Kocaeli, Turkey).

Keywords: Medicinal plant, micropropagation, thyme.

PP-214

Morphological, micromorphological, and palynological investigation on the genus *Physospermum* (Apiaceae) from Turkey

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Aim of the study: *Physospermum* Cusson ex Juss. is a small genus of the Apiaceae family. *Physospermum* is represented by only one species, *P. cornubiense* (L.) DC., in Turkey. In this study, the morphological, micromorphological, and palynological properties of *Physospermum cornubiense* are investigated.

Material and Methods: Specimens were collected from Karabük in Turkey. Collected specimens were pressed, mounted on herbarium sheets, and deposited in the KNYA herbarium. For morphological investigations, descriptions were done according to *Flora of Turkey and the East Aegean Islands*. Morphological characters were observed under stereo microscope, and at least ten different specimens were measured. Plant parts were photographed under a microscope with a digital camera. For SEM investigations, fruit and pollen grains were mounted on stubs using double-sided adhesive tape and coated with gold. Photographs were taken with a Zeiss LS-10 after coating with a Polaron SC7620 sputter coater.

Results: As a morphological result, the findings were compared with descriptions in the *Flora of Turkey*. Some differences between *Flora of Turkey* and our results have been presented, as well as flowering and fruiting times, threat categories, distribution map, and photos of natural habitat. The micromorphological and palynological results showed that pollen of *Physospermum cornubiense* has radial symmetry and is isopolar, 3-zonocolporate. The polar axis (P) is 23.70 µm, the equatorial axis (E) is 16.14 µm. The P/E ratio is 1.16 µm. The shape of pollen grain is prolate. The ornamentation of pollen grains is rugulate. The fruit of *Physospermum cornubiense* is oblong, hemispherical, 3-4 x 3-5 mm, and slightly laterally compressed. The mericarp coat surface consists of pentagonal or hexagonal cells, which are slightly striat and glabrous.

Keywords: *Physospermum*, SEM, Umbelliferae, Turkey.

PP-215

The Anatomical Investigation on *Bupleurum lophocarpum* Boiss. & Bal.

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Aim of the study: In this study, the anatomical characteristics of *Bupleurum lophocarpum* Boiss. & Bal. taxa which are Turkey endemic type of *Bupleurum* species belonging to *Apiaceae* family has been identified. According to IUCN; *Bupleurum lophocarpum* Boiss. & Bal. is classified in NT category which means nearly threatened (Ekim et al., 2000). In the study anatomical structure of leaf, root and stem cross-section one by one plant tissues and structures was examined. Also types of stoma which detected in the leaf analyzed. Finally, stoma index were identified.

Material and Methods: As research material, *Bupleurum lophocarpum* Boiss. & Bal. which is collected in Adana provincial border. We collected vegetative and generative plant parts in 911 meter highness. The pictures of collected plant samples were taken in natural setting. Herbarium samples are kept under protection in Selçuk University Science Faculty KNYA Herbarium. In order to diagnose the samples, the book named "Flora of Turkey and the East Aegean Island" (Davis, 1972) is used and the diagnosed plant samples are compared to samples in Selçuk University KNYA herbarium. For anatomical studies, plant samples are put into 70% alcohol solution. For anatomical studies, collected root, stem and leaf organ of plant samples are diagnosed in 70% alcohol. Then, Algan's (1981) methods are used in the studies which are done on these samples. Anatomical studies are generally completed in 5 steps. These are: water disposal (dehydration), saturation, land burial, cut view and stain.

After preparates are passed in these steps, they are transformed into permanent preparates by being closed with entellan until there is no air bubble. Then, some pictures of these permanent preparates are taken with Leica DM 1000 microscope and Canon photograph machine.

Results: In this study, these data was determined: In the root; Thickness of epiderm $5.02 - 19.49 \times 8.06 - 39.6 \mu\text{m}$. Diameter of cortex cells just below epiderm is $8.67 \times 91.46 \mu\text{m}$. As trachea cells get close to core, their diameter grows. Trachea diameter at core is $17.46 \times 35.60 \mu\text{m}$. Core region of root is sclerenchymatic. In the stem; Thickness of cortex cells is $2.97 - 12.84 \times 5.09 - 23.61 \mu\text{m}$. Cortex layer consists of 3- 4 row cell layer. There exists chlorenchyma at cortex layer which includes chloroplast. Diameter of trachea cells is $13.91 \times 30.98 \mu\text{m}$. In the leaf; Thickness of lower epiderm cells is $7.06 - 17.60 \times 9.17 - 35.25 \mu\text{m}$. Thickness of upper epiderm cells is $8.28 - 33.21 \times 11.64 - 49.60 \mu\text{m}$. Thickness of mesophyll is $40.71 - 160.25 \mu\text{m}$. Secretory canal cells exist. There is a spongy layer at mesophyll layer; but lower palisade parenchyma is interpenetrated with spongy parenchyma. There exists any stomata type stoma. Stoma index is 1.618.

Acknowledgements: This investigation (BAP 12201040), Selçuk University scientific Research Council supported. We wish to thank the Selçuk University Research Council (BAP) for their support of this investigation.

Keywords: Anatomy, *Apiaceae*, *Bupleurum*, Endemic, Turkey.

PP-216

Relationships among Turkish *Epilobium* (Onagraceae) Taxa Based on the nrDNA ITS Sequences DataSuzan KUNDAKÇI¹, Serdar MAKBUL¹, Kamil COŞKUNÇELEBİ², Mutlu GÜLTEPE³¹Department of Biology, Faculty of Sciences and Art, Recep Tayyip Erdogan University, Turkey²Department of Biology, Faculty of Sciences, Karadeniz Technical University, Turkey³Bulançak School of Applied Science, Giresun University, Turkey

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Aim of the study: In this study, the phylogenetic relationships of 26 *Epilobium* L. taxa from Turkey belonging to the section *Epilobium* (22 taxa) and the section *Chamaenerion* Tausch. (4 taxa) with four out-group taxa were evaluated based on nrDNA ITS (Internal Transcribed Spacer) sequence data.

Material and Methods: The plant materials were collected from different wild populations occurring in Turkey. The molecular materials were obtained from living plant leaves and stored in the bag containing silica. Genomic DNAs were extracted from silica-dried young leaves of samples. The entire ITS regions (ITS1, 5.8S, and ITS2) were amplified using universal ITS primers (ITS4 and ITS5) with thermal cycler. PCR products purification and sequence analysis were performed by Macrogen Inc. All the sequences were aligned with Bioedit v. 7.0 software before subjecting to analysis. Molecular analyses were conducted using MEGA5 software. Maximum Likelihood (ML), Maximum Parsimony (MP) and Neighbour-Joining (NJ) trees were built with 1000 bootstrap replications.

Results: This is the first detailing report performed on molecular characteristics of all Turkish *Epilobium* taxa. All the phylogenetic trees obtained from ML, MP and NJ analyses revealed similar topology. Out-group taxa were split the examined *Epilobium* taxa into two groups at phylogenetic trees. These groups were consisted with the distinction of sectional level of the genus. Four taxa belonging sect. *Chamaenerion* and the remaining taxa belonging sect. *Epilobium* were grouping in different branches with 100% bootstrap value. Molecular data supports traditional sectioning of *Epilobium* based on morphological data.

Acknowledgements: This study is financially supported by TÜBİTAK (113Z782).

Keywords: *Chamaenerion*, *Epilobium*, molecular, ITS, Turkey.

PP-217

A palynological, fruit and seed micromorphological investigation on *Silene tunicoides* Boiss. from Turkey

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Aim of the study: The present study has been given detailed pollen, fruit and seed morphology of *Silene tunicoides* which belongs to Caryophyllaceae family for the first time.

Material and Methods: The specimens of *S. tunicoides* were collected from Antalya province and were prepared according to standard herbarium technique. They were stored in Selçuk University Konya Herbarium (KNYA). Wodehouse technique (1935) was used for light microscopic investigations. In this technique pollen grains were obtained from mature anthers and then were stained with glycerin-jelly with safranin, and were covered by coverslip. Pollen slides were photographed with Leica light microscope which attached to Canon EOS 450D camera. Punt et. al (2007) was followed for pollen terminology. Mature fruits and seeds were selected and measured by several characters. Measurements of pollen, fruits and seeds were based on 20 or more per specimen. For scanning electron microscopy (SEM) studies, dried pollen grains, fruits and seeds directly were transferred on aluminium stubs and coated with gold in a Cressington Auto 108 sputter-coater. They were photographed with ZEISS EVO LS10 SEM.

Results: Pollen grains of studied taxon are monad, isopolar, radially symmetrical and pantoporate. Pollen shapes are spheroidal and pollen diameter is approximately 30 µm. Exine sculpture of pollen is microechinate-perforate and the structure of exine is semitectate. Pore diameter is about 4 µm. The fruits of species are ±globose-ovoid in shape. The length and width of fruit is 4 µm;2.6 µm, respectively. The ornamentation of fruits is verrucate. Fruits are many-seeded. The seeds of *S. tunicoides* are rectangular-orbicular, the micropylar pole is emarginated and chalazal pole is obtuse. The general conclusion of our study showed that the pollen, fruit and seed morphology of *S. tunicoides* is useful for the taxonomy of genus.

Acknowledgements: We wish to thank the Selçuk University Scientific Research Unit for its financial support (Project No: 15201097).

Keywords: Caryophyllaceae, Fruit, Pollen, Seed, *Silene*,

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Pollination system of *Jasione supina* subsp. *supina* (Campanulaceae)Volkan EROĞLU¹, Serdar Gökhan ŞENOL¹, Özcan SEÇMEN¹¹Ege University Botanical Garden -Herbarium Research & Application Center, Turkey
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Aim of the study: With this study, we try to figured out pollination system of *Jasionesupina* Sieber subsp. *supina*. This taxon has hermaphroditic, protandrous flowers and exhibit secondary pollen presentation involving pollen carrying hairs on style. For this reason, we aimed to investigate flower structure and function. Another part of this study include investigate pollinator types and effects on *J. supina* subsp. *supina*.

Material and Methods: Perennial, ± caespitose, with-numerous procumbent or ascending stems, hairy to 5-10 cm from base, glabrous above. Basal leaves oblong, spatulate, ± obtuse, ciliate at base, 10-15 x 2.5-4 mm. Cauline leaves ovate-lanceolate, sessile. Involucral bracts ± ovate-lanceolate, acuminate to obtuse, outer involucral bracts usually broad, dentate, glabrous on inner side. Capitula 10(-20) mm diam. Calyx lobes linear-lanceolate, 2-3 mm. Flowering 7-10. Rocky slopes and screes, 900-2000 m. Uludağ, Bursa population are material of this study. Style length at first stage of secondary pollen presentation, length of pollen collecting part on style, style length at presentation, and style length at female phase have been measured at 50 flowers. Flower opening times for each stage have been compared for touched and untouched style. Pollinators and pollination activity have been observed two days in their most active period (between 08:30-17:00). The temperature, wind speed, pollinators and their visitation number between this time period have been recorded for every half hour.

Results: Style length at the beginning of the presentation is 5 mm. Pollen collecting hair length is 2.84 mm (±0.32mm). Style length at pollen presentation is 9.91 mm (±0.55 mm). Style length at female phase is 10.12 (±0.57 mm). Lifespan a flower is ~2 days. Male and female phase are end in 25.5 hours at untouched style. In spite of that this period occur in 7,5 hours at touched style. There are four common and effective pollinators, *Apis mellifera* (1399 visitation) *Chelostoma rapunculi* (341 visitation), *Sphaerophoria scripta* (277 visitation), and *Eristalis tenax* (245 visitation) at the study-site. Less frequent effective pollinators are *Megachile (Eutricharaea) pilidens* (24 visitation), *Rhamphomyia maculipennis* (30 visitation), *Bombylius venosus* (43 visitation), *Pleibeius pylaon* (79 visitation), *Pleibeius idas* (22 visitation), *Pieris rapae* (1 visitation).

Acknowledgements: We would like to extend our thanks to Ege University Botanical Garden, Herbarium Research and Application Center.

Keywords: *Jasione*, pollination, secondary pollen presentation.

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The study of the sistematical structure and species diversity of medicinal plant in subalpic zone of south ColchisMedea BERIDZE¹, Eteri JAKELI², Nato ZOSIDZE², Natela VARSHANIDZE²¹ *Biology Department, Batumi Shota Rustaveli State University, Georgia;*² *Faculty of Natural Sciences and Health Care, Batumi Shota Rustaveli State University, Georgia*eteri_jakeli@yahoo.com

Aim of the study: The aim of your research is to study the sistematical structure and species diversity of medicinal plant in subalpic zone of south Colchic (Ajara). Since, nowadays, the medical practice has been successfully used for preparations made from medicinal plants, their advantage over synthetic drugs reflected in the fact that they do not cause side effects, allergies, chronic toxicity, and do not demonstrate any teratogenic, mutagenic effect, which is typical for synthetic drugs. Nowadays a half of the medicines are produced from medicinal plants. Therefore, the study of medicinal plants in modern biology is one of the urgent problems.

Material and Methods: The material of our study was the medicinal plants spread in sub alpic zone of South Colchis (Ajara), which widely use in traditional and oficinal medicine. During the research there were used the following methods: Traditional expedition method for field studies; Herbarium collection and the processing; Identification method with Georgia's plant identification guides and the "Flora Georgia", where medicinal plant systematic structure is presented according to Cherepanov (Cherepanov 1995).

Results: 105 species of medicinal plants are widely spread in the sub alpic zone of South Colchis (Ajara). They are distributed in 43 families: Equisetaceae; Hypolepidaceae; Polypodiaceae; Pteridaceae; Pinaceae; Apiaceae; Araliaceae; Asteraceae; Betulaceae; Caryophyllaceae; Corylaceae; Crassulaceae; Ebenaceae; Ericaceae; Fabaceae; Fagaceae; Gentianaceae; Hypericaceae; Lamiaceae; Malvaceae; Oleaceae; Papaveraceae; Plantaginaceae; Polygonaceae; Primulaceae; Ranunculaceae; Rhamnaceae; Rosaceae; Rubiaceae; Salicaceae; Sambucaceae; Scrophulariaceae; Solanaceae; Tiliaceae; Urticaceae; Viburnaceae; Violaceae; Viscaceae; Vitaceae; Alliaceae; Juncaceae; Poaceae, and 94 genus: *Equisetum*; *Pteridium*; *Asplenium*; *Dryopteris*; *Polypodium*; *Pteris*; *Abies*; *Picea*; *Pinus*; *Carum*; *Cervaria*; *Sanicula*; *Hedera*; *Achillea*; *Arctium*; *Artemisia*; *Bidens*; *Cichorium*; *Cicerbita*; *Dichrocephala*; *Matricaria*; *Pyrethrum*; *Pyrethrum*; *Taraxacum*; *Tussilago*; *Alnus*; *Herniaria*; *Saponaria*; *Corylus*; *Hylotelephium*; *Capsella*; *Diospyros*; *Rhododendron*; *Vaccinium*; *Galega*; *Melilotus*; *Ononis*; *Trifolium*; *Castanea*; *Fagus*; *Quercus*; *Centaurium*; *Gentiana*; *cruciata*; *Hypericum*; *Juglans*; *Calamintha*; *Clinopodium*; *Glechoma*; *Lamium*; *Leonurus*; *Melissa*; *Mentha*; *Origanum*; *Stachys*; *Trachistemon*; *Malva*; *Fraxinus*; *Chelidonium*; *Plantago*; *Poligonum*; *Rumex*; *Lysimachia*; *Primula*; *Clematis*; *Frangula*; *Rhamnus*; *Cydonia*; *Geum*; *Fragaria*; *Laurocerasus*; *Malus*; *Potentilla*; *Poterium*; *Rosa*; *Sorbus*; *Asperula*; *Salix*; *Sambucus*; *Digitalis*; *Verbascum*; *Veronica*; *Datura*; *Hyoscyamus*; *Solanum*; *Tilia*; *Urtica*; *Viburnum*; *Viola*; *Viscum*; *Vitis*; *Allium*; *Juncus*; *Elytrigia*. Most numerous families are as follows: Asteraceae — 13 species, Lamiaceae - 13, Rosaceae - 12, Hypericaceae - 6, Polypodiaceae - 4, Scrophulariaceae- 4, Fabaceae - 4, Fagaceae - 4, Solanaceae - 4. Polygonaceae - 4.

Keywords: medicinal plants, Species diversity, South Colchis.

PP-220

A New Hybrid of *Origanum* L.: *O* × *Dumanii* Dirmenci, Arabacı & YazıcıTuncay DIRMENCI¹, Türker YAZICI¹, Turan ARABACI², Sevcan ÇELENK³, Taner ÖZCAN¹, Ekrem DÜNDAR⁴¹Department of Biology Education, Necatibey Education Faculty, Balıkesir University, Balıkesir, Turkey²Department of Pharmaceutical Botany, Faculty of Pharmacy, İnönü University, Malatya, Turkey³Department of Biology, Faculty of Arts and Sciences, Uludağ University, Görükle Campus, Bursa, Turkey⁴Department of Biology, College of Arts and Sciences, Balıkesir University, Çağış Campus, Balıkesir, Turkeyturkeryazici10@gmail.com

Aim of the study:The genus is reported by 23 species (26 taxa), 14 of which are endemic. The species are classified into 8 sections. Mediterranean area is the mainly origin of the species. Endemic species are concentrated to Mediterranean area, in Turkey. The main purpose of this study, similarities and differences of the hybrid specimen has been introduced between its ancestors with using morphological, palinological and molecular characters.

Materials and Methods:In this study, the specimens were collected in 2015 by the authors. The collected specimens were studied as morphologically, palinologically and molecularly. Woodhouse and SEM photos were obtained from the palinological studies, ITS nrDNA and rpl32-trnL cpDNA region data were analyzed. And morphological characters of hybrid specimens and its ancestral species were illustrated with drawing and using stereo microscope.

Results: The hybrid occur between *O. saccatum* P.H. Davis (Sect. *Amaracus* (Gled.) Vogel) and *O. husnucan-baseri* H.Duman, Aytac & A.Duran (Sect. *Brevifilamentum* letsw.) whose distribution areas are overlapped. *O. x dumanii* is similar and have intermediate characters as habitus, spicules, bracts, calyx, corolla and stamens between its parents, *O. saccatum* and *O. husnucan-baseri*. It differs from *O. saccatum* in its calyx 2-lipped and 6.-6.5 mm (not 1-lipped and 4.5-5.5 mm), 2 stamens exserted and 2 stamens included in corolla (not all stemens exserted from corolla). It differs from *O. husnucan-baseri* in its stems 45-50 cm (not 10-30 cm), calyx 6-6.5 mm (not 6-8 mm); corolla slightly or distinctly saccate (not saccate). Comparison of the ITS sequences *O. saccatum*, *O. husnucan-baserii* and *O. x dumanii* show that thirteen different loci (71, 165, 166, 178, 190, 416, 430, 467, 509, 511, 553, 563, 568) separating *O. saccatum* and *O. husnucan-baserii* at species level. Actually, these loci exhibit the hybridization of *O. x dumanii* between these two species.

Acknowledgments: We would like to thank TUBITAK for financial support to our researches (project no. 113 Z 225).

Keywords: Endemic, hybridization, ITS, natural hybrid, molecular systematic, *Origanum*.

PP-221

Occurrence of *Tylodelphys* Infection Linked to Seasons, Host Fish Size And Sex From Lake Dam Kunduzlar, Turkey

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Aim of the study: In this study, metacercar *Tylodelphys* sp. infection was examined on seven fish species (*Cyprinus carpio*, *Carassius gibelio*, *Barbus plebejus*, *Capoeta tinca*, *Chondrostoma nasus*, *Leuciscus cephalus*, *Alburnus escherichii*) through on-site surveys carried out between February 2009 and August 2010.

Material and Methods: In parallel with the subject of the study, *Tylodelphys* sp. *metacercars* specimens was examined at the skin, fin, gill, eyes and body cavity of the fish via with Olympus x30 stereo microscope. Then, it was taken to physiological water environment with the help of a scalpel, were washed with tap water and their mucus were cleaned. They were placed in warm AFA (Alcohol-Formaldehyde-Acetic acid) fixative and they were left for 12-24 hours. And then, dehydration process was applied to parasites with the help of ethyl alcohol series (35%, 50, 70). Following this, some of the parasites were preserved in 70% ethyl alcohol. Another part of them was made into preparation in glycerin-gel.

Results: Three host fish species were infected with metacercar *Tylodelphys* sp.: (its prevalence %5.1 and mean parasite intensity 67.5 ± 92.6 in *Chondrostoma nasus*; %10.6, 5.6 ± 1.8 in *Capoeta tinca*; %12.5, 2.5 ± 2.1 in *Barbus plebejus*). Infection data of the parasite species were evaluated for seasons, host fish size and sex. The period of the study covered the four seasons: spring, summer, fall, winter.

Keywords: *Alburnus*, *Capoeta*, *Chondrostoma*, *Tylodelphys*.

PP-222

***Argulus foliaceus* Infestation of Tench, *Tinca tinca* in Lake Dam Çatiören, Turkey**

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Aim of the study: In this study, *Argulus foliaceus* L. (Crustacea: Branchiura) infection of one cyprinid fish species, tench (*Tinca tinca*) in Lake Dam Çatiören, Turkey was examined on the basis of samples taken from on-site surveys carried out.

Material and Methods: The fish specimens were caught by local fishermen using gill-nets. After sacrificed, the lengths of the fishes were recorded and the skin, fins, gills, and oral cavity were cut off the body, and placed in separate petri dishes with physiological solution. Some of the parasites were fixed in glacial acetic acid and preserved using glycerine-gel under the cover glass in accordance with Pritchard and Kruse (1982). For the identification of the parasite specimens, based on Bychowskaya-Pavlovskaya et al. (1962) a light microscope with $\times 100$ and $\times 400$ magnification was used.

Results: Of the 97 *T. tinca* examined, 15 (7.6%) was infected with *Argulus foliaceus*. The distribution on microhabitat locality of *A. foliaceus* was found to be as follows: 6.1%, 1.9 ± 0.8 specimens/fish on gill filaments; 2.0%, 1.0 ± 0.0 on pectoral fins of the host fish. However, it was not a statistically meaningful differences among the microhabitat locality ($P > 0.05$). Moreover in this study, *A. foliaceus* infection was investigated depending on the years, and seasons, and host fish size.

Keywords: *Argulus*, Çatiören, *Tinca*.

PP-223

***Tetraonchus monenteron* infestation of Pike (*Esox Lucius* L.) from Lake Eber, Turkey**

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Aim of the study: In this study, infection of *Tetraonchus monenteron* was examined on 195 host fish species, pike (*Esox lucius*).

Material and Methods: In parallel with the subject of the study, *Tetraonchus monenteron* parasite specimens was examined at the skin, fin, gills, nasal and oral cavity of the host fishes via with Olympus x30 stereo microscope. Then, it was taken to physiological water environment with the help of a scalpel, were washed with tap water and their mucus were cleaned. They were placed in warm AFA (Alcohol-Formaldehyde-Acetic acid) fixative and they were left for 12-24 hours. And then, dehydration process was applied to parasites with the help of ethyl alcohol series (35%, 50, 70). Following this, some of the parasites were preserved in 70% ethyl alcohol. Another part of them was made into preparation in glycerin-gel.

Results: 121 host fish species out of 195 were infected with monogenean trematode parasites, *Tetraonchus monenteron* (its prevalence 62.1% and mean parasite intensity 25.8 ± 27.9). Infection data of the parasite species were evaluated for seasons, host fish size and sex. The period of the study covered the four seasons: spring, summer, fall, winter.

Keywords: *Esox lucius*, Lake Eber, *Tetraonchus monenteron*.

PP-224

Antioxidant Activities and Essential Oil Composition of *Marrubium heterodon* (Benth.) Boiss. & Balansa from TurkeyTuran ARABACI¹, Mehmet Sina İÇEN² and Tuncay DIRMENCI^{3*}¹ İnönü University, Faculty of Pharmacy, Department of Pharmaceutical Botany, Malatya, Turkey² İnönü University, Faculty of Pharmacy, Department of Pharmacognosy, Malatya, Turkey³ Balıkesir University, Necatibey Education Faculty, Department of Biology Education, Balıkesir, Turkey
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Aims of the study: *Marrubium* L. is a herbaceous genus of Lamiaceae, including about 40 species in the Irano-Turanian and Mediterranean phytogeographic regions. The genus is represented by 20 species (24 taxa) in Turkey. The genus has a widespread traditionally usage such as, treating various diseases, asthma, pulmonary infections, inflammation and hypotension, as cholagogues and sedative agents, and for pain relief.

Materials and Methods: Aerial parts of *Marrubium heterodon* (Local name: Kınalı Kekik) were collected at its flowering stage from Bolkar mountain, Niğde-Turkey (Collector No: Arabacı 2976 & Dirmenci). The essential oil was obtained from the air-aerial parts by hydrodistillation for 3 h with Clevenger-type apparatus. The essential oil was analysed by GC/MS. The dried aerial parts were ground and 5 gr of material were taken for each extract. The aqueous, methanolic, ethyl acetate extracts were macerated 24 h with 150 ml of each solvent according to a standard protocol. The maceration was repeated 3 times. The extracts were filtered and then evaporated to dryness under vacuum using rotary evaporator.

Results: The essential oil content in the dry herb was very low in quantity and calculated as 0.04% (v/w). The numbers of the identified compounds are 38 and representing 86.3% of the oil. The major components of the essential oil were α -pinene (17.3%), β -farnesene (11.9%) and γ -elemene (5%). Antioxidant activities of extracts were expressed as percentage of DPPH and ABTS radicals inhibition and IC50 values ($\mu\text{g/ml}$). The highest inhibition values were measured in methanolic extract as 90% inhibition at the concentration of 500 $\mu\text{g/ml}$ in the DPPH assay. In the ABTS assay, the highest inhibition values of the aqueous, methanolic, ethyl acetate extracts were measured 94%, 96% and %68 at the concentration of 1000 $\mu\text{g/ml}$ respectively. This is the first report for the antioxidant activities and essential oil composition of *Marrubium heterodon*.

Keywords: Antioxidant activity, Essential oil, Marrubium.

PP-225

A New Hybrid of *Origanum* L.: *O. x bilgiii* Dirmenci, Yazıcı & ArabacıTuncay DIRMENCI¹, Türker YAZICI¹, Turan ARABACI², Sevcan ÇELENK³, Taner ÖZCAN¹, Ekrem DÜNDAR⁴¹Department of Biology Education, Necatibey Education Faculty, Balıkesir University, Balıkesir, Turkey²Department of Pharmaceutical Botany, Faculty of Pharmacy, İnönü University, Malatya, Turkey³Department of Biology, Faculty of Arts and Sciences, Uludağ University, Görükle Campus, Bursa, Turkey⁴Department of Biology, College of Arts and Sciences, Balıkesir University, Çağış Campus, Balıkesir, Turkeyturkeryazici10@gmail.com

Aim of the study: Natural interspecific hybridization is relatively common event in *Origanum* L. The genus comprises of 12 hybrids into the world (<http://apps.kew.org/wcsp/qsearch.do>). 5 hybrids distribute naturally in Turkey (Ietswaart 1982; Güner et al., 2000). Mediterranean area is the mainly origin of the hybrids. The aim of this study, similarities and differences of the hybrid specimen has been introduced between its ancestors (*Origanum saccatum* P.H. Davis and *O. vulgare* L. subsp. *hirtum* (Link.) Ietsw.) with using morphological, palinological and molecular characters.

Materials and Methods: The hybrid specimens were collected by the authors during to the field trips between 2014 and 2015. Morphological, palinological and molecular characters of the specimens were reported. Woodhouse and SEM photos were obtained from the palinological studies, ITS nrDNA and rpl32-trnL cpDNA region data were analyzed. And morphological characters of hybrid specimens and its ancestral species were illustrated with drawing and using stereo microscope.

Results and Discussion: *Origanum x bilgiii* has some similar and different characters between its parents. *O. x bilgiii* is distinguished from *Origanum saccatum* by calyx 2-lipped and 2.5-3 mm (mostly 1-lipped and 4.5-5.5 mm), corolla 5-8 mm and pinkish-white (not 11-13 mm and pink), stamens 4 or absent, if 4 stamens, 2 stamens exerted, 2 stamens included in corolla (not 4 stamens and all stamens exerted); It differs from *Origanum vulgare* subsp. *hirtum*, calyx 2-lipped and densely long pilose at throat (not actinomorphic, teeth \pm equal and pilose at throat), corolla saccate, 5-8 mm and pinkish-white (not saccate, 4-5 mm and white). When comparison of the ITS sequences among *O. saccatum*, *O. x bilgiii* and *O. vulgare* ssp. *hirtum* nine main loci can be easily separated (positions of 165, 166, 190, 416, 421, 467, 494, 509, 558). It is showed that *O. saccatum* and *O. vulgare* ssp. *hirtum* can be separated at species level and *O. x bilgiii* has polymorphisms and these polymorphic loci suggest that hybridization can be occurred between *O. saccatum* and *O. vulgare* ssp. *hirtum*. It was also studied rpl32 DNA region in addition to ITS DNA region. This DNA region gave some different information about hybridization or speciation of the *Origanum*. The sequence positions of 317, 409, 451, 530, 690, and 711 are very important for the hybridization.

Acknowledgments: We would like to thank TUBITAK for financial support to our researches (project no. 113 Z 225).

Keywords: Endemic, hybridization, ITS, natural hybrid, molecular systematic, *Origanum*.

PP-226

Occurrence of two Endoparasite Infestation of Tench, *Tinca tinca* in Lake Dam Çatiören, Turkey

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Aim of the study: In this study, two endoparasite species, *Ligula intestinalis* and *Asymphlodora tincae* infection of the cyprinid fish species, tench (*Tinca tinca*) in Lake Dam Çatiören, Turkey were examined on the basis of samples taken from on-site surveys carried out.

Material and Methods: The fish specimens were caught by local fishermen using gill-nets. After sacrificed, the lengths of the fishes were recorded and the body cavity and the other inner organs such as, intestine, gall bladder, liver and genital organs were cut off the body, and placed in separate petri dishes with physiological solution. Some of the parasites were fixed in glacial acetic acid and preserved using glycerine-gel under the cover glass in accordance with Pritchard and Kruse (1982). For the identification of the parasite specimens, based on Bychowskaya-Pavlovskaya et al. (1962) a light microscope with x100 and x400 magnification was used.

Results: Of the 97 *T. tinca* examined, 3 host fish specimens were infected with *Asymphlodora tincae* and *Ligula intestinalis*. The distribution on microhabitat locality of *A. tincae* was found to be as follows: 1.3%, 1.0±0.0 specimens in one intestine of host fish specimens; 2.6%, 1.5±0.4 in body cavity of two host fish.

Keywords: *Asymphlodora*, *Ligula*, Çatiören, *Tinca*.

PP-227

Nutlet micromorphology of Turkish *Origanum* (Lamiaceae) and its systematic implicationsGülay ECEVİT-GENÇ¹, Tuncay DIRMENCI², Turan ARABACI³, Ekrem AKÇIÇEK²¹Department of Pharmaceutical Botany, Faculty of Pharmacy, İstanbul University, Beyazıt, İstanbul, Turkey²Department of Biology Education, Necatibey Faculty of Education, Balıkesir University, Balıkesir, Turkey³Department of Pharmaceutical Botany, Faculty of Pharmacy, İnönü University, Malatya, Turkey
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Aim of the study:The objective of the current study is to investigate the nutlet micromorphological characters of Turkish *Origanum* species and to determine the systematic value of these characters in specific and infraspecific classification of the taxa.

Material and Methods:Most of the materials used for this study were collected from natural habitats and different localities in Turkey by the authors. Some samples were provided by the ISTE herbarium. Voucher specimens were deposited in the herbarium of the Faculty of Pharmacy, İstanbul University (ISTE). The nutlets were preliminarily observed using a light microscope to make sure that they were of normal size and maturity. For scanning electron microscopy (SEM) analysis, at least 5 samples were prepared. The samples of nutlets and leaves were mounted on stubs and coated with gold before they were studied with an FEI Quanta 450 FEG-EDS scanning electron microscope.

Results:Nutlets of *O. saccatum*, *O. sipyleum*, *O. vogelii*, *O. minutiflorum*, *O. amanum*, *O. acutidens*, *O. bargyli*, *O. husnucan-baseri*, *O. leptocladum*, *O. haussknechtii*, *O. majorana*, *O. onites*, *O. solymicum*, *O. xintercedens* are glabrous. *O. hypericifolium*, *O. vulgare* subsp. *hirtum*, *O. bilgeri* and *O. rotundifolium* have eglandular trichomes. Regarding sculpturing pattern of nutlet surface five basic types can be distinguished: papillate (the most common type) in *O. saccatum*, *O. hypericifolium*, *O. sipyleum*, *O. vulgare* subsp. *hirtum*, *O. rotundifolium*, *O. acutidens*, *O. leptocladum*, *O. haussknechtii*, *O. onites*, *O. solymicum* and *O. xintercedens*; rugose in *O. bargyli*, reticulate-foveate in *O. husnucan-baseri*; reticulate-ruminate in *O. amanum*, *O. majorana* and *O. bilgeri*; ruminate in *O. munitiflorum* and *O. vogelii*. The epidermal features of nutlets are specific to some sections were determined. (Sect. *Origanum*, Sect. *Anatolicon* and Sect. *Amaracus* have papillate surface pattern; Sect. *Chilocalyx* and Sect. *Longitubus* have ruminate surface pattern. The surface patterns of nutlets are systematic value some species identification. Only *O. bargyli* show rugose surface pattern. *O. husnucan-baseri* have reticulate-foveate surface pattern. *O. munitiflorum* and *O. vogelii* have ruminate surface pattern. Our data are in accordance with previous studies in Lamiaceae confirming the usefulness of nutlet surface structures in taxonomic identification at different infrageneric levels.

Acknowledgements:We thank the Research Fund of TÜBİTAK for its financial support of our research (project no.113 Z 225)

Keywords: *Origanum*, Lamiaceae, nutlet, micromorphology.

PP-228

Cyanobacterial toxins during blooms of Bilikol Lake, Kazakhstan

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Aim of the study: The aim of this work is to study the taxonomic structure of cyanobacteria and biotic score, the analysis of freeze-dried phytoplankton biomass extracts collected during the water bloom in the Bilikol Lake.

Material and Methods: To study water samples collected in the summer during the "blooming" of water from Bilikol lake, Zhambyl region, water temperature is 35⁰C, pH 7.5. The total amount of collected samples were 16 species of algae. The cyanobacteria identifier was used to determine species. The number of organisms was evaluated according to frequency scale after enumeration on 100 fields of view. Frequency of appearance was accounted by nine-score six-step scale: 1-very rare; 2-rare; 3-often; 5-often; 7-very often; 9-weight. Types of indicators-microalgae installed on the identifiers specified in the list of references. The saprobe index was measured by the method of Pantle and Bucca. Concentrated biomass of phytoplankton freeze dried at 70⁰ C. Lyophilized biomass of phytoplankton (200 mg), survived in 70% aqueous methanol (6 ml) for 1 h at room temperature. The extract was centrifuged at 4000 g for 1 min and then used for high-performance liquid chromatography (HPLC) and toxicity testing. The toxicity of the cyanobacteria was studied in short-term (acute) experiments to test the *Daphnia magna Straus*.

Results: The study of Bilikol lake *algae* *cenosis* characterized by the predominance of green algae on taxa, but the occurrence of blue-green algae is much higher. The number of species identified in Bilikol lake equal to 102 species and subtypes. We have defined the 4 division, 9 classes, 102 species of the genus. High species richness differed in the phytoplankton of Bilikol lake green and blue-green algae, their number of species, varieties and forms is slightly more than half of the taxonomic list. As a result of the analysis of certain types of indicator - saprobe cyanobacteria Bilikol lake we identified 12 species and varieties of indicator species of cyanobacteria. Thus the composition of species-indicators of cyanobacteria in Bilikol lake describes the body of water as β -mezosaprobic area organic pollution. The principal representatives of the indicator of cyanobacteria in Bilikol lake are *Microcystis aeruginosa f pseudofilamentosa*, *Phormidium autumnale*, *Oscillatoria brevis*. The study sample extract plankton Bilikol lake on the four point system are evaluated by Stroganov as highly-toxic. HPLC Analysis of extracts of dried biomass of plankton have three structural variants of hepatotoxin *microcystin*: *Microcystin -RR-7*, *Demethylmicrocystin- RR* and *Microcystin-LR* that apparently involves active development in biomass of phytoplankton in the summer population of cyanobacteria from *Microcystis*, *Anabaena*, etc genera. Mass development of cyanobacteria reduces the quality of the water by giving it a nasty organoleptic properties. It is prohibited to use Bilikol lake during "blossoming" as recreational water reservoir because it threatens health of people

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PP-229

SSR Fingerprinting of Apple Varieties, Growing in KazakhstanMadina OMASHEVA¹, Alexander POZHARSKIY¹, Akerke MAULENBAY¹, Natalya RYABUSHKINA¹,
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Aim of the study: Apple is a global economically valuable fruit culture. An ambiguity of classification of apple cultivars growing in Kazakhstan including local varieties is a problem for horticulture and plant selection. Often apple farms cultivate the same cultivar under different, synonymous names and in other cases completely different cultivars under the same name. Thus it is important to characterize varieties using modern methods of molecular genetics. A six polymorphic microsatellites have been used for a genetic passportization of 71 apple varieties, including 31 of a local breeding, growing in Kazakhstan.

Material and Methods: Varieties were collected in different locations in Kazakhstan. Genomic DNA was extracted from approx. 100 mg of fresh leaf tissue using procedure approved previously (Aubakirova et al., 2014). DNA quality and quantity was tested using 1% agarose and NanoDrop 2000 (Thermo Scientific, USA) For PCR amplification DNA was diluted up to 30 ng/μL. The optimization of PCR was previously exercised (Omasheva et al., 2015). Six polymorphic microsatellite markers developed for *Malus* (Hokanson et al., 1998), namely GD12, GD96, GD142, GD147, GD162, and GD100 were used to identify the varieties' genetic diversity. After PCR amplification the products of all six markers per sample were combined and mixed with formamide and size standard LIZ (Size standard 500 LIZ Applied Biology). Samples were then analyzed on capillary sequencer ABI Prizm 310 (Applied Biosystems). Data were processed by Gene Mapper Software 4.0 (Applied Biosystems) and alleles defined by their size in bp. Statistical analysis of genotyping data including hierarchical clustering, PCoA, using R software and Bayesian clustering implemented in STRUCTURE software was conducted. To identify fire blight resistant genotypes two markers AE10-375 and GE-8019 were used (S.Keller-Przybyłkiewicz et al., 2009).

Results: Comparison of genotyping data of apple cultivars with known genealogy revealed several names' inconsistencies among samples from different locations. For instance, three samples of Aport Alexander appeared to be completely different by their genotypes, one of them was identical to cultivar Rumayanka Almatinskaya. A similar situation was with some other varieties. Aport is an important variety for Almaty region, being a progenitor of a dozens of local varieties. For example, varieties Adilet, Yesen, Rashida, and Bayterek all inherited one allele of Aport from each analysed locus. Only one sample namely Aport Aleksandr was appeared to be the right one. Thereby in dendrogram and genetic clustering analysis by PCoA the samples originated from Kazakhstan selection were arranged with their parents, mostly with varieties Aport and Golden Delicious. Two markers AE10-375 and GE-8019, together responsible for no more than 40% of fire blight resistance, showed that only 10 varieties, all originated from European selection, were positive for both markers.

Acknowledgements: The research was funded by the Grant from the Scientific Committee of the Ministry of Education and Science of the Republic of Kazakhstan (grant no.1105/GF4).

Keywords: *Malus domestica*, Kazakhstani apple cultivars, genotyping, SSR markers, PCR.

PP-230

The Analysis of Physicochemical Properties and Cyanobacterial Morphotypes of Kozyaka and HamidiyeMeral YILMAZ CANKILIÇ¹, Umut ÇELİKOĞLU²¹Department of Biology/ Institute of Science, Anadolu University, TURKEY²Department of Chemistry/ Institute of Science, Anadolu University, TURKEYmeralyilmaz@anadolu.edu.tr

Aim of the study: The aim of this study is descriptions of the morphology of cyanobacteria in Kozyaka and Hamidiye.

Material and Methods: Water samples were collected from Kozyaka and Hamidiye under the aseptic conditions for Cyanobacterial cultures in sterile glass bottles. Temperature and pH of water samples were measured at sampling side. The chemical properties which is chlorine, sodium, potassium, calcium, magnesium, iron, manganese and boron of water samples were analysed with ICP OES. Quantitative analysis of nitrite, nitrate and sulphate was performed with ion chromatography. Organic matter content was measured with HPLC. Cultivation and isolation attempts were conducted in liquid BG-11 medium and on agar plates of BG-11 medium, using incubation temperatures of 28°C for several weeks until a green active biomass became visible and purification process was then performed. Subsequent cultures were incubated in the BG11 solid medium at 28°C. Cyanobacterial morphotypes were identified using an Olympus light microscope (BX51, Olympus). Ten morphological criteria were used to describe the morphotypes (trichome shape, number of trichomes in sheath, presence or absence of terminal attenuation of trichome, calyptra on mature apical cell, shape of apical cell, presence or absence of constrictions at transverse walls, granules, branching, range in width of trichomes and range of cell length). In addition we applied the Fluorescent In Situ Hybridization (FISH) to screening of the cyanobacterial density in water samples.

Results: On the basis of microscope observation, 6 morphotypes *Leptolyngbya* sp., *Phormidium* sp., *Nostoc* sp., *Pseudoanabaena* sp., *Synechococcus* sp. and *Synechocystis* sp. were distinguished in the samples. Two were assigned to the order Chroococcales, three to Oscillatoriales and one to Nostocales. No members of the Stigonematales were encountered. Result of the FISH study filamentous, spontaneous radiation cyanobacteria members were observed.

Keywords: Cyanobacteria, Kozyaka, Hamidiye, FISH.

PP-231

Observations on the Vegetation of Kızıldağ, Masa and Yılanlı Mountains (Muğla) : A Preliminary StudyYeliz DEĞERLİ¹, Ömer VAROL¹¹ *Department of Biology, Science Faculty, Muğla Sıtkı Koçman University, Kötekli, Muğla*
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Aim of the study: Kızıldağ, Masa and Yılanlı Mountains falls within C2 square of the grid system adopted by Davis. Vegetation structure, types of formation, dominant vegetation of research area will be presented with this phytosociological research that will be held. Plant associations of research area will be determined by using the method of Br.-Bl. and then their relationship with the environment will be examined. In this study, preliminary informations and observations obtained from field survey in 2015 are presented.

Material and Methods: Plant associations were determined by using the method of Br.-Bl. Observations of quadrats were carried out when plants flowered at the optimum level.

Results: In general, forest, macchie and steppe vegetation were seen in the research area. As a result of field survey, 33 quadrats have been taken. In Kızıldağ, forest vegetation occupies from 750 to 950 m, macchie vegetation occupies between 700-800 m altitude. Observed vegetation type of Masa Mountain is macchie vegetation. In the Yılanlı Mountain, forest, macchie and steppe vegetation is observed. In the Yılanlı mountains, *Pinus brutia* Ten. is distributed up to 1000 m, *Pinus nigra* Arn. subsp. *pallasina* (Lamb.) Holmboe is distributed at altitudes above 1000 m. Steppe vegetation, mostly found just above 1600 m in Kurdu Hill in Yılanlı Mountains.

Acknowledgements: This study was supported by scientific research projects of Muğla Sıtkı Koçman University.

Keywords: Vegetation, phytosociological, Muğla.

PP-232

A new record of *Pontobdella muricata* (Annelida, Hirudinea, Piscicolidae) from Iskenderun Bay, northeastern MediterraneanAlper YANAR¹, Argun Akif ÖZAK², Nuri BAŞUSTA³¹ Faculty of Marine Sciences and Technology, Iskenderun Technical University, Hatay, Turkey.² Department of Aquaculture & Fish Diseases, Çukurova, Adana, Turkey.³ Faculty of Fisheries, Firat University, TR-23119, Elazig, Turkey.

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Aim of the study: The aim of this study is to report a new record of marine leech, *Pontobdella muricata* (Linnaeus, 1758) from Iskenderun Bay, northeastern Mediterranean.

Material and Methods: Fish material (n=133) were collected during a trawl fishing conducted at a depth of ranging from 150 to 300 m in Iskenderun Bay, Turkey. Fish individuals, infected with marine leeches, were transferred to the ecophysiology laboratory in Fisheries Faculty of the Firat University. Infected fish were photographed and the parasites were removed from the hosts and fixed in ethanol for further morphological examinations and measurements. Species identification was conducted by using Sawyer (1986) and Llwellyn (1966).

Results: Collected parasites (n=3) were identified as *Pontobdella muricata* (Linnaeus, 1758) which are one of the most common species of leeches found on skates and rays.

Acknowledgements: A part of this work was supported by Scientific Research Projects Coordination Unit of Firat University. Project Number SUF.15.04.

Keywords: Hirudinea, *Pontobdella muricata*, Mediterranean, fish, parasite.

PP-233

Endemic Plants of the Bozburun PeninsulaKenan AKBAŞ¹, Ömer VAROL²¹*Köyceğiz Vocational School, Department of Herbal and Animal Production, Muğla Sıtkı Koçman University, Turkey*²*Biology/ Science Faculty, Muğla Sıtkı Koçman University, Turkey*
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Aim of the study: The Bozburun Peninsula is located in Muğla province, Southwestern of Turkey, which is recognized as a key biodiversity area. It represents one of the most pristine Mediterranean lowland forest and coastal landscapes. Despite the recognition as an important biodiversity area, its endemic plants and their conservation status has not been studied previously. The aim of the study was to determine the endemic plants of the area and to show their conservation status according to IUCN red data categories and criteria.

Material and Methods: Plant species were collected from Bozburun Peninsula between 2013 and 2015 years. All specimens were pressed and dried according to the standard herbarium methods. Identifications were made using Flora of Turkey and the East Aegean Islands (Davis 1965-1988; Güner et al., 2000).

Results: In this study, 40 endemic plant taxa belonging to 22 families were identified from study areas. This species were categorized according to IUCN Red Data categories (Ekim et al., 2000; IUCN Survival Commission, 2001): 4 taxa (% 10) Endangered (EN), 9 taxa (% 22.5) Vulnerable (VU), 27 taxa (% 67.5) Lower Risk (LR).

Acknowledgements: This study was supported by Muğla Sıtkı Koçman university scientific research projects coordination unit (Project no: 15/18).

Keywords: Endemic plants, Bozburun Peninsula.

PP-234

Antioxidant Activities and Chemical Composition of Leaf and Bulb Extracts from the Endemic *Hyacinthella lineata* Steudel in AnatoliaCigdem AYDIN¹, Ramazan MAMMADOV¹¹Pamukkale University, Faculty of Science and Art, Department of Biology, Kinikli, Denizli/Turkey
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Aim of the study: This study was aimed to determine the *in vitro* antioxidant activities and chemical composition of various solvent extracts (methanol, ethanol and acetone) obtained from bulbs and leaves of *Hyacinthella lineata* Steudel. From HPLC analysis of some extract and fractions of plant different phenolic constituents were identified.

Material and Methods: Ethanolic, methanolic and acetonic extracts were obtained from using leaves and bulbs of geophyte species. The extracts were screened for their possible antioxidant activities by four complementary tests; DPPH (2,2-diphenyl-1-picrylhydrazyl) free radical-scavenging, ABTS free radical scavenging, ferric reducing antioxidant power assays (FRAP) and β -carotene-linoleic acid assays. BHT was used as standards. In addition, total phenolic and flavonoid contents in all the extracts of *H. lineata* were determined as gallic acids and quercetin equivalents.

Results: Total phenolic contents value ranged from 2.29 to 8.07 for bulb and 3.76 to 6.98 GAE (mg/mL) for leaves while total flavonoid contents value ranged from 20.51-83.45 for bulb and 35.12-97.48 (mgQE/g) for leaves of *H. lineata*. The highest total phenolic contents value was showed by ethanol fraction (8.07 mg/mL) of bulb and ethanol fraction (97.48 mgQE/g) of leaves showed highest total flavonoid contents value. The highest antioxidant activity efficiency was determined in extract leaves ethanol (80.01%) and the least efficiency in extract leaves-acetone (59.97%). From HPLC analysis of some extract and fractions of plant different phenolic constituents were identified. The major phenolic groups gallic acid, 3,4-dihydroxy, 4-dihydroxy, chlorogenic acid, Vanilic acid, Caffeic acid, p-Coumaric acid, Ferulic acid and Cinnamic acid were identified in different fractions of plant. From this research work it is concluded that this plant could be used as natural antioxidant and antimicrobial agents and medicinally very important.

Keywords: Antioxidant activity, *Hyacinthella lineata*, total phenolic content, HPLC.

PP-235

Determination of Reducing Power and Minimum Inhibitory Concentration of *Crocus alata* Extracts

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Aim of the study: *Crocus alata* is an early spring ephemeral and geophytic-geocarpic species that grows in subalpine areas of the northern and western Tianshan Mountains. It is an endemic of Kazakhstan flora belonging to the group of bulbous and tuberous plant. It is interested as a source of naturally active substances that have many useful biological properties. The species has been used as spasmolytic, anti-inflammatory, bactericidal, antiviral and diuretic agents and to treatment of some diseases. The purpose of this study is to investigate antioxidant and antimicrobial properties of the methanol and ethanol extracts of *C. alata*.

Material and Methods: Aerial part and bulbs of *C. alata* were collected in Almaty region during the flowering phase. The air dried and powdered samples were extracted with methanol and ethanol. Reducing Power assay. The extract (0.75 ml) of various concentrations (0.2-1.2 mg/ml) was mixed with 0.75 ml of phosphate buffer (0.2 M, pH 6.6) and 0.75 ml of potassium hexacyanoferrate, followed by incubation at 50°C for 20 min. Then was added 0.75 ml of trichloroacetic acid solution (10%) and mixture centrifuged at 800 g for 10 min. 1.5 ml of the obtained supernatant was mixed with 1.5 ml of distilled water and 0.1 ml of ferric chloride (FeCl₃) solution (0.1%) for 10 min. The absorbance of reaction mixture was taken at 700 nm. Four bacterial strains including gram-positive *Staphylococcus aureus* ATCC 25923, *Bacillus cereus* RSKK 863 and gram-negative *Escherichia coli* ATCC 25922, *Proteus vulgaris* ATCC 33420 were used for evaluation of minimum inhibitory concentration (MIC) of the extracts. MIC was carried out in 96-well plates using Tryptic soy broth. Extracts at the final concentrations of 2 µg/ml, 4 µg/ml, 8 µg/ml, 16 µg/ml, 32 µg/ml, 64 µg/ml, 128 µg/ml, 256 µg/ml were examined.

Results: Reducing power of *C. alata* extracts increased with concentration. The highest reducing power was observed in methanol extract from aerial part. Ethanol extract from aerial part showed stronger reducing power than methanol and ethanol extracts from bulb, when both extracts from bulb showed the same activity. The extracts of *C. alata* showed varying degree of antimicrobial activity. MIC against different bacteria ranged from 2 µg/ml to 16 µg/ml. The methanol extracts were most effective than the ethanol extracts. Methanol extracts from bulb presented same MIC (2 µg/ml) against *E. coli*, *P. vulgaris* and *S. aureus*. *E. coli* and *B. cereus* were also susceptible (MIC 2 µg/ml) to the methanol extracts from aerial part than *P. vulgaris* and *S. aureus* (MIC 4 µg/ml and 16 µg/ml, respectively). MIC of the methanol extract from bulb estimated 4 µg/ml for *B. cereus*. Among the tested bacteria only *S. aureus* was susceptible to the ethanol extracts from aerial part and bulb with 2 µg/ml and 4 µg/ml MIC, respectively. Ethanol extracts did not show any activity against *B. cereus*, *P. vulgaris* and *E. coli*. The extracts from aerial part of *C. alata* have a high reducing power potential and some degree of antibacterial activity.

Acknowledgements: This research was supported by the Ministry of Education and Science of the Republic of Kazakhstan. We acknowledge the Department of Biology of Pamukkale University and the Department of Biology of Muğla University for technical assistance.

Keywords: *Crocus alata*, extract, reducing power, antibacterial, MIC.

PP-236

Investigation of *Blastocystis* spp. in sea water samples collected from Sinop Province by Polymerase chain reaction¹Zeynep KOLÖREN, Berivan Başak GÜLABI¹ Ordu University, Faculty of Arts and Sciences, Department of Biology, 52200, Ordu, Turkey
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Aim of the study: This study aimed to investigate *Blastocystis* subtype in sampling sites of Sinop Province of The Black Sea by Polymerase chain reaction (PCR).

Material and Methods: *Blastocystis* spp. were investigated in uncultured 48 sea water samples collected from 4 sites of Sinop Province which is named Gelincik-Ozturkler public beach, Iskele, Taşkopru and Eski Pazar in 2011 year. All water samples collected as 5 L and performed flocculation by aluminum sulfate. After obtained water pellets with centrifugation, they are purified by sucrose gradient method. DNA extracted from this purified pellets with QIAamp DNA Mini Kit. SSU rDNA gene PCR were performed from these DNAs for detection of *Blastocystis*. PCR-positive sample was sequenced and the small subunit (SSU) rRNA sequences were aligned by Bioedit and phylogenetic tree was drawn by using MEGA version 5.05.

Results: One of 48 (2%) environmental water samples were positive for *Blastocystis*. This positive sample taken from Eski Pazar sampling site was subtype 1 (ST1) which has the pathogenic potential. According to obtained phylogenetic analysis, our positive sample (Eski Pazar) were placed in the same lineage with JQ665863 (ST-1) and AM275361 (ST-1) as shown in Figure 2. The positive sample from Eski Pazar showed 76.6% homology with sequences of ST-1 which supported with 99%, 100%, 98% bootstrap values in NJ, ML and MP trees, respectively. This is the first molecular study to determine the occurrence of *Blastocystis* in Sinop Province. In this study we showed that detection of *Blastocystis* subtypes in the investigated area. Considering the use of sea water in recreational purposes, we suggests that *Blastocystis* in sea water must be routinely monitored at least seasonally during the year for protecting and maintaining safe water.

Acknowledgements: The authors thank to Prof. Dr. Funda Doğurman AI from Faculty of Medicine in Gazi University for providing *Blastocystis* subtypes.

Keywords: *Blastocystis* spp., Sinop, PCR, Phylogenetic analysis.

PP-237

Population Distribution Patterns of Invasive Alien Plant *Eichhornia crassipes* in Asi River, TurkeyMuhip HİLOOĞLU¹, Emel SÖZEN¹¹Department of Biology, Faculty of Science, Anadolu University, 26470, Eskisehir, Turkey
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Aim of the study: *Eichhornia crassipes* (Mart.) Solms (Pontederiaceae) is a perennial aquatic invasive weed throughout the tropical and subtropical regions of the world. In recent years, *E. crassipes* (also called water hyacinth) was introduced from Syria to Turkey on Asi River. Therefore, knowledge of its population area, size and density will reveal population dynamics and provide data for designing management strategies of this species in Asi river. The aim of our study was to analyse distributional patterns, size range and population density of the invasive alien water hyacinth in Asi River.

Material and Methods: Asi River is flowing northward transboundary in Lebanon through Syria and Turkey. In Turkey, Asi River spans 88 km and a total area of ~5700 km² before entering the Mediterranean Sea. *Eichhornia crassipes* demography studies were conducted on large rectangular macroplots within 10m x 10m (100 m²) that were set up in the center of the study sites. The sampling unit in this case is the 1m x 1m quadrat. The quadrat was randomly placed and repeated three times at each population. The location and elevation of each plot were recorded by global positioning system (GPS). Based on GPS data, we calculated populations distances as the shortest distance from the margins of the river following connecting plot sites using MapSource. Then, the average of 3 quadrats per population was made in order to have an ultimate estimation of population size depending on the total area. At each site, population density were also measured. The analysis of variance, One-way ANOVA, is used for testing for the means of population size and density among sample plots. The density were calculated as the ratio between the population size and total area of the population (plants/m²).

Results: In this study, we determined localities of *Eichhornia crassipes* populations during field work in Hatay between June-November 2015. After monitoring 9 sites in following regions: Hacıpaşa (452 km²), Bohşin (517 km²), Güzelburç (258 km²), Antakya (195 km²), Tekebaşı (130 km²), and Meydan (250 km²) along Asi River; we found that *E. crassipes* was represented with three main populations (Reyhanlı, Antakya, Samandağ). All 9 sites were located between 36° 4' E, 35° 59' N and 36° 14' E, 36° 21' N, 22-120m. Population size of *E. crassipes* in the study area ranged from 4.800 to 13.500 plants (median=9000 plants). The number of plants per m² (a rough estimation of population density) were highest in Antakya-Güzelburç (1.24 along with 7 km), and lowest in Tekebaşı-Meydan villages (0.80 along with 6 km). These preliminary results will be beneficial to development of a suitable management programme and control implications for invasive plant *E. crassipes* in Asi River, Turkey.

Acknowledgement: This study was supported by Anadolu University Scientific Research Found, Project No: 1502F067

Keywords: *Eichhornia crassipes*, Asi River, Population size, Density.

PP-238

Monumental Trees in Ordu VicinityÖznur ERGEN AKÇİN¹, Tuğba ÖZBUCAK², Şenay SÜNGÜ³¹ Department of Biology, Faculty of Science and Art, Ordu University, Ordu, Turkey² Department of Biology, Faculty of Science and Art, Ordu University, Ordu, Turkey³ Department of Biology, Faculty of Science and Art, Ondokuz Mayıs University, Samsun, Turkey
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Aim of the study: Ecotourism is typically a modern form of tourism in which learning about nature and help to protect of nature. Natural resources have significance in nature-based attractions in ecotourism. The monumental trees are one of these natural resources. We aimed inform of the monumental trees of Ordu vicinity and to provide a contribution to nature based attractions in Ordu.

Material and Methods: Monumental trees of Ordu vicinity were investigated. Their morphological features (the height of tree, circumference of trunk, first brunch height) and status were recorded and photographed. Additionally, scientific names, estimated age and localities information were given.

Results: 19 monumental trees were determined in Ordu vicinity. In Perşembe district, five *Quercus* sp. (Oak), three *Carpinus* sp. (Hornbeam) and one *Tilia* sp. (Linden); in Unye district, one *Quercus* sp.; in Gülyalı district, one *Quercus* sp.; in Fatsa district, four *Platanus* sp. (Plane); in Akkuş district, one *Fagus* sp. (Beech); in center of the Ordu two *Quercus* and one *Tilia* sp. were determined. Monumental trees usually located in the cemetery, park and near the tomb.

Acknowledgements: We thank Scientific Research Project Unit of Ordu University for the partial financial support.

Keywords: Monumental trees, Ordu, ecotourism.

PP-239

Taxonomic Investigations on Liacarid Mites (Acari, Oribatida, Liacaridae) of the Harşit Valley (Turkey)Perihan AĞÇAKAYA¹, Nusret AYYILDIZ²¹Yunus Emre Quarter, Liman Street, Selim Apartment, 55/20 Kocasinan, Kayseri, Turkey²Department of Biology, Faculty of Science, Erciyes University, Turkey
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Aim of the study: In order to contribute to the geographic distribution of species and the oribatid fauna of Turkey, liacarid mites inhabiting in the Harşit valley were evaluated from the taxonomic point of view, based on samples collected in 2013 and 2014.

Material and Methods: In the extraction of mites from soil, litter, moss and lichen collected from the investigation area was used a Berlese-Tullgren funnel extractor. Extracted mites were killed, fixed and stored in 80% ethanol. The light and scanning electron microscopes (SEM) were used to examine mites. The compound microscopic examinations of specimens were made in lactic acid, mounted in temporary cavity slides. Scanning electron microscope images of all determined taxa were taken.

Results: As a result of the evaluation of the examined mite samples, total four species belonging to the genera *Adoristes* Hull, 1916 and *Liacarus* Michael, 1898 from the family Liacaridae Sellnick, 1928 were determined. Of these, *Adoristes (A.) poppei* (Oudemans, 1906), *Liacarus (L.) xylariae* (Schrank, 1803) and *Liacarus (Dorycranosus) zachvatkini* Kulijew, 1962 are new records for the Turkish fauna; *Liacarus (L.) coracinus* (Koch, 1841) have already been determined in Turkey. In conclusion, their morphological features were reviewed along with the SEM images based on our samples.

Acknowledgements: We are grateful to Dr Salih DOĞAN and researchers of Department of Biology, Erzincan University (Turkey), for their help with collecting mites.

Keywords: Oribatid mites, Liacaridae, new records, Harşit valley, Turkey.

PP-240

Comparative study of the antioxidant and reactive oxygen species scavenging properties in the extracts of *Salvia russelli* and *Salvia candidissima*Emre KOÇ¹, Ferda CANDAN¹¹ Department of Biochemistry/ Faculty of Science, University of Cumhuriyet, Sivas/Turkey,
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Aim of the study: Cellular damage caused by reactive oxygen species has been implicated in several diseases, and hence natural antioxidants have significant importance in human health. The present study was carried out to evaluate the *in vitro* antioxidant and reactive oxygen species scavenging activities of *Salvia russelli* and *Salvia candidissima* extracts.

Material and Methods: The methanol extracts were studied for *in vitro* total antioxidant activity along with phenolic and flavonoid contents. Scavenging ability of the extracts for radicals like hydroxyl, superoxide and hydrogen peroxide were also performed to determine the potential of the extracts. Hydrogen peroxide (H₂O₂) scavenging activity of the methanolic extracts were carried out following the procedure of Ruch et al. Hydroxyl radicals scavenging activity was measured with Fenton reaction. Superoxide anion scavenging activity was evaluated by the method of xanthine/xantine oxidase (XOD) system. Inhibition of reactive oxygen species were calculated for changing the concentration of plant extracts. IC₅₀ which is the amount of extract supplying 50% inhibition were calculated using the graph.

Results: The ability of the extracts in exhibiting their antioxidative properties follow the order of *Salvia russelli* > *Salvia candidissima*. The same order is followed in their flavonoid content and also it was case for phenolic content showing *Salvia russelli* > *Salvia candidissima*. Reactive oxygen species scavenging activity of positive controls and plant extracts were shown. Lower IC₅₀ value reflects better protective action of the studied samples. In a whole, the studied *Salvia russellii* showed quite good efficacy in their antioxidant and radical scavenging abilities, compared to the standard BHT (Butylated hydroxytoluene).

Acknowledgements: This research was part of the project number F-348 supported by the Research Council of Cumhuriyet University in Sivas / Turkey.

Keywords: *Salvia candidissima* ; *Salvia russelli* ; phenolic content ; flavonoid content ; antioxidant capacity ; reactive oxygen species (ROS).

PP-241

Antioxidant and Antihemolytic Activities of methanol extracts of *Salvia euphratica*Emre KOÇ¹, Ferda CANDAN¹¹ Department of Biochemistry/ Faculty of Science, University of Cumhuriyet, Sivas/Turkey,
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Aim of the study: Reactive oxygen species (ROS) can lead to hemolysis and eventually to diseases such as thalassemia and sickle cell anaemia. Their action can be counteracted by the antihemolytic activity of therapeutic agents. To develop a natural antioxidant and anti-hemolytic agents, we investigated the effects of methanol extracts of *Salvia euphratica*.

Material and Methods: Hydroxyl radical, superoxide radical and hydrogen peroxide scavenging activities were used to evaluate antioxidant activities. Antihemolytic activity was evaluated by H₂O₂ induced hemolysis in human erythrocyte. The total amount of phenolic compounds was determined as gallic acid equivalents and total flavonoid contents were calculated as quercetin equivalents from a calibration curve. The synthetic antioxidant Butylated hydroxytoluene (BHT) and natural antioxidant such as curcumin and ascorbic acid were used as positive controls.

Results: Quantitative determination of phenols and flavonoids in *Salvia euphratica* showed that *Salvia euphratica* has the highest phenolic and flavonoid concentrations with 144.04±3.50 mg GAE g⁻¹ dry weight and 171.20±3.15 mg QAE g⁻¹ dry weight, respectively. All antioxidant assays showed that *Salvia euphratica* has the strongest antioxidant capacity with; IC₅₀ 53.32±3.11 µg mL⁻¹ in hydroxyl radical scavenging assay, IC₅₀ 18.91±2.16 µg mL⁻¹ in superoxide radical scavenging assay and IC₅₀ 22.25±1.13 µg mL⁻¹ in hydrogen peroxide scavenging assay compared to controls. *Salvia euphratica* showed good activity against cumene hydro peroxide induced hemolysis in RBCs. Results of T₅₀ showed that extract have a strong antihemolytic capacity, compared to BHT. These results suggest that *Salvia euphratica* may have value as the potential antioxidant and antihemolytic medicinal plant. Biological effects may be attributed, at least in part, to the presence of phenols and flavonoids in the extract.

Keywords: *Salvia euphratica*; phenolic content; flavonoid content; antioxidant capacity; Antihemolytic effect

PP-242

Molecular Analysis of the Olive Putative Universal Stress Protein A Gene (*OeUspA*)Tuğba AKYÜZ¹, Ekrem DÜNDAR²¹*Institute of Science, Balıkesir University, Turkey*²*Department of Molecular Biology and Genetics,
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Aim of the study: The aim of this study was to analyse olive (*Olea europaea* L.) putative universal stress protein A gene (*OeUspA*) by using bioinformatic tools.

Material and Methods: Putative *OeUspA* cDNA sequence was obtained from a colony that was isolated from cDNA libraries of July unfruited olive leaves. BLASTn and BLASTx analyses were done to find out similarity of gene or genes to *OeUspA* gene in NCBI BLAST databases. Similar UspA sequences from other plants in GenBank were aligned with *OeUspA* cDNA sequence and phylogenetic tree of these sequences was obtained. PCR experiments were performed with primers (designed using Primer3 program) and genomic DNA (gDNA) and amplified products were sequenced. The sequences obtained through direct DNA sequencing were analyzed with respect to nucleotide / amino acid composition, open reading frame (ORF) and intron analysis by BioEdit and FincTV programs. Hydrophathy analysis was determined using software in ExPasy webpage. Various other ExPasy software (TargetP, Predotar, SOSUlsignal) were used to find the putative location of protein in the cell.

Results: *OeUspA* was found AT-rich (61.57%) based on cDNA sequence analysis. The protein encoded by this cDNA was found to be rich for alanine, valin and leusine (apolar amino acids) that is in accordance with its predicted membrane localization determined by ToPredII. According to TargetP and SOSUlsignal programs *OeUspA* protein was localized in cytoplasm and had no signal peptide. *OeUspA* gene had no introns according to PCR amplified / sequenced / aligned cDNA and gDNA sequences.

Acknowledgements: This study was supported by TUBITAK through grant number 110O108.

Keywords: *OeUspA*, bioinformatic analysis, PCR, phylogenetic tree.

PP-243

Molecular Analysis of a Putative Lipoxygenase Gene (*OeLOX*) from OliveTuğba AKYÜZ¹, Ekrem DÜNDAR²¹*Institute of Science, Balıkesir University, Turkey*²*Department of Molecular Biology and Genetics,
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Aim of the study: The objective of this study was to conduct bioinformatic analysis and molecular characterization of olive (*Olea europaea* L.) putative lipoxygenase gene (*OeLOX*).

Material and Methods: A cDNA clone labeled BK2-62 from previously constructed cDNA libraries of July unfruited olive leaves was analysed with bioinformatics tools for plasmid (insert) sequence information. The cDNA similarity analysis was conducted by BLASTn and BLASTx programs of NCBI-GenBank. The cDNA was determined to be a putative LOX gene of olive (*OeLOX*). To determine the phylogenetic marker potential of *OeLOX*, similar LOX sequences from other plants were aligned and obtained a phylogenetic tree. The open reading frame and nucleotide / amino acid composition of *OeLOX* were determined using BioEdit. Hydrophilic and hydrophobic regions of *OeLOX* were determined via online software at ExPasy. Primers were designed with Primer3 program to amplify the full length genomic sequence and introns were determined by comparing this sequence to that of cDNA. The polymorphism of *OeLOX* gene between olive cultivars was determined by aligning this gene's DNA sequences from 28 olive cultivars.

Results: *OeLOX* gene was slightly AT-rich (52,83%) based cDNA nucleotide composition while the protein contained 10% serin and 8.4% glycine amino acids out of 178 aminoacids. *OeLOX* sequence analysis indicated the protein had both intracellular and extracellular segments. Polymorphism analyses revealed multiple SNPs (single nucleotide polymorphism) among olive cultivars. PCR results showed that *OeLOX* gene had no introns.

Acknowledgements: This study was supported by TUBITAK through grant number 110O108.

Keywords: *OeLOX*, polymorphism, bioinformatic analysis, PCR.

PP-244

Antioxidant activities of the extracts from different parts of two *Salvia* speciesHilal Saruhan FİDAN¹, Abdulselam ERTAŞ², Mehmet BOĞA³, Mustafa Abdullah YILMAZ⁴, Sevgi İRTEGÜN⁵, Mehmet FIRAT⁶, İsmail Yener², Hamdi TEMEL⁴, Gülaçtı TOPÇU⁷¹Department of Biochemistry, Faculty of Pharmacy, Dicle University, Turkey²Department of Pharmacognosy, Faculty of Pharmacy, Dicle University, Turkey,³Department of Pharmaceutical Technology, Faculty of Pharmacy, Dicle University, Turkey,⁴Department of Pharmaceutical Chemistry, Faculty of Pharmacy, Dicle University, Turkey,⁵Department of Medical Biology, Faculty of Medicine, Dicle University, Turkey⁶Department of Biology, Faculty of Education, Yüzüncü Yıl University, Turkey⁷Department of Pharmacognosy and Phytochemistry, Bezmialem Vakif University, Turkey
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Aim of the study: In this research, antioxidant activities of extracts obtained from various parts of (roots, leaves, stems, flowers and mixed) *Salvia siirtica* and *Salvia kurdica* were compared.

Material and Methods: *Salvia siirtica* and *Salvia kurdica*, which was collected from east Turkey (Hakkari and Şırnak, respectively) in May 2015 and characterized by Mehmet Fırat (Yüzüncü Yıl University, Faculty of Education, Department of Biology, TR-65080 Van,). Voucher specimens were deposited in the Herbarium of Van Yuzuncu Yil University, Faculty of Science (*S. siirtica* VANF 30755, *S. kurdica* VANF32564). β -Carotene method, ABTS cation radical decolorisation method, cupric reducing antioxidant capacity assays and DPPH free radical scavenging activity were carried out to indicate the antioxidant activity. **DPPH Free radical scavenging activity method:** 0.1 mM, 160 μ L of DPPH solution in methanol was added to 40 μ L of sample solutions in methanol at different concentrations. After 30 min., the absorbance values were read at 517 nm. **ABTS cation radical decolorization assay:** Seven millimolar ABTS in H₂O was added to 2.45 mM potassium persulfate to produce ABTS^{•+} and solution was stored in the dark at 25 °C for 12-16 h. The prepared solution was diluted with ethanol to get an absorbance of 0.700 \pm 0.025 at 734 nm. ABTS^{•+} solution (160 μ L) was added to each sample solution (40 μ L) at different concentrations. After 30 min., the percentage inhibition at 734 nm was read for each concentration relative to a blank absorbance (methanol). **Cupric reducing antioxidant capacity (CUPRAC) method:** Aliquots of 61 μ L of 1.0 \times 10⁻² M copper (II) chloride, 61 μ L of NH₄OAc buffer (1 M, pH 7.0), and 61 μ L of 7.5 \times 10⁻³ M neocuproine solution were stirred, x μ L sample solution (2.5, 6.25, 12.5, and 25 μ L) and (67 - x) μ L distilled water were added to reach the final volume 250 μ L. The tubes were left to stand for one hour. Afterwards, the absorbance at 450 nm was measured against a reagent blank.

Results: It was determined that the studied two *Salvia* species had a high antioxidant potential according to the overall results. Especially ethanol extracts of these two species were found to be significantly more active than petroleum ether and chloroform extracts. The comparison at the extracts of different parts of the two species revealed that the root extracts were found to be more active within the two species. Ethanol extract of the root of *S.siirtica* species has been identified that it has a very high antioxidant potential in the methods of β -Carotene (IC₅₀:11,78 \pm 0,38), ABTS cation radical decolorisation method (IC₅₀: 25,15 \pm 0,30), cupric reducing antioxidant capacity assays (Inhibition: 1,465 \pm 0,052) and DPPH free radical scavenging activity IC₅₀: 37,20 \pm 0,99).

Acknowledgements: The research was funded by grant: KBAG 114Z801 from TUBITAK, The Scientific and Technological Research Council of Turkey.

Keywords: *Salvia siirtica*, *Salvia kurdica*, antioxidant.

PP-245

New and Known Records of Oribatid Mites (Acari) from the Yedigöller National Park (Bolu,Turkey)Ayşe TOLUK¹, Abdulkadir TAŞDEMİR², Sedat PER³, Nusret AYYILDIZ¹¹Department of Biology, Faculty of Science, Erciyes University, Turkey²Department of Biology, Institute of Natural and Applied Sciences, Erciyes University, Turkey³Department of Biology, Faculty of Art and Science, Bozok University, Turkey

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Aim of the study:The oribatid mites inhabiting in the Yedigöller National Park were evaluated from the taxonomic point of view with the aim of contributing to the oribatid fauna of Turkey

Material and Methods:The examined material were collected in 2014. Mites were extracted with the help of a Berlese-Tullgren funnel extractor from soil, litter, moss and lichen collected from the investigation area. Extracted mites were killed, fixed and stored in 80% ethanol. The light and scanning electron microscopes (SEM) were used to examine mites. The compound microscopic examinations of specimens were made in lactic acid, mounted in temporary cavity slides.

Results: In this study, total five oribatid mite species viz. *Hypochthoniella minutissima* (Berlese, 1904), *Oribatella (Oribatella) heterodentata* Karpinen and Shtanchaeva, 1987, *Tectocepheus alatus* Berlese, 1913, *Dissorhina ornata ornata* (Oudemans, 1900) and *Moritzoppia escotata* (Subías and Rodríguez, 1986) were determined. Of these, *Hypochthoniella minutissima* (Berlese, 1904) and *Oribatella (O.) heterodentata* Karpinen and Shtanchaeva, 1987 are new records for the Turkish fauna. In conclusion, the morphological features of the determined species were given along with the SEM images.

Keywords: Oribatid mites, new records, Yedigöller National Park, Turkey.

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Bioinformatic Analysis, Polymorphism and Allele Diversity of an Oleocanthal Related Secologanine Synthase from OliveMevlüt KOÇAK¹, Ekrem DÜNDAR¹, Ayhan DAĞDELEN²¹Balıkesir University, Faculty of Science and Literature, Department of Molecular Biology and Genetics, Balıkesir, TURKEY²Balıkesir University, Faculty of Engineering and Architecture, Department of Food Engineering, Balıkesir, TURKEYmevlut_kocak72@hotmail.com

The aim of the study: Secologanin is an important iridoid in the formation of indole alkaloids. It is (with tryptamine) the direct precursor of strictosidine, the general intermediate in indole alkaloid biosynthesis. In this study, molecular characterisation of a secologanin in olive (*Olea europaea* L.) by determination of nucleotide sequences of this gene (OeSec) and the protein encoded by this sequence was aimed.

Material and Methods: Nucleotide BLAST and protein BLAST (for comparison of the similarity of this gene with that of other organisms) were conducted on NCBI web page. Phylogenetic tree (determination of affinity of this gene with other organisms) construction, amino acid composition analysis (to determine the number and types of amino acids of this gene in different plants), nucleotide composition analysis (to detect the AT / GC ratio), hydropathy analysis (to determine whether its hydrophilic or hydrophobic) and translation through ExPASy (to determine the molecular weight of the protein and isoelectric point / pI) were conducted. Primer3 was used to design forward and reverse primers to amplify OeSec from different olive cultivars, and to detect polymorphism along with allele diversity.

Results: Analysis with BioEdit program revealed that 485 amino acids were encoded by this gene. A+T ratio was more than G+C according to the nucleotide composition analysis. According to amino acid composition analysis isoleucine, lysine and leucine were more than other amino acids while Kyte&Doolittle hydropathy analysis revealed that the protein was hydrophilic. Abundance of hydrophobic amino acids (leucine and isoleucine) along with an abundant hydrophilic amino acid (lysine) suggest the existence of hydrophobic pockets in the protein which may mean a membrane bound protein or a cytoplasmic protein with a strong hydrophobic core. The molecular weight of the protein was 56 kDa with an isoelectric point (pI) of 9.21. The protein was found to have a signal peptide based on the analysis with TargetP program. According to the SOSUI_{GramN}, secologanin intracellular localization was found to be in the inner membrane. Polymorphism and allele diversity among olive cultivars, spatial and temporal expression pattern and SDS-PAGE analyses are in progress.

Acknowledgements: This study was supported by TUBITAK with grant number 110O108.

Key words: Olive, *Olea europaea* L., Secologanin, Polymorphism, Allele diversity.

PP-248

Molecular Characterization and Biodiversity Analysis of an Acyl CoA Binding Protein from OliveEkrem DÜNDAR¹, Büşra BAŞ²¹Department of Molecular Biology and Genetics,
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Aim of the study: The aim of this study was to characterise an acyl CoA binding protein from olive (*OeACBP*) with respect to sequence analysis, intron-exon numbers, amino acid analysis, polymorphism, temporal and spatial expression patterns, allele diversity, and biochemical characterization.

Material and methods: In this study, BioEdit, FinchTV, CLC Genomics Workbench, Primer3, SOSUI, SignalP, TMHMM, nucleotide and protein BLAST programs for bioinformatic analysis of *OeACBP*, were utilized. Polymorphism, real time PCR, cloning, transformation and Western Blot analyses were used for further molecular and biochemical characterization of the gene.

Result: Bioinformatic analysis revealed that *OeACBP* was a protein consisting of 88 amino acids (most of amino acids were glutamic acid, alanine and lysine), it had 10 kDa molecular weight, it was hydrophobic with an isoelectric point (pI) of 5.85. Polymorphism analysis using primers amplifying the full length *OeACBP* revealed that the gene is polymorphic among olive cultivars but not able to distinguish all cultivars from each other. The number of alleles among olive cultivars were more than 10 based on nucleotide sequences while they were less based on amino acid sequences. Temporal and spatial expression patterns conducted using quantitative RT-PCR (qRT-PCR) revealed that the gene expressed mostly in fruits. Considering the fact that it was isolated from a fruit cDNA library, its expression pattern is in accordance with its tissue location.

Acknowledgements: This study was supported by TÜBİTAK with grant number 110O108.

Keywords: Olive, *Olea europaea* L., *ACBP*, Bioinformatic analysis, Molecular characterization, Western Blot analysis.

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Determination Of the Chemical Composition and Antioxidant Activities of Different Solvent Extracts from *Cyclamen coum*Cigdem AYDIN¹, Ramazan MAMMADOV¹¹Pamukkale University, Faculty of Science and Art, Department of Biology, Kinikli, Denizli/Turkey
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Aim of the study: This study was aimed to determine the *in vitro* antioxidant activities of various solvent (ethanol, methanol and acetone) extracts obtained from *Cyclamen coum* Mill. Its fractions were investigated for their phytochemical screening and the HPLC analysis of the extracts revealed the presence of several polyphenols.

Material and Methods: Ethanolic, methanolic and acetonetic extracts were obtained from using leaves and bulbs of geophyte species. Phenolic compounds were evaluated by reversed-phase high performance liquid chromatography (HPLC). The phenolic compounds were recognized by comparing retention times and UV absorption spectra with those of pure standards. The amount of each phenolic compound was expressed as µg/g per gram of the extract. The extracts were screened for their possible antioxidant activities by four complementary tests; DPPH (2,2-diphenyl-1-picrylhydrazyl) free radical-scavenging, ABTS free radical scavenging, ferric reducing antioxidant power assays (FRAP) and β-carotene-linoleic acid assays. BHT was used as standards. In addition, total phenolic and flavonoid contents in all the extracts of *Cyclamen coum* were determined as gallic acids and quercetin equivalents

Results: The results indicated that ethanol fraction exhibited stronger antioxidant activities than other fraction. The highest antioxidant activity efficiency was determined in extract leaves ethanol (87.56%) and the least efficiency in extract tuber-acetone (10.1%). The highest total phenolic content of the leaves ethanol extracts was found 8.99±3.010 mg/mL GAE as gallic acid equivalent. HPLC data indicated that more phenolic acids were extracted of plants and maximum nine phenolic acids (gallic acid, 3,4-dihydroxy, 4-dihydroxy, chlorogenic acid, Vanilic acid, Caffeic acid, p-Coumaric acid, Ferulic acid and Cinnamic acid) Results of the present study demonstrated that the extracts of *C. coum* may be used as a source of natural antioxidant and phenolic acid in the food and pharmaceutical industries. *Cyclamen coum* is a traditional medicinal plant in the Turkey.

Keywords: Antioxidant activity, *Cyclamen coum*, total phenolic content, HPLC.

PP-250

The Second Record of *Stigmaeus uzunolukensis* Özçelik and Doğan (Acari: Stigmaeidae) from Turkey

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Aim of the study: The members of the family Stigmaeidae have been discovered from almost all biogeographical region and more than 35% of the species are free-living predators on plant leaves and branches. *Stigmaeus* is a cosmopolitan genus in the family. *Stigmaeus uzunolukensis* was described from Uzunoluk Forest (Turkey) by Özçelik and Doğan (2011). With this study, four female specimens of this species are collected in the new locality, Harşit Valley (Turkey). Harşit Valley is rich in terms of biodiversity with its nature of soil and climatic features. We aimed to contribute to distribution of the species.

Material and Methods: Mite specimens were collected from Harşit Valley, between the years 2013-2015. Under conditions of laboratory; female specimens of this species were extracted by using Berlese funnels, cleared in 60% lactic acid and mounted on microscopic slides in Hoyer's medium under stereo microscope. Measurements were taken in micrometers (μm) with the aid of the Leica Application Suite (LAS) Software Version 3.8. and drawings for some parts of the body were made under a Leica DM 4000 microscope. Photos were taken with the aid of a Olympus BX63 DIC microscopes.

Results: The type specimens of *S. uzunolukensis* Özçelik and Doğan were previously obtained from lichen on a decayed pine log and altitude of 2049 m. This time, female specimens of this species are collected from moss on an unidentified decayed log and altitude of 1248 m, Harşit Valley. Structural differences between type and specimens collected from Harşit Valley were emphasized. Specimens from Harşit Valley are smaller than the type specimens in terms of body size, and they have apodemal markings on their propodosomal shield. This is the second report of the species.

Acknowledgements: This study was supported by the Scientific and Technological Research Council of Turkey (TÜBİTAK), research project number 113Z094.

Keywords: Acari, Harşit Valley, new locality, *Stigmaeus*, Stigmaeidae, Turkey.

PP-251

A Phytosociological Investigation on the Phrygana Vegetation of Bodrum (Muğla) Peninsula

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Aim of the study: The study area is within the boundary of Muğla city. The approximate size is 400 km². This investigation was carried out between 2011 and 2013 in order to research the vegetation of Bodrum (Muğla) Peninsula. In this study, our aim was to identify the phrygana vegetation of Bodrum (Muğla) Peninsula.

Materials and Methods: Vegetation studies have been made according to the Braun-Blanquet method (Br.-Bl., 1932). In order to compare associations, we used Jaccard's index of similarity. For the definition of the plant associations, sample plots were taken from each plant formation, in adequate number and in suitable size. Consequently, the floristic compositions of the associations, and the dominance and constancy of the species were determined. In total, 56 sample plots were taken, and 5 plant associations and 2 subassociations were individuated by the analyses of these plots.

Results: The vegetation of Bodrum Peninsula belongs to the Euro-Mediterranean belt. Phrygana vegetation is secondary vegetation and is usually formed by the destruction of macchie vegetation. This vegetation represented five plant associations and two sub associations. Associations and their higher syntaxa are as follows:

Cisto-Micromerietea Oberdorfer 1954*Cisto-Micromerietalia* Oberdorfer 1954*Sarcopoterio spinosi-Asphodeletum aestivi* Aytepe & Varol ass.nova*gynandriretosum sisyrinchii* Aytepe & Varol subass. nova*cistosum monspeliensis* Aytepe & Varol subass. nova*Hyperico empetrifolii-Micromerion graecae* Barbero & Quezel 1989*Cisto salviifolii-Ericetum manipuliflorae* Aytepe & Varol ass.nova*Helichryso orientale-Phagnalenion graeci* Barbero & Quezel 1989*Helichryso orientalis-Sarcopoterietum spinosi* Aytepe & Varol ass.nova*Sarcopoterio spinosi-Artemisietum arborescentis* Aytepe & Varol ass.nova*Cisto monspeliensis-Genistetum acanthocladae* Aytepe & Varol ass.nova

Acknowledgements: This study was supported by the Scientific Research Projects of Muğla Sıtkı Koçman University (Project Number 1138).

Keywords: Bodrum, Muğla, Peninsula, Phrygana, Phytosociology, Vegetation.

PP-252

**Effects Of Red Clover Extract On Sex Reversal And Gonadal Development In The African Catfish
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Aim of the study: Monosex populations are in demand in many fish species with sexual dimorphism, e.g., better growth performance, higher gonad value, superior ornamental value. Synthetic steroids are commonly used to induce monosex population in fish but because of the potential hazards of such steroids; the use of new chemicals is a potential alternative to be explored. Phytochemicals are also reported to induce sex reversal and positive effects of the phytoestrogens on growth in fish attracted to research into possible benefits in fish culture. In this study, effects of red clover extract on sex reversal and gonadal development of African catfish *Clarias gariepinus* were investigated.

Material and Methods: The newly hatched African catfish larvae (averaging 2.8 ± 0.03 mg) were randomly removed from the hatching tank, and placed in 12 glass aquaria, each containing 30 L of water. The photoperiod was maintained on a 12-h light: 12-h dark schedule and controlled temperature ($25 \pm 1^\circ\text{C}$). Each aquarium comprised 100 larvae and a total 1200 larvae were used for the experiment. Positive control treatment and three different concentrations (0, 10, 50 and 75 mg/l) of red clover extracts were applied by immersion method on *C. gariepinus* larvae for 30 days, and the effects of red clover extract on sex reversal and gonadal development were also examined at the end of 120 days. When the fish reached four months, gonads in male and female catfish can clearly be distinguished, 50 randomly sampled fish from each group were sacrificed. For histological examination, the gonads were fixed in 10% neutral formalin and processed by routine dehydration and paraffin embedding procedures. Cross-sections (4-6 μ thick) were stained with Mayer's hematoxylin and eosin phloxine B solution, examined, and microphotography.

Results: At the end of experiment, highest feminization (89%) was observed at 50 mg/l red clover group. Morphological and histological examinations of the gonads in all groups revealed no intersex fish. Histological examination of fish treated with red clover extract revealed no damage to the testes or ovaries. In addition, mean growth rate, gonad weight and gonadosomatic index values of all treatments were compared from the control group with t-test and found no significant differences ($P > 0.05$). This study demonstrated successful sex reversal with treatment of red clover extract on new-born progenies of *C. gariepinus* than untreated progenies.

Acknowledgements: The study was supported by the project (03 E 0208) of University of Mustafa Kemal in Turkey.

Keywords: African catfish, *Clarias gariepinus*, Red clover extract, *Trifolium pratense*, Sex reversal.

PP-253

**The Effects of Soy Extract on Sex Reversal and Growth Performance in the Rainbow trout
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Aim of the study: Monosex fish stocks are desirable in aquaculture in order to control reproduction and select the gender that displays faster growth characteristics in a particular species. Synthetic steroids are commonly used to sex-reverse trout but because of their potential hazards; the use of new chemicals is a potential alternative to be explored. Phytoestrogens present in many plants have many reported biological properties. This study explores the possible utilization of soy extract as phytoestrogen on Sex Reversal and Growth Performance in the Rainbow trout (*Oncorhynchus mykiss*, Walbaum, 1792)

Material and Methods: The experiment was carried out in Kahramanmaraş trout farm of Kiliç Holding Co. in Turkey. The 14 days-old rainbow trout larvae (mean weight 0.123±0.03 g) were randomly removed from the hatching tank, and placed in 1000-l fiberglass tanks (200x100x75 cm). Each tanks comprised 1500 larvae and a total 6000 larvae were used for the experiment. Four dietary groups were fed a formulated diet supplemented with soy extract at a concentration of 0, 20, 40 and 60 mg/kg, respectively. Soy extracts were administered with the first exogenous feed for up to 60 days, and the effects of soy extract on sex reversal were also examined at the end of 125 days. When the fish reached four months, 50 randomly sampled fish from each group were sacrificed. For histological examination, the gonads were fixed in 10% neutral formalin and processed by routine dehydration and paraffin embedding procedures. Cross-sections (4-6 µ thick) were stained with Mayer's hematoxylin and eosin phloxine B solution, examined, and microphotography.

Results: At the end of experiment, the highest feminization (75%) was observed at 60 mg/kg soy extract treatment group. While second high rate of sex reversal (66.33%) was observed at 40 mg/kg soy extract group, sex reversal rate at 20 mg/kg soy extract group was 60%, indicating that feminization is a dose-dependent process. Morphological and histological examinations of the gonads in all groups revealed no intersex fish. Histological examination of fish treated with soy extract revealed no damage to the testes or ovaries. In addition, the highest value of weight gain, specific growth rates (SGR) and feed conversion range (FGR) were 2.67±0.19 g, 5.22±0.17 and 0.95±0.07 at 60 mg/kg soy extract treatment group, respectively. In conclusion, these result indicate that the use of higher doses of soy extract are more effective for all-female production of the rainbow trout population.

Acknowledgements: We thank to Taner SEKER from the KILIÇ HOLDING Co. for allowing this experiment in their farm.

Key Words: Rainbow trout, *Oncorhynchus mykiss*, Sex reversal, Soy extract.

PP-254

***In vitro* multiplication and essential oil accumulation of *Thymus leucotrichus* Hal.**Tuba BEKİRCAN¹, Mustafa CÜCE¹, Ahmet YAŞAR², Atalay SÖKMEN¹¹Karadeniz Technical University, Faculty of Science, Department of Biology, 61080, Trabzon, TURKEY.²Karadeniz Technical University, Faculty of Pharmacy, 61080, Trabzon, TURKEY
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Aim of the study:The objective of this study was to develop a rapid regeneration system of an important medicinal plant of *Thymus leucotrichus* Hal. (Labiatae).

Material and Methods:Initially *in vitro* grown seedling were exposed to Murashige and Skoog, (MS) medium, Gamborg (GB-5) medium , Linsmaer and Skoog (LS) medium and Shake Hildebrandt (SH) medium. Then, for shoot proliferation, BAP (benzyl amino purine), KIN (Kinetin), 2iP (2-isopentenyladenine) and TDZ (Thidiazuron), each at the concentrations of 0.1, 0.5,1.0 and 2.0 mg / L , were tested for their ability to multiply *T. leucotrichus*. For the essential oil analyses, one gram dried samples from seedlings were randomly chosen from the population and subjected to Headspace GC-MS.

Results:Maximum number of shoots (56,66± 6,67 %) was observed on the MS mediumAccording the shoot number 1mg/L BAP showed the best value with 3,30 ± 0,59 mg.. Kinetin gave the highest values of shoot length at the concentration of 0,1mg/L (40,16 ± 3,81 mg) and 0,5 mg/l (40,88 ± 3,53 mg). In addition, 1 mg/L TDZ obtained the best results in the fresh (697± 59,7 mg) and dry weight (61,3± 6,8 mg). The essential oil content was completely different and variable depending up on the PGR content; gamma terpinene, thymoquinone, myrcene, limonene, camphene and alpha-phell being the major constituents.The highest percentage of thymol was observed at 1mg/L Kin (55.82 %) while control group had 37.91%. Considering the percentage of carvacrol, 0.1 TDZ (12.53%) had given best value. Some essential oils were not observed in the control group, appeared with PGRs addition like a myrcene,cymene-para,gamma terpinene.

Keywords: *T. leucotrichus*, *in vitro*, Kinetin, BAP, essential oil, GS-MS.

PP-254

Antimicrobial and cytotoxic properties of both micropropagated and naturally growing plantlets of *Crepis stojanovii* GEORG.

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Aim of the study: This study was designed to determine antimicrobial and cytotoxic effects of both natural and micropropagated plantlets of *Crepisstojanovii* GEORG. Extracts of all plantlets were also evaluated for their antimicrobial and cytotoxic activity.

Material and Methods: The HE, DCM and MeOH extracts were tested against *Staphylococcus aureus* ATCC 25923, *Escherichia coli* ATCC 25922, *Pseudomonas aeruginosa* ATCC 27853, *Acinetobacter haemolyticus* ATCC 19002, *Enterobacter aerogenes* ATCC 13048, *Klebsiella pneumoniae* ATCC 13883, *Salmonella* Typhimurium ATCC 10708 for antibacterial activity and *Candida albicans* ATCC 10231, *Candida parapsilosis* ATCC 22019 for anticandidal activity tests. The microorganisms were provided by the Department of Clinical Microbiology, Faculty of Medicine, Karadeniz Technical University, Trabzon, Turkey. Disc diffusion assay was performed by following the protocols of Clinical and Laboratory Standards Institute (2013) and The European Committee on Antimicrobial Susceptibility Testing (2014). For *Cell culture*, Human HeLa cervical carcinoma cells were cultured in Eagle's Minimum Essential Medium (EMEM) supplemented with 10% (v/v) heat-inactivated fetal bovine serum, and antibiotic-antimycotic mixture [penicillin (100 U/mL), streptomycin (100 µg/mL), amphotericin B (0.25 µg/mL)]. For *Cytotoxicity Test (MTT Viability Assay)*, Cytotoxic activities of the MeOH extracts were tested by using the MTT assay with minor modifications (Önay-Uçar et al., 2012). The absorbance was measured at 570 and 690 nm in a microplate reader (µQuant, Bio-Tek Instruments, Inc. Highland Park, USA). The cell viability was calculated using the following equation:

Cell viability (%) = (A sample / A control) x 100

Results: Hexane extracts from natural and *in vitro* propagated plantlets showed activity only against *Staphylococcus aureus* ATCC 25923 with MIC values at 1.47 and 0.9 mg/mL, respectively while in the latter case, extracts from natural plantlets exerted higher cytotoxic activity than those of micropropagated ones (IC50 of 0.091 µg/mL and IC50 of 0.781 µg/mL on HeLa cells, respectively).

Acknowledgements: The authors deeply appreciate the financial support of KTU-BAP (The Scientific Research Committee of Karadeniz Technical University) for the project KTÜ-BAP.1064 and Prof. Dr. Hüseyin İNCEER for his contributions.

Keywords: *Crepisstojanovii*, Micropropagation, Antimicrobial Activity, Cytotoxic Activity

PP-256

On the occurrence of juveniles and egg capsule of *Scyliorhinus canicula* from North-eastern Mediterranean SeaEbru Ifakat OZCAN¹, Nuri BAŞUSTA²¹Fisheries Faculty, Tunceli University, TR-62300, Tunceli, Turkey²Fisheries Faculty, Firat University, TR-23119, Elazig, Turkey
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Aim of the study: Smallspotted catshark, *Scyliorhinus canicula* is a catshark of the family Scyliorhinidae. It has ecological importance. This species is currently listed as "Least Concern" on the IUCN Red List of Threatened Species, because there is no evidence to indicate that the global population has declined significantly. There are currently no conservation actions in the Mediterranean. This study is to describe potential nursery and egg laying areas of *S. canicula* in the North-eastern Mediterranean. Thus, this study provides the first record of eggs and juvenile smallspotted catshark from the same area.

Material and Methods: During commercial trawl fishing in the international of the North-eastern Mediterranean (between 35° 31' 328 N - 36° 13' 242 E and 35° 14' 566 N - 36° 12' 927 E) at 45-60 m depths eggs and juvenile of *Scyliorhinus canicula* specimens were caught as by-catch on the 12th of June 2015. Fish samples were immediately transported in the Department of Fisheries Faculty ecophysiology laboratory (Firat University) where they were identified, sexed and photographed. Morphometric measurements of the specimens were taken to the nearest 1 mm and the weight of each specimen was measured with a digital scale to the nearest 0.01 g (Total length, fork length, precaudal length, predorsal length, head length, prebranchial length, preorbital length, preanal length, eye length). *S. canicula* specimens were preserved at the Museum of Fisheries Faculty, Firat University.

Results: The length at which lesser spotted cat shark began laying eggs during the years of the present study was 51 cm. The average largest egg diameter was measured as 7.45 mm and smallest 1.4 mm. Smallest egg sac diameter 4.3 mm; the largest egg sac has been identified as 19, 8 mm in diameter. Total lengths and weights of females and males of *S. canicula* were 12.5-15.6 cm, 3.79-9.48 g, respectively. Considering total lengths of *S. canicula*, it is thought that this area of North-eastern Mediterranean Sea might be one of the breeding and nursery grounds for this species. There are currently no conservation actions in region. Continued monitoring of landing and discarded data is necessary measures important to avoid any future population decline.

Acknowledgements: A part of this work was supported by Scientific Research Projects Coordination Unit of Firat University. Project Number SUF.12.02.

Keywords: *Scyliorhinus canicula*, spotted catshark, egg capsule, juvenile, North-eastern Mediterranean.

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DNA Barcoding and Detection of the *Wolbachia* Infections in the *Culex* Species Collected from Aegean Region of TurkeyBurçin MORÇİÇEK¹, Belgin GÖÇMEN TAŞKIN¹, Ersin DOĞAÇ², Taylan DOĞAROĞLU¹, Vatan TAŞKIN¹¹Department of Biology, Faculty of Science, Mugla Sitki Kocman University, Mugla, Turkey²Koycegiz Vocational School, Department of Medicinal and Aromatic Plants, Mugla Sitki Kocman University, Mugla, Turkey.Corresponding author: tvatan@mu.edu.tr

Aim of the study: The genus *Culex* is one of the largest groups of Culicidae and some species of this genus are known to be important disease vectors and are widely distributed throughout the world. Identifying members of the *Culex* species by morphological methods is difficult and time consuming. In the present study, a fragment of the cytochrome c oxidase subunit I (COI) mitochondrial gene was employed to assess the species identification in natural populations of *Culex* species sampled from western part of Turkey. We also investigated the presence and diversity of *Wolbachia* infections in these populations.

Material and Methods: During 2013 and 2014 specimens of *Culex* were collected from twenty five different sublocations belonging to six provinces of the Aegean region in Turkey. The universal barcoding primers were used to amplify the barcode region of the mtDNA COI gene. A total of 120 specimens were screened by using general *wsp* primers for the presence of *Wolbachia* strains. The population genetic structure and genetic variability within and between populations of *Culex* species were also calculated.

Results: DNA barcoding analysis showed the presence of three distinct species *Culex quinquefasciatus*, *Culex pipiens* and *Culex perexiguus* in the studied region. *Wolbachia* infections were found to be prevalent with nearly 70% in all analyzed samples. A single *Wolbachia* haplotype were found in screened individuals.

Acknowledgements: Part of this study was financially supported by Mugla Sitki Kocman University Scientific Research Funds (project number MSKUBAP-2015/162).

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Karyological study in *Amphoricarpos praedictus* (Asteraceae)Esra MARTİN¹, Bekir DOĞAN², Ahmet DURAN³, Ayşe KAPLAN⁴, Meryem ŞEKER³¹*Necmettin Erbakan University, Science Faculty, Department of Biotechnology, Konya, Turkey*²*Necmettin Erbakan University, Education Faculty, Department of Science Education, Konya, Turkey*³*Selçuk University, Science Faculty, Department of Biology, Konya, Turkey*⁴*Bülent Ecevit University, Science and Arts Faculty, Department of Biology, Zonguldak, Turkey*

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Aim of the study: The purpose of this study to report the somatic chromosome number and karyotype of *Amphoricarpos praedictus* for the first time.

Material and Methods: For karyotype analysis, root tips were obtained from seeds germinated for ten days on wet filter paper in petri dishes. Root tips were pretreated with α -monobromonaphthalene for 16 h at 4 °C, fixed in ethanol: glacial acetic acid (3:1) for 24 h and stored at 4 °C until use. Root tips were washed in distilled water to remove the fixative, hydrolysed in 1N HCl for 7 min at room temperature and stained in 2% aceto-orcein for 2 h. Permanent slides were made with the standard liquid nitrogen method; slides were dried for 24 h at room temperature and mounted in depex. Karyotype analysis was made using Bs200Pro Image Analysis Software.

Results: Karyotype of *Amphoricarpos praedictus* (Asteraceae) naturally in Turkey was analyzed in detail. Squash preparation method was used for chromosome study in this species. The somatic chromosome number was counted as $2n=24$ in *Amphoricarpos praedictus*. The basic chromosome number of the genus was $x=12$. The shortest chromosome length is 0.99 μm , the longest is 2.48 μm , and haploid chromosome length is 19.11 μm . Chromosome arm ratios are measured as 1.08–1.83. Centromeric index varies between 5.21 and 13.00, and relative lengths vary from 2.46 to 5.23. The karyotype was determined using Image Analysis System. The karyotype formula of this species consists of nine median chromosome pairs and three submedian chromosome pairs. The ideogram was drawn based on centromeric index and arranged in the decreasing size order.

Acknowledgements: We express our thanks to TUBITAK (Project no. KBAG-113Z803) for financial support.

Keywords: *Amphoricarpos praedictus*, Karyotype, Turkey.

PP-259

Elemental Composition of *Plantago holosteum* Scop. (Plantaginaceae) Naturally Growing Around the Abandoned Tungsten Mine WorkHülya ARSLAN¹, Gürcan GÜLERYÜZ¹, Hawa KIAZOLU¹, Ümran Seven ERDEMİR²¹Department of Biology, Faculty of Arts and Sciences, University of Uludağ, 16059, Bursa, Turkey²Department of Chemistry, Faculty of Arts and Sciences, University of Uludağ, 16059, Bursa, Turkey
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Aim of the study: Phytoremediation are included the alternative techniques to conventional techniques for the remediation of diffused or moderately contaminated soils. Further geobotanical surveys and plant screenings are necessary because these could lead to the identification of additional plant species with potential value for plant-based remediation techniques. This study evaluates the elemental (W, Mo, Zn, Fe, Cu, Cd, Mn, Pb, Cr, Co, B and Bi) composition of *P. holosteum* around the abandoned tungsten mine on Uludağ Mountain, Turkey.

Material and Methods: Three sample sites were selected around the mine for soil and plant sampling. Two sites approximately 500 m from the mine were assumed to be unpolluted sites. The other site was selected from a waste removal pool (WRP) and was assumed to be a polluted site. The soil and different organs (roots, leaves and flowers) of plant samples were analyzed by ICP-MS to determine the elemental content. The classic open wet digestion procedure was applied to the samples with 5 mL HNO₃ and 3 mL H₂O₂ in a borosilicate glass vessel for the roots, leaves and the flowers of the plants. Kjeldahl digestion was used for the soil samples. The W, Zn, Fe, Cu, Cd, Mn, Pb, B and Bi contents were found to be higher in the soil samples from the waste removal pools compared with the samples from the unpolluted sites.

Results: We found that the elemental composition of *P. holosteum* has generally been increased by the activity of the tungsten mine. The results suggest that *P. holosteum* may be considered a bioaccumulator species for W, Mn, Cu, Cd, and Fe and can be used as a bioindicator for these elements.

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Keywords: *Plantago*, Tungsten Mine Work, Uludağ, element content.

PP-260

Germination responses to GA₃ and short-time chilling of Endemic *Onosma velutinum* Boiss. (Boraginaceae)Gürcan GÜLERYÜZ¹, Hülya ARSLAN¹, Serap KIRMIZI²¹Department of Biology, Faculty of Arts and Sciences, University of Uludağ, 16059, Bursa, Turkey²Horticulture Programme, Gemlik Asım Kocabıyık Graduate Vocational School, University of Uludağ, 16600, Gemlik/Bursa, gurcan@uludag.edu.tr

Aim of the study: Germination response patterns can vary depending on habitat, life history traits, phylogenetic relationships and geographic distribution. Although germination is only the first step in a plant's life cycle, the successful recovery of endemic and rare species requires the best biological information available; this information is also necessary for developing recovery guidelines. In this study, we aimed to investigate the germination requirements of a rare endemic plant species, *Onosma velutinum* Boiss. (Boraginaceae) collected from natural population on Uludağ Mountain, Turkey.

Material and Methods: Freshly mature seeds of *O. velutinum* were collected from sub-alpine belt of Uludag Mt. between 1500 and 1800 m a.s.l. in September 2009. We studied the effects of moist chilling (+4°C) for 15 days, different doses of gibberellic acid (GA₃; 100, 150 and 250 ppm) and combined hormone and moist chilling treatments under dark (20°C) and photoperiod (20/10°C; 12/12 h, respectively) conditions. GA₃ was able to break dormancy.

Results: The highest germination rate was found in the seeds treated with 250 ppmGA₃; 51% of these seeds germinated when treated with moist chilling and incubated in the photoperiod conditions. The shortest mean germination time (MGT) was found as 8.9 day with 250 ppmGA₃ combined with moist chilling in the photoperiod conditions. In the treatment series non-combined with GA₃, the seed germination percentage was %12 in the seeds treated with 15 days moist chilling under photoperiod conditions while it was %3 in the seeds treated with dark conditions. These results show that the seeds of *O. velutinum* are dormant and they require long term moist chilling for breaking dormancy.

Acknowledgements: This study was part of a research project funded by the Turkish Scientific and Research Council (to S. Kırmızı, Project No: 107T494)

Keywords: seed dormancy, *Onosma velutinum*, endemics, stratification, gibberellic acid.

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Antimicrobial Activity of Essential Oils from Four *Ferula* L. Species Growing in Kazakhstan Against Methicillin-Resistant *Staphylococcus aureus*

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Aim of the study: The genus *Ferula* L. belonging to the Apiaceae family consist of more than 170 species extending from central Asia westward throughout the Mediterranean region to northern Africa. Several species of *Ferula* L. have been used in traditional medicine. It has been reported that plants of this genus possess antimicrobial, antifungal, anti-inflammatory, anticonvulsant, antioxidant activities. Part of the biological activities can be attributed to their essential oils. There are only few reports on the biological activities of essential oils from *Ferula* species. The antimicrobial effect of essential oils may be associated with the high content of α -pinene and β -pinene or polysulfides.

Material and Methods: Essential oils were obtained by hydrodistillation from the air-dried plant material of *Ferula iliensis* Krasn. ex Korov., *Ferula ovina* (Boiss.) Boiss., *Ferula kelleri* Koso-Pol. and *Ferula akitschkensis* B.Fedtsch. ex Koso-Pol. from the Almaty region of Kazakhstan. Analysis of the chemical composition of these essential oils was investigated using GC-MS. Essential oils were tested against methicillin-resistant *Staphylococcus aureus* (MRSA pulsed-field gel electrophoresis type USA300). Bacteria used in the studies were cultured in tryptic soy broth with 0.5% glucose and harvested at mid-exponential growth phase $OD_{600}=1.5$. Bacteria (2.5×10^7 CFU/ml) were resuspended in RPMI and incubated for 4 h at 37°C with 5 different concentrations of essential oils in 96-well tissue culture plates. Solutions of the essential oils were prepared in DMSO. Spectinomycin was added as a control. The growth suppression of bacteria was monitored as absorbance ($\lambda=600$ nm) using a SpectraMax 190 microplate reader. The inhibitory effect of essential oils was determined by calculation of the median effective concentration values (EC_{50}).

Results: The results showed that *F. ovina* essential oils had antimicrobial activity against MRSA in comparison with other *Ferula* species' essential oil samples. Furthermore, we found that essential oils from various plant parts of *F. ovina* had different levels of inhibitory activity. Essential oils isolated from *F. ovina* roots in the blossoming and fruiting stages possessed the highest antimicrobial activity. The main components of these oils were α -pinene, β -pinene and eremophylene. Concentrations of α -pinene, β -pinene and eremophylene in the essential oils of *F. ovina* roots during the blossoming stage were 47.4%, 1.9 % and 12.0% respectively, while concentrations of these monoterpenes and sesquiterpene in roots from the fruiting stage were 46.5%, 6.7% and 8.2%, respectively. Thus, these studies suggest essential oils from *F. ovina* may have antimicrobial properties that could be investigated in further research.

Acknowledgement: The research was financed by the grant (#2117/GF4) of Ministry of Education and Science, Republic of Kazakhstan.

Keywords: *Ferula*, essential oil, antimicrobial activity.

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Chemical Composition, Anti-Alzheimer, Anti-Microbial and Antioxidant Activity of *Stachys palustris* L.Hasibe YILMAZ¹, Ekrem AKÇİÇEK², Ahmet Ceyhan GÖREN¹, Turgut KILIÇ³, Tuncay DİRMENÇİ²
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Aim of the study: *Stachys* L. (Lamiaceae) is a subcosmopolitan genus of herbs and shrubs comprising approximately 370 species. There have been found 91 species (118 taxa) in Turkey and, 57 taxa of the 118 taxa are endemic to Turkey. Several Pharmacological studies have demonstrated the extracts from *Stachys* spp. have anti-inflammatory, cytotoxic, antitoxic, antibacterial and antioxidant activities. In folk medicine, *S. palustris* L. is used to antiseptic, antispasmodic, emetic, emmenagogue, expectorant, haemostatic, nervine, sedative, tonic, vulnerary agents. In this study, the essential oil and phenolic profile of *Stachys palustris* was investigated.

Material and Methods: The plant was cutted in small pieces and then extracted with chloroform, acetone and methanol. The plant extracted with chloroform (C), acetone (Ac) and methanol (M). The phenolic profile of the extracts was analyzed by LC-MS/MS. Also anticholinesterase activity of extracts and antimicrobial activity of the oil were studied.

Results: The main phenolic constituents of the extracts were as follow: for chloroform Chlorogenic acid, fumaric acid, for acetone chlorogenic acid, caffeic acid and fumaric acid, for methanol-1 and methanol-2 chlorogenic acid, fumaric acid, Luteolin-7-glucoside and Luteolin-5-glucoside. The extracts did not show antimicrobial activity against studied microorganism. For CUPRAC method both methanol extracts and acetone extract showed very remarkable activity. In DPPH and β -carotene-linoleic acid assay, the extracts have moderate activity especially at 100 μ g/mL concentration. The chloroform extract showed very weak activity for all methods. The anti-Alzheimer activity result showed that any of the extracts have not inhibited AChE or BChE significantly.

Acknowledgements: The authors thank to TÜBİTAK for supporting this study as a part of the project 112T139.

Keywords: *Stachys palustris*, Essential oil, Anticholinesterase activity.

PP-263

Amphibian, Reptile and Mammal Diversity of the Sölöz Dam and Its Surroundings (İzник, Bursa)

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Aim of the study: This study aimed to identify wild life species (except Avian fauna) diversity of Sölöz Dam and its surroundings. Determination of the diversity will allow the monitoring of anthropogenic effects on the wild life.

Material and Methods: In this study, field and observational study was conducted during 2015, in different habitats in Sölöz Dam and its surroundings. During the field work, optical devices (cameras, telescopes) and *global positioning system devices* has been used. Live capture traps for capture small mammals and mist- net mechanism for capture bats and landing net for amphibians has been used. Individuals captured were released back to nature after species identification. Moreover, determination of wild life species has been used for animal tracks (footprint, feces etc.).

Results: This study documents the results of a one year, field study of these organisms conducted Sölöz Dam and its surroundings in İzник, Bursa. A total of 15 species of amphibians, reptiles and small mammals were collected by trapping. Other species can not be trapped, observed and photographed. A total of 13 amphibian and reptile species and 9 mammal species were either collected or observed at the study area. This research resulted in the terrestrial and aquatic biotope of Sölöz Dam and its surroundings, is likely to spread 22 species were identified. This species belong to the following orders; Anura (Amphibia) (3 species), Testudinata (Reptilia) (1 species), Squamata (Reptilia) (9 species), Rodentia (Mammalia) (5 species), Chiroptera (Mammalia) (1 species), Lagomorpha (Mammalia) (1 species), Carnivora (Mammalia) (1 species) and Erinaceomorpha (Mammalia) (1 species). Wild life fauna of Sölöz Dam and its surroundings, evaluated by IUCN category. All species of study area are the LC (low risk, widely distributed) category. There are no endemic species.

Acknowledgements: This study was supported by Republic of Turkey Ministry of Forestry and Water Affairs. I wish to thank Esra TAŞ for her help in field work.

Keywords: Wildlife biodiversity, Sölöz Dam, Bursa.

PP-264

Total Phenolic Content and Antioxidant Capacity in Some Representatives of the Tribe Anthemideae (Asteraceae) from TurkeyNesrin COLAK¹, Huseyin INCEER¹, Sema HAYIRLIOGLU-AYAZ¹, Faik Ahmet AYAZ¹¹Department of Biology, Faculty of Science, Karadeniz Technical University, 61080 Trabzon, Turkey
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Aim of the study: Bioactive compounds such as phenolics and flavonoids and related antioxidant capacity in plants are associated with phytomedicines that play an important role in the human health care system. Anthemideae is one of the largest tribe of the family Asteraceae. The members are commonly used as folk medicine in Turkey and contain high level of phenolic compound. This study investigated total phenolic content and various associated antioxidants in 16 selected Asteraceae species.

Materials and Methods: Sixteen taxa belonging to genera *Tripleurospermum* (*T. tenuifolium*, *T. corymbosum*, *T. microcephalum*, *T. tempskyuanum*, *T. rosellum* var. *album*, *T. elongatum*, *T. oreades* var. *tchihatchewii*, *T. monticolum*, *T. repens* and *T. caucasicum*), *Achillea* (*A. biebersteinii*, *A. bisserata* and *A. wilhemsii*) and *Artemisia* (*A. annua*, *A. austriaca* and *A. santonicum*) were collected from different regions of Turkey. Collected whole plant parts including root, shoot and leaf were fully dried in shade at room temperature and stored under appropriate conditions. Only the capitulum parts of plants were used in this study. Total phenolic content, DPPH radical scavenging activity, ferric reducing antioxidant power (FRAP) and cupric Reducing Antioxidant Capacity (CUPRAC) were determined using standard methods. All results were expressed as dry weight (d.w.).

Results: The phenolic contents of the 10 selected members of the genus *Tripleurospermum* varied from 48.8 to 28.8 mg GA/g. *T. oreades* var. *tchihatchewii*, *T. corymbosum*, *T. tempskyuanum* had the highest total phenolic contents (48.8, 43.4 and 43.3 mg GA/g, respectively) while *T. monticolum* had the lowest content (28.8 mg GA/g). The extract of *T. corymbosum* exhibited the highest DPPH radical scavenging activity (150,8 µmol TE/g) and FRAP (435,2 µmol TE/g), while *T. microcephalum* exhibited the highest CUPRAC level (181,4 µmol TE/g). *A. wilhemsii* extract exhibited the highest antioxidant activity and highest amount of phenolic compounds (64.7 mg GA/g). The highest total phenolic content was obtained from *A. annua* (48,4 mg GA/g), and also the highest FRAP and CUPRAC levels (410,4 and 126,8 µmol TE/g, respectively).

Acknowledgment: Financial support for this study was provided by the Scientific and Technological Research Council of Turkey (TUBITAK- Project number: 106T162).

Key words: *Tripleurospermum*, *Achillea*, *Artemisia*, Antioxidant, Phenolics.

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Phenolics and Antioxidant Capacity of Erzincan Black Grape (*Vitis vinifera* 'Karaerik')Nesrin ÇOLAK¹, Aynur KURT¹, Faik Ahmet AYZAZ¹, Erdal AKPINAR²¹*Karadeniz Technical University, Graduate School of Natural and Applied Sciences, Biology Graduate Program, Trabzon*²*Erzincan University, Faculty of Education, Social Sciences Teacher Training Department, Erzincan.*
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Aim of the study: Grapes are one of the most important and most popular fruits because of their juicy texture, sweet taste and health benefits. Erzincan black grape (*Vitis vinifera* 'Karaerik') is one of the few patented and certified agricultural products of Turkey. Black grapes containing high levels of flavonoids are recommended as an important raw material for human health, and are used in the food, cosmetic and pharmaceutical industries as antioxidants, natural dyes, therapeutic substances, etc. The objective of this study was to conduct an assessment of the phenolic content and antioxidant activity of grapes grown in different habitats in Erzincan province, Turkey.

Materials and Methods: Grape samples at the same maturity levels were collected from six different habitats (Üzümlü, Bayırbağ, Karakaya, Pişkidağ, Göllerköyü, and Çağlayan-Yamaçlı) in Erzincan. Standard methods of analyses were used to determine total phenolics, flavonoid and monomeric anthocyanin contents and antioxidant capacity (DPPH, FRAP and CUPRAC). Sugar and organic acid contents in different berry parts of the fruit (flesh, peel, and seed) were also determined. All results were expressed as fresh weight (f.w.).

Results: Seeds from Üzümlü, skin from Karakaya and whole grape from Pişkidağ had the highest total phenolics compound content (6525.1, 834.5 and 246.8 mg GA equivalent /100g respectively). Grape skin and whole grape from Pişkidağ had the highest total flavonoid and monomeric anthocyanin contents (106.9 and 16.3 mg /100 g, 41.7 and 5.3 mg as of C3G /100g, respectively). Seeds from Bayırbağ had the highest DPPH free radical scavenging activity (299.2 µMol TEAC/g), and seeds from Üzümlü and Bayırbağ had the highest reducing powers (FRAP and CUPRAC; 991.3 and 11.1 µmol TEAC/g, respectively). Fructose and glucose were the major soluble sugars determined, and malic acid was the major organic acid. In conclusion, the black grape has high TPC and TF contents and may also be beneficial to human health. It has a low sugar level and may also be beneficial to diabetics and patients with heart disease. Expansion of growth in the region would also bring socio-economic benefits.

Acknowledgement: Financial support for this study was provided by the Scientific and Technological Research Council of Turkey (TUBITAK- Project number: 115Z365).

Keywords: Grape, *Vitis vinifera*, Antioxidant, Phenolic, Anthocyanin

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Biodiversity of *Bacillus thuringiensis* Isolates from different habitats in TurkeyBurcu POYRAZ¹, Müjgan OKTAY¹, Mehlika ALPER², Hatice GÜNEŞ¹¹Department of Biology, Muğla Sıtkı Koçman University, Turkey²Department of Molecular Biology and Genetics, Muğla Sıtkı Koçman University, Turkeyhaticegunes@mu.edu.tr

Aim of the study: *Bacillus thuringiensis* (Bt) is an entomopathogenic bacterium widely used in biological control. It produces insecticidal crystal proteins (ICP) during its sporulation phase. Cry proteins encoded by *cry* genes show specific toxicity against insect larvae. So far, many Bt strains have been isolated and characterized to have new Bt collections from different regions in the world. In this study, we investigated the diversity of crystal morphology, *cry* gene distribution and serotyping of *B. thuringiensis* isolates obtained from grain, olive and fig related areas in Turkey.

Materials and Methods: Soil, fruit, leaf, leaf residue, stored product dust, animal faeces, various residues and straw were collected from grain, olive and fig related areas where Bt preparation have not been applied in central Anatolia and the Aegean region. Samples were taken at 5-10 cm depth from the surface. All samples were placed in sterile plastic bags and stored at 4 °C until processed. Bt strains were isolated and examined with a phase-contrast microscope for crystal production and morphology. Then, the content of *cry* genes of Bt samples were detected by Polymerase Chain Reaction (PCR). Bt samples were screened by six pairs of primers for the *cry1*, *cry2*, *cry3*, *cry4*, *cry9* and *cry11* genes. *cry1* positive strains were further screened for 10 *cry1* genes: *cry1Aa*, *cry1Ab*, *cry1Ac*, *cry1Ad*, *cry1B*, *cry1C*, *cry1D*, *cry1E*, *cry1F*, *cry1G* and *cry1H*. Serotype distribution of isolates originated from olive and grain related habitats was carried out. Serological analysis based on reactivity with flagellar antisera was performed according to a micromethod, using 96-well microtiter plates.

Results: The frequency of Bt based on sample type showed that soil was the most frequent source with 50-70% for Bt isolation for each habitat followed by fruit, dust and leaf sources. The crystal shapes of Bt had a wide diversity. Even though Bt isolates from grain related areas contained mostly spherical, spherical and irregular pointed or cubic and spherical Cry proteins, high frequency of irregular shaped crystal inclusions were observed in Bt isolates from olive related areas. According to the PCR results, *cry* gene distribution showed a diversity among different habitats. Bt samples contained mostly *cry9* (43%) and *cry1* (35%; *cry1* (92%) and *cry2* (58%); *cry1* (67%) and *cry4* (55%) genes in grain, fig and olive related areas, respectively. The results of PCR analysis using specific primers for *cry1* genes indicated that *cry1Aa*, *cry1Ab*, *cry1Ac*, *cry1B*, *cry1C*, *cry1D* and *cry1Ea* genes were the most frequent genes (100%) followed by the *cry1Ad* (94%), *cry1G* (78%) and *cry1H* (43%) in fig related areas. On the other hand, *cry1E* (100%) gene was the most frequent one followed by *cry1Aa* (95%), *cry1Ac* (91%), *cry1D* (83%), *cry1C* (67%), *cry1G* (58%), *cry1F* (52%), *cry1Ab* (7%), *cry1Ad* (6%), *cry1B* (3%) in strains from grain habitats. In serotyping, *morrisoni* and *toumanoffi* in olive areas whereas *sotto* and *tochigiensis* in grain habitats were the most frequent serotypes. Unknown serotypes were observed in the collection as well. In conclusion, a major difference in distribution and diversity of *cry* genes were detected in all habitats and the *cry1* gene was the most frequent in fig and olive related areas.

Acknowledgements: This work was partially supported by grants from DPT (2002K-120/390), and TÜBİTAK-108T178)

Keywords: *Bacillus thuringiensis*, *cry* gene, crystal shape, serotyping

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Evaluation of phylogenetic relationships in the lichen-forming ascomycete *Xanthoria parietina* (L)**Th. Fr. species with a cosmopolitan distribution**Mithat GÜLLÜ¹, Fatma ÖZTÜRK KÜP¹, Mehmet Gökhan HALICI¹¹Department of Biology, Erciyes University, Kayseri, TURKEYmithatgullu23@gmail.com

Aim of the study: This study has been made to examine as phylogenetic relationships of *X. parietina* species belong to genus *Xanthoria*, which widely spreaded in our country and the world, and to determine the intraspecific genetic variation by using ITS primers with the help of PCR.

Material and Methods: A total of 20 samples of *Xanthoria parietina* were collected from different parts of Turkey and the world. DNA isolation was performed by using Qiagen DNeasy plant mini kit. PCR analysis was performed by using ITS primers (ITS1 and ITS4). Phylogenetic analysis of *Xanthoria parietina* lichen samples was performed by using the Maximum Likelihood method of the Mega 6 (Molecular Evolutionary Genetics Analysis) software program.

Results: The results are used to investigate the related regions by sequence analysis and to reveal the intraspecific genetic variation between *X. parietina* species. The phylogenetic analysis for ITS sequences are performed with the investigated samples and also with the samples obtained from Genbank. The analysis are conducted by the help the maximum likelihood method in order to reveal the genetic similarities between our studied samples. When we examine the Maximum Likelihood dendrogram, it is observed that species are seperated into two main branches. The species which is considered out group forms one of the branches, while the samples *X. parietina* species are grouped together.

Acknowledgements: This study was financially supported by FBY-11-3685 coded Erciyes University project.

Key words: Lichens, ITS (nrDNA), Phylogenetic analysis, *Xanthoria parietina*.

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Phylogenetic relationships of *Sarcogyne magnispora* Knudsen & Halıcı with the other members of the genusMithat GÜLLÜ¹ & Mehmet Gökhan HALICI¹¹*Department of Biology, Erciyes University, Kayseri, TURKEY*
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Aim of the study: In this study, we will discuss phylogenetic analysis as well as the morphological and ecological characters of these species along with distributional data of the species in Turkey.

Material and Methods: In this study, numbers of samples belonging to this genus collected from Turkey. DNA isolation was performed by using Qiagen DNeasy plant mini kit. Phylogenetic analysis of *Sarcogyne* lichen samples was performed by using the Maximum Likelihood method of the Mega 6 (Molecular Evolutionary Genetics Analysis) software program. After morphological and anatomical examinations; molecular analyses of ITS nrDNA gene region was carried in the samples.

Results: This genus is represented by 6 species in Turkey and 3 of them are present in Turkey: *S. magnispora*, *S. privigna*, *S. regularis*. A new species of *Sarcogyne magnispora* Knudsen & Halıcı in the calcareous nivea group is described from the uplands of central Anatolia, Turkey in 2009. It is distinguished from other species in the group by its larger ascospores. The phylogenetic analysis for ITS sequences are performed with the investigated samples and also with the samples obtained from Genbank. The analysis are conducted by the help the maximum likelihood method in order to reveal the genetic similarities between our studied samples. When we examine the Maximum Likelihood dendrogram, it is observed that species are separated into two main branches. The species which is considered out group forms one of the branches, while the samples *Sarcogyne* species are grouped together.

Keywords: Lichens, ITS (nrDNA), Phylogenetic analysis, Acarosporaceae, Turkey.

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Examination with ITS (rDNA) Gene Region as well as Morphological and Anatomical Methods of Some Lichenized Fungi in Erciyes MountMehmet Ünsal BARAK¹ & Mehmet Gökhan HALICI¹¹*Department of Biology, Erciyes University, Kayseri, TURKEY**munsalbarak@gmail.com*

Aim of the study: This study has been made to examine with the morphological, anatomical and molecular methods of some lichenized fungus which located in Erciyes Mountain. we will discuss phylogenetic analysis as well as the morphological and ecological characters of these species which located in Erciyes Mountain.

Material and Methods: In this study, some lichenized fungus collected from Erciyes Mountain, Kayseri. DNA isolation was performed by using Qiagen DNeasy plant mini kit. Molecular studies has been performed by using ITS primers with the help of PCR. By sequence analysis, the relevant regions were examined. Phylogenetic analyzes were conducted by NJ (Neighbor Joining) method.

Results: In this study, *Aspicilia cinerea*, *Lecidea atrobrunnea*, *Lecanora rupicola*, *Physcia dubia*, *Rhizocarpon geographicum*, *Rhizoplaca peltata*, *Tephromela atra* and *Xanthoparmelia pulla* species were used. The phylogenetic analysis for ITS sequences are performed with the investigated samples and also with the samples obtained from Genbank. The phylogenetic analysis are conducted by using the neighbor-joining method in order to reveal the genetic similarities between our studied samples.

Keywords: Lichenized Fungus, Erciyes Mountain, Biodiversity, Phylogenetic.

PP-270

Description of Novel Microsporidium from Elm Leaf Beetle, *Xanthogaleruca luteola* Müller (Coleoptera: Chrysomelidae)Çağrı BEKİRCAN¹, Onur TOSUN², Hilal BAKI³¹Department of Biology, Faculty of Science, Karadeniz Technical University, TURKEY²Department of Crop and Animal Production, Junior Technical College of Alucra Turan Bulutcu, Giresun University, TURKEY³Department of Plant and Animal Production, Espiye Vocational School, Giresun University, TURKEY
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Aim of the Study: Present study conducted for determine the new entomopathogenic microsporidia from elm leaf beetle, *Xanthogaleruca luteola* Müller (Coleoptera: Chrysomelidae).

Materials and Methods: *X. luteola* larvae and adults were collected from April to September 2013 - 2015 in İstanbul, Turkey. The beetles were dissected in Ringer's solution and smeared on microscopic slides then observed under a light microscope at magnifications of 400x to 1000x for detection of microsporidian pathogens. Smears, infection positive with microsporidia, were air-dried and fixed in methanol for 10 min. then stained with Giemsa stain. Microsporidian spores were photographed with Leica DM1000 microscope combined with Leica ICC50 digital camera. Spore measurements were taken using LAS EZ 1.0 Soft Imaging System imaging software. For transmission electron microscopy, an infected beetle's tissue were fixed within 2.5% glutaraldehyde in 0.1 M cacodylate buffer (pH 7.4) for 1–2 h, after washed with cacodylate buffer, postfixed in 1% aqueous OsO₄ for 2 hours. After the end of postfixation, again washed with cacodylate buffer and passed the step of dehydration which was performed with through an ascending alcohol series and acetone before the embedding in Spurr's resin. Prepared samples were examined and digitally photographed under a JEOL JEM 1220 transmission electron microscope.

Results: During the present study, 1029 *X. luteola* beetles were dissected and examined with light microscope. Two hundred eighty nine of the 1029 beetles were infected with that microsporidium (infection rate 27.89%). According to light microscopic observation infection only determined host's intestine. During the examinations, mature spores and intracellular stages were observed. Fresh spores were oval in shape and measured $4.25 \pm 0.52 \mu\text{m}$ in length and $2.12 \pm 0.25 (n = 500) \mu\text{m}$ in width. After the Giemsa staining, life stages of the pathogen were observed in the Giemsa stained smears. According to TEM (Transmission Electron Microscopy) analysis; novel microsporidium was unikaryotic and occurred in direct contact with the host cell cytoplasm. Adult spores were oval in shape and spore wall was relatively thin (75 to 115 nm); the wrinkle exospore thickness was 34 to 45 nm and the endospore thickness was 65 to 80 nm. The polar filament was isofilar and had eleven coils. Mature coils measured 67–79 nm in diameter. The polaroplast structure had a lamellated and vesicular structure under the anchoring disc.

In present study, we described the novel microsporidium pathogen that infect the elm leaf beetle, *X. luteola*, from İstanbul, Turkey.

Keywords: Elm, microsporidium, pathogen, spore, Turkey

PP-271

Diversity of Rhizobacteria Cotton Growing Regions of Harran Plain, Şanlıurfa, Turkey

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Aim of the study: The aims of this study were (i) to isolate *rhizosphere soil bacteria* from the rhizosphere of cotton in Harran Plain, Turkey; (ii) to screen these isolates in vitro for antagonism against some phytopathogenic fungi.

Material and Methods: Soil samples were collected from plants rhizospheres in saline areas in Harran Plain. The chemical and physical properties of the soils were determined. Rhizosphere soil samples were collected from healthy field grown plants. Fungal cultures (*F.moniliforme*, *F.acuminatum*, *F.solani*, *F.chlamydosporum*, *Dreschlera sorokiniana*) were obtained from the culture collection of the Microbiology Laboratory of Harran University in Turkey. A selection of bacterial isolates was made based on morphological characters of bacterial colonies which were determined both microscopically and macroscopically. The identification of isolates relied on standard biochemical and physiological tests according to the classification of Bergey's (Holt *et al.*, 1994). Antagonistic activities of bacterial isolates against *F.moniliforme*, *F.acuminatum*, *F.solani*, *F.chlamydosporum*, *Dreschlera sorokiniana* was determined by employing dual culture technique.

Results: Bacteria were isolates from the rhizosphere of cotton grown in field locations within a semi-arid region of Turkey. Isolates were identified as dominant being *Spingomonas paucimobilis*, *Pantoea sp.*, *Pseudomonas fluorescens*, *Bacillus cereus*, *Serratia plymuthica*, *Staphylococcus vitulinus*, *Acinetobacter sp.* The isolates produced different enzymes, phytohormone auxin. All isolates were able to grow in the absence of nitrogen. This study represents the first survey of cotton associated bacteria in the Harran Plain, Turkey and unveiled a set of isolates with potential for use as inoculants.

Keywords: Cotton, rhizosphere, bacterial diversity.

PP-272

Effects of Land Use on Some Soil Microbiological Properties

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Aim of the study: This study aimed to investigate the effects of different cropping systems on soil microbial activities in Harran Plain, Turkey.

Material and Methods: For this purpose, soil samples were collected from the soils under Maize (*Zea mays* L.) Cotton (*Gossypium hirsutum*), wheat (*Triticum aestivum*). Enzyme activities (dehydrogenase, catalase, β -glucosidase, alkaline phosphatase, urease) microbial biomass carbon, respiration of soils were determined.

Results: Cropping systems the data showed that the soil microbial biomass carbon (MBC) and soil enzymes such as dehydrogenase, alkaline phosphatase, urease and β -glucosidase activities varied in soil samples. The soil MBC contents were higher wheat- maize cropping systems while the soil enzyme activities were different. Also, it was found that changes of land use type associated with organic and inorganic fertilizers can alter the some microbiological activities of soils.

Keywords: Land use, cropping systems, soil microorganisms, soil microbiological properties

PP-273

**The Rhizosphere Microbiological Properties of Pasture Soils and Plant Distribution in Şanlıurfa;
Turkey**

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Aim of the study: The general objective of our study was to determine the influence microbiological and biochemical properties of plant species in pasture soils, semiarid region of Turkey

Material and Methods: This study was carried out in semi-arid region, Şanlıurfa to determine in influence of dominant plants *V. pannonica*, *V. villosa*, *V. narbonensis*, *A. elangatum*, *B. inermis*, *L. perenne*, *D. glomerata*, *A. sativa*, *H. vulgare*, *L. italicum*, *V. ervilia*; *A. eriantha*, *H. murinum*, *H. spantancum* growing pasture on the rhizosphere soil microbiological properties. For this aim, plants with diverse growth pattern were collected from pastures of Şanlıurfa. Enzyme activities such as dehydrogenase, catalase, urease, alkaline phosphatase activities of rhizosphere soil samples were determined.

Results: Soil samples were also collected from the rhizosphere of each plant. Soil samples were also collected from the rhizosphere of each plant. The soil samples were analyzed for soil biological properties. Microbial biomass carbon, soil respiration were highest in the rhizosphere of *V. pannonica*, *V. villosa*, *V. narbonensis*, *V. ervilia*. Enzyme activities were affected by the rhizosphere, their values depending on the plant species. Our results suggest that plant species related to some soil biological properties.

Keywords: Plant distribution, enzyme activity, soil.

PP-274

Determination of Effects of Different Organic Fertilizers with Humic Acid and Humic acid-free on Microelement and Heavy Metal Contents on BarleyFatih ÇİĞ¹, Ferit SÖNMEZ², Murat ERMAN¹¹Department of Field Crops, Siirt University, Turkey²Department of Seed Science and Technology, Abant İzzet Baysal University, Turkey
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Aim of the study: This study was conducted to determine the effect of sludge with inorganic fertilizer, whey and sheep manure application applied humic acid and untreated conditions on the heavy metal content and microelements on barley straw and grain for two years.

Material and Methods: The experiment was established in a randomized complete block design with three replications. At the end of trial, Fe, Mn, Zn, Cu, Pb, Cd and Ni contents of stalk and grain of barley were determined.

Results: First year, organic fertilizers affected microelements on the stalk for Fe, Mn, Zn and Cu when organic fertilizers affected Zn and Cu contents in the second year. First year, organic fertilizers on the heavy metal content of barley was determined not significantly while it was found significantly in the second year. Organic fertilizer had a significant impact on grain for Zn and Cu contents in the first year when it had a significant impact for Fe, Zn and Cu contents in the second year. Only Pb among heavy metals was significantly affected for every two years. Humic acid application affected Fe uptake among microelements for every two years while it affected Ni uptake for every two years and Pb uptake for only the second year among heavy metals. It was observed that Fe was affected significantly on the scope of microelement at first year, Zn was affected at second year and Cu was affected at every two years. It was found significant impact on Pb and Ni contents in the second year while it was found significant impact on Cd in the first year among heavy metals.

Keywords: barley, heavy metal, humic acid, organic fertilizer .

PP-275

Effects of Nickel Contamination on Nutrient Contents of Daffodil (*Narcissus poeticus* L. c.v. "Ice Folies")Arzu ÇIĞ¹, Füsün GÜLSER², Tuğba Hasibe GÖKKAYA², Gülçinay BAŞDOĞAN³¹Department of Horticulture, Siirt University, Turkey²Department of Soil Science and Plant Nutrition, Yüzüncü Yıl University, Turkey³Department of Landscape Architecture, Yüzüncü Yıl University, Turkey

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Aim of the study: The objective of this study was to determine the effects of nickel on nutrient contents of daffodil (*Narcissus poeticus* L. c.v. "Ice Folies") in nickel contaminated media. *Star*).

Material and Methods: This research was carried out in a completely randomized experimental design with three replications in greenhouse conditions. Four different doses of nickel (control, 25 mg kg⁻¹, 50 mg kg⁻¹, 75 mg kg⁻¹) were applied to each pot having 500 g soil:sand mixture in 2:1 ratio. The distillate water was used in irrigation and hoagland solution was applied for fertilization.

Results: At the end of experiment the highest K, Mg and Ca contents of daffodil bulbs were obtained as 0.90 %, 0.91 % and 2.72 % in control. The highest Fe (27.42 mg kg⁻¹), Cu (7.62 mg kg⁻¹), and Zn (20.99 mg kg⁻¹) were in 50 mg kg⁻¹, 75 mg kg⁻¹ and 25 mg kg⁻¹ nickel applications respectively. Similarly the highest K, Mg and Ca contents of daffodil leaves were obtained as 2.2 %, 1.72 % and 5.87 % in control. The highest Fe (66.62 mg kg⁻¹), Cu (41.29 mg kg⁻¹) and Zn (41.04 mg kg⁻¹) were in 25 mg kg⁻¹ and 75 mg kg⁻¹ nickel applications respectively. Nickel applications increased micronutrients contents of daffodils.

Keywords: daffodil, nickel, nutrient content

PP-276

The Assessment of consuming *Macrolepiota procera* (Scop.) Singer Mushroom for Human HealthHasan AKGÜL¹, Deniz ALTUNTAŞ², Mustafa SEVİNDİK¹, İlğaz AKATA³, Celal BAL⁴, Muhittin DOĞAN⁵¹Akdeniz University, Science Faculty, Department of Biology, Antalya²Muğla Sıtkı Kocman University, Science Faculty, Department of Biology, Muğla.³Ankara University, Science Faculty, Department of Biology, Ankara.⁴Gaziantep University, Oğuzeli Vocational School, Gaziantep.⁵Gaziantep University, Arts and Sciences Faculty, Department of Biology, Gaziantep.
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Aim of the study: For centuries, people have sought to obtain mushrooms directly from the natural environment and used for different purposes. Humans have been examining the pros and the cons of consuming mushrooms for human health. For instance, *Macrolepiota procera* (Scop.) Singer, also known as parasol mushrooms, which are widely consumed. Here, we have opted these mushrooms as examples to compare and contrast the activities and the heavy metal content in TAS (total antioxidant status) and TOS (total oxidant status level). These samples are collected from Balıkesir (Kazdağı National Park) and Antalya (Akseki) provinces.

Materials and Methods: The collected mushrooms are first dried and finely grinded in a mechanical mill. Each sample contains 30 grams of each mushrooms. They are extracted by using ethanol in Soxhlet extractor for approximately 6 hours at 75° C. The antioxidant activity and oxidant activity of mushrooms are then analyzed by using Rel Assay kits methods. After wet digestion, heavy metal content of mushrooms are examined with the use of an atomic absorption spectrometer.

Result: Both of the collected mushroom samples was determined that they have very good antioxidant levels. In contrast oxidant levels in samples collected from the Kazdağı National Park was observed at normal levels, High oxidant levels were found in samples collected from Akseki. In addition, the heavy metal level of Fe, Zn, Cu, Pb, Ni for content (mg.kg⁻¹) are resulted as 205.88, 60.60, 45.02, 9.41 and 2.87 (samples from Kazdağı National Park) and 133.64, 55.90, 38.37, 8.01 and 0.18 (samples from Akseki) respectively. In both of the studies, Pb content remains to be at high levels as expected. It is believed that consuming the mushrooms from Akseki may pose negative impacts on human health due to the high level of antioxidants, oxidant levels and Pb content in the samples. In contrast, it is considered to be better and healthier to consume the mushrooms from the Kazdağı National Park. Yet, it is not recommended to consume the mushrooms from the Kazdağı National Park much due to of heavy metal content and oxidant levels.

Keywords: *Macrolepiota procera*, Parasol Mushroom, Antioxidant, Oxidant, Heavy Metal.

PP-277

Dynamic Flow Mode Decolorization Performance of *Neurospora sitophila*–*Zea mays* silk tissue biomass system for a Reactive DyeTamer AKAR¹, Sema CELİK²¹Department of Chemistry, Faculty of Arts and Science, Eskişehir Osmangazi University, 26480 Eskişehir, Turkey² Department of Biology, Faculty of Arts and Science, Eskişehir Osmangazi University, 26480 Eskişehir, Turkey
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Aim of the study: Dye pollution in aquatic environment poses serious environmental problem and is dangerous to living organism. The treatment of colored waters using eco-friendly technologies is a popular research topic in recent years. The use of immobilized biomaterials gives certain advantages by offering ideal size, mechanical strength, rigidity, porous characteristics to the biological material and minimal clogging in dynamic flow mode operations. The goal of this study was to investigate the possible use of a *Neurospora sitophila*–*Zea mays* (*N. sitophila*–*Z. mays*) silk tissue immobilized biosorbent system for decolorization of Reactive Blue 49 (RB49) contaminated solutions in dynamic flow mode.

Material and Methods: *N. sitophila* was passively immobilized on silk tissues of *Zea mays* in growth media. After immobilization of fungal cells on silk tissue, the material was separated from media and washed repeatedly with deionized water, dried at 60°C, ground using a laboratory mill and sieved to 150 µm particle size. Dynamic flow mode biosorption experiments were conducted using 11 cm i.d. cylindrical fixed-bed glass columns. Biosorbent was packed between glass wool into the column. Tygon tubing was used for the connections between solutions and column. 25 mL of 100 mgL⁻¹ dye solutions at pH 2.0 were fed into the column by a peristaltic pump. Dynamic flow biosorption parameters studied were: biosorbent dosage (1.0–6.0 g L⁻¹), flow rate (0.5–6.0 mL min⁻¹) and initial dye concentration (25–300 mg L⁻¹).

Results: Biosorption yield decreased while the biosorbent dosage was increased from 0.5 mL min⁻¹ to 6.0 mL min⁻¹. The biosorption yield increased from 23.62 to 81.61% as the biosorbent dosage of the natural biomass was increased from 1.0 to 6.0 g L⁻¹. Maximum biosorption capacity reached to 33.10 mg g⁻¹ at 300 mg L⁻¹. The results suggest that the *N. sitophila*–*Z. mays* biosorbent system can be used as a sorbent material for an efficient removal of a reactive dye from contaminated aquatic media

Keywords: decolorization, dye, immobilization, *Neurospora sitophila*, *Zea mays*

PP-278

Evaluation of the the possible interactions between synthetic dye and surface modified biosorbentTamer AKAR¹, Esra OZKARA², Sema CELİK³, Serpil TURKYILMAZ⁴, Sibel Tunali AKAR¹¹Department of Chemistry, Faculty of Arts and Science, Eskişehir Osmangazi University, 26480 Eskişehir, Turkey²Department of Chemistry, Graduate School of Natural and Applied Sciences, Eskişehir Osmangazi University, 26480 Eskişehir, Turkey³ Department of Biology, Faculty of Arts and Science, Eskişehir Osmangazi University, 26480 Eskişehir, Turkey⁴ Department of Mathematics, Faculty of Arts and Science, Bilecik Şeyh Edebali University, 11100 Bilecik, Turkey
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Aim of the study: Because of the coloration and aquatic pollution of dyes used in different industries, there is a need for potential and effective decolorization technology to treat the colored effluents. Biosorption is a promising pollution removal method based on the interactions of pollutant-biosorbent surface. In this field, surface modification procedures have been suggested to improve the biosorption potential of biomaterials. In this direction, *Pyracantha coccinea* (*P. coccinea*) berries were modified by alkylbenzyltrimethylammoniumchloride (ABDAC). Reactive Red 45 (RR45) is chosen a model pollutant. The possible dye–biosorbent interactions were evaluated by means of kinetic and isotherm models, SEM and IR analysis.

Material and Methods: Powdered *P. coccinea* berries were treated with 0.125% ABDAC solutions and stirred at 24 h. The suspensions were washed repeatedly with deionized water, dried at 60°C, ground using a laboratory mill and sieved to 212 µm particle size. The possible dye-biomaterial interactions were investigated by contacting biosorbent sample with 25 mL of RR45 solutions. Batch mode studies were conducted with different initial pH values (1.0–9.0) and biosorbent amounts (0.4–1.2 g L⁻¹). For kinetic modelling, contact time was varied from 5 to 90 min. in addition to isotherm studies conducted with different concentrations of dye solutions at optimum conditions. IR spectral analysis and SEM micrographs were also used to identify the biosorption mechanism.

Results: The non-linear regression analysis was used to evaluate the isotherm and kinetic model parameters. Biosorption equilibrium data were predicted by the Langmuir isotherm model. The highest monolayer biosorption capacity of modified biosorbent was recorded as 152.49 mg g⁻¹. Kinetic studies indicated fast decolorization rate of the process following the pseudo-first-order model. Mechanism studies revealed that a combined action of the different functional groups of the biosorbent played a role in the dye removal process. Based on this study, modified plant origin material is proved to be a potential biosorbent for RR45 removal due to its cost effective and high removal performance.

Keywords: dye biosorption, mechanism, modification, isotherm, kinetic.

PP-279

Nickel Biosorption Conditions of a Macro Fungus *Lactarius salmonicolor*Tamer AKAR¹, Sema CELİK², Asli Gorgulu ARI³, Sibel Tunali AKAR¹¹Department of Chemistry, Faculty of Arts and Science, Eskisehir Osmangazi University, 26480 Eskisehir, Turkey² Department of Biology, Faculty of Arts and Science, Eskisehir Osmangazi University, 26480 Eskisehir, Turkey³Department of Elementary Education, Faculty of Education, Yildiz Technical University, 34210 Istanbul, Turkeytakar@ogu.edu.tr

Aim of the study: The effluents from electroplating, battery and accumulator manufacturing, porcelain enamelling, welding and nickel refining are important sources of aquatic pollution of nickel. Its removal from these effluents is an important aspect of water treatment. The application of conventional treatment methods is sometimes restricted due to technical and economic drawbacks. In this respect, different biomaterials have been identified as suitable biosorbent. This study was aimed to prepare a potential biosorbent for the removal of nickel from aquatic media. *Lactarius salmonicolor* was chosen as biomass source because meager information is available regarding its biosorption capability and it is a natural and readily available biomaterial.

Material and Methods: Fresh biomass of fungus was collected from its natural habitat in Gemlik, Turkey. The fungal biomass was washed repeatedly with deionized water, dried at 60 °C, ground using a laboratory mill and sieved to select particle size of less than 150 µm. A stock solution of Ni²⁺ (1000 mg L⁻¹) was prepared by dissolving a weighed quantity of Ni(NO₃)₂·6H₂O in 1000 mL deionized water. It was used by diluting to prepare other concentrations. The pH levels of the test solutions were adjusted to the required values by adding 0.1 N HNO₃ or 0.1 N NaOH. The biosorption studies were carried out with 50 mL of Ni²⁺ solutions in glass bakerys at 200 rpm on multipoint magnetic stirrer. The optimum pH for biosorption was determined by agitating the biosorption mixture containing 0.1 g of biomass at different pH values. The sorbent amount was evaluated at 1.0-3.0 g L⁻¹ dosages at optimum pH. The contact time was varied from 5 to 90 min using the same biosorption mixture described above.

Results: Biosorption capacity of the biomass increased from 1.45 mg g⁻¹ to 14.03 mg g⁻¹ when the pH was increased from 2.0 to 8.0. The biosorption yield increased from 15.23 to 26.71% as the biosorbent dosage of the natural biomass was increased from 1.0 to 2.0 g L⁻¹. Equilibrium time was recorded as 10 min. Overall, *L. salmonicolor* is suggested as a low cost and alternative biosorbent for the removal of nickel ions from contaminated solutions.

Acknowledgements: This work was supported by the Commission of Scientific Research Projects of Eskisehir Osmangazi University (ESOGU) with Project number 200819007. The authors gratefully acknowledge for financial support by ESOGU.

Keywords: biosorption, fungus, heavy metal, nickel, wastewater

PP-280

Removal of Pb²⁺ ions from contaminated solutions by microbial composite: Combined action of a soilborne fungus *Mucor plumbeus* and Alunite matrixTamer AKAR¹, Sema CELİK¹, Asli Gorgulu ARI² Sibel TUNALI AKAR¹¹Department of Chemistry/Eskişehir Osmangazi University, Turkey,²Department of Elementary Education, Yıldız Technical University, Turkeytakar@ogu.edu.tr

Aim of the study: The aim of this study was to investigate the biosorption kinetics and isotherms for Pb²⁺ removal by *Mucor plumbeus*–alunite composite as a new sorbent material. Zeta potential measurements, IR, SEM and EDX analysis were also used to characterize the biosorption mechanism.

Material and Methods: *M. plumbeus* ATCC 6795 was obtained from the American Type Culture Collection. It was maintained, produced and grown in the appropriate conditions. After this period, fungal biomass was separated by filtration, washed with distilled water, dried at 60°C in an oven and sieved to obtain particle fraction less than 150 µm. Microbial composite was prepared mixing alunite and the paste was heated in an oven at 60 °C to drive off the water. The wetting and drying steps were repeated three times in order to maximize the contact between the fungal biomass and alunite mineral. Composite material was sieved to a particle size of 150 µm for use as a sorbent. For kinetic evaluation of Pb²⁺ biosorption process, the contact time was varied from 5 to 90 min. In order to model the equilibrium biosorption data by Langmuir, Freundlich and Dubinin–Radushkevich isotherm models, the initial Pb²⁺ concentration were varied between 75 and 600 mg/L. The surface charges of the sorbent material were measured by a zeta potential analyzer (Malvern zeta sizer). The functional groups on the sorbent were analyzed using an Infrared Spectrophotometer (Bruker Tensor 27). The sorbent surface was characterized using scanning electron microscope (JEOL 560 LV).

Results: R^2 values for the kinetic models indicated that the Pb²⁺ biosorption is well represented by the pseudo–second–order model rather than the pseudo–first–order model. The Pb²⁺ biosorption capacity calculated from this model is also much closer to the experimental q_e value. Time-dependent data also showed the intraparticle diffusion was not the only rate–controlling mechanism for the Pb²⁺ removal process. The biosorption equilibrium data were evaluated Langmuir, Freundlich and Dubinin–Radushkevich isotherm models. It was found that the Langmuir isotherm model with R^2 values over 0.995 for both sorbent materials was the best described the data. Experimental q_{max} values were also agree with the calculated values. EDX spectra of composite did not show lead signal, while Pb²⁺ loaded material showed distinct peaks of lead. This confirmed the existence of the corresponding ion onto the composite surface. IR spectrum of Pb²⁺ loaded material showed the band shifts from 3433 to 3437 cm⁻¹, from 608 to 602 cm⁻¹ and from 473 to 469 cm⁻¹. Also after the biosorption process a decrease was observed in the intensity of the peak at 1105 cm⁻¹. These results implied the possible involvement of these functional groups in Pb²⁺ biosorption process.

Acknowledgements: This study was supported by the Commission of Scientific Research Projects of Eskişehir Osmangazi University (ESOGU) with the Project Number 200819007. The authors gratefully acknowledge for financial support by ESOGU.

Keywords: Alunite, Biosorption, Isotherm, Kinetic, Lead, *M. plumbeus*

PP-281

Studies on Antioxidant Properties and Polyphenol Composition of the Different Solvent Extracts of *Sternbergia clusiana*

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Aim of the study: This study was aimed to determine the *in vitro* antioxidant properties of various solvent (ethanol, methanol and acetone) extracts obtained from *Sternbergia clusiana* Ker-Gawl ex Sprengel. Its fractions were investigated for their phytochemical screening and its phenolic compound profile was also realized by HPLC.

Material and Methods: Ethanolic, methanolic and acetonetic extracts were obtained from using leaves and bulbs of geophyte species. Phenolic compounds were evaluated by reversed-phase high performance liquid chromatography (HPLC). The phenolic compounds were recognized by comparing retention times and UV absorption spectra with those of pure standards. The amount of each phenolic compound was expressed as $\mu\text{g/g}$ per gram of the extract. The extracts were screened for their possible antioxidant activities by four complementary tests; DPPH (2,2-diphenyl-1-picrylhydrazyl) free radical-scavenging, ABTS free radical scavenging, ferric reducing antioxidant power assays (FRAP) and β -carotene-linoleic acid assays. BHT was used as standards. In addition, total phenolic and flavonoid contents in all the extracts of *Sternbergia clusiana* were determined as gallic acids and quercetin equivalents.

Results: The results indicated that ethanol fraction exhibited stronger antioxidant activities than other fraction. The highest antioxidant activity efficiency was determined in extract bulbs ethanol (87.50%) and the least efficiency in extract leaves-acetone (59.62%). The highest total phenolic content of the bulbs ethanol extracts was found 9.77 ± 5.021 mg/mL GAE as gallic acid equivalent. HPLC data indicated that more phenolic acids were extracted of plants and maximum nine phenolic acids (gallic acid, 3,4-dihydroxy, 4-dihydroxy, chlorogenic acid, Vanilic acid, Caffeic acid, p-Coumaric acid, Ferulic acid and Cinnamic acid). Results of the present study demonstrated that the extracts of *S. clusiana* may be used as a source of natural antioxidant and phenolic acid in the food and pharmaceutical industries.

Keywords: Antioxidant properties, *Sternbergia clusiana*, phenolic compound, HPLC.

PP-282

Accumulation Copper (Cu) in the *Halimione portulacoides* (L.) Aellen and *Suaeda prostrata* subsp. *prostrata* Pall. Plants, Spreading in Ayvalik Saltern (Balıkesir-TURKEY)Murat KILIÇ¹, Güngör AY¹, Fatma KOÇBAŞ¹, Fatma MÜNGAN¹¹Biology department, Faculty of Science and Letters, Celal Bayar University, Manisa-Turkey
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Aim of the study: In this study, it was studied to determine deposition copper (Cu) in the *Halimione portulacoides* (L.) Aellen and *Suaeda prostrata* subsp. *prostrata* Pall. plants, spreading in Ayvalık saltern which is partaking Izmir-Canakkale highway.

Material and Methods: The root, stem, leaves and cultivation soil of plant were formed as the material of this study. Sampling, were done on 8 station (*H. portulacoides* 7 station) which is determined on the soil dam surrounding saltern. Through 12 months, samples were regularly collected from every station.

Results: All of the analyzes were found to be below the limit values. Level of Cu in *H. portulacoides* was 0003-0925 ppm, it was between 0862-1111 ppm in the soil. Level of Cu in *S. prostrata* subsp. *prostrate* plants was 0004-0896 ppm, it was found to be between 0.858-1.111 ppm in the soil. Analysis were done by using Perkin Elmer Analyst 700 Flame Atomic Absorption Spectrophotometer (FAAS) device. The fact that the results in the analysis are below the limit values is because of the fact that the dominant direction of the wind is North-west (through Tuzla motorway), there aren't any crossroads or signalization on the motorway on the southern part of Tuzla and there aren't any industrial plants having polluting effects.

Acknowledgements: We wish to thank Scientific Investigation Project to Coordinate of Celal Bayar University (Project No. FEF 2009-35) for financial support. This study contains a part of Master dissertation prepared by Murat Kılıç in Celal Bayar University.

Keywords: Ayvalık Saltern, Copper, *Halimione portulacoides*, Pollution, *Suaeda prostrate* subsp. *prostrata*.

PP-283

Identification of genetic diversity of *Rammeihippus turcicus* (Orthoptera: Acrididae: Gomphocerinae) within the framework of detection of National Genetic ResourcesDeniz ŞİRİN¹, Levent CAN¹, Gürkan AKYILDIZ¹, Abbas MOL², Mehmet Sait TAYLAN³¹Department of Biology, Namık Kemal University, Turkey²Department of Emergency and Disaster Management, Aksaray University, Turkey³The Society of Anatolian Speleology Group, İstanbul, Turkeydsirin@nku.edu.tr

Aim of the study: *Rammeihippus turcicus* (Orthoptera: Acrididae: Gomphocerinae) is one of the endemic species in Anatolia and distribution of the populations show similarity with the north-south direction in the Black sea mountain ranges. This research aims to determine genetic variability of *Rammeihippus turcicus* populations from North to South.

Material and Methods: For this purpose, we have examined five populations of the *Rammeihippus turcicus*. A total of 550 base pairs of mitochondrial COI gene were sequenced in order to clarify the relationship between populations.

Results: It was observed that *Rammeihippus turcicus* contains two different clads which are North populations and they have either higher genetic diversity or ancestral haplotypes. Uluagaç is the Southern population and it is determined to be a new evolutionary lineage separated from the core group.

Acknowledgements: This study includes data of the Project numbers NKUBAP.00.10.AR.13.07, supported by Namık Kemal University Scientific Research Found (Turkey, Tekirdağ).

Keywords: Phylogeography, speciation, Anatolia.

PP-284

Gomphocerinae (Orthoptera: Acrididae) fauna of the European part of TurkeyDeniz ŞİRİN¹, Mehmet Sait TAYLAN², Abbas MOL³¹Department of Biology, Namık Kemal University, Turkey²The Society of Anatolian Speleology Group, İstanbul, Turkey³Department of Emergency and Disaster Management, Aksaray University, Turkey
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Aim of the study: The Gomphocerinae fauna of the European part of Turkey has not been studied comprehensively until now. This study aims to find and identify the actual Gomphocerinae fauna of the European part of Turkey.

Material and Methods: To address this deficiency, this study provides the classical morphological methods and sound characteristics, which is the most important indicator and pre-mating isolation barrier for the subfamily taxa. Each species recorded in the laboratory and also in the field conditions to eliminate the stress dependent song. All songs were analysed with Cool Edit and Turbolab software.

Results: After three years field trip in European part of Turkey, 16 taxa were identified from the study site. Species numbers of the genera were respectively: 7 species belongs to *Chorthippus*, 2 species belongs to *Omocestus* and *Dociostaurus*, and 1 species belongs to *Stenebothrus*, *Arcyptera*, *Euchorthippus*, *Ramburiella* and *Notostaurus*.

Acknowledgements: This study includes data of the Project numbers NKUBAP.00.10.AR.12.01, supported by Namık Kemal University Scientific Research Found (Turkey, Tekirdağ).

Keywords: Song analyses, distribution, systematics

PP-285

Differential Role of Cave Temperature and Humidity in Distribution of Cave Crickets in AnatoliaMehmet Sait TAYLAN¹, Nadim YILMAZER², Deniz ŞİRİN²¹*The Society of Anatolian Speleology Group, Istanbul, Turkey*²*Department of Biology, Namık Kemal University, Tekirdag, Turkey*
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Aim of the study: The diversity of cave crickets (Orthoptera, Rhaphidophoridae) remarkably differs between geographic regions in Anatolia. While only 3 species are distributed along northern Anatolia where the Black Sea climate prevails, it is known that 13 different species are found throughout southern and western Anatolia where the Mediterranean climate is dominant. However, cave crickets may not exist in the middle and eastern Anatolia where continental climate is seen. There is no apparent explanation for distribution pattern of different species of cave crickets, but it is assumed that climatic factors including temperature and relative humidity in the ecological zones (entrance zone, twilight zone, and dark zone) within the caves and in the outdoor atmosphere affect their distributions. This study aimed to reveal the relation between climatic conditions and distribution of cave crickets in three caves selected as representatives for three climate types seen in Anatolia.

Material and Methods: Temperature and relative humidity in the ecological zones within Geyikbayiri, Sipahiler and Tuluntas caves, representatives for Mediterranean, Black Sea and continental climate, respectively, and in the outdoor atmosphere were periodically measured from January 2012 to January 2013. From the obtained measurements, changes in annual and seasonal temperature and relative humidity were determined.

Results: Our data indicate that in all three caves (i) temperature and relative humidity decreased from the outdoor atmosphere towards the dark zone, (ii) over winter period, temperature increased from the outdoor atmosphere to the dark zone, (iii) over summer period, temperature decreased from the outdoor atmosphere to the dark zone, (iv) the most dramatic swing in temperature variation was measured in continental climate, and (v) the greatest similarity of climatic conditions between cave and climate type was observed in the cave in Black Sea region.

Acknowledgements: This study was supported by TÜBİTAK BİDEB, 2218-Post-doctoral scholarship.

Keywords: Cave crickets, Climatic factors, Ecological zones, Anatolia

PP-286

The effect of ancient central lake system to speciation of the genus *Dolichopoda* (Orthoptera) in AnatoliaMehmet Sait TAYLAN¹, Deniz ŞİRİN²,¹The Society of Anatolian Speleology Group, İstanbul, Turkey²Department of Biology, Namık Kemal University, Turkeydsirin@nku.edu.tr

Aim of the study: This research aims to determine of the evolutionary relationships between the Turkish *Dolichopoda* species, and to define and clarify the systematics of the group located in Anatolia.

Material and Methods: For this purpose, we have examined 27 populations of the genus *Dolichopoda* from Anatolia and adjacent regions (Caucasia and the Greek islands). A total of 532 base pairs of mitochondrial 16S rDNA gene was sequenced in order to clarify the phylogenetic relationships of the genus.

Results: Five main clades can be distinguished and well-supported by phylogenetic analyses. In these clades, the results obtained from Samos Island and Anatolia are remarkable. In contrast to some previous studies, our results point to an Aegean origin of the Anatolian *Dolichopoda* species. According to the mitochondrial 16S rDNA divergence data, the current distribution of the genetic diversity was affected by the ancient central lake system, habitat types, Messinian period and Plio-Pleistocene characterized by alternating dry/cold and warm/humid stages.

Acknowledgements: This study includes data of the Project numbers 2008.03.0121.002, supported by Akdeniz University Scientific Research Found (Turkey, Antalya).

Keywords: Orthoptera, *Dolichopoda*, Central Lake System.

PP-287

Bacterial Populations of Meke Lake in TurkeyMiyesser AYCAN, Mehmet Burçin MUTLU*Anadolu University Faculty of Science Dept. of Biology 26470 Eskisehir, Turkey*
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Aim of the study: Meke Lake is one of the most important wetland in Turkey. The lake feeds from underground and its salinity goes ahead 32% in drying seasons. Halophilic microorganisms require a salt rich environment for its growth and survival. Meke Lake of bacterial diversity was first time characterized and existence of some strains were showed first times with this study

Material and Methods: Sample was taken from the Meke Lake on August 2010 and April 2011. The total salt concentration of sample was determined *in situ* with a hand refractometer (Eclipse). The bacterial diversity of the lake was examined by fluorescence in situ hybridization (FISH) and denaturing gradient gel electrophoresis (DGGE). 16S rRNA genes were PCR amplified for the DGGE with a set of one of the following primers: 341F-GC (5'-tail-CCTACGGGAGGCAGCAG) and 907R (5'-CCGTC AATTCCTTTRAGTTT-3') for Bacteria. DGGE was performed with the Phor U System (Ingeny). Gels were photographed after ethidium bromide staining. The nucleotide sequences of the purified PCR products were sequenced using Big Dye Terminator Cycle Sequencing kit and CEQ 8000 DNA Sequencer (Beckman). 16S rRNA gene sequences were initially compared with reference sequences at NCBI (<http://www.ncbi.nlm.nih.gov>) using BLAST. Probes used for in situ hybridization Eub338 for Bacteria and EHB 412 for *Salinibacter ruber*. Formamid concentration in the hybridization buffers were 35%.

Results: The salinities of the sample, as measured in situ with a hand refractometer, was above the 25%. Totally 7 bands obtained for August sample and 6 bands obtained for April sample with DGGE. Sequenced DGGE bands were related to *Salinibacter*, uncultured salinibacter in August sample and uncultured bacterium in April sample. The community was dominated by *rod shaped Bacteria* in FISH analysis.

Acknowledgements: This study was support by Anadolu University Scientific Research Projects. Project number is 1005F109.

Keywords: Meke Lake, DGGE, FISH.

PP-288

The study of gene transfer from rapeseed genetically modified varieties in the field

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Aim of the study: The main aim of the study is to investigate gene transfer from genetically modified rapeseed plants to non-genetically modified varieties of rapeseed, coleseed and mustard, as well as the possibility of transferring to relatives and next of kin for the purpose of forecasting environmental and agro-technical risks. Agro-technical risks include loss of biodiversity among cultivars, changes in non-target characteristics and properties of modified varieties, the emergence of super weeds. Typically, the risks listed above arise as a result of gene flow from the GM plants to other varieties and to relatives, as well as by horizontal gene flow from GM crops to insects and microorganisms.

Material and Methods: Materials for the study were GM Chris rapeseed varieties (*Brassica napus* L.) with a reporter GUS gene and kanamycin resistance gene, Chris variety of spring rapeseed (*Brassica napus* L.), Rocket variety of mustard (*Brassica juncea* L.) and Golden coleseed variety (*Brassica campestris* L.). Plants seeding was carried out in the field on a fenced plot of 0.5 ha, harvesting was performed manually by segments, sector numbers were observed and distance from the center of the circle was noted. In vitro screening was carried out on MS medium with full salt content with 50 mg/l kanamycin. Surviving plants were grown to 5 leaves stage and tested for expression of the GUS reporter gene using method developed by Jefferson (1987), the expression of GUS gene was assessed visually from the intensity of tissue staining in blue.

Results: Seeds of GM-rapeseed plants were seeded in the center of the circle and at a distance from 0 to 10 meters radially were seeded non-GM rapeseed plants, coleseed and mustard. After the harvest was conducted screening of non-GM rapeseed, mustard and coleseed was performed for resistance to kanamycin. Resistance was checked on MS medium, germination was performed for 7 days and then survived plants were screened for expression of the reporter gene GUS. Preliminary results showed the presence of cross-breeding between GM and non-GM plants. It was found that 7% of seed obtained from non-GM oilseed rape plants were resistant to kanamycin and the insertion of the transgene had taken place.

Acknowledgements: These studies are carried out within the framework of funding for Kazakhstan scientific technical program 0.0677 "Development of biotechnological bases for the creation and monitoring of genetically modified plants with improved economically valuable traits" for 2015 - 2017.

Keywords: genetically modified, gene transfer, rapeseed.

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Socio-Economical Status of Cage Trout Farming Companies and their Problems and Recommendation For Solutions

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Aim of the study: This study focuses on the cage trout farming companies operating on Gökçekaya Dam Lake in Ankara province. The purpose of this work is to determine the socio-economical status of trout farms as well as the issues such as establishment, mechanization, trout culture, diseases, marketing, professional team and, health and safety at work. As a result of determination of these issues, recommendations for sustainable farming have also been put forward.

Material and Methods: Twelve cage farming facilities on Gökçekaya Dam Lake registered in the province Ankara were surveyed to obtain the data. The survey was undertaken by direct communication with the owners and workers of the facilities. In order to reach a conclusion 80 questions have been directed to concerned people i.e., owners and/or employees.

Results: It was revealed that all of the companies are non-governmental private establishments. Of these, 70% are limited companies and the rest has been owned by single individuals. Marketing of annual trout production includes wholesale and retail. Most of the production is wholesale (71%). Remaining 29% is sold directly to the final consumers. Diseases in the facilities are diagnosed as *Streptococcosis*, *Vibriosis*, *Yersiniosis*, *Furunkulosis*. Treatment, precautions and control technics relating to these diseases are applied accordingly. Because most of the establishments are recently founded, they are not able to use full capacity of the farms. In order to improve the usage of technical capacity employees should be trained and equipment in the facilities should be modernized. As a conclusion the number of educated professionals should be strengthened and definite measures for the problems incurring during trout farming should be sought and applied instead of seeking solutions when the problem occurs.

Keywords: Gökçekaya Dam Lake, rainbow trout farming, structural properties, disease, economic structure.

PP-290

Biosorption, Preconcentration and Determination of Cd (II) Ion Using Amberlite XAD-16 Resin Modified with *Anoxybacillus caldiproteolyticus* and *Geobacillus stearothermophilus* through FAASBarış ENEZ¹, Sema AGÜLOĞLU FİNCAN², Elif VARHAN ORAL³, Berrin ZİYADANOĞULLARI⁴¹Vocational School of Technical Sciences, Bingöl University, Bingöl/Turkey²Science Faculty, Department of Biology, Dicle University, Diyarbakır/Turkey³Science Faculty, Department of Pharmacy, Dicle University, Diyarbakır/Turkey⁴Science Faculty, Department of Chemistry, Dicle University, Diyarbakır/Turkey

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Aim of the study: In this study isolation, identification and characterization of the bacteria obtained from soil sample of Ergani Makam Mountain was performed. Based on this study it was identified that was of thermophilic *Anoxybacillus caldiproteolyticus*.

Material and Methods: These bacteria whose characterization was performed and on AmberliteXAD-16 and two different sorbents were acquired to be used for sorption studies. The resulting sorbents were loaded into separate mini columns. Cd(II) ions found in the solution were enriched using mini columns containing biosorbent and were determined by flame atomic absorption spectrometric method. The effects of parameters such as the pH of the solution on these paration and preconcentration efficiency, flowrate, eluent type, concentration and the sample volume were investigated.

Results: For AmberliteXAD-16 immobilized separately with *A.caldiproteolyticus* and *G.stearothermophilus* there covery yields were determined as 98.23 ± 2.40 and 98.93 ± 1.3 (N = 5) under the experimentally optimum operating conditions and the Cd(II)ions retained in the column were recovered respectively through 1 M10 ml of HCl and 0.5 M2 ml of HNO₃ solutions. For both biosorbents optimum pH= 6, and the flow rate was 2ml /min in the enrichment studies. In order to investigate the applicability of the developed enrichment methods, the maximum recovery of matrix ions such as Na⁺, K⁺, Cl⁻ and Na⁺ were examined. The accuracy of the proposed methods was analysed through Standard reference material(SCP SCIENCE EnviroMATWasteWater, Low (EU-L-2)) and the results obtained were supplemented by the methods we have developed. Methods were applied for the determination of Cd(II) ions in real samples such as Tigris River, the Hazar Lake and Diyarbakir city drinking water.

Keywords: *Anoxybacillus caldiproteolyticus*, *Geobacillus stearothermophilus*, Biosorption, Amberlit XAD-16, FAAS.

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Orchids of Tosya District (Kastamonu, Turkey)Gamze TUTTU¹, Gökhan ABAY², Şinasi YILDIRIMLI³¹ Department of Forest Engineering, Faculty of Forestry, Çankırı Karatekin University, 18200 Çankırı, Turkey² Department of Plant Materials and Propagation Techniques, Division of Landscape Architecture, Recep Tayyip Erdogan University, Rize, Turkey³ Department of Biology, Faculty of Science, Hacettepe University, 06800 Beytepe, Ankara, Turkey
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Aim of the study: The aim of the presented study is to determine the orchid taxa occurring in Tosya district and to give their IUCN categories.

Material and Methods: The materials of this study includes orchid plant specimens collected from Tosya district, in order to determine the floristic structure of the study area in 2014-2015. This study is the part of the PhD thesis entitled 'Flora and Ethnobotany of Tosya District (Kastamonu)' in progress. The specimens were dried using the standard herbarium methods. These specimens were identified basically by using Flora of Turkey and the East Aegean Islands Vol.8 (Davis 1984), Flora of Turkey and the East Aegean Islands Vol.11 (Güner et al. 2000), and 'Orchids of Turkey' (Kreutz and Çolak 2009). Phytogeographical regions of the taxa were given according to Flora of Turkey (Davis 1965) and threat categories of the endemic and rare orchids were based on 'Red Data Book of Turkish Plants' (Ekim et al. 2000). Synonym names of the taxa follow 'the.plantlist.org' web site and 'A Checklist of the Flora of Turkey (Vascular Plants)' (Güner et al. 2012). In addition, the threatened orchid plants for Turkey were listed from the CITES database.

Results: There are approximately 150 orchids belonging to the Orchidaceae family in Turkey. Another source, 'A Checklist of the Flora of Turkey (Vascular Plants)' reported 230 orchid taxa in Turkey with hybrids. In this study, as a result of the identification of the orchid specimens, seven genera and 16 taxa were determined from the area. Three taxa are endemic to Turkey; *Dactylorhiza nieschalkiorum* H.Baumann & Künkele, *Dactylorhizaosmanica* (Klinge) P.F.Hunt & Summerh. and *Dactylorhiza urvilleana* (Steudel) Baumann & Künkelesubsp. *ilgazica* (Kreutz) Kreutz. The distributions of threat categories of the endemic and rare taxa are as follows: *Dactylorhiza incarnata* (L.) SoóVU (Vulnerable), *Dactylorhiza nieschalkiorum* and *Dactylorhizaosmanica* LR (Ic) (Least concern). Seven taxa are in the CITES category for Turkey: These are *Cephalanthera rubra* (L.) Rich., *C. damasonium* (Mill.) Druce, *Anacamptis pyramidalis* (L.) Rich., *Neotinea tridentata* (Scop.) R.M.Bateman, Pridgeon & M.W.Chase, *Orchis mascula* (L.) L., *O. purpurea* Huds., and *Dactylorhiza nieschalkiorum* H.Baumann & Künkele. The rates of orchid taxa included in phytogeographical regions are as follows: 18.75% Euro-Siberian (3 taxa), 18.75% East Mediterranean (3 taxa), 6.25% Mediterranean (1 taxon), 6.25% Euxine (1 taxon), 6.25% Irano-Turanian (1 taxon), and finally 43.75% multiregional or of unknown phytogeographic origin (7 taxa).

Acknowledgements: We thank to Çankırı Karatekin University scientific research projects unit (BAP-project no: of12035d02), for the support provided for this project.

Keywords: Orchid, Orchidaceae, Plant biodiversity, Turkey

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Isolation, Purification and Characterization of Thermostable α -Amylase from Thermophilic *Anoxybacillus flavithermus*Sema AGÜLOĞLU FİNCAN¹, Barış ENEZ², Veysi ORTAKAYA¹¹Science Faculty, Department of Biology, Dicle University, Diyarbakır/Turkey²Vocational School of Technical Sciences, Bingöl University, Bingöl/Turkeysemaagul@dicle.edu.tr

Aim of the study :This study reports on the purification and characterization of thermostable α -amylase (α -1-4 D-glucanglucanohydrolase EC 3.2.1.1) from a newly isolated *Anoxybacillus flavithermus*.

Material and Methods: *A. flavithermus* was used, which was isolated from hot water springs of Ömer, Afyonkarahisar, Turkey. The organism was identified by biochemical tests and 16S rRNA sequence. α -Amylase activity was determined according to Bernfeld method. Sodium dodecyl sulfate polyacrylamide gel electrophoresis (SDS-PAGE) of these samples was carried out. Optimum temperature and pH were determined.

Results: The gram-positive, spore-forming, motile, moderately thermophilic bacteria were found to be a strain of *A. flavithermus* analysed by 16S rRNA comparison. The optimal conditions for bacterial growth were determined to be at 20th h, 55°C and pH 6.0. Maximum α -amylase activity was obtained at 55°C at pH 7.0 after 24 h of incubation. Thermostable α -amylase from *A. flavithermus* was purified by 70% (NH₄)₂SO₄ and ion exchange chromatography. The molecular weight of α -amylase was 60 kDa, as calculated by sodium dodecyl sulphate-polyacrylamide gel electrophoresis (SDS-PAGE).

Keywords: *Anoxybacillus flavithermus*, α -amylase, isolation, purification, characterization.

PP-293

Antibiotic Resistance in AquacultureYasemin BİRCAN YILDIRIM¹, Naci KARASU²¹*İskenderun Technical University, Faculty of Marine Sciences and Technology, İskenderun/HATAY.*²*Ministry of Food Agri. and Livestock, Veterinary Border Inspection Direct. İskenderun/HATAY*
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Aim of the study: The aim of protecting the health of aquatic organisms, to create a series of protection measures before encountering the disease. The protection and control measures are easier than treating of the diseases. And the risk is less. Despite everything, a disease state or it is inevitable to apply the chemicals to detect any physiological condition disorder. Besides the effect of the substances used in the treatment of a side effect of using or consuming the body of living creatures is the danger of creating a possible accumulation.

Material and Methods: In the present study, carried out until today, especially fisheries, antibiotic resistance studies and reflection will be discussed. Appropriate antimicrobial therapy and protection measures are very valuable in terms of preventing the spread of the disease and its effects. Unconscious use of antimicrobials; the emergence of a number of serious side effects, resistance development among bacteria and cause economic losses.

Results: Development of resistant pathogens and the consumption of fish loaded with antibiotics, load times, especially in the treatment of diseases that must be passed immediately be put in the treatment of human disease diagnosis, motivation, can lead to tangible and intangible losses. It may be a positive outcome from treatment for a substance that the body previously met. Constantly dose increases and may need medication changes. For this, the water resources, water level raised and hunted constantly live in the detection and antibiotic susceptibility, resistance exercises should be done, and should be repeated. Scientific data should be regularly monitored.

Keywords: Antibiotic resistance, fish diseases, fisheries.

PP-294

A New Species of *Origanum* L.: *Origanum ayliniae* Dirmenci, Akçiçek & Yazıcı
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Aim of the study: The genus *Origanum* comprises 43 species on the world. The species are mainly concentrated in the temperate regions of the Mediterranean and South West Asia. In Turkey, *Origanum* is represented by 23 species (26 taxa), 14 of which are endemic. Endemic species are concentrated to Mediterranean area, in Turkey. The main purpose of this study is to introduce the similarities and differences of *Origanum ayliniae* and its allies with using morphological, palinogical and molecular characters.

Materials and Methods: In this study, the specimens were collected from Aydın province in 2015 by the authors. The collected specimens were studied as morphologically, palinologically and molecularly. Woodhouse and SEM photos were obtained from the palinological studies, nrDNA ITS and cpDNA rpl32-trnL region data were analyzed. And morphological characters of the new species and its allies were illustrated with drawing and using stereo microscope.

Results and Discussion: *Origanum ayliniae* related to *O. dictamnus* but it can be easily differs from *O. dictamnus* in its flowering stems ascending, to 10 cm and not rooting at base (not to 35 cm and rooting at base), lanate hairs simple (not lanate hairs branched), leaves 4-10 × 3-10 mm, lower ones petiole to 1 mm (not to 15 mm), margins flat (not revolute), bracts glabrous, with minutely glandular papillate at ½ lower part, with sessile glands on inner faces, rounded at apex (not ciliate and obtuse or acute at apex), flowers to 1.5 mm pedicellate, (not subsessile), calyx 4.5-5 mm (not 4-7 mm), throat distinctly pilose (not sparsely pilose or absent), corolla 9-10 mm (not 8-15 mm). ITS region of the nrDNA sequences gives some important information about speciation between the *O. ayliniae* and *O. dictamnus*. *O. ayliniae* has 12 different nucleotides from *O. dictamnus* specimens and these nucleotides are same at two different *O. dictamnus* samples. rpl32-trnL region sequences does not give any information because there is no parsimony informative nucleotides. *O. ayliniae* is similar *O. sipyleum* than *O. dictamnus* as molecularly.

Acknowledgments: We would like to thank TUBITAK for financial support to our researches (project no. 113 Z 225).

Keywords: Endemic, ITS, *Origanum*, Turkey.

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A New Hybrid of *Origanum* L.: *Origanum × adae* Dirmenci, Yazıcı & AkciçekTuncay DIRMENCI¹, Türker YAZICI¹, Ekrem AKÇIÇEK¹, Taner ÖZCAN¹, Sevcan ÇELENK², Ekrem DÜNDAR³¹Department of Biology Education, Necatibey Education Faculty, Balıkesir University, Balıkesir, Turkey²Department of Biology, Faculty of Arts and Sciences, Uludağ University, Görükle Campus, Bursa, Turkey³Department of Biology, College of Arts and Sciences, Balıkesir University, Çağış Campus, Balıkesir, Turkeydirmenci@balikesir.edu.tr

Aim of the study: The genus *Origanum* comprises 12 hybrids on the world. The hybrids are mainly concentrated in the Mediterranean area. In Turkey, *Origanum* is represented by 5 hybrids, 3 of which are endemic. Endemic hybrids are distributed in Mediterranean area of Turkey. The main purpose of this study, similarities and differences of *Origanum × adae* Dirmenci, Yazıcı & Akciçek and its ancestors has been introduced with using morphological, palinological and molecular characters.

Materials and Methods: In this study, the specimens were collected from Aydın province in 2015 by the authors. The collected specimens were studied as morphologically, palinologically and molecularly. Woodhouse and SEM photos were obtained from the palinological studies, ITS nrDNA and rpl32-trnL cpDNA region data were analyzed. And morphological characters of the new species and its allies were illustrated with drawing and using stereo microscope.

Results and Discussion: *Origanum × adae* is similar to its parents, *Origanum aylinae*. and *O. sipyleum*. It is distinguished from *Origanum aylinae* by its stems to 25 cm, villous to subglabrous towards to above, branches of the first order present, branches up to 5 pairs per stem (not to 10 cm, villous and branches of the first order), bracts obovate, (not orbicular to obovate), calyx 2-lipped (not mostly 1-lipped), corolla not saccate (not saccate). It can be distinguished from *O. sipyleum* by its stems up to 25 cm (not to 80 cm), lanate hairs at base (not tomentellous), branches up to 5 pairs per stem (no to 26 pairs per stem), leaves 6-16 × 4-14 mm and densely villous (not 3-24 × 3-15 and glaucous),

Acknowledgments: We would like to thank TUBITAK for financial support to our researches (project no. 113 Z 225)

Keywords: Endemic, ITS, *Origanum*, natural hybrid, Turkey

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Fauna of Darkling Beetles (Tenebrionidae: Coleoptera) of Davraz Mountain (Isparta)Didem KORKMAZ¹, Ali GÖK²¹Biology Department, Suleyman Demirel University, Isparta, Turkey²Biology Department, Suleyman Demirel University, Isparta, Turkey

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Aim of the study: Darkling beetles are a family insufficiently studied in Turkey. Davraz Mountain is an area that have a rich diversity of species in respect to geographical location, vegetation and intersection of Mediterranean-Continental climate. Therefore, the aims of the present study are to give information on habitat preference, species composition and diversity of darkling beetles inhabiting Davraz Mountain, to evaluate as taxonomic, ecological and zoogeographical of the species and to give distribution maps in Turkey, and to contribution interesting data for the fauna of Turkey.

Material and Methods: The study was carried out on Davraz Mountain (Isparta, Turkey), localated in Southern Turkey, in 2014 year. The speciemens were collected from under stones and on the ground by hand and using pitfal traps in different altitude and areas of Davraz Mountain. The species were also given together with distribution maps in Palearctic and Turkey, as well as taxonomic, ecological and zoogeographical notes and habitat preference, abundance categories (Trotuş and Naie, 2008), dominance (Krebs, 1994) of them.

Results: With this study performed during April-November 2014, a total of 1579 individuals belonging to 13 Tenebrionidae species and 12 genera were recorded. Among the collected species; *Pimelia subglobosa* (%26.91), *Dailognatha quadricollis* (%25.20) and *Blaps tibialis* (%13.74) was the most dominant species. When considered in terms of habitat preference of the species have been encountered to *Pimelia subglobosa polita* in four habitat type (shrubs, steppe, meadow and forest). In the study area, the number of total individual was found to be maximum in summer season. When considered in terms of ecological type; *Zophosis punctata* is an eurytopic, psammophilic and geophilic species, present in steps; *Tentyria rotundata* is a stenotopic, psammophilic and geophilic, present in shrub including *Juniperus* sp.; *Pimelia subglobosa polita* is an eurytopic and geophilic; *Dendarus messenius* is a geophilic; *Pachyscelis quadricollis* and *Dailognatha quadricollis* are a detritivore, geophilic, myrmecophilous and concern to ants; *Blaps tibialis*, *Blaps jeannei* and *Gnaptor spinimanus* are a detritivor, concern to shrub and meadows including *Verbascum* spp. and *Astragalus microcephalus*; *Pedinus strabonis* isageophilic, concern to steppe and meadow; *Gonocephalum granulatum pusillum* is a xerophilus, geophilic; *Opatrum alternatum* phytophage, geophilic. Among the determined species; *Blaps jeannei* and *Pedinus strabonis* are endemic species for Turkey.

Acknowledgements: We would like to thanks Assoc. Prof. Dr. Bekir Keskin for help in literature researchs and diaognsis of the specimens. We are also thanks to Department of Scientific Research Project Management of Suleyman Demirel University (SDUBAP) with project number 3762-YL-213 for financial supporting in conduct of this study.

Keywords: Darkling beetles, Tenebrionidae, Coleoptera, pitfall trap, Davraz.

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In vitro antioxidant, biofilm and quorum sensing inhibitory activity of *Sonchus oleraceus* L.Ozgur CEYLAN¹, Rukiye BORAN², Tuba BAYGAR³, Aysel UGUR⁴, Nurdan SARAC⁵, Hatice KARAKUS⁵¹Food Quality Control and Analysis Program, Vocational School of Ula Ali Kocman, Mugla Sitki Kocman University, Turkey²Medical Laboratory Program, Vocational School of Health Service, Aksaray University, Turkey³Material Research Laboratory, Research Laboratories Center, Mugla Sitki Kocman University, Turkey⁴Section of Medical Microbiology, Department of Basic Sciences, Faculty of Dentistry, Gazi University, Turkey⁵Department of Biology, Faculty of Sciences, Mugla Sitki Kocman University, Turkeytubaygar@mu.edu.tr

Aim of the study: The aqueous and ethanolic extracts of the aerial parts of *Sonchus oleraceus* extracts were isolated and its antioxidant, antibiofilm, and quorum sensing inhibitory activities were investigated.

Material and Methods: Its antimicrobial activity was evaluated against 15 bacterial strains and *Candida albicans* using the disc diffusion assay and broth microdilution assay. The antioxidant capacity was determined by the ferric thiocyanate method (FTC) and the 1,1-diphenyl-2-picrylhydrazyl (DPPH) free-radical scavenging assay. The antibiofilm effect of extracts was measured by microplate biofilm method. Anti-quorum sensing activity of extracts was determined using biosensor bioassay with *Chromobacterium violaceum* CV026. Inhibition of QS-regulated violacein production in *Chromobacterium violaceum* ATCC 12472 and swarming motility in *Pseudomonas aeruginosa* PA01 were carried out using standard methods

Results: In disc diffusion test, the aqueous extract had antimicrobial effect on three Gram-positive bacteria (*S. aureus* ATCC 25923, *S. aureus* MU 46 and MU 47) with 11 and 10 mm inhibition zones, respectively. Ethanol extract showed no antimicrobial activity. As a result of MIC test, the aqueous extract inhibited *S. aureus* ATCC 25923, *S. aureus* MU 46 and *P. aeruginosa* MU 189 at 20 mg/mL concentration. *P. fluorescens* MU 181 and *M. luteus* NRRL B-4375 were found the most sensitive bacteria against ethanol extract with 10 mg/mL concentration. The highest antibiofilm activity was determined at the 10 mg/mL concentration of aqueous extract with the reduction rate of 33.3% against *P. aeruginosa* ATCC 27853 biofilm production. In the presence of 20 mg/mL ethanol extract (MIC), the mean biofilm formation values were equal to 17.51% for *P. aeruginosa* ATCC 27852, and 6.89% for *P. aeruginosa* MU 189. As far as DPPH scavenging assay results in concerned, the ethanol extract was more effective in the DPPH assay, as it reduced the stable free radical DPPH with lower IC₅₀ value (56.67 mg/mL) than the aqueous extract (63.47 mg/mL). Results obtained from FTC assay revealed that aqueous and ethanol extracts of *S. oleraceus* carry the antioxidative potential for chain-breaking inhibition of lipid peroxidation and for free radical scavenging as extract has shown 54.36 and 26.09% inhibition. The violacein inhibition rate was 35.32 % for 2.5 mg/mL aqueous extract. The ratio was determined as 5.54% for 12.5 mg ethanol extract. Aqueous extract and ethanol extract of *S. oleraceus* inhibited swarming by 19% and 9.5%, respectively. No effect on pigment inhibition was observed by extracts at sub-MICs concentrations for anti-quorum sensing activity.

Acknowledgements: The authors acknowledge the Mugla Sitki Kocman University Research Funds for financial support (Project 12/68).

Keywords: *Sonchus oleraceus*, antimicrobial, antioxidant, antibiofilm, quorum sensing

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Mutagenic, antimutagenic and antioxidant activity of *Hypericum perforatum* L. ethanol extract
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Aim of the study:Free radicals and oxidants may play a major role as endogenous initiators of degenerative processes, such as DNA damage and mutation, that may be related to cancer, aging and heart disease. Worldwide attention has recently been given to plant-based products including foods, pharmaceuticals and dietary supplements capable of protecting humans against these disease. The aim of the study was to investigate the mutagenic, antimutagenic and antioxidant effects of extract from *Hypericum perforatum* L. (St. John's Worth).

Material and Methods: In this study, aerial parts of *H. perforatum* were collected by local residents in Adana province of Turkey in August 2012 and ethanol extract was obtained. The evaluation of the mutagenic and antimutagenic activity of extract was evaluated by using *Ames Salmonella/microsome* test system. In addition, in vitro antioxidant ability was determined by using DPPH, β -carotene-linoleic acid and total phenol content assays.

Results: Results showed that, extract have antimutagenic and antioxidant activity. The extract showed no sign of mutagenicity at the tested concentrations (0.0002-2.0 mg/ml), and showed concentration-dependent antimutagenic activity against NaN₃ and 4-NPD at percents ranging from 26.77%-64.3%. The antioxidant activity of the extract was compared with synthetic antioxidants such as ascorbic acid and BHT. DPPH assay results showed the antioxidant activity (IC₅₀) of the extract, BHT and ascorbic acid were 0.36±0.01 mg/ml, 0.184±0.01 mg/ml and 0.01±0.03 mg/ml, respectively. The results of β -carotene bleaching tests found the IC₅₀ values of the extract, BHT and ascorbic acid to be 0.257±0.21 mg/ml, 0.05±0.012 mg/ml and 0.014±0.2 mg/ml, respectively. The total phenolic content of the extract was evaluated spectrophotometrically and calculated in gallic acid equivalents (GAE) as 41.75± 0.52 mg/ml.

Keywords: *Hypericum perforatum*, mutagenicity, antimutagenicity, antioxidant.

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**Abundance and habitat preferences of Dolichopodidae (Diptera) in three provinces
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Aim of the study:The paper gives information about abundance and habitat preferences of 75 dolichopodid flies collected in Afyonkarahisar, Kütahya and Uşak. Habitat preferences and abundance of dolichopodids were examined between April and September through three years (2009–2011), using hand net. 4323 specimens of dolichopodid flies examined in different habitats from Afyonkarahisar, Kütahya and Uşak provinces. The specimens of investigated research area are divided in five groups according to the abundance and calculated. Habitat preferences of collected species were given a table and discussed.

Material and Methods: Specimens were collected between 2009 and 2011 in aquatic and semi aquatic habitats in the Turkish provinces Afyonkarahisar, Kütahya and Uşak in Inner West Anatolia. Adults were collected with an entomological hand net (40 cm diameter) and with an aspirator. They were preserved in insect envelopes or vials in the field and then pinned before drying. All specimens are deposited in the Muğla Sıtkı Koçman University, Science Faculty, Department of Biology, Zoology Laboratory, Muğla, Turkey (MUZL). Some habitat characteristics were noted in research area. Adult flies were collected in six habitat types. These main habitat types were defined as follows: (1) marshlands; (2) woodlands; (3) coastal dunes; (4) grasslands; (5) heathland; and (6) disturbed habitats. Habitat information of the collected species was given according to Pollet (2000). Collected specimens were also evaluated by habitat types. Abundance of collected specimens were calculated according to Krebs (2004).

Results:The total number of the collected dolichopodid flies in the investigated period was 4323 specimens belonging to 75 species. About half of the total number was due to *Syntormon pallipes* – 1917 specimens (44,34 %). Five groups of species are found according to Krebs (2004)'s classification: eudominant – *Syntormon pallipes* (44,34 %), *Hydrophorus balticus* (11,06 %) and *Poecilobothrus regalis* (11,50 %), dominant *Campsicnemus umbripennis* (5,34 %) ve *Sympycnus pulicarius* (6,75 %) subdominant – *Hercostomus gracilis* (2,84 %), rare – *Dolichopus signifer* (2,50 %) and *Campsicnemus curvipes* (1,73 %), subrare – 67 species (<1%).

Large majority of species in research area prefers moist and shady habitat like fenlands, reedmarshes, humid coniferous woodland and humid grassland according to habitat preferences.

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Keywords: Dolichopodidae, Abundance, Habitat preferences, Afyonkarahisar, Kütahya, Uşak

PP-300

Seasonal flight period of long legged flies (Dolichopodidae, Diptera) species in the inner western Anatolia regionAlper TONGUÇ¹, Murat BARLAS²¹ *Department of Molecular Biology and Genetics, Science Faculty, Muğla Sıtkı Koçman University, Turkey*² *Department of Biology, Science Faculty, Muğla Sıtkı Koçman University, Turkey*

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Aim of the study: In this study, the seasonal phenology of long legged flies (Dolichopodidae) species was investigated. This study was carried out in the inner western Anatolia Region, consist of provinces of Afyonkarahisar, Kütahya and Uşak. Seventy five of Dolichopodidae species were collected by a hand net from 763 locality, between April and September, through three years (2009 and 2011). A great majority of species fly between May and July in the research area. It was determined that the maximum species number of long legged flies in May (46) while the minimum species number of long legged flies in September (3). In the other months, the number of species ranged from 21- 43.

Material and Methods: This study was carried out in provinces of inner western Anatolian part (Afyonkarahisar, Kütahya and Uşak) of Turkey. The material for the present work was collected by sweeping in aquatic and semi aquatic habitats in the period from April to September between 2009 and 2011. Adults collected in the field were put in vials containing 75% ethanol or insect envelopes. The specimens were sorted in the laboratory with a binocular microscope. All specimens are deposited in the Muğla Sıtkı Koçman University, Science Faculty, Department of Biology, Zoology Laboratory, Muğla, Turkey (MUZL). 75 long legged flies species were identified in the research area. Each monthly period were divided into four weeks, to determine flight period of long legged flies in a table. These species in the region were tried to determine for marking as weakly that corresponds to the sampling date.

Results: As a result of this study, a major part of species were determined to fly between May-July in the research area. It was determined that the maximum species number flies in May (46) while the minimum species number flies in September (3). In the other months, the number of species ranged from 21- 43 (22 species in April, 30 species in June, 43 species in July, 21 species in August). While the samples of three species fly all the months in the region, it was determined that the flight period for adults of thirty four species were limited to a month.

Acknowledgements: The authors would like to thank Muğla Sıtkı Koçman University (Research Project No: 09/04) for financial support.

Keywords: Diptera, Dolichopodidae, Long legged flies, flight period, Inner Western Anatolia Region

PP-301

The Dolichopodidae (Diptera) fauna of inner western Anatolia (Turkey)Alper TONGUÇ¹, Murat BARLAS²¹ *Department of Molecular Biology and Genetics, Science Faculty, Muğla Sıtkı Koçman University, Turkey*² *Department of Biology, Science Faculty, Muğla Sıtkı Koçman University, Turkey*

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Aim of the study: This study was carried out between the 2009 and 2011 in Inner part of Western Anatolia Region (Afyonkarahisar, Kütahya and Uşak). As a result of field study 4323 adult dolichopodid specimens were collected. It was determined that the collected specimens were belong to 10 subfamilies, 24 genera and 75 species. On the other hand, a total of 9 individuals of *Hercostomus* genus are identified as belonging to a new species. A faunistic list of species are given and the distribution of these species in the research area is presented in table.

Material and Methods: Specimens were collected between 2009 and 2011 in aquatic and semi aquatic habitats in the Turkish provinces Afyonkarahisar, Kütahya and Uşak in Inner West Anatolia. Adults were collected with an entomological hand net (40 cm diameter) and with an aspirator. They were preserved in insect envelopes or vials in the field and then pinned before drying. All specimens are deposited in the Muğla Sıtkı Koçman University, Science Faculty, Department of Biology, Zoology Laboratory, Muğla, Turkey (MUZL).

Results: A total of 763 field survey was performed in the Inner western Anatolia region with the purpose of collecting adult Dolichopodidae samples. A total of 4323 samples, including 2579 males, were collected between 2009 and 2011. According to the identification results, a total of 75 species, 24 genus and 10 subfamilies (Diaphorinae, Dolichopodinae, Hydrophorinae, Medeterinae, Neurigoninae, Peloropodinae, Rhabdriinae, Sciapodinae, Sympycninae and Xanthochlorinae) were determined. 47 species from Afyonkarahisar, 45 species from Kütahya and 43 species from Uşak were detected. A total of 19 species were found all provinces in research area. 38 of these species found in the research area were from both the West Palearctic and East Palearctic regions; 36 of them were only found in the West Palearctic.

Acknowledgements: The authors would like to thank Muğla Sıtkı Koçman University (Research Project No: 09/04) for financial support.

Keywords: Diptera, Dolichopodidae, Fauna, Turkey, Inner Western Anatolia Region

PP-302

Primary School Students' Recognition and Conscious Usage Levels of Mushroomsİsmail ŞEN¹, Oğuz ÖZDEMİR², Hakan ALLI¹¹ *Science Faculty, Biology Department, Muğla Sıtkı Koçman University, Turkey*² *Education Faculty, Science Education Department, Muğla Sıtkı Koçman University, Turkey*
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Aim of the study: Turkey has a large mushroom potential by suitable ecological features and the wild mushrooms are collected by local people for food. Poisoning cases are likely to occur as consequence of consume of the wild mushrooms. Edible mushrooms are confused with poisonous ones by local people and this situation can be considered as the primary reason of mushroom poisoning in Turkey. There are many incorrect knowledge about mushrooms among the local people, and this incorrect knowledge is passed from generation to generation. So, aim of this study is determination of the primary school students' recognition and conscious usage levels of mushrooms.

Material and Methods: The participants of this study were chosen randomly from two different schools located centre of city and village. The participants were randomly selected among the students at sixth, seventh and eighth grade (n=184) between 2009 and 2010.

For collection data, likert scale has been developed by researchers. Data obtained from pre-application to similar to another group was analyzed for determining of reliability of the scale, and Cronbach Alpha reliability value was found as 0.64. The collected data were analyzed by SPSS statistical analysis program.

Results: In the light of the results, basic knowledge of primary school students was acceptable level. But, they could not distinguish the edible mushrooms from others. Identification level of the students living in the city centre was found higher than others. This situation was interesting, because students living in the village are in more interaction with nature. But, students living in the village have many incorrect knowledge about distinguishing of mushrooms, and this result supports the opinion of passing incorrect knowledge from generation to generation.

It has shown that the primary reason of mushroom poisoning is lack of sufficient knowledge about mushrooms, and similar situation has been observed from the primary students. So, several education programs should be developed for the primary students. Thus, we could protect the people from mushroom poisoning in the future.

Keywords: Mushroom, poisoning, primary students, recognition, consume

PP-303

Determination of the Oxidative Status and Heavy Metal Content of *Fomitopsis pinicola* (Sw.) P. Karst.Hasan AKGÜL¹, Hakan ALLI², Mustafa SEVİNDİK¹, Ilgaz AKATA³, Celal BAL⁴¹ Akdeniz Üniversitesi, Fen Fakültesi, Biyoloji Bölümü, Antalya.² Muğla Sıtkı Koçman Üniversitesi, Fen Fakültesi, Biyoloji Bölümü, Muğla.³ Ankara Üniversitesi, Fen Fakültesi, Biyoloji Bölümü, Ankara.⁴ Gaziantep Üniversitesi, Oğuzeli MYO, Gaziantep

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Aim of the study: The search for alternative nutrients due to the increase the human population is increasing nowadays. Mushrooms is an alternative food source for humans, and day by day due to the increasing use of medical importance is increasing in alternative medicine. Even though it is not edible or edible collected from the natural habitat of many fungi by consumption or culture for its medicinal properties are made. The natural environment of fungi obtained from the detection of people is important in terms of benefits and harms human health. In this study, which is medical importance with mushrooms *Fomitopsis Pinicola* (Sw.) P. Karst Balıkesir (Kaz Dağı National Park) and Yalova (Çınarcık, Hasan Baba Protect) mushroom samples collected from the province, TAS (Total Antioxidant Status) TOS (Total Oxidant Status) and OSI (Oxidative Stress Index) aims to determine the heavy metal content and compared with values.

Materials and Methods: The collected mushrooms are first dried and finely grinded in a mechanical mill. Each sample contains 30 grams of each mushrooms. They are extracted by using ethanol in Soxhlet extractor for approximately 6 hours at 75 ° C. The antioxidant activity and oxidant activity of mushrooms are then analyzed by using Rel Assay kits methods. After wet digestion, heavy metal content of mushrooms are examined with the use of an atomic absorption spectrometer.

Results: On one hand, both of the collected mushroom samples have been proved that they have normal antioxidant levels. On the other hand, oxidant levels in the samples that collected from the Kaz Dağı National Park is shown as lowest whereas high oxidant levels are found in the samples that collected from Çınarcık. Both of the collected mushroom samples have been proved that they haven't got Ni content. In addition, the heavy metal level of Fe, Zn, Cu, Pb for content (mg.kg⁻¹) are resulted as 31.31, 60.61, 2.30 and 11.83 (samples from Kaz Dağı National Park) and 265.88, 41.27, 12.53 and 6.45 (samples from Çınarcık) respectively. They are used as indicators of pollution due to heavy metals that accumulate in the body fungi. As a result of the studies, due to the heavy metal content, antioxidant and oxidant levels were collected from Kaz Dağı National Park, this region can be said to be more clean in terms of environmental pollution. Oxidative stress, disease-causing or triggering factor. It is known to increase oxidative stress of environmental pollution. Due to the very high OSI level of the samples collected from the area Çınarcık, the fungi collected from this area should not be consumed because it will adversely affect human health. There is environmental pollution in the region of Çınarcık because of the high OSI level. In contrast to the samples collected from the Kaz Dağı National Park it is considered to be more healthy.

Keywords: *Fomitopsis pinicola*, Red-Belt Conk, Antioxidant, Oxidant, Heavy Metal, Environmental pollution.

PP-304

Morphological and molecular evidence for new record *Discina apiculata*, from TurkeyHalil GÜNGÖR¹, Hakan ALLI¹, Mehmet Halil SOLAK²¹Department of Biology, Science Faculty, Muğla Sıtkı Koçman University, Muğla- Turkey²Program of Elementary Science Education, Faculty of Education, Muğla Sıtkı Koçman University, Muğla-Turkeyhakanalli@gmail.com

Aim of the study: The aim of this study is to contribute to the mycobiota of Turkey with fenotypically and molecularly describing and illustrating new macrofungal record.

Material and Methods: The material for the present study was collected in 2015 during routine field trips all around the Turkey. After an investigation in the laboratory and fungarium, *Discina apiculata* was identified. Total genomic DNA was extracted according to Paolocci et al., (1999) from identified specimen. ITS1 and ITS4 primers were used for PCR and sequencing. PCR products were sequenced by Source Bioscience inc.

Results: In the light of the current literature on Turkish macrofungi (Solak et al., 2015; Sesli & Denchev, 2015), *Discina apiculata* is new species record for the Turkish mycobiota. ITS nrDNA nucleotide sequences of the taxon were not found in GenBank for compare with our specimen. We added to ITS nucleotide sequences to the Genbank for further studies.

Acknowledgements:We would like to thank TÜBİTAK (The Scientific and Technical Research Council of Turkey) for supporting this project (TBAG-212T133) financially.

Keywords: New record, ITS, molecular characterization, *Discina*, Turkey

PP-305

The Spread of Chinese Sleeper (*Perccottus glenii* Dybowski, 1877) in Ukraine

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Aim of the study: Chinese Sleeper is one of the most successful alien species in Europe in general and Ukraine in particular. The aim of our study was to clarify the boundaries of modern Chinese Sleeper distribution in Ukraine, especially in the Dnieper basin, by summarizing the literature data of other researchers and own conducted search of this species in the water bodies. However, it should be remembered that these boundaries are subject to change almost every year, since active distribution of this fish continues.

Material and Methods: In order to detect the earliest references of this species in Ukraine, we analyzed the literature, including leading Ukrainian periodicals since 1970; publication of key authors at this problem; thesis and materials of the thematic conferences. Collections of Zoological Museum NNPM NAS of Ukraine (Kyiv) were analyzed too. We also conducted our own field research – from 2001 to 2015 as part of the study of fish fauna in the region. Fishes were sampled by trawl, 8 m long, 0,5 cm in cell diameter, sometimes fishing rods. Also used data collected by fellow zoologists (fixed material, or sometimes photos). Total we studied about 130 locations, mostly in the Dnieper basin, its tributaries, but also in the basins of the Danube, Southern Bug and others. We found Chinese Sleeper in 72 samples, including material provided by colleagues, number of individuals registered is 1463.

Results: Today Chinese Sleeper is known in Ukraine for five basins. According to published data and collections of NNPM Chinese Sleeper known in more than 50 research points in Dnipro Basin, from 2001, the same number is known for our own data. For other basins are such amount famous finds the following: Vistula – about 10 points; Dniester – 30 points; Danube – 40 points; Southern Bug – only 5 points. Today, this species is spread rather sporadically in northern Ukraine in the Dnipro basin, which may indicate the spontaneous character of its distribution. This is likely to transfers of planting material from one to another farm. In the basins of Vistula, Danube, Dniester distribution of this species started earlier (in period of 70 - 90's century.) And, accordingly, it finds there are more evenly throughout the basin. In the basins of the Dnipro and Southern Bug first information about Chinese Sleeper already dates of XXI century. That is why it episodic, and mainly deal the northern part of the basin. For some regions is indicated opportunity to stay of this species even in fluvial sections of the river, not only in the floodplain or bays.

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PP-306

Microorganisms caused to rotting of grape root infected by phylloxera in Tovuz region conditionHaji SHIKHLINSKI¹, Naila MAMMADOVA²¹Genetic Resources Institute of the Azerbaijan National Academy of Sciences,²Genetic Resources Institute of the Azerbaijan National Academy of Sciencessh.haci@yahoo.com

Aim of the study: This distribution is almost conditional because there are also the pests in partially infected and a few infected regions (free zones). It is enough to mark this fact that phylloxera was found just 9 hectares of grape plantations, but now about 50-60% of plantations are infected with phylloxera.

Material and Methods: The roots of Qirmizi kishmishi, Ag kishmishi, Qara kishmishi and Tavkveri grape varieties were taken and researched microbiologically from the viticulture farm of Tovuz region. The separation from roots of grape and reproduction of phytopathogen and saprotrophs root rotting microorganisms' which is cause to rotting grapevines' infected with phylloxera is carried out with the method preparing by P.N.Nedov with the purpose of creating complex artificial infection background.

Results: The quantity of microorganisms separated from the roots of Qirmizi kishmishi grape varieties have been 100 % that concerning to phytopatogenic fungus and bacteria. From these is identified the fungus belong to *Gliocladium* species is 35%, fungus belong to *Cylindrocarpon* species is 10%, the fungus belong to *Fusarium* species is 25%, the bacteria belong to *Pseudomonas* species – 30 %. At the same time it's necessary to mark that in the roots of this grape sort aren't discovered bacteria belong to *Bacillus* species and saprotrophic fungi. The quantity of microorganisms separated from the roots of Ag kishmishi grape varieties have been 92,5 %. From these is identified the fungus belong to *Cylindrocarpon* species is 20%, fungus belong to *Fusarium* species is 7,5%, there isn't discovered belong to *Gliocladium* fungus species. There were identified bacteria belong to phytopatogenic *Pseudomonas* species – 42,5 %, the bacteria belong to *Bacillus* species – 17,5%. As well as is identified that here are the fungus belong to saprotrophic *Penicillium* species – 2,5%, the fungus belong to *Mucor* species – 2,5%. In the roots of this grape sort aren't discovered more saprotrophic fungi compared to phytopatogenic fungus. The quantity of microorganisms separated from the roots of Qara kishmishi grape varieties damaged by phylloxera have been 100 %. From these is identified the fungus belong to *Cylindrocarpon* species is 60%, the bacteria belong to *Pseudomonas* species – 40%. In the roots of this grape sort is not discovered belong to saprotrophic fungi species. The quantity of microorganisms separated from the roots of Tavkveri grape varieties infected by phylloxera have been 100 %. From these is identified the fungus belong to *Gliocladium* species is 50%, In the roots of this grape sort isn't discovered belong to *Cylindrocarpon* and *Fusarium* phytopatogenic fungus species. The bacteria belong to *Bacillus* species – 50%. In the roots of this grape sort is not discovered belong to saprotrophic fungi species. Phytopathogen fungus species: *Fusarium*, *Gliocladium*, *Cylindrocarpon*; phytopathogen bacterium species: *Pseudomonas*, *Bacillus*; saprotroph fungus species: *Mucor*, *Absidia*, *Molissia*, *Penicillium* and *Rhacodiella* caused rotting the roots of grape by phylloxera were determined in Aghdam region of Azerbaijan.

Keywords: phylloxera, grape, fungi, phytopathogenic fungi, saprotrophic fungi.

PP-307

**Phytopathologic estimation of cotton intra- and interspecific hybrids resistance to fungi
Verticillium dahliae Klebahn**Naila MAMMADOVA¹, Haji SHIKHLINSKI²¹Genetic Resources Institute of the Azerbaijan National Academy of Sciences, Azerbaijan²Genetic Resources Institute of the Azerbaijan National Academy of Sciences, Azerbaijan
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Aim of the study: Cotton is one of the valuable crops. A significant attention is being paid to production of this culture. Creation of highly productive varieties of the cotton resistans against diseases and their introduction in agriculture is very important link in system of actions for struggle against them. Researches of immunity and also selection of a cotton is conducted concerning the most harmful diseases. One of the most dangerous diseases of cotton is wilt. This disease is caused by fungi *Verticillium dahliae* Klebahn, which concerns to imperfect fungies.

Material and Methods: We studied resistance to wilt intra- and interspecific hybrids of *G.hirsutum* L. and *G.barbadense* L. cotton species. The phitopathologic estimation of cotton hybrids resistance was carried out on an artificial – infections background by Vaytenoks metod on a five-ball scale. Symptom of disease is appearens of yellowish round and angular spots on leaves.

Results: The estimation of cotton hybrids resistance has shown different sensitivity of crops to diseases which has allowed to reveal the most resistant to this one. On the results of our data of the interspecific hybrids of *G.hirsutum* L x *G.barbadense* L. cotton species turned out more resistant to this disease. Amount and per centage of sensitive and highly sensitive to wilt interspecific hybrids at *G.hirsutum* L. x *G.barbadense* L species. twice exceeded than intraspecific hybrids of cotton at *G.hirsutum* L. species id est these made accordingly – 20,5% -14,3% and 8,9% - 6,1%. The per centage of immune hybrids at this cotton species equalled accordingly – 21,2% and 44,5%. The most resistant ones Pima-S-4 x 18819; S-5497 x 6465-b; Todla-16 x Acala-1517 and ets.

Acknowledgements: According to the above-stated one can make conclusion, that the interspecific cotton hybrids *G.hirsutum* L. x *G.barbadense* L. are more resistant to wilt, that the intraspecific hybrids of cotton at *G.hirsutum* L. species. These hybrids can be used in selection as donors of resistance to this disease.

Keywords: cotton, *G.hirsutum* L., *G.barbadense* L., interspecific hybrids, wilt.

PP-308

Two new species of the genus *Cobitis* Linnaeus (Teleostei: Cobitidae) from TurkeyFüsün ERKAKAN¹, Filiz ÖZDEMİR¹¹ *Biology Department, Science Faculty, Hacettepe University, Ankara, Turkey*
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Aim of the study: This study is aimed to describe new fish species to contribute to biodiversity and distribution of Turkey.

Material and Methods: The specimens used in this study was collected with electrofishing equipment. Specimens are stored in HUIC: the collection of the Ichthyology Museum, Department of Biology, Hacettepe University (Ankara). Seventeen morphometric variables such as Standart lenght (SL), Head lenght, Head depth at nape, Body depth, longitudinal eye diameter, interorbital lenght, snout lenght, post orbital lenght, lenght and depth of dorsal fin, lenght of anal fin, lenght of pelvic fin, lenght of pectoral fin, lenght of pre-dorsal, lenght of pre-pelvic, lenght of pre-anal, lenght and depth of caudal peduncle were measured, according to Banarescu *et.al.*(1972). The measurements were made with digital calipers. Lenght of maxillar barbels were not measured due to changing with geographic and ecological condition. 4 meristic characters (unbranched and branched dorsal, anal, pectoral and ventral fin rays) were counted using a binocular dissecting microscope. All drawings were made by F. Erkakan.

Result: Based on these result, re-examination of Kırkgözler population (Antalya region) and newly caught Köyceğiz Basin (Muğla region) population which belong to Mediterreanean With this study two new species of the genus *Cobitis* from Turkey, *Cobitis dorademiri* from Köyceğiz Basin (Muğla province) and *Cobitis nalbanti* from Kırkgözler (Antalya province) are described and illustrated. *Cobitis dorademiri* is more similar to *Cobitis hellenica* but can be distinguished from *C. hellenica* by the lack of 5th Gambetta zone, lack of the straight black line between eyes and snout, longer pectoral fin in males, shorter caudal peduncle and mental lob structure with papilla. *Cobitis nalbanti* is closely related to *Cobitis turcica*, *Cobitis evreni* and *Cobitis levantina* but differs from them. Basin revealed that these two *Cobitis* population different from all *Cobitis* species in Turkey and from each other.

Acknowledgements: Researchers are pleased to thank technician İbrahim Aslan for collecting the materials.

Keywords: New species, *Cobitis dorademiri*, *Cobitis nalbanti*, freshwater, taxonomy, Turkey.

PP-309

An Unnoted Check-List and Distribution of Nemacheilidae of TurkeyFiliz ÖZDEMİR¹, Füsün ERKAKAN¹¹Biology Department, Science Faculty, Hacettepe University, Ankara, Turkey
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Aim of the study: Loaches of the family Nemacheilidae is reported as one of the most widely distributed group from the rivers of Asia, Europe and Ethiopia. *Oxynemacheilus*, *Seminemacheilus* *Shistura* and *Turcinoemacheilus* are the four genera of the group distributed in Turkey. Nemacheilid loaches in Asia Minor show rapid genetic differentiation and fast local speciation. Fish speciation case arises complexity in Turkey because of the connection between the river basins of the geological eras. For that reason, the distribution of Nemacheilid loaches in Turkey is very complicated. The present study provides the distribution of Nemacheilid loaches of Turkey.

Material Methods: The species lists are compiled from previous studies. In addition, fish samples of Nemacheilid loachs in ichthyological collection of Hacettepe University (HUIC) were evaluated.

Results: There are four genera belonging to *Nemacheilidae*, *Oxynemacheilus* (31 species), *Seminemacheilus* (2 species), *Shistura* (only 1 species) and *Turcinoemacheilus* (2 species) distributed in Turkey.

Acknowledgements: Researchers are pleased to thank technician İbrahim Aslan for collecting the materials.

Keywords: Nemacheilidae, distribution, check-list, freshwater, Turkey.

PP-310

An Unidentified Organism from Intertidal Sediments of Saros Bay, Aegean Sea (Turkey)Esra Elif AYDIN DEDE¹, Won Je LEE²¹Advanced Technologies Application and Research Center, Hacettepe University, Turkey²Department of Urban Environmental Engineering/Kyungnam University, Koreaesraelif@gmail.com

Aim of the study: As a contribution to the study of heterotrophic flagellates, we have sought to understand the geographical distribution of morphospecies of these organisms. Recently, there have been an increase in the studies on the taxonomy and distribution of marine species, but still there are less studied regions of the world. The idea that heterotrophic flagellates have a world-wide distribution and are cosmopolite is quite strong but we also know that there are extreme species too. The aims of this study are to address issues of endemism and to find out if an extreme morphospecies is exist in Saros Bay –a non-studied area by protozoologists.

Material and Methods: This study was carried out at Saros Bay, Aegean Sea (Turkey) from 25th June 2010 to 10th October 2010 (N44°30'25.1", E26°41'36.2"). During the period, water temperature and salinity were in the ranges of 18–29°C and of 14.5–26.2 psu, respectively. Samples were collected monthly (n = 5) from intertidal sediments to a depth of about 1 cm from a 1 m². quadrat. After collecting the sediments, the sediments were sieved to remove macro-fauna and plant material and then the sediments were placed in trays in 1 cm deep layers, allowed to settle for several hours, excess water drained off, and the sediments were covered with a sheet of lens tissue upon which 22x22 mm No. 1 coverslips were placed. After 12-24 hrs the coverslips were removed and flagellates were observed using a Leica DMR microscope equipped with a digital camera (Nikon D90 Model) and drawn. The flagellates were also recorded in movie files with the camera. The samples were maintained at room temperature (~20°C) for 5–7 days.

Results: Thirty eight species from 30 genera of heterotrophic flagellates and one unidentified taxon were reported with uninterpreted records based on light-microscopy. One unidentified organism was observed at one occasion. It was difficult to establish the identity of the cell due to not enough information, but its presence should be recorded to establish its occurrence in a marine bottom sediment. The cell observed in this study is reported as an unidentified taxon because of not enough information. This cell is similar to *Multicilia marina* Cienkowski 1881 in having many flagella, but can be easily distinguished by their movement patterns; the unidentified cell swims, while *Multicilia glides* or rolls. *Multicilia marina* has been studied well by Mikrjukov and Mylnikov (1998). This species differs from *Stephanomonas locellus* (Fromentel) Kent 1880 because *S. locellus* has only one flagellum and many cilia around the body. Also *S. locellus* (32 µm) is bigger than the cell observed here. Further studies are needed to establish the identity of this organism to find out if it is an extreme taxon or not.

Acknowledgements: This study was accomplished by the project named “Determination of the Diversity of Freshwater Benthic Heterotrophic Flagellates in Gala and Çıldır Lakes” supported by the Scientific and Technological Research Council of Turkey and the laboratory works were done at Hacettepe University. Additionally this work was supported by the Kyungnam University Research fund to W. J. Lee. We are also grateful to Professor Ali Demirsoy (Hacettepe University) for making this work possible.

Keywords: Protista, marine heterotrophic flagellates, unidentified organism, systematic, Saros Bay.

PP-311

Heterotrophic Flagellate Diversity of One Brackish and Three Hypersaline Lakes of TurkeyEsra Elif AYDIN DEDE¹, Won Je LEE², Ali İsmet DEMIRSOY³¹*Advanced Technologies Application and Research Center, Hacettepe University, Turkey*²*Department of Urban Environmental Engineering/Kyungnam University, Korea*³*Department of Biology/Hacettepe University, Turkey*esraelif@gmail.com

Aim of the study: Heterotrophic flagellates are the consumers of the bacteria and the food of the other eukaryotic organisms. Recently, there has been an increase in the studies on the systematics and distribution of marine and freshwater heterotrophic flagellates. Compared with these marine and freshwater studies, the studies from hypersaline environments are few. The knowledge of the systematics of hypersaline protists was based on the sporadically performed studies over the years. Thus protists of hypersalines became an interesting study area for taxonomists. Within this context we aimed to document the diversity of the heterotrophic flagellates from four saline lakes of Turkey.

Material and Methods: One brackish, and three hypersaline lakes were studied which are located in the Konya Closed Basin in Central Anatolia of Turkey. Samples were collected monthly from 2008 to 2011 (n = 13) from surface sediments to a depth of about 1 cm from a 1 m² quadrat. After collecting the sediments, the sediments were sieved to remove macro-fauna and plant material and then the sediments were placed in trays in 1 cm deep layers, allowed to settle for several hours, excess water drained off, and the sediments were covered with a sheet of lens tissue upon which 22x22 mm No. 1 coverslips were placed. After 12-24 hrs the coverslips were removed and flagellates were observed using a Leica DMR microscope equipped with a digital camera (Nikon D90 Model) and drawn. The flagellates were also recorded in movie files with the camera. The samples were maintained at room temperature (~ 20°C) for 5–7 days.

Results: As a result of this study, twenty three morpho-species of heterotrophic flagellates are reported. These twenty three species consist of one apusomonad, three choanoflagellates, one jakobid, six kinetoplastids, four stramenopiles, 7 of uncertain affinities and 1 unidentified protist. Three species of uncertain affinities were first described by Namyslovski at 1913 and later described by Ruinen at 1938 from the hypersaline habitats of Poland and Australia. These three species were not reported from the following studies till now. The other species except the unidentified protist have been reported previously from other locations worldwide. Thus it seems that species observed with this study have a cosmopolitan distribution. To identify the un-identified protist it must be cultured and ultrastructural studies should be carried out. The species diversity decreases in contrast with the increase of salinity and this is an expected result since salinity is a restricting factor for the protist diversity.

Acknowledgements: This study was accomplished by two projects with the numbers 4809 and 2006K120650 supported by the Scientific Research Projects Coordination Unit of Hacettepe University and the laboratory works were also done at Hacettepe University. We are grateful to İbrahim Aslan for his valuable helps at the field studies.

Keywords: protozoa, heterotrophic flagellates, hypersaline, brackish, lakes, systematic.

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Identification of novel SNPs and 10 bp deletion of ovine DGAT1 geneÖzge OZMEN¹ and Selim KUL²¹Ankara University, Faculty of Veterinary Medicine, Department of Genetics, Turkey²Firat University, Faculty of Veterinary Medicine, Department of Animal Breeding, Turkey

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Aim of the study: The objective of this study is to detect novel variants of the intron 6, exon 7, intron 7, exon 8, intron 8 and exon 15, intron 15, exon 16, intron 16, exon 17 and partially 3' untranslated region (UTR) in the ovine DGAT1 genotypes.

Material and Methods: Four hundred and fifty blood samples were used in the study, which included 150 samples from each of Sakiz, Akkaraman and Awassi ewes respectively. The sample selected randomly consisted of animals that were 4 years old, multiparous and lactating. Genomic DNA was extracted from the whole blood using the phenol chloroform method. For this study, according to the ovine (EU178818) sequence of DGAT1 gene, three pairs of primers were designed to amplify for intron 6, exon 7, intron 7, exon 8, intron 8 and exon 15, intron 15, exon 16, intron 16, exon 17 and partially 3' untranslated region (UTR), respectively, in DGAT1 gene. Genotypes were identified by differential migration due to fragment size. PCR products showing different band patterns on RFLP gel were selected for sequencing. To confirm RFLP results, 20 randomly chosen PCR samples of each genotype were sequenced from both directions. Sequences were analysed using the BIOEDIT, DnaSP and NETWORK software's.

Results: In this study, sequencing analysis and alignment of the exon 15, intron 15, exon 16, intron 16 and exon 17 of the DGAT1 gene showed the presence of eight polymorphic sites in the Sakiz breed. For exon 15, intron 15 and exon 17 regions, except for reference sequences (EU178818) two different haplotypes were obtained. One variation point was determined in exon 15, which is synonymous mutation: g.8134G>A; four variation points were determined in intron 15: g.8184T>C, g.8187G>A, g.8231T>C, g.8236A>G; one variation point was determined in intron 16: g.8384T>C and two variation points were determined in partial exon 17, of which is synonymous mutations: g.8413C>G, g.8431C>T. Furthermore, by comparing sequences from Sakiz breed, we identified a novel 10 bp deletion (g.8213_8223delTGGGGCGGGG) in the intron 15 region. The DGAT1 haplotype sequences from Sakiz sheep breeds have been deposited in the GenBank database under the access number: KP215640 – KP215641

Acknowledgements: The project was supported by Scientific Research Projects Council of Firat University, project number VF.12.17.

Keywords: Dairy sheep breeds, DGAT1 gene, SNPs

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Effects of low temperature on the fatty acid compositions of adult of *Acanthoscelides obtectus* (Say) (Coleptera: Chrysomelidae)Leyla KALYONCU¹, Hüseyin ÇETİN²¹Department of Biology, Science Faculty, Selcuk University, Konya, Turkey²Department of Plant Protection, Faculty of Agriculture, Selcuk University, Konya, Turkeylkalyoncu@selcuk.edu.tr

Aim of the study: The common bean *Phaseolus vulgaris* (L.) is one of the most commonly used vegetables in human nutrition worldwide and is of the main sources of protein, particularly in developing countries. Bruchids encompass a group of approximately 1700 insect species. However attack by bruchids (Coleptera: Chrysomelidae: Bruchinae) during storage compromises the quality and commercial value of beans. *Acanthoscelides obtectus* (Say) is one of the major insect pests affecting the common bean. The bean weevil causes significant damage to haricot-bean and bean. This study was conducted to investigate the effects of a warehouse at low temperatures, which is harmful to the adult *A. obtectus* fatty acid composition.

Material and Methods: Newly hatched adults are carefully separated, each group containing 10 individuals try was created. Three groups of mature individuals novel, including the control group, chloroform / methanol (2: 1, v / v) solution was stored in a freezer until the analysis process by placing the capped tube containing small. To create the experimental group of 10, 20 and 30 days at low temperature (4°C) to be kept waiting, each made of three separate groupings of three again. Experimental groups, inside the plastic cups covered with onionskin paper, openings covered with one layer of cheesecloth +4°C were placed in coolers set. These groups were 10, 20 and 30 days were subjected to low temperature applications. At the end of each experimental group of low temperature applications is taken from deep milling separately, were put in vials and chloroform / methanol mixture was added. This group is stored in a freezer until the analysis process in. At the beginning of each analysis, the samples were allowed to equilibrate to room temperature and homogenized in chloroform/methanol mixture (2/1, v/v). Samples of fillets were extracted by Folch et al., (1957) method were transesterified with BF₃ methanol (Moss et al., 1974).

Results: Gas chromatographic analysis result of C12:0 and C21:0 of 16 fatty acids are determined and the largest percent respectively oleic acid in the fatty acid composition (C18: 1ω9), palmitic acid (C16: 0) and linoleic acid (C18: 2ω6) were of. It was showed that oleic acid (59.56-61.74%), palmitic acid (16.36-18.02), linoleic acid (7.21-8.38%) and stearic acid (6.29-7.34%) constituted the major part of fatty acid compositions of adult. In the fatty acid compositions of adult, total saturated fatty acids percentage were decreased but percentages of total monounsaturated fatty acids were increased by low temperature.

Keywords: Low temperature, *Acanthoscelides obtectus*, Fatty acid composition.

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Wild ornamental spring grasses in the North-East part of Azerbaijan

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Aim of the study: A priority in the strategy for biodiversity conservation is the identification of wild flora, including ornamental grasses. Grasses are important but most ignored part of green cover of the world. Spring grasses include species with short growth period about 40-60 days and most of them are ephemeroids. Sometimes small, bright flowers are visible on the snow. These plants take advantage of abundant light in early spring period, just after snow melts. The purpose of the study was to investigate and flowering grass species in the North-East part of Azerbaijan, to reveal the diversity of ornamental grasses, to define ecological impacts and identify potential control strategies for protection of these plants.

Material and Methods: Materials were collected in Quba (2574 km²) and Qusar (1542 km²) districts of the country. Various routes were chosen for collection of herbarium specimens during spring period of 2013-2016 years. Growth places were defined, GPS coordinates were recorded and photos of plants were taken. Ornamental grasses were identified based on the phenology, the size and colour of flowers, leaves, stems, aesthetic forms were taken into account. An appropriate literature was used for identification of species (Əsgərov 2005, 2006, 2008; Çolak, Sorger 2004; Флора Азербайджана I-VIII, 1950-1955, 1957, 1961; Конспект Флоры Кавказа I-III, 2003, 2006, 2008). Classification of species were crosschecked with APG III system (2009) and "Global Compositae Checklist" web site.

Results: The territory of the Quba and Qusar districts divided into three heights zone (foothills, middle upland and high upland) from 500 to 4466 meters a.s.l. and the floristic richness is well represented in this region. Significant part of this native richness are hundreds of taxa of spring grasses and wildflowers. Typically grasses divided into annual and perennial species. A wealth of spring grasses growing here represented with the various genera. The first wildflowers appear in the end of February and beginning of March. They are species belonging to the genera of *Coridalis*, *Galantus*, *Primula* and *Viola* in grasslands and open woodlands. Following them in April, species of the genera *Adonis*, *Androsace*, *Dictamnus*, *Fritillaria*, *Matthiola*, *Nepeta*, *Ophrys*, *Orchis*, *Ranunculus*, *Skilla*, *Tulipa* and *Vinca* appear in abundance. In May species of *Anacamptis*, *Aster*, *Bellis*, *Betonica*, *Caltha*, *Calystegia*, *Campanula*, *Cephalantera*, *Glaucium*, *Himantoglossum*, *Limodorum*, *Matthiola*, *Papaver*, *Planthera*, *Poligonatum*, *Reseda*, *Roemeria*, *Saxifraga*, *Sempervium*, *Stachys* etc. enrich the diversity in this region, along some species of above mentioned genera. Some of them grow as single specimens (*Epipactis palustris*, *Iris caucasica*, *Planthera chlorantham*), some in small groups (*Aster roseus*, *Crocus adamii*, *Stachys fruticlosa*) in meadows or forest edges and some appear with dense growth and cover the land as carpet. Masses of *Bellis perennis*, *Cephalanthera adamsonium*, *Ornithogalum sigmoideum*, *Tulipa bibersteiniana* are particularly notable. Most of these plants have short flowering period, such as *Galantus caucasicus*, *G. caspicus*, *Viola alba* and *V. odorata*. But *Aster roseus*, *Campanula elatior*, *Scutellaria orientalis* etc. have long period of flowering.

Acknowledgements: The author thanks all the colleagues from the Institute of Botany ANAS who have contributed to the study.

Keywords: diversity, grass, native, ornamental, species, wildflower

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The Assessment of Air Pollution in During 2013 and 2014 in Tokat Province

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Aim of the study: Air pollution is the introduction of particulates, biological molecules, or other harmful materials into Earth's atmosphere, causing diseases, death to humans, damage to other living organisms such as animals and food crops, or the natural or built environment. Air pollution may come from anthropogenic or natural sources. Tokat economy is based on agriculture and agriculture-related industry widely. All kinds of products are grown in the fertile plains of Tokat. Livestock is also quite advanced. Tokat province is located in an area which promotes development and industrialization. As it is still an industrially developing city, it is necessary to be aware of the dimensions of the air pollution when one makes plans to solve this problem. This study aimed to determine the amount of total polluting matter emitted into the atmosphere from heating and industrial-based emissions and the total pollution bulk of Tokat city center.

Material and Methods: Air particulate samples were collected from three different locations situated around Tokat. Sampling stations had wide open surroundings. Aerosol samples were collected using a high volume air sampler developed in our laboratory. Sampling systems having flow rate of 12 L/min. can filter 17 m³ of air in a day. All sampling at each site were performed between 12.00 am and 12.00 am the next day. The filtering material sheets of 4.7 cm diameter were used with a plastic stamp to avoid metal contamination. The filters collected an average mass of 20 mg of air particulate matter in a single experiment. Air particulate samples were collected during November 1, 2013 to October 31, 2014.

Results: The possible source of atmospheric pollution is the large and middle sized industrial factories in this region. Higher winter concentrations of heavy metals can be attributed to intense coal combustion in addition to emissions from industrial sectors in the region. The concentrations of Pb and Zn were higher in air particles, which were mainly due to the traffic density and direct emission of exhaust gases into the atmosphere. Use of insecticides, pesticides and fertilizers in agricultural activities has grown quite a lot. They emit harmful chemicals into the air and can also cause water pollution. World Health Organization Considering that limit values for PM₁₀ (10 µg/m³ annual average) and SO₂ (20 µg/m³ annual average) advised, Tokat province seems to be exceeded in the atmosphere. As a solid fuel for heating in Tokat is used imported coal, wood and domestic coal.

Keywords: Air pollution, particle matter, PM₁₀

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Diversity of Marine Red Algal Tribe Ceramieae (Ceramiales, Rhodophyta) in the Sea of Marmara (Turkey)Murat ÇAKIR¹, Ergün TAŞKIN¹¹Department of Biology, Faculty of Arts and Sciences, Celal Bayar University Muradiye, Manisa 45140, Turkey.

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Aim of the study: The aim of the present study is to increase the knowledge of diversity of the marine red algal tribe Ceramieae (Ceramiales, Rhodophyta) in the Sea of Marmara (Turkey).

Material and Methods: The algal material was collected by snorkeling and Scuba-diving from 20 sites located in the Sea of Marmara (Turkey) during 2015-2016. Specimens were preserved in 2-5% formaldehyde in sea water. Voucher specimens were deposited in personal herbarium of Ergün Taşkın in the Department of Biology at Celal Bayar University (Manisa, Turkey). Samples were studied using a light microscope (Nikon SE, Tokyo, Japan), and photographs were taken using a digital camera (Nikon P5100, Nikon, SE, Tokyo, Japan). Nomenclature has been checked against AlgaeBase.

Results: In the present study, a total of 16 taxa of the marine red algal tribe Ceramieae are recorded in the Sea of Marmara (Turkey), 14 which of *Ceramium* taxa (*C. ciliatum* var. *diaphanum*, *C. ciliatum* var. *robustum*, *C. cimbricum*, *C. circinatum*, *C. deslongchampsii*, *C. diaphanum*, *C. diaphanum* var. *elegans*, *C. rubrum* var. *barbatum*, *C. secundatum*, *C. siliquosum* f. *minusculum*, *C. siliquosum* var. *lophophorum*, *C. tenerrimum*, *C. tenerrimum* var. *brevizonatum*, *C. virgatum*) and two which of *Gayliella* taxa (*G. flaccida*, *G. mazoyerae*). *Ceramium diaphanum* and *Ceramium virgatum* are the most common species in the research area. *Ceramium ciliatum* var. *diaphanum* is rare known taxon in the Mediterranean Sea. The highest taxa were found in three stations (eight taxa in Paşalimanı Island, seven taxa in Gelibolu and five taxa in Marmara Ereğlisi).

Acknowledgements: The study has been supported by a TÜBİTAK (Ankara, Turkey) project "114Y238".

Keywords: Ceramiales, Ceramieae, *Ceramium*, *Gayliella*, red algae, Sea of Marmara.

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Relationships of *Tragopogon* L. (Lactuceae, Asteraceae) taxa inferred from Morphological Data
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Aim of the study: We aim to determine the phenetic relationships among twenty-one of *Tragopogon* L. taxa occurring in Turkey by means of cluster analysis.

Material and Methods: Samples collected between 2011 and 2014 from Turkey and stored in the herbarium of Karadeniz Technical University, Department of Biology (KTUB). Forty-four morphological characters were scored. All the characters were measured at least thirty times. A raw data matrix created by using the average measurement of the traits. Thirty six of the characters were selected after preliminary analysis for using in further numerical analyses. CA (Cluster Analysis) was carried out using SYN TAX 2000 software. For CA, a pairwise matrix of resemblance values was calculated from the raw standardized data matrix using Gower's coefficient of resemblance designed for mixed data sets. A dendrogram was generated by the UPGMA.

Results: All examined *Tragopogon* taxa fall into two main groups corresponding to the fistular peducles with 33% dissimilarity levels. The result is not consistent with the discrimination of the genus according to colour of the ligules. All the yellow-flowered species except *T. dubius* Scop., were grouped in same clade. Moreover, the species included in this clade have beaks shorter than achenes. *T. dubius*, the yellow-flowered species, is grouped with purple-flowered species in other clade that having swollen peduncles below theirs capitula.

Acknowledgements: Authors express their thanks to TUBITAK (TBAG-110T954) for financial support

Keywords: CA, *Tragopogon*, Turkey, UPGMA.

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Deep Marine Algal Flora in Princes Islands (İstanbul, Sea of Marmara, Turkey)Ergün TAŞKIN¹, Murat ÇAKIR¹, Barış AKÇALI²¹*Department of Biology, Faculty of Arts and Sciences, Celal Bayar University Muradiye, Manisa 45140, Turkey.*²*Dokuz Eylül University, Institute of Marine Sciences and Technology, Haydar Aliyev Bulvarı, 35430, İnciraltı-İzmir, Turkey.**cakirmurat@hotmail.com*

Aim of the study: The aim of the present study is to increase the knowledge of the deep marine algal diversity of Princes Islands (İstanbul, Sea of Marmara, Turkey).

Material and Methods: The deep marine algal material was collected by Scuba-diving at 15-22 m depth from three different localities in Princes Islands (İstanbul, Sea of Marmara, Turkey) in 2015. Specimens were preserved in 2-5% formaldehyde in sea water. Voucher specimens were deposited in personal herbarium of Ergün Taşkın in the Department of Biology at Celal Bayar University (Manisa, Turkey). Samples were studied using a light microscope (Nikon, SE), and photographs were taken using a digital camera (Nikon P5100, Nikon, SE). Taxonomy and nomenclature has been checked against AlgaeBase.

Results: In the present study, the deep marine algal flora was studied from Princes Islands (Istanbul, Turkey), and one Cyanobacteria (blue green algae), two Phaeophyceae (brown algae), 28 Rhodophyta (red algae), and four Chlorophyta (green algae) have been reported in a total of 35 marine benthic algal species, and two of which are alien species [*Codiumfragile* and *Falkenbergiarufolanosa* (tetrasporophyte of *Asparagopsisarmata*)]. Red algal species was found abundant in 15-22 m depth (as 80%), and the most represented order was red algal order Ceramiales, with 15 taxa (43%).

Acknowledgements: The study has been supported by a TÜBİTAK (Ankara, Turkey) project "114Y238".

Keywords: Deep marine algae, Princes Islands, red algae, seaweeds, Sea of Marmara, Turkey.

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Almond (*Amygdalus* Species) Genetic Resource Studies in Siirt Province (Turkey)Halit Seyfettin ATLI¹¹Siirt University, Faculty of Agriculture, Department of Horticulture Siirt/TURKEY
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Aim of the study: The importance of plant genetic resources can be better understood with each passing day. Protection studies should be replicated to these resources will not get lost and to assess. This study was started in 2013 to create almond genetic resource for breeding programs in future.

Material and Methods: Almond genetic resource of Pistachio Research Institute were used as materials. Yield, blooming and some nut characterizations were determined of 21 almond varieties and 6 almond species in 2013. Almond varieties were Glorieta, Super Nova, Ayles, Guara, False Barese, Moncayo, Ne Plus Ultra, Ferrastar, Marta, Bertina, Bozkurt, Halit Bey, Garrigues, Ferragnes, Cristomorto, Nonpareil, Ferraduel, Yaltinski, Sonora, Texas and Peerless. Almond species were *Amygdalus orientalis* Mill., *A. turcomanica* Lincz., *A. webbii* Spach, *A. arabica* Oliver, *A. bucharica* Korsh. and *A. kuramica* Korsh. Blooming time and nut weight were determinate of almond species in Gaziantep ecology in 2013.

Results: Blooming time and nut weight were determinate of almond species in Gaziantep ecology in 2013. The earliest flowering was observed at *Amygdalus orientalis* and *A. webbii* species (before 4 days from Nonpareil), medium period flowering was observed at *A. bucharica* and *A. kuramica* (before 1 day from Nonpareil) while the latest flowering was observed at *A. turcomanica* and *A. arabica* (after 10 days from Nonpareil). Blooming was observed. Yield, nut weight, double kernel rate and kernel rate of almond varieties were investigated in 2013. The earliest flowering was observed at Sonora (-3) followed by Ne Plus Ultra (-2) and Peerless (-1), Nonpareil (0), Texas (+2), Ferrastar (+2), Bozkurt (+4), Moncayo (+4), False Barese (+6), Marta (+6), Halit Bey (+6), Garrigues (+7), Ferragnes (+8), Cristomorto (+9), Ayles (+9), Yaltinski (+9), Ferraduel (+10), Super Nova (+11), Bertina (+11) respectively, and the latest flowering was observed at) Glorieta (+12) and Guara (+12). Twenty one varieties and 6 species of almond were grafted on seedlings in 2013 and established genetic plots in Siirt University in 2014. Orchard was established at 5 x 3 m in spacing.).

Acknowledgements: This genetic plot was established in Siirt University in 2014. This project supported from Siirt University.

Keywords: Almond, Genetic Resources, *Amygdalus*.

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**Adaptation Study of Medium and Late Blooming Almond Varieties for Gaziantep (Turkey)
Ecological Condition**Halit Seyfettin ATLI¹¹Siirt University, Faculty of Agriculture, Department of Horticulture Siirt/TURKEY

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Aim of the study: USA is the biggest almond producer country with 750.000 tons production, Spain with 215.000 tons production ranks second and Turkey takes places eighth with 75.000 tons production (Anonymous, 2012). Production of almond in Turkey is so lower that it is just used in domestic market. To increase almond export ratio, it is needed to growth almond under irrigated conditions with high yielded and good kernel cultivars. Thus, both the domestic market and exporting will increase. This adaptation study was carried out between 2006 - 2013 at Gaziantep ecological condition to determine the suitable almond cultivars.

Material and Methods: This study established in Gaziantep province in 2006 with 16 almond cultivars, with domestic and foreigner cultivars, which are Halit Bey and Bozkurt (new domestic cultivars), Super Nova, Marta, Bertina, False Barese, Ne Plus Ultra, Ferrastar, Guara, Ayles, Glorieta, Ferraduel, Ferragnes, Lauranne, Moncayo, Sonora under irrigated conditions between 2006 and 2013. Trial plots planted with 5x3 m intervals, 5 trees in each cultivars and results were examined according randomized plot design. Locations were irrigated with drip watering system. Blooming time, yield and nut quality characterizations of almond cultivars were determined between 2010-2013.

Results: According to the results of four years (2010 – 2013) the suitable almond cultivars were determined in term of blooming, yield and some nut characterizations for Gaziantep ecological condition. Cultivars blooming were observed at 4 periods. Medium blooming (Sonora and Ne Plus Ultra), mid late (Bozkurt, Halit Bey, Moncayo, False Baresse, Lauranne, Ferrastar and Marta), late (Ferragnes, Ferraduel and Ayles) and very late (Guara, Bertina, Super Nova and Glorieta). Yield of Guara (8240 kg/ha) was the highest, followed by Ferraduel (6850 kg/ha), Bertina (6720 kg/ha), Marta (6250 kg/ha), Bozkurt (6130 kg/ha), Halit Bey (5730 kg/ha), Ferragnes (5540 kg/ha), Lauranne (5520 kg/ha), Ne Plus Ultra (4870 kg/ha), Ayles (4420 kg/ha), Glorieta (4270 kg/ha), Moncayo (3990 kg/ha), Super Nova (3700 kg/ha), False Barese (3350 kg/ha) and Sonora (3140 kg/ha). The lowest yield per hectare was obtained from Ferrastar (2830 kg/ha).

Acknowledgements: This adaptation study was carried out between 2006-2013 on Gaziantep Pistachio Research Institute's field. This project supported from Gaziantep Pistachio Research Institute.

Keywords: Almond, adaptation, blooming, yield.

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A New Species of *Micromeria* Benth. (Lamiaceae): *Micromeria aybala* H.Duman & DirmenciHayri DUMAN¹, Tuncay DIRMENCI²¹Department of Biology, College of Arts and Sciences, Gazi University, Ankara, Turkey²Department of Biology Education, Necatibey Education Faculty, Balıkesir University, Balıkesir, Turkey
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Aim of the study: The genus *Micromeria* Benth. s.l. is a taxonomically complex genus in Lamiaceae. A recent molecular analysis has been revealed that *Micromeria* is polyphyletic and members of sect. *Pseudomelissa* Benth. are closely related to the genus *Clinopodium* L. In 2006, the species of *Micromeria* sect. *Pseudomelissa* were transferred to the genus *Clinopodium*. After this transfers, the genus *Micromeria* comprises 54 species with 32 subspecies and 13 varieties. *Micromeria* is distributed from Macaronesia to China. *Micromeria* s.str. comprises 8 species (13 taxa, endemic) in Turkey. In this study, *Micromeria aybala* H.Duman and Dirmenci is described as a new species from Köyceğiz/Muğla province, southwest of Turkey. The differences between the new species and its allies are discussed.

Materials and Methods: The plant specimens belong to new species was collected by the first author from Muğla province in southwest of Turkey in November 2015. The collected specimens were studied as morphologically and molecularly. ITS nrDNA and trnL-F cpDNA region data were analyzed. And morphological characters of new species were illustrated with drawing and using stereo microscope.

Results: *Micromeria aybala* is similar to *Micromeria cremnophila* as morphologically, such as habitus, spicules, bracts, calyx, corolla and stamen. It differs from *M. cremnophila* s.l. in it is stems prostrate, slender and fragile (not ascending to erect and woody rootstock), pilose with minutely glandular papillate (not puberulent, short hispid or scabrid), cauline leaves revolute only at apex and 4-8 × 2.5-5 mm (not revolute and 4-7 × 1.5-2.5(-3) mm), calyx 4-4.5 mm and pilose with minutely glandular papillate (not 2-3 mm and puberulent to scabrid pubescent); teeth 1.25-1.75 mm and 1/3-1/2 of tube (not 0.3-0.5 mm and 1/5-1/4 of tube), ciliate (not ciliate), corolla 5-6 mm (not 3-4 mm), pinkish-white (not purplish-pink). According to molecular data, the new species *M. aybala* clearly belong to sect. *Micromeria* (bootstrap values: 82 for ITS region and 99 for trnL-F chloroplast DNA region). The new species *M. aybala* has a close relationship with *Micromeria* species growing in Turkey.

Acknowledgments: We would like to thank Nature Conservation Centre-Ankara (Project Title: Muğla/Köyceğiz GEF-5 Project) for financial support to our researches.

Keywords: Endemic, ITS, *Micromeria*, trnL-F, Turkey.

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Morphological, Anatomical, Ecological Features of *Pilularia minuta* and Its Distribution in TurkeySerdar Gökhan ŞENOL¹, Erdiñ OĞUR², Duygu BOZYEL¹, Nazlı Bahar PELİT¹, Göksele Erdem ARSLAN¹¹Botanical Garden-Herbarium Research and Application Center, Ege University, İZMİR²Aegean Agricultural Research Institute, İZMİR

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Aim of the study: This study aims to carry out the field research and recollecting of *Pilularia minuta* from the same location, which distributed in Mediterranean basin and belongs to Marseliaceae family whose Flora of Turkey is known to be on İzmir-Çeşme-Alaçatı, reveal the differences by comparing it with its descriptions in Flora of Turkey by means of morphological, anatomical and ecological studies and observations, and determine a new description for this species as a consequence of this comparison.

Material and Methods: *P. minuta* is a regional Mediterranean element with a restricted distributon, confined to W. Mediterranean Region (Portugal, Spain, France, Sardinia, Sicily, Algeria) and Aegean Region (Greek Islands). Its main location in Turkey is Kadifekale (İzmir) but this population became extinct due to urbanization. Its present location has been reported as vernal pool in phrygana in Alaçatı-Çeşme (İzmir). Materials gathered by means of this study were brought to Herbarium EGE and various morphological and anatomical studies were carried out. Leaf characteristics (width-length measurements), distance between nodiums, sporocarp characteristics (width-length measurement), peduncle length of the species and anatomical sections taken from leaf and sporocarps were examined under Olympus CX21 microscope and Dino-lite digital microscope and pictures were taken. Additionally, during the field research, water sample from the wetland where species is found were taken and pH level of the sample was examined. Potential and real range of the species were mapped by marking the range of the species via GPS. All these findings were compared with current description.

Results: As a result of the studies, it was determined that there are differences between the descriptions of species in flora and newly gathered material. Measurements recorded that leaf length is between 1-7 cm, leaf width is between 1-4mm, innernodiums are between 1.5-4 mm, peduncle length is between 1-4 mm, sporocarp diameter is between 0.8-1.5 mm. These values differ greatly from the description of Flora of Turkey. Sporocarps which are globose in flora record are mostly ellipsoid in material. In addition to these morphological measurements, sections taken from sporocarps for anatomical studies show that existing anatomic structure has the same characteristics with those given in flora, and sporocarps have 2 megaspores and 2 microsporangia. Additionally, as a result of the examination of samples taken from different water bodies, it was found that average pH values were 8.7, which shows that this species prefer acidic habitat. Although GPS records show that potential distribution of species is 1.48 km², existing distribution was calculated as 0,02 km². Due to these differences, existing description and range of *P. minuta* were redetermined.

Acknowledgements: We would like to extend our thanks to TAGEM (Project no: TAGEM/TBAD/14/A01/PO1/001) and Ege Üniv. Botanical Garden-Herbarium Research and Application Center.

Keywords: *Pilularia*, Ecology, Distribution, IUCN.

PP-323

Distribution of *Phoenix theophrasti* and Problematic Gölköy-Muğla Population in Turkey

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Aim of the study: This study primarily aims to determine distribution, number of individuals and sexual distribution of *P.theophrasti* population in Turkey, and differences and similarities between populations in terms of morphological characteristics. In the field trip to Bodrum - Gölköy (Göltürkbükü) population during the study, it was determined that individuals in the population differ in morphological characteristics (flowering and fruiting in particular). Considering these differences, existing state of relict taxon has been examined.

Material and Methods: *P. theophrasti* was originally described by W. Greuter in 1967 on Crete Island. The state of this palm species which is relict in Turkey and geography had not been known until 1980's. In field researches for *P. theophrasti* made by using distribution areas given in Flora of Turkey as a base, determination of number of individuals and male and female individuals, morphological observations and measurements on individuals in terms of characteristics were carried out. Distribution area of populations were mapped. Bodrum-Gölköy population has also been studied. Colour scale was created by means of fruit samples taken from Gölköy population, width-length measurement was carried out and individuals with parthenocarpic fruits were determined.

Results: As a result of studies, 62 individuals (12 of them are juveniles) were determined in Hürmalıbük, Datça-Muğla population. Population distribution by gender was recorded as 18 females and 32 males. At the same time, it was found that this population has standart diagnostic characteristics in terms of flower axis and fruit characteristics. It was determined that Finike-Antalya population has standart characteristics like Datça population but differ as individuals have shorter leaf length-width, narrow stem with a single trunk (rare branching from base) and lower fruiting. One part of Finike population was determined as gene protection forest, and 27 individuals were counted in total including 10 females, 15 males and 2 juveniles with individuals that were put under protection. Bodrum- Gölköy population were recorded to have 82 individuals but fruit samples were taken from 13 individuals for the determination of morphological differences and parthenocarpic fruit structure was observed in 4 of them. Additionally, fruit length change between 1,1 cm - 2,8 cm and width change 0.6 cm - 1.3 cm. It was found that the colours of fruit turn into red from yellow before ripening, and turn into mahogany from brown in ripening period. As a result of measurement carried out on the flower axis of 10 males in same population, it was determined that axis size is between 85-105 cm. Measurements and observations caused a suspicion that Gölköy population in particular might be a hybridization center. This issue will be enlightened with molecular and more detailed morphological studies planned to be performed.

Acknowledgements: We would like to extend our thanks to Ege Üniv. Botanical Garden-Herbarium Research and Application Center.

Keywords: *Phoenix*, Morphology, Hybridization, Distribution, IUCN.

PP-324

Effects of Lead Contamination on Nutrient Contents of Hyacinth (*Hyacinthus orientalis* L. c.v. "Blue Star")Füsün GÜLSER¹, Arzu ÇIĞ², Tuğba Hasibe GÖKKAYA¹¹Department of Soil Science and Plant Nutrition, Yüzüncü Yıl University, Turkey²Department of Horticulture, Siirt University, Turkey

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Aim of the study:The aim of this study was to determine the effects of lead on nutrient contents of hyacinth (*Hyacinthus orientalis* L. c.v. "Blue Star") in lead contaminated media.

Material and Methods:This research was conducted in a completely randomized experimental design with three replications in green house conditions. Four doses of lead as control, 20 mg kg⁻¹, 40 mg kg⁻¹, 80 mg kg⁻¹ were applied to each pot having 500 g soil: sand mixture in 2:1 ratio. The irrigation was made by distillate water and hoagland solution was applied for fertilization.

Results:At the end of the experiment the highest Mg, Fe and Cu contents of hyacinth bulbs were obtained as 0.59 %, 36.00 mg kg⁻¹ and 3.40 mg kg⁻¹ in control while the highest K (9.72 %), Zn (32.27 mg kg⁻¹) and Ca (2.69 %) were in 40 mg kg⁻¹ and 80 mg kg⁻¹ lead applications respectively. On the other hand the highest Mg (1.46 %) and Cu (13.75 mg kg⁻¹) contents of hyacinth leaves were obtained in control. The highest K (2.41 %), Ca (4.82 %), Fe (129.86 mg kg⁻¹) and Zn (50.14 mg kg⁻¹) contents of leaves were obtained in lead contaminated media. Lead applications generally increased Fe and Zn contents and decreased of Cu content of hyacinth leaves.

Keywords: hyacinth, lead, nutrient contents

PP-325

Determination of genetic structure in natural house fly (*Musca domestica* L.) populations from TurkeyErsin DOĞAÇ¹¹ Köyceğiz Vocational School/Department of Medicinal and Aromatic Plants/Muğla Sıtkı Koçman University/Turkeyersindogac@hotmail.com; ersindogac@mu.edu.tr

Aim of the study: Population genetic structure and differentiation can be studied with investigating the variation in mitochondrial DNA (mtDNA). MtDNA is a powerful genetic marker that is often used in population and evolutionary biology. *Musca domestica* L. (Diptera), is a cosmopolitan, highly vagile, synanthropic and therefore of veterinary and medical significance. In order to ensure basic information for the genetic resources of the species, genetic variation in *M. domestica* populations from western and southern parts of Turkey was studied using nucleotide sequence analysis of 348 base pairs in the mitochondrial cytochrome oxidase subunit I gene (COI).

Material and Methods: House fly samples were collected from 16 different provinces including Afyon, Aydın, Denizli, İzmir, Kütahya, Manisa, Muğla and Uşak in the Aegean region; Adana, Antalya, Burdur, Hatay, Isparta, Mersin, Osmaniye and Kahramanmaraş in the Mediterranean region. From each location, 12 individual flies (total 192) were used in DNA extraction and sequencing. DNA extraction were performed as described by Bender et al., (1983) with little modifications. Polymerase chain reaction (PCR) was performed using a primer set: UEA-3 5'-TATAGCATTCCCACGAATAAATAA-3' and C1-N2329 5'-ACTGTAAATATATGATGAGCTCA-3', which produced a ~ 566-bp product. The PCR assays were conducted in 25 µL reactions consisting of 1X Taq Buffer, 1.5 mM MgCl₂, 0.2 µM dNTPs, 0.4 µM of each primer, 1.25 U of Taq polymerase and 1 µl of DNA. PCR conditions were an initial 4 min at 94°C, followed by 40 sec at 94°C, 1 min at 48°C, 1 min at 72°C for 35 cycles, and 10 min at 72°C. All products, were then purified using Qiagen QIAquick Gel Extraction kit and sequenced unidirectionally by using UEA-3 primer. Nucleotide sequence data analyses were performed with MEGA 6, DnaSP v. 5.10.01, Arlequin v. 3.11 and Network v. 4.6 softwares.

Results: Our results show that the 348 bp of the 189 COI gene sequences from all 16 localities of *M. domestica* revealed 13 variable sites (2.9%) defining 6 haplotypes. Two of these haplotypes (H5 and H6) were unique to Turkey and four of them (H1, H2, H3 and H4) were shared with previously identified haplotypes. There was no difference in geographical distribution frequency between the two regions of Turkey. Overall, haplotype diversity (h) was low, ranging from 0 to 0.5606 with the average overall value of 0.178±0.04 and nucleotide diversity (π), ranged from 0 to 0.0056 with the overall mean of 0.0016. Analysis of molecular variance (AMOVA) results showed that genetic differentiation within individuals and populations was low and significant ($P < 0.05$). Sixteen populations clustered under six haplotypes and two of them are unique to Turkey. Haplotype networks suggested that, house fly populations in Turkey are grouped with the Palearctic region, which is the most probable place for the origin of this species.

Acknowledgements: I thank Dr Vatan Taskin for his help in collection house fly samples. I thank Sevan Ağdamar and Abuzer Güler for their contribution.

Keywords: *Musca domestica*, genetic variation, Palearctic region, cytochrome oxidase subunit I.

PP-326

Morphological and anatomical studies on *Conium maculatum* (Apiaceae) from TurkeyAhmet DURAN¹, Mustafa ÇELİK², Özlem ÇETİN²¹Department of Biology, Selçuk University, Turkey²Department of Biotechnology, Selçuk University, Turkey

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Aim of the study: *Conium* L. is one of the most poisonous plants and is called 'baldıran' in Turkish. *Conium* is a small genus in Apiaceae family and is represented by approximately four species in the world. Only one species, *Conium maculatum* L., is found in Turkey. In this study, morphological and anatomical features of *Conium maculatum* were investigated.

Material and Methods: *Conium maculatum* samples were collected from Adıyaman by first author. Collected specimens were dried according to standart herbarium techniques and stored in KNYA Herbarium. The taxonomic description was done according to *Flora of Turkey and the East Aegean Islands*. Measurements of morphological characters were carried out under a stereomicroscope from ten different herbarium specimens. In anatomical investigations, fruit samples were deposited in 70% alcohol and rehydrated and placed in formalin-acetic acid-alcohol (1:1:8) for a minimum of 24 h. Rehydrated materials were embedded into paraffin blocks following traditional paraffin section method. A transverse section about 5-10 µm thick was cut using a Thermo microtome and stained with safranin solution. Micrographs were taken using a Nikon AZ100M microscope.

Results: As a morphological result, description of the species has been expanded. As a anatomical result, the mericarps of *Conium maculatum* are homomorphic. The exocarp consists of single line, flattened and rectangular like cells. The mesocarp comprises 2-3 layer, parenchymatic cells. Vitta is absent and vascular bundles are 5, large and located below each primary rib and surrounded by parenchyma cells. Ribs are conspicuous and endosperm is distinctly convex on the commissural side.

Keywords: *Conium*, Umbelliferae, Turkey.

PP-327

Genetic Analyses of *Limonia nubeculosa*, Meigen1804 Museum Samples using Mitochondrial DNA COI Sequence AnalysesGürkan NACAR¹, Okan ÖZGÜL², Ersin DOĞAÇ³, Rahşan İvgin TUNCA², Hasan KOÇ⁴¹Biology Department/Graduate School of Natural and Applied Sciences, Muğla Sıtkı Koçman University, Turkey² Department of Plant and Animal Breeding/Vocational School, Muğla Sıtkı Koçman University, Turkey³Department of Medicinal and Aromatic Plants/Vocational School, Muğla Sıtkı Koçman University, Turkey⁴Biology Department/Science Faculty, Muğla Sıtkı Koçman University, Turkeyokanozgul@mu.edu.tr

Aim of the study: *Limonia nubeculosa*, Meigen1804 is a woodland species. The aim of the study was to determine the genetic variation of the *Limonia nubeculosa* museum samples in Turkey using mitochondrial DNA (mtDNA) analyses.

Material and Methods: *Limonia nubeculosa* museum samples were collected during 1998-2015 from open fields in West (Afyon and Çanakkale) and Central Anatolia (Aksaray) in Turkey. Samples were conserved in Zoology Museum, Mugla Sıtkı Koçman University. Genomic DNA isolation from museum samples was performed using commercial kits mtDNA COI region primers were used in PCR analyses. AMOVA test and Pairwise F_{ST} values were done using Arlequin (3.11). Genetic structure values such as haplotype diversity, nucleotide diversity, haplotype number, Tajima D values were estimated using DNAsp software (5.10.01 version). Phylogenetic relationships between haplotypes were conducted by Network (4.6v). Neighbour Joining Dendrogram was comprised by MEGA 6 software program.

Results: A total of 131 polymorphic sites including 52 singleton variable and 79 parsimony informative sites were detected. Sequence analysis of the mtDNA COI gene from 17 individuals resulted in 15 haplotypes. Haplotype diversity (Hd) and Nucleotide diversity (Pi) was estimated as 0.985 and 0.04590, respectively. Insertions and deletions were not observed from sequenced data. Expected heterozygosity (He) values ranged between 0.00447 (Aksaray) and 0.07106 (Afyon). Mean He was estimated as 0.04750. Little genetic differentiation ($F_{ST} = -0.0504$) and a high rate of migration ($Nm = 3.83$) among populations. Tajima's D was calculated as -1.399 and this result indicated that heterozygosity is too low for the number of segregating sites, indicating too many rare alleles. Phylogenetic analysis showed that all haplotypes were highly interrelated. Two different main branches were observed in Neighbour Joining Dendrogram. The current study is the first to analyze the genetic variation of *Limonia nubeculosa* populations in Turkey.

Acknowledgements: We thank to zoology museum team in order to provide this museum samples.

Keywords: *Limonia nubeculosa*, Museum samples, mtDNA COI, Turkey.

PP-328

Distribution and ecological requirements of mollusc fauna in Takaz Greek (Malatya, Turkey)Serap KOŞAL ŞAHİN¹, Melek ZEYBEK²¹ *Istanbul University, Fisheries faculty, Laleli, İstanbul, Turkey*² *Süleyman Demirel University, Department of Hydrobiology, Isparta, Turkey*
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Aim of the study: The aim of this study is that to investigate both ecological and biological species assemblages of Mollusc fauna of Takaz Greek (Malatya/ Türkiye). There were not any documented studies on the mollusc of Malatya. Species show different tolerances and preferences to various ecological variables. If ecological preferences and tolerance levels of individual species are known, the past, current and future habitat conditions can be estimated.

Material and Methods: Sampling was done seasonally at 5 different stations in Takaz greek using Ekman grap (15*15 cm) between February 2008 and January 2009 (Figure 1). Mollusc samples were preserved in 70% ethanol within plastic bottles. It was used Schütt (1988; 1989), Macan (1969; 1977), Zhadin (1965) and Glöer (2002) to taxomical identification of the specimens. While the water temperature, pH, dissolved oxygen were measured in the field, the values of NO₃-N, NO₂-N, NH₃ were determined in the laboratory within 24 hours according to Claude et al. (1992). To learn the relationships between species and environmental variables, the Canonical Correspondence Analyse (CCA) were used to data

Results: In this study, a total of 11 mollusc species were identified at the sampling stations in Elemendik Greek . It was found that two species of them (*Viviparus viviparus costae* Mousson, 1863, *Bithynia tentaculata* (L., 1758)) belong to Prosobranchia, six species of them (*Physella acuta* Draparnaud, 1805, *Galba truncatula* (O.F. Müller, 1774), *Lymnea (Radix) peregra* (Müller, 1774), *Lymnaea stagnalis* (L., 1758), *Planorbis planorbis* (L., 1758), *Coretus corneus* (L., 1758)) belong to Pulmonota, and three species of them (*Unio pictorum* (L., 1758), *Dreissena polymorpha* (Pallas, 1771), *Anadonta cygnea* (L., 1758)) belong to Bivalvia. In this study, it has been calculated 817 individuals in per m² at average in the lake, and *V.viviparus costae* was found to have the most dominant species. While *D.polymorpha* was detected in all sampling stations, it was accrossed *B.tentaculata* rarely during the studied period

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Keywords: Ecology, Mollusc, Malatya, water quality

PP-329

Conserved DNA Derived Polymorphism Based Genotyping in *Fusarium graminearum*Elif Sedef DEVELİ¹, Emre YÖRÜK¹¹Department of Molecular Biology and Genetics/Faculty of Arts and Science, Istanbul Yeni Yuzyil University, Turkey
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Aim of the study: *Fusarium* species cause head blight and rot root in all small grain cereals. The diseases result in severe yield losses. *F. graminearum* is a primary pathogen responsible for head blight and rot root damages worldwide. Since *F. graminearum* display a high genetic diversity worldwide, characterization of *F. graminearum* isolates from different regions is critical step in disease management. Most of genotyping investigations associated with *F. graminearum* include amplification of random DNA region and repeat motifs. Thus, it was aimed to develop a DNA marker strategy targeting conserved genic regions in fungi which could be alternative, promising, fast and cost-effective.

Material and Methods: Totally 22 *F. graminearum* isolates obtained from diseased kernels and roots showing head blight and rot root were used in this study. *F. graminearum* isolates were grown on potato dextrose agar (PDA) medium at 25°C for seven days. Genomic DNA was extracted from seven-day-old cultures using sodium dodecyl sulphate based isolation protocol. Qualitative and quantitative analysis of isolated DNA's were carried out via 1% agarose gel electrophoresis and spectrophotometer. For developing conserved DNA derived polymorphism (CDDP) marker for *F. graminearum* genotyping, housekeeping genes, fungal common genes and/or genes with two or more copies were subjected to bioinformatics analysis. In polymerase chain reaction (PCR) assays, 94°C for 5 minutes (min) and 72 °C for 5 min were used as pre-denaturation and final extension. PCR cycling conditions were as follows: 94°C for 1 min, 45-55°C for 1 min and 72°C for 3min. PCRs were carried out in a reaction volume of 25 µL containing 50 ng genomic DNA, 1X PCR buffer, 2.5 mM MgCl₂, 10 pmol primer, 0.4 mM of dNTPs and 1U of *Taq* DNA polymerase. Presence/absence of bands were scored for genetic similarity assays.

Results: Each fungal isolates were successfully grown on PDA medium and intact genomic DNA's were isolated from seven-day-old cultures. 0.5-3µg/µL genomic DNA's were isolated from 100 mg fresh mycelia. According to similarity alignment analysis obtained from ClustalW, 18S rDNA, 28S rDNA, Hsp70, Histone H3, cytochrome P450, α-tubulin and β-tubulin genes had at least two conserved regions for primer design and these genes were used as CDDP markers. Up to three degenerated base position in 18-mer primer were used in CDDP genotyping. In single primer based genotyping analysis different melting temperature were used in association with specific primer. According to PCR profiles each isolates yielded bands from Hsp70 and Histone H3 primers whereas some of isolates gave amplicons with 28S rDNA, α-tubulin and β-tubulin primers. Remaining gave no amplification patterns. PCR product sizes were in the range of 0.1-3 kb. Minimum and maximum band numbers were ranged from 1 to 10. Findings showed that Hsp70 and Histone H3 could be adapted in genotyping studies in *F. graminearum* and closely related *Fusarium* species.

Acknowledgements: The study was supported by board regents of Istanbul Yeni Yuzyil University. Elif Sedef Develi and Emre Yörük contributed equivalently to this study.

Keywords: *Fusarium graminearum*, CDDP, PCR, genotyping.

PP-330

Monitoring and Conservation of Soft-Shelled Nile Turtle (*Trionyx triunguis*) in Mugla, Turkey

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Aim of the study The Soft-shell Nile turtle is one of the freshwater turtle species in Turkey. They protected under the Bern Convention and CITES. But their recently their IUCN statues was changed to Data Deficient. Turkey has 13 nesting site for them. Dalyan and Dalaman are important nesting and feeding habitat for the Nile Soft-shelled Turtle. The aim of this work to identify their potential nesting and feeding areas in Turkey.

Material and Methods: We counted the number of adult individuals using visual encounter surveys and surveys at breeding sites because they require the minimum equipment and we have presented the maximum numbers recorded using these techniques. The visual encounter survey (VES) was used to determine the species richness of the lakes and estuaries and estimate the relative abundance of species within the region.

Results: The present statuses of the Nile Soft-Shelled turtle (*Trionyx triunguis*) populations of Turkey were surveyed and the intensive studies were carried out at Dalaman. 153 adult tracks were observed during 2015 breeding season in Dalyan. Of these, 61 tracks were non-nesting emergences and 92 of them resulted in nests. 92 of the total 66 nests were completely destroyed by foxes. Hatching only occurred in 26 nests. There were 793 eggs in these 26 nest and 793 (91.9 %) of them produced hatchlings. In Dalaman was found 30 nests and 19 nests of them completely destroyed by predators. 245 hatchling reached to lake. The total number of eggs were only given under the protected nests due to the lack of efficient information in predated nests. Population Surveys, Nesting records, nest protection and observations of feeding techniques combined with the Nile Turtles Natural Behaviors are leading o their decline. The majority of these dead turtles were recorded in Dalaman, Seyhan and Dalyan regions. The morph metric measurements of adults were also recorded. The reasons for these mortalities were found to be fishery and/or boat related evidences from external injuries. The results indicate that Turkey is the most important nesting area for *T. triunguis* holding up to 60 % population of Mediterranean by obtaining the data from literature.

Acknowledgements: We would like to thank Turkish Ministry of Environment and Urbanization, Natural Directorate of the Protection of Natural Assets for the financial support of the Project.

Keywords: Soft-shell Nile Turtle, *Trionyx triunguis*, conservation, Mugla.

PP-331

Mycelium Growth and Genetic Relationship of some *Stereum hirsutum* strains collected from different areas in Aegean and Marmara regions of TurkeyEbru BALCI¹, Hakan ALLI¹, Bekir ÇÖL¹¹Biology/Faculty of Science, Muğla Sıtkı Koçman University, Turkey
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Aim of the study: *Stereum hirsutum* (Willd.) Pers. is a fungus species used as a model organism in some studies, found in nature on the trees such as *Betula pendula*, commonly known as silver birch (“huş” in Turkish) and deciduous trees. This fungus has anti-bacterial and anti-tumor activities and is present in many areas. In this study, *S. hirsutum* samples were collected from 6 different locations (Aydın Kuşadası, Aydın Çine, Muğla, Afyon, Balıkesir, İznik and Bursa). Genetic relationship was determined among the specimens following RAPD-PCR and statistical analyzes.

Material and Methods: Small excised samples were taken out from dried fungi samples and inoculated onto PDA (Potato Dextrose Agar) to grow mycelium. The mycelia were obtained and glycerol stocked in -80 °C. The method of silica dioxide was used to isolate gDNAs from the mycelia of the fungi specimens. RAPD primer and 5 ul of 1/10 the dilutions of isolated DNA were used in each 50 ul PCR reaction at a Tm degree of 32 °C. The PCR bands were visualized following agarose gel electrophoresis (1.4%) and scored as “1” or “0” depending on the presence or absence of the specific band, respectively. SPSS 21 statistics program was used to construct a dendrogram.

Results: In the study, 11 RAPD primers (OPA-01, OPA-02, OPA-03, OPA-05, OPA-08, OPA-09, OPA-10, OPA-13, OPA-15, OPA-18, OPA-19) were used and different band patterns were obtained depending on the primer used and the fungus sample. According to the dendrogram, 531 (Aydın, Kuşadası), 536 (Aydın, Çine) and 520 (Muğla) samples are clustered together. 1539 (Afyon) and 1244 (Balıkesir) are relatively distant to these 3 samples. 4976 (Bursa) sample is clustered separately in the dendrogram indicating that it is relatively the most distant fungus to all in terms of genetic relationship.

Acknowledgements: This study is supported by Muğla Sıtkı Koçman University BAP (15/114) project.

Keywords: *Stereum hirsutum* (Willd.) Pers., RAPD, genetic diversity, mycelium

PP-332

Genetic diversity of *Schizophyllum commune* strains collected from seven different locations in TurkeyEbru BALCI¹, Hakan ALLI¹, Bekir ÇÖL¹¹Biology/Faculty of Science, Muğla Sıtkı Koçman University, Turkey
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Aim of the study: *Schizophyllum commune* Fr. is a cosmopolitan fungi species with medical importance and sequenced genome. In this study, *S. commune* samples collected from seven different areas (Kütahya, İzmir, Mersin, Bursa, Aydın, Balıkesir, Muğla) in Turkey were used. The specimens were obtained from Muğla Sıtkı Koçman University Kriptogram laboratory. The micelles were grown from the samples taken from the fungi samples and genomic DNAs were isolated. Then, RAPD-PCR analysis was performed and some bioinformatics approaches were applied to investigate the genetic relationship among the specimens.

Material and Methods: Instead of dry fungi specimens, DNA was isolated from mycelia that were produced by taking samples from the mushroom and growing in potato dextrose agar (PDA). The mycelium for each sample was kept as a glycerol stock at -20 celcius freezer in order to grow again in PDA to obtain the cell debris to be used in DNA isolation through the study. A manuel silica dioxide method was used for DNA isolations from the mycelia. RAPD-PCR analyzes were performed using the genomic DNAs as template. Depending on the amount of genomic DNA, 1/10 the dilutions of gDNA or undiluted gDNA was used in 50 ul PCR reactions. Following PCR amplifications using 13 different RAPD primers, the products were analyzed by agarose gel electrophoresis and the bands obtained were evaluated, scored and a dendrogram was constructed.

Results: 11 RAPD primers (OPA-01, OPA-02, OPA-03, OPA-05, OPA-08, OPA-09, OPA-10, OPA-13, OPA-18, OPA-19, OPA-20) produced successful results in the study. According to dendrogram drawn to illustrate genetic relationship among the samples, 375 (Muğla), 380 (İzmir), and 381 (Aydın) were in the same cluster. 1331 (Balıkesir) was in a different branch. 5099 (Mersin), 4826 (Kütahya) and 5442 (Bursa) samples were clustered differently and relatively distantly related to the other four samples in terms of genetic similarity.

Acknowledgements: This study was supported by Muğla Sıtkı Koçman University, BAP project (15/114).

Keywords: *Schizophyllum commune* Fr., RAPD, genetic diversity, mycelium, biodiversity.

PP-333

Determination of Genetic Relationship of some *Orobanche* species collected from different locations in Muğla provinceGökçe HAS¹, Bekir ÇÖL¹, Saliha KARABIYIK¹, Taner KAYNAR¹, Yonca SURGUN²,
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Aim of the study: The broomrape plants (*Orobanche*) belonging to Orobanchaceae family are the parasites living on some agricultural plants and thereby harming their host and causing loss in crop yield and quality. This study aims to investigate genetic relationship of some members of *Orobanche spp.* collected from different locations in Muğla, Turkey using RAPD analysis.

Material and Methods: The plants *Orobanche spp.* were collected from near the agricultural plants such as tomato, pepper and eggplant that are grown by the locals in the province of Muğla. The species of the plants were identified using an appropriate species identification key. Then, DNA isolations from the plants were conducted. After checking the quality and amount of genomic DNAs, one to tenth dilutions was made to be used in RAPD-PCR. Ten different RAPD primers were used. PCR products were run on 1.2% agarose gels and the bands were visualized with ethidium bromide and an imager. The bands were scored as absence (0) or presence (1). JMP and IBM statistics programs were used to assess the relationship.

Results: According to the results of genetic distance calculations obtained from RAPD analysis using 10 different primers, it is found that C.O18 *Orobanche nana* (Karabağlar-Hacıabbas Köprüsü) and C.O19 *Orobanche nana* (Ortaköy) are closest to each other. C.O12 *Orobanche nana* (Bahçeyaka) and C.O18 *Orobanche nana* (Karabağlar-Hacıabbas Köprüsü) are more distant to each other in comparison to the *O. nana* members. C.O9 *Orobanche nana* (Bayır) and C.O20 *Orobanche ramosa* (Kötekli) are the most distant members among all tested. A dendrogram was constructed to show the relationship between the plants used in the study.

Acknowledgements: We thank TUBITAK (2209/A) and Muğla–BAP (projects) for supporting this study.

Keywords: *Orobanche spp.*, RAPD, genetic relationship, biodiversity, Muğla Turkey.

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Molecular analysis of some *Inocybe* species collected from Kütahya provinceGökçe HAS¹, Ezgin BÖLÜK¹, İsmail ŞEN¹, Hakan ALLI¹, Bekir ÇÖL¹¹Biology/Faculty of Science, Muğla Sıtkı Koçman University, Turkeybekircol@gmail.com

Aim of the study: In this study, some specimens belonging to *Inocybe* sp. were used for molecular analysis. Some species were hard to identify using classical approaches due to high degree of morphological similarity and lack of information in the literature. For these *Inocybe* samples, ITS (Internal Transcribed Spacer) barcode gene sequences were determined and used to contribute the taxonomic efforts for species identification.

Material and Methods: Genomic DNAs were isolated from the fungi samples collected from Kütahya province during field trips using the methods of a manual silica dioxide or Qiagen plant DNA isolation kit. ITS region was amplified for each specimen using ITS1 and ITS1F primers in polymerase chain reactions. Also, for one sample, 18S, 28S and MS gene regions were amplified using the appropriate primers. The PCR products were excised from agarose gel and purified to homogeneity using a PCR Gel purification kit (Fermentas). The PCR products were sequenced by Macrogen (The Netherlands). Each gene was sequenced by upper and lower primers and the sequences obtained were checked for quality by the appearance of peaks and QV>20 values. The sequences were then analyzed in Bioedit program to obtain full contig sequence. BlastN at NCBI was used to search for identical and closely related sequences and a phylogenetic tree was constructed by Mega6 package program using the sequences determined in this study and some of the chosen related sequences from the nucleic acid databases.

Results: It was initially problematic to identify some *Inocybe* species by virtue of classical taxonomy methods. For example, *Inocybe splendens* R. Heimile, *Inocybe inodora* Velenand *Inocybe cervicolor* (Pers.) Quél. and *Inocybe bongardii* (Weinm.) Quél. are very similar to each other in terms of morphological and microscopic characters. Therefore, molecular results were needed to ensure about the identification for these species. ITS gene sequence was greatly helpful in identification and this was shown by the phylogenetic tree constructed. The results were discussed in reference to the literature.

Acknowledgements: This study was supported by TUBITAK (110R019) Project.

Keywords: *Inocybe* sp.(Fr.) Fr. ,ITS, barcode gene, molecular taxonomy.

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Molecular Analysis of *Gymnopus ocior* and *Gymnopus dryophilus* collected from Muğla and Kütahya in the Aegan region of Turkey

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Aim of the study: In this study, molecular analyzes were conducted on the fungi samples identified systematically as *Gymnopus ocior* (Pers.) Antonin & Noordel or *Gymnopus dryophilus* (Bull.) Murrill in order to aid in identification. The samples were collected from Muğla and Kütahya provinces in Turkey. ITS barcode gene was used to distinguish between the samples for identification.

Material and Methods: The materials of the study included the mushroom samples (3709, 3722, D17, D18, D22, D40) collected from Muğla ve Kütahya provinces. Genomic DNAs were isolated from dried mushroom samples using silica dioxide method or Qiagen Plant DNA isolation kit. ITS (Internal Transcribed Spacer) region was amplified using ITS1 or ITS1F and ITS4 primers. 2 ul of genomic DNA and Tm degree of 52 was used in polymerase chain reactions. The success of PCR was checked by agarose gel electrophoresis and pure PCR products were obtained using a PCR Gel Purification kit (Fermentas). Pure PCR products were subject to sequencing using the appropriate primers by Macrogen (The Netherlands). The contigs were created by Bioedit program from the sequences obtained by the two primers. Full ITS gene sequences were analyzed by BLAST-N at NCBI. Hit sequences and related ones were used to construct a phylogenetic tree by MEGA6 program.

Results: The two macrofungi species are similar to each other morphologically. *G.dryophilus* (Syn. *Collybia dryophila*) has a darker brown fruiting body with white toned lamellas, whereas *G.ocior* has a pale brown color with white, yellow, lemon yellow toned lamellas and stripes on the edges of the fruiting body. It is, therefore, not easy at times to correctly identify the species especially the old and dry ones. Microscopically, the structure of cheilocystidia is the only distinguishing character between the two. Consequently, the classical approaches can be insufficient to differentiate these species. ITS gene sequence was found to be efficient in identifying *G. ocior* and *G.dryophilus* species belonging to the Omphalotaceae family.

Acknowledgements: This study was supported by Muğla SK University BAP (13/85) and TUBITAK (110R019) projects.

Keywords: *Gymnopus ocior* (Pers.) Antonin & Noordel, *Gymnopus dryophilus*, (Bull.) Murrill, ITS, barcode gene

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General characteristics of *Curtobacterium* sp. and isolation of a *Curtobacterium flaccumfaciens*-like isolate from soil in TurkeySeda KANLIKAYA¹, Gökçe HAS¹, Bekir ÇÖL¹,¹Biology/Faculty of Science, Muğla Sıtkı Koçman University, Turkey
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Aim of the study: This study aims to review general characteristics of the members of *Curtobacterium* genus and present the isolation and identification of an isolate highly similar to *Curtobacterium flaccumfaciens* in Turkey.

Material and Methods: The bacteria isolates were obtained from the soil samples using conventional isolation procedures. The bacteria were grown on tryptic soy broth medium and morphology was analyzed using a phase contrast microscope. Gram staining and catalase tests were performed. A modified phenol chloroform extraction was applied for DNA extraction. 16SrRNA gene sequence of the isolate was determined and used to construct a phylogenetic tree using all of the available reference sequences of *Curtobacterium* species.

Results: The species of *Curtobacterium* genus that were found in our literature searches are *Curtobacterium albidum*, *C. citreum*, *C. flaccumfaciens*, *C. herbarum*, *C. luteum*, *C. plantarum*, *C. pusillum*, *C. saperdae*, *C. testaceum*, *C. ammoniigenes*, *C. ginsengisoli* and *C. oceanosedimentum*. The species were compared in terms of their phenotypic parameters and gene sequences. Some striking differences were noted. For example, *C. luteum* is a psychrotrophic bacterium that produces an extracellular protease. *C. citreum* was isolated from some plants, but not a pathogen. *C. pusillum* contains an important component of cellular fatty acids, 11-cyclohexylundecanoic. *C. flaccumfaciens* is a plant pathogen that was isolated from soybeans. When we analyzed 16SrRNA gene sequences of some of the isolated bacteria from the soil samples collected from Balıkesir, we found that the gene sequence of an isolate is 99% identical to *C. flaccumfaciens*. A phylogenetic tree was constructed showing the positions of *Curtobacterium* species and the isolate and the possibility of the strain as a new species was also discussed in this study.

Acknowledgements: We thank TUBITAK and Muğla Sıtkı Koçman University-BAP for supporting our projects.

Keywords: *Curtobacterium* sp., *Curtobacterium flaccumfaciens*, bacteria, gene, plant, biodiversity.

PP-337

Ecological analysis of *Juniperus* species in AzerbaijanAfag RZAEVA

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Aim of the study: Nowadays, learning of genus and species of local flora is very important in current situation of global ecological crisis. *Juniperus* is a wide-ranging shrub or small tree in the Cupressaceae family native to cool mountainous areas and has the largest geographic range. It has variable growth forms. Azerbaijan's eight species of *Juniper* is usually encountered in mountainous areas.

Material and methods: During observations we used Serebryakov's and Raunkier's life forms systems.

Results: In middle zones of dry forests of Azerbaijan with rarely water, climate and soil conditions changes we can meet *Juniperus communis* in small tree life form. But if *Juniperus* grows near to living spaces leading branches can be injury and plant takes spreading shrubby life form. In high mountainous regions *Juniperus* can be meet in spreading shrubby life form by creation low branches near land. All listed up life forms were find in Azerbaijan Republic by observations and literature analysis. All *Juniper* species encountered in our area are woody plants according to Serebryakov's and Phanerophytes according to Raunkier's system. They are litophytes and calsiophils to soil conditions, heliophytes for light approach and kserophytes for water need.

Keywords: *Juniperus*, life forms, Azerbaijan.

PP-338

Molecular Systematic Properties of *Rhododendron* L. (Ericaceae) Taxa Distributed in the Borders of Kaçkar National Park (Rize)Fatih S. BERIS¹, Elvan OFLUOGLU¹, Esmâ AKYILDIZ¹, Vagif ATAMOV¹¹*Department of Biology, Faculty of Arts&Sciences, Recep Tayyip Erdogan University, Turkey*
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Aim of the study: In this study, *Rhododendron* L. (Ericaceae) taxa were investigated with respect to molecular systematics.

Material and Methods: Plant materials used in the study were collected from 32 different locations in Kaçkar National Park between 2013-2014. Then a portion of these material was herbarium specimens. Another part of material were used molecular techniques. Before DNA extraction, all materials were sterilized against contamination with other DNA contaminant. Genomic DNA was extracted using Nucleospin Plant II (Macherey-Nagel, Germany) Isolation Kits. ITS regions of the examined samples were amplified by PCR using universal primers, ITS-4 and ITS-5, and then sequenced. DNA sequences of all samples were aligned with BLAST and Clustal-W programs and analysed by using MEGA 6.05 software. Phylogenetic tree were formed in order to explain genetic relationship among the taxa.

Results: Identification keys for *Rhododendron* taxa were generated using all samples. *Rhododendron* taxa represents 9 species in Rize, Turkey. We found that all ITS regions were between 203 to 880 basepairs. Cluster analysis of the similarity matrix separated the *Rhododendron* samples including two main branches. In the first main branch contains *R. calendulaceum* and *R. luteum* with 97,6% similarity. And the second branch contains two subgroups with twenty-three samples. The first subgroup includes samples of *R. caucasicum*, *R. irroratum*, and *R. arboreum*. The second subgroup has two branches with three sub-branches. There are many studies on *Rhododendron* taxa associated with their biochemical compounds, medicinal usages, and any other fields, but only a few reports have indicated their genetic identification and polymorphisms. This is the first report on the use of DNA-based polymorphism assay that contributes assessing phylogenetic relationship among *Rhododendron* taxa in Turkey.

Acknowledgements: This study was financially supported by the Recep Tayyip Erdogan University BAP Unit (2013.102.03.7). We are grateful to Biologist Abdulkadir SUZEN for valuable technical helps.

Keywords: *Rhododendron*, Kaçkar National Park, ITS region, Phylogeny.

PP-339

Comparative assessment of phenolic and flavonoid contents of some *Citrus* peels and their antioxidant capacityİbrahim Halil GEÇİBESLER*Laboratory of Natural Product Research, Health College, Bingol University, 12000 Bingol, Turkey
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Aim of the study: To determine the richest phenolic and flavonoid content of fresh, dried and frozen of some highly economic *citrus* peels mandarin (*Citrus reticulata*), orange (*Citrus sinensis*), lemon (*Citrus limon*) and grapefruit (*Citrus paradisi*) as well as antioxidant capacities.

Material and Methods: Ultrasound assisted extraction was used to recover extracts from fresh, frozen and dried *Citrus* peels. The antioxidant activity studies were carried out by 2,2-diphenyl-1-picrylhydrazyl (DPPH) free radicals, superoxide anion radicals, reducing power, metal-ion chelating and total antioxidant activity by ferric thiocyanate methods. The total phenolic content (Folin–Ciocalteu assay) and flavonoid content were also determined by UV-VIS spectrometer.

Results: Fresh, frozen and dried *citrus* peels showed good antioxidant activity in all the biological antioxidant activity experiments ($p < 0.05$). The total phenolic content ranged from 67.36 ± 3.09 to 227.21 ± 1.78 mg of gallic acid equivalents (GAE)/100 g dry extract. Interestingly, among *citrus* samples, dried lemon and grapefruit had the highest total phenolic contents of 168.34 ± 4.03 and 227.21 ± 1.78 mg (GAE)/100 g dry extract, respectively. At the concentration of 75 $\mu\text{g/ml}$, dried lemon extract exhibited the highest superoxide anion radical scavenging and reducing power activities with scavenging percentage of 93.45 and 88.81 %, respectively, however, at same concentration, the superoxide anion radical scavenging and reducing power activities of dried orange extract were 68.54 and 71.59%, respectively. These results showed that the amounts of phenolics compounds were in accordance with higher effectiveness in performed antioxidant activity tests.

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Keywords: *Citrus*, phenolic, flavonoid, antioxidant, reducing power.

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Contact toxicity of *Stachys byzantina* C. Koch against *Sitophilus granarius*İbrahim Halil GEÇİBESLER*Laboratory of Natural Product Research, Health College, Bingöl University, 12000 Bingöl, Turkey*
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Aim of the study: To figure out the contact toxicity of organic extract from the aerial part and leaf of *Stachys byzantina* in growing Turkey.

Material and Methods: Air dried and powdered aerial parts and leaves of the *Stachys byzantina* were macerated with methanol: dichloromethane (1:1; v/v). Each extract was concentrated under reduced pressure to give solvent free residue. The obtained extracts were diluted with acetone to obtain 10% (w/w) stock solution. 1 mL of each plant extract was applied to every insect with a microapplicator and acetone was used as the blank in the control. The insects were incubated at 27 °C in a dark climatic chamber and the mortality was recorded every 24 h for 3 days. The whole experiment was repeated three different times.

Results: The aerial part (50.00±1.01%) and leaf (39.86±1.05%) extracts of *Stachys byzantina* showed contact toxicity against *S. granarius*. When compared with blank control (acetone) 00.00 ± 0.00% after 24, 48 and 72 h, the aerial part extract showed significantly higher activity ($p<0.05$). The results obtained suggest that the aerial part extract could be considered as a potential source of natural insecticides.

Acknowledgements: I.H Geçibesler would like to express his sincere thanks to Prof. Dr. İbrahim Demirtaş, Department of Chemistry, Science Faculty, Çankırı Karatekin University for his supervisor. Author also thanks Assist. Prof. Dr. Omer Cem Karakoç Department of Crop and Animal Protection Yapraklı Vocational School, Çankırı Karatekin University for contact toxicity studies.

Keywords: *Stachys byzantina*, contact toxicity, leaf, aerial part.

PP-341

Total phenol content and antioxidant activity of methanolic extracts from different parts of Turkish oriental hackberry (*Celtis tournefortii* Lam.)İbrahim Halil GEÇİBESLER*Laboratory of Natural Product Research, Health College, Bingöl University, 12000 Bingöl, Turkey
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Aim of the study: To evaluate the total phenol content and antioxidant activity of methanolic extract from different parts of Turkish oriental hackberry (*Celtis tournefortii* Lam.).

Material and Methods: Soxhlet assisted extraction technique was used for extraction of fruit, leaf and young twig of *C. tournefortii* using methanol. Antioxidant activities of the methanolic extract from different parts were evaluated by using ABTS (2,2'-azinobis (3-ethylbenzothiazoline-6-sulfonic acid) diammonium salt) cation radical DPPH (2,2-diphenyl-1-picrylhydrazyl) free radical scavenging, ferric thiocyanate (FTC), reducing power and metal chelating activity assays. The total phenolic contents were determined using Folin-Ciocalteu reagent.

Results: Fruit, leaf and young twig were the valuable organs for the extractable content representing a yield of 15.24, 23.45 and 12.34% (w/w), respectively. The methanolic extracts from different parts of *C. tournefortii* were exhibited significant antioxidant activity against 2,2-diphenyl-1-picrylhydrazyl radical ($p < 0.05$). According to the ferric thiocyanate assay particularly, higher activity was exhibited by leaf and young twig extracts with 96.34% and 87.65% inhibitions respectively, while 74.56% inhibition by fruit extracts. However, both fruit and leaf extracts exhibited higher reducing power activity than Vit. C. In addition, leaf extract showed highly ABTS cation radical scavenging activity than Trolox, and comparable with well known antioxidant agent BHA. The leaf extracts of *C. tournefortii* determined to have the highest total phenol content. Correlation analysis indicated that there was a linear relationship between the antioxidant activity and phenolic compound content of the extracts from different parts of Turkish oriental hackberry. The leaf extract of Turkish oriental hackberry can be utilized as a natural source of antioxidant.

Acknowledgements: I.H Geçibesler would like to express their sincere thanks to Mr. Mustafa Karabulut and Miss Seda Karabulut for their kind assistance to provide plant material. Author also thanks Assist. Prof. Dr. Alpaslan Koçak Department of Botanic, Science and Art Faculty, Bingöl University for botanical studies.

Keywords: *Celtis tournefortii*, antioxidant, total phenol content, oriental hackberry

PP-342

Genetic Effects of Fish Stocking and Aquaculture Activities on Natural StocksFunda TURAN¹, Cemal TURAN¹¹*Iskenderun Technical University, Faculty of Marine Science and Technology, Turkey.**Email of the corresponding author: funda.turan@iste.edu.tr;**turanfunda@yahoo.com*

Aim of the study:All over the world, anthropogenic factors such as fishing pressure, pollution and distraction of fish habitat rapidly decreases the size of fish populations. As a results, aquaculture and stocking of hatchery-reared fish activities are carried out to enhance natural fish resources. Today, as a result of these activities, there are many controversies and uncertainties on negative effect of hatchery-reared fish on the genetic integrity of native species. In the present paper, the potential genetic effects of fish stocking and aquaculture activities on natural populations and conservation strategies are discussed.

Material and Methods:Farmed fish is genetically different from the natural forms, and fish stocking and aquaculture escapes cause genetic pollution in natural populations due to hybridization and introgression. Therefore, genetic gains earned in hundreds of years in natural fish populations can be lost, and thus natural populations can be under threat. These activities are also known to cause the lose fish population's ability to compete successfully, decrease the ability of local adaptation, reduce the health and fish welfare and other potential effects (disease transfer, etc.). But, ecological and genetic effects of stocking hatchery fish and aquaculture facilities have received limited attention. Therefore it is important to consider potential risks and concerns about interbreeding and aquaculture-ecosystem interactions. In the present review, we aim to evaluate the literature dealing with such effects in marine and freshwater fish and increase our knowledge about ecological interactions between hatchery and wild fish, and to establish better management practices.

Results: Studies of differences between hatchery and wild fish documents the existence of differences and speculates about their origins and identify the environmental and/or genetic origins of the differences. The performance of hatchery fish and their interactions with wild fish appear to be of such a character as to suggest that many of the current stocking practices may be detrimental to the recipient populations. The present synthesis should incite caution in our attempts to mitigate negative effects of habitat degradation by releasing hatchery produced fish. Environmental and genetic changes to fish in hatcheries cannot be avoided entirely and many of the risks are negatively correlated, so efforts to reduce one risk simultaneously increases another. The effects that released hatchery fish can impose on naturally produced fish should make us cautious toward implementing stocking programs to compensate for habitat degradation and to increase fisheries. Indeed, under certain scenarios, theoretical models suggest that long-term stocking may lead to extinction of the native population.

Key words: Fish Stocking, Aquaculture Activities, Genetic Effect, Natural Stocks.

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Climate Change and Biodiversity Effects in Turkey Seas

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Aim of Study: The present study, sea temperature change in the Mediterranean, Aegean, Marmara and Black Sea coasts of Turkey and its biodiversity effects are investigated.

Material and Methods: This study was conducted on surface temperatures of the Mediterranean, Aegean, Marmara and Black Seas according to meteorological data collected between 1970-2015 years and captured fish species data of purse seiner, trawler and trammel net from the Mediterranean Sea between 2009 and 2015 years.

Results: Surface sea water temperatures have been increased for all seas, especially for the Mediterranean Sea in which surface sea water temperatures for the Antalya Bay, Mersin Bay and Iskenderun Bay were increased about 1.5°C, 3°C and 2°C. This indicates that the Mediterranean Sea has been under tropicalization. On the biodiversity aspects, the warming cause an increase in the number of Indo-Pacific species in the Mediterranean. The number of Indo-Pacific species is getting rapidly increased for the last decade, and there will be increased invasion of the Indo-Pacific species and more significant change of biodiversity in the Mediterranean. Some of endemic species have been replaced with other Indo-Pacific species. Nowadays, the occurrence of Atlantic-Mediterranean (*Lithognathus mormyrus*, *Serranus hepatus* and *Callinectes sapidus*) and Indo-Pacific (*Stephanolepis diaspros*, *Lagocephalus spadiceus*) originated species in the Marmara and Black Seas can also be an important indicator of the process of Mediterraneanization of the Marmara and Black Seas.

Acknowledgements: The study was supported by the Ministry of Agriculture and Rural Affairs of Turkey with a project number of TAGEM-09AR-GE11 coordinated by C.Turan

Keywords: Climate Change, Turkish Seas, Surface Sea Temperature, Biodiversity.

PP-344

Morphometric differences among different streams of brown trout *Salmo trutta* from the Abant RegionCemal TURAN¹, Deniz YAĞLIOĞLU², Funda TURAN¹¹*Molecular Ecology and Fisheries Genetics Laboratory, Marine Science Department, Faculty of Marine Science and Technology, Iskenderun Technical University, 31220 Iskenderun, Hatay, Turkey*²*Duzce University, Biology Department, Duzce, Turkey;*³*Mediterranean Fisheries Research and Production Institute, Antalya, Turkey.*
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Aim of the study: In the present study, three different forms of brown trout *Salmo trutta* (*Salmo trutta abanticus*, *Salmo trutta fario* and possibly a hybrid form (*Salmo trutta abanticus* x *Salmo trutta fario*)) was evaluated on the bases of morphological differences using truss network system.

Material and Methods: Truss measurements were made on specimens by collecting X-Y co-ordinate data for 13 morphological landmarks. Principal component analysis was used to remove size effect from the shape measures. Principal components were used in discriminant function analysis using SPSS. Population centroids with 95% confidence ellipses derived from the CVA were used to visualise relationships among the individuals of groups.

Results: In principal component analysis (PCA), 25 principal components which contains percentage of total variance of all variables were produced, and 91 % of the total variation was presented in first PC which presents allometric size factor and was excluded from the analyses. The subsequent components (24 PCs) represented 9 % of the variation which were used in discriminant function analysis (DFA). In discriminant function analysis, overall 100 % of *a priori* grouped cases were correctly classified, with within-group classifications being 100% for each group. Plotting first and second discriminant functions showed a clear differentiation of three forms. The 95 % confidence ellipses of the samples were clearly distinct from each other. *Salmo trutta fario* was most differentiated form from the *Salmo trutta abanticus* and the hybrid form which showed closer relationship.

Keywords: *Salmo trutta*, different forms, morphological differentiation.

PP-345

Population Structuring and Migration Pathway of Atlantic bonito *Sarda sarda* in Turkish Marine waters

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Aim of the Study: Genetic and morphologic structuring of Atlantic bonito *Sarda sarda* from the Turkish coasts of the Black Sea, Marmara, Aegean, Mediterranean Seas, Bulgarian Coast and Adriatic Sea. Possible pathway of spawning migration of *Sarda sarda* was also discussed on the bases of genetic and morphological dataset.

Material and Methods: Mitochondrial DNA D-loop gene sequencing and nDNA microsatellite techniques were used to analyses population genetic differences. Morphometric and meristic characters were used for morphological analysis.

Results: MtDNA analysis revealed that populations of *Sarda* in Turkish coastal waters were divided into two genetically different two populations, *Sarda sarda* in the Black Sea and Marmara Sea comprise one genetic unit, and *S. sarda* in the Aegean and Mediterranean coast of Turkey constitute the genetically different second unit. Microsatellite analysis revealed two genetically different population in Turkish coastal waters as mtDNA sequencing, first constitute the Black Sea and Marmara Sea population and the second comprise the Aegean and Mediterranean Seas population. In morphologic analysis of *S. sarda*, only the Adriatic Sea population was different, and the others revealed homogeneity. On the bases of genetic results, the first stock of *Sarda sarda* has spawning grounds in the Black Sea that migrate to the Marmara Sea for feeding and some parts of which also migrate to the Aegean Sea. This adult Atlantic bonito group may also go back to the Marmara and Black Sea for spawning during the spring. The second stock of Atlantic bonito is located in the Aegean and Mediterranean part of Turkey. The possible spawning ground of this stock may be Antalya Bay, and this stock possibly has different spawning pathways and migrate between Aegean and Mediterranean Seas for feeding.

Acknowledgements: Thanks to the Scientific & Technological Research Council of Turkey (TUBITAK-111T481) for financial support.

Keywords: Atlantic bonito, *Sarda sarda*, population genetics, mtDNA sequencing, microsatellite, morphology.

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**Microsatellite Genetic Differences between Wild and Hatchery Populations of Turbot,
*Scophthalmus maximus***Cemal TURAN¹, Deniz YAGLIOGLU², Mevlüt GÜRLEK¹, Deniz ERGÜDEN¹, Funda TURAN¹, Yılmaz EMRE³, Serpil KARAN¹, Servet A. DOĞDU¹, Ali UYAN¹¹Fisheries Genetics and Molecular Ecology Laboratory, Faculty of Marine Sciences and Technology, Iskenderun Technical University, Iskenderun, Turkey;²Duzce University, Biology Department, Duzce, Turkey;³Mediterranean Fisheries Research and Production Institute, Antalya, Turkey.
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Aim of the study: Turbot, *Scophthalmus maximus*, is one of the major aquaculture species around the world and supports an important component of the aquaculture industry in Europe. In this study, microsatellite loci were used to assess the level of genetic diversity and population differentiation in *Scophthalmus maximus* of both wild and hatchery origin.

Material and Methods: *S. maximus* specimens were collected from the Black Sea and hatchery station. The level of genetic heterogeneity within and between natural and aquaculture populations was investigated using five polymorphic microsatellite loci.

Results: A total of 24 alleles were detected across all loci that were ranged from 4 to 10 considering per locus and population. Compared to wild populations, hatchery stock showed less genetic variation as revealed in lower number of alleles. Genetic heterogeneity between wild and hatchery populations was 0.2282 which was statistically highly significant ($P < 0.001$). Garza-Williamson statistics was lower in wild population (0.37838) than that hatchery population (0.56818), indicating a possible bottleneck effect in the wild populations.

Acknowledgements: Thanks to the scientific & Technological Research of Turkey (TUBITAK-112O920) for funding.

Key words: Turbot, *Scophthalmus maximus*, microsatellite, wild, hatchery.

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On the distribution and ecology of an endemic geometrid moth (Lepidoptera)

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Aim of the study: In the family *Geometridae*, the valid genus name *Xanthorhoe* was advised by Hübner [1825]. This genus is distributed worldwide with 228 species and 62 species are described from the Palaearctic region, 20 of them occurring in Europe. 11 species are known from Turkey. In this study, pictures of external morphology and genitalia of *Xanthorhoe inconsiderata* (Staudinger, 1892), of which endemic and only known from Turkey are presented. Furthermore, data on new locality, habitat and phenology are given.

Material and Methods: The study materials were collected from Bacavan Mountain, Şirvan district, Siirt province, Southeastern of Turkey, in 2013 within the framework of the doctoral programme. But it could be identified to as genus level in the thesis. After further investigation, it is understood that there is no data except of the study which is written in German language and described the species by Staudinger in 1892. External morphological characters are not sufficient for exact diagnosis in this group. However, could not be found in any source despite the detailed research on its genitalia. Therefore, we compared the specimens within the Munich museum (Zoologische Staatssammlung Muenchen) for identify at the species level. The materials are deposited in the laboratory of Batman University, Faculty of Arts and Sciences, Department of Biology.

Results: In this research, the author has presented information about rare and little-known *X. inconsiderata* species that is distributed only in Turkey. The specimen flies 1500-1600 m above sea-level in october at night. Bacavan Mountain where the habitat of the specimens is containing rocky areas and including intensely *Crataegus* and *Quercus* species with *Juniperus* and *Paliurus* plants. In addition, the area contains various herbaceous plant species in the family *Asteraceae*, *Poaceae*, *Brassicaceae* and *Rubiaceae*. Larva is unknown but it is estimated that feed on herbaceous plants in the family *Brassicaceae* or *Rubiaceae* such as other *Xanthorhoe* species distributed in Europe. In the original description of *X. inconsiderata* (Staudinger, 1892) that is introduced based on two male specimens from Amasya (Turkey). Later, this species is recorded by Wherli in 1934 from Kahramanmaraş province (samples in Munich museum). In this study, it is presented from Siirt province where new locality is. Specimens in this study are stored a local archive in Turkey, while other samples are in the abroad museums. In addition, genitalia pictures of male and female of the species are submitted for the first time.

Acknowledgements: The author is grateful to Dr. Axel Hausmann (Munich, Germany) and Dr. Ahmet Ö. Koçak, Dr. Muhabbet Kemal Koçak (Van, Turkey) for their help in determining of the species and valuable advice.

Keywords: *Xanthorhoe*, *inconsiderata*, Geometridae, Lepidoptera.

PP-348

Endemic Plants of the Phrygia ValleyOkan SEZER¹, Derviş ÖZTÜRK¹, Atila OCAK¹¹Department of Biology/Faculty of Science and Letters, Eskişehir Osmangazi University, Turkey
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Aim of the study: On the triangle of Kütahya, Afyonkarahisar, Eskişehir the hilly settlement known as "Phrygia Epiktetus" (The Small Phrygia) is today called with the name of "Phrygia Valley". The region attracts deep interest of the domestic tourists as well as the foreigners both with having monuments belong to the civilisations of Phrygia, Rome, Byzantine and with its unique natural beauty. Not knowing its biodiversity completely is one of the most important lack of the region came to the surface with the performed ecotourism activities. To protect a region's biological richness and to evaluate them economically is only possible with defining its available biodiversity. This study aims to reveal the endemic plant diversity of the Phrygian Valley which has a considerably high economic potential in terms of ecotourism.

Material and Methods: Many excursions have carried out between 2011-2015 on the hiking trail of Phrygia Valley and on the surroundings of Phrygia, Rome and Byzantine's historical artifacts on this line. When excursions were being planned, collecting plants on each vegetation period had shown ultimate attention. The region's available endemic plant diversity was released by diagnosis of collected plant samples and by evaluating the data of former studies carried out on the region.

Results: In this study committed on the hiking trail of Phrygia Valley and on the surroundings of Phrygia, Rome and Byzantine's historical artifacts on this line between 2011-2015. 833 plant taxa were determined from study area. 101 of them are endemic plants peculiar to our country and its endemism ratio is 11,4 %. 6 of these taxa stated from the region are under threat. 1 of them are endangered (EN), 5 are on the vulnerable categories (VU). Danger categories of these taxa are; *Dianthus aculeatus* Hamzaoğlu EN B1b(i,iii), *Muscariracemosum* Mill. VU, *Hieracium schmidtii* subsp. *pseudodontotrichum* (Hub.-Mor.) Greuter VU, *Hesperiskotschyi* Boiss. VU, *Crocus flavus* subsp. *dissectus* T.Baytop & B.Mathew VU and *Convolvulus phrygius* Bornm. VU. 80 of left 95 taxa are on the LC category and left 15 are on the NT category.

Acknowledgements: This study was supported by Eskişehir Osmangazi University Scientific Research Projects Commission (Project name: Frigya Vadisi Florası (In Turkish). Project Number: 201319A203).

Keywords: Flora, Endemic, Phrygia, Ecotourism.

PP-349

Citric acid modified *Thuja orientalis* (*T. orientalis*): Batch studies for the biosorption of Basic Blue 9 from aqueous solutionsSibel TUNALI AKAR¹, Yasemin YETİMOĞLU BALK¹, Okan TUNA, Tamer AKAR¹
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Aim of the study: Citric acid modified *Thuja orientalis* was used as biosorbent for the treatment of Basic Blue 9 (BB9) contaminated solutions. Biosorption potential of the CA-modified *T. orientalis* was explored in the batch mode. Modification significantly enhanced the biosorption performance of unmodified biosorbent by 30%. Dye solutions were used without pH adjustment in the biosorption studies. The pseudo-second-order kinetic model well described the data while the equilibrium data was the best modeled by the Langmuir isotherm. Overall, CA-modified *T. orientalis* could be used as an effective biosorbent for removal of BB9 with the advantages of high biosorption capacity and short equilibrium time.

Material and Methods: The biosorption of BB9 onto modified *T. orientalis* was investigated in the batch mode. 25 mg L⁻¹ BB9 solutions were used and known amount of biosorbent was added. The mixtures were stirred on a magnetic stirrer at 200 rpm. Liquid and solid phases were separated by centrifugation at 3500 rpm for 3 min. In order to examine the effect of pH on BB9 biosorption potential of modified *T. orientalis* pH of the solutions was changed from 2.0 to 10.0. Biosorbent amount was varied from 0.01 to 0.05 g. Biosorption kinetics was evaluated for the data at different time interval and at various temperatures (15, 30 and 45°C). The concentration of dye solutions was varied from 10 to 725 mg L⁻¹ for isotherm modeling. BB9 concentrations in the solutions were quantified by using UV-Visible spectrophotometer at maximum wavelength of dye.

Results: In this study *T. orientalis* was successfully modified with citric acid and showed excellent performance for BB9 biosorption. The experiments were conducted at original pH of the dye solution (6.60). The biosorption yields of BB9 were found as 92.25% and 97.87% with 0.03 and 0.015 g of natural and CA-modified *T. orientalis*, respectively. An increase in the temperature from 15 to 45°C did not cause an important change in the biosorption capacity of both biosorbent. The rapid biosorption was observed at three different temperatures (15, 30 and 45°C) and equilibrium was established within 25 min for both biosorbent. The kinetics of BB9 biosorption onto CA-modified *T. orientalis* indicated that the pseudo-second-order is the best model at all studies temperatures. The maximum monolayer biosorption capacities of natural and modified biomass were found to be 91.03 and 203.21 mg g⁻¹ at 30°C, respectively.

Keywords: CA-modified *T. orientalis*; biosorption; citric acid; Basic Blue 9.

PP-350

Determination of Water Quality Using Benthic Macroinvertebrates and Physicochemical Parameters of Nilufer StreamMustafa DURAN¹, Gürçay Kıvanç AKYILDIZ², Serdar POLAT¹, Recep BAKIR¹¹*Biology Department, Pamukkale University, Turkey,*²*FAGUMER-Flora and Fauna Research, Development and Application Center of Pamukkale University
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Aim of the study: The main aims of this study were to determine the biological richness of the stream with particular emphasis on the relationship between the structure of the macroinvertebrate community and the physical and chemical features of their environment and to assess the water quality of the Nilufer Stream in Bursa.

Material and Methods: Macroinvertebrate communities along the stream were sampled Spring, Summer and Autumn in 2015 at each of the five stations. In this project will be applied WFD (Water Framework Directive) standards 10870 BS EN ISO 2012, Water quality - selection of manual sampling methods and devices for benthic invertebrates in fresh water BARBOUR et. al. accepted after 1999 and multiple multi-habitat technique AQEM I/STAR protocol contains a selection of selected sampling areas to improve habitat diversity (Cheshmedjiev et al, 2011). In addition, TSE 6469 EN 27828, EN 28265, EN ISO 9391, EN 8689-1, EN 8689-2 selection standards taking into account the common sampling procedures and equipment will be monitored. All the animals collected were immediately fixed in formaldehyde (4%) in the field and then transferred to 70% ethyl alcohol. The macroinvertebrates were sorted, identified to the lowest possible taxon and counted under a stereomicroscope. BMWP, ASPT and Margalef Index calculated.

Results: A total of 2116 individuals were collected covering 21 families in five stations. Tubificidae, Asellidae, Chironomidae, Muscidae, Psychodidae, Syrphidae, Tubificidae, Sphaeriidae, Lymnaeidae, Physidae, Valvatidae, Corixidae, Pleidae, Baetidae, Caenidae, Coenagrionidae, Hydrophilidae, Piscicolidae, Clausiliidae, Planorbidae, Tabanidae and Dytiscidae families were identified. Average Biotic indices of five stations have poor water quality and average 19,6 for BMWP and 3,63 for ASPT index score were calculated. Margelef average score for five stations was 1,39. The most dominant family for the first station Psychodidae (48,65%) were detected. Psychodidae family members of some types of alpha-mezosaprobik and beta-mezosaprobik includes taxa founded in alpha and beta - mezosaprobik stream zones. Baetida most dominant family for the second station (61,91%) were detected. Most Baetida family accessible in type beta-mezosaprobic and alpha-mezosaprobic environment. Tubificidae most dominant family for the third, fourth and fifth stations (94,84%), (87,91%) and (88,27%) were detected respectly.

Acknowledgements: This research was supported by TUBITAK-MAM "Determination of Some Basin in Sensitive Areas and Water Quality Objectives in Turkey" SUSURLUK, Marmara and Meric-Ergene Rivers Basin, 2015

Keywords: Susurluk River basin, Bioindicators, Biological monitoring, bentik fauna.

PP-351

Poisonous Macrofungi from Tekke (Elmalı-Antalya) District

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Aim of the study: The aim of this study is to determine the species of poisonous fungi and these species are introduced the public living in the area.

Material and Methods: The materials were collected during field trips in the Tekke place (Elmalı-Antalya) in 2015-2016. The morphological and ecological characteristics of the macrofungi were recorded and they were photographed in their natural habitats. The species were identified with the help of field and laboratory studies with relevant literature.

Results: With this study, 14 poisonous macrofungi taxa have been determined. These species belong to Basidiomycota. Identified species and syndromes caused by these species: *Galerina badipes*, *Galerina marginata*, *Lepiota cristata* (Phalloides syndrome), *Cortinarius orellanus* (Orellanus syndrome), *Inocybe lacera*, *Inocybe whitei*, *Inocybe amblyospora*, *Inocybe rimosa*, *Inocybe splendens*, *Clitocybe foetens*, *Mycena pura* (Muscarine syndrome), *Hebeloma sinapizans*, *Hebeloma alpinum*, *Tricholoma inamoenum* (Gastrointestinal Syndrome).

Acknowledgements: This research was financially supported by the Selçuk University Scientific Research Projects Coordinating Office (SÜ-BAP- 2014/14201071).

Keywords: Poisonous, macrofungi, syndrome, Tekke, Antalya.

PP-352

Assessment of Water Quality Using Benthic Macroinvertebrates and Physicochemical Parameters of Orhaneli Stream in TurkeyMustafa DURAN¹, Gürçay Kıvanç AKYILDIZ^{1,2}, Serdar POLAT¹, Recep BAKIR¹¹Biology Department, Hydrobiology Lab., Pamukkale University, Turkey²FAGUMER-Flora and Fauna Research, Development and Application Center of Pamukkale University
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Aim of the study: The main aims of this study were to determine the biological richness of the stream with particular emphasis on the relationship between the structure of the macroinvertebrate community and the physical and chemical features of their environment and to assess the water quality of the Orhaneli Stream in Kutahya.

Material and Methods: Macroinvertebrate communities along the stream were sampled Spring, Summer and Autumn in 2015 at each of the five stations. In this project will be applied WFD (Water Framework Directive) standards 10870 BS EN ISO 2012, Water quality - selection of manual sampling methods and devices for benthic invertebrates in fresh water BARBOUR et. al. accepted after 1999 and multiple multi-habitat technique AQEM I/STAR protocol contains a selection of selected sampling areas to improve habitat diversity (Cheshmedjiev et al, 2011). In addition, TSE 6469 EN 27828, EN 28265, EN ISO 9391, EN 8689-1, EN 8689-2 selection standards taking into account the common sampling procedures and equipment will be monitored. All the animals collected were immediately fixed in formaldehyde (4%) in the field and then transferred to 70% ethyl alcohol. The macroinvertebrates were sorted, identified to the lowest possible taxon and counted under a stereomicroscope. BMWP, ASPT and Margalef index calculated.

Results: A total of 4234 individuals were collected covering 36 families in five stations. Tubificidae, Baetidae, Caenidae, Ceratopogonidae, Chironomidae, Coenagrionidae, Corixidae, Dixidae, Dryopidae, Dytiscidae, Entomobryidae, Ephydriidae, Hydrophilidae, Hydrophsychidae, Potamanthidae, Asellidae, Calopterygidae, Simuliidae, Stratiomyidae, Platycnemididae, Odontoceridae, Gomphidae, Gammaridae, Ephemerellidae, Empididae, Elmidae, Tipulidae, Sciomyzidae, Psychodidae, Planorbidae, Isotomidae, Limonidae, Lymnaeidae, Muscidae, Physidae and Piscicolidae families were identified. Average Biotic indices of five stations have moderate water quality and average 55,14 for BMWP and 5,02 for ASPT index score were calculated. Margelef average score for five stations was 2,39. The most dominant family for the first, third and fifth stations Chironomidae (54,53%), (43,07%) and (20,68%) were detected respectively. Chironomidae family members of some types of beta-mezosaprobik includes taxa founded in alpha-mezosaprobik and polysaprobic stream zones. Baetida most dominant family for the second and fourth stations (68,83%) and (49,78%) were detected. Most Baetida family accessible in type beta-mezosaprobic and alpha-mezosaprobic environment.

Acknowledgements: This research was supported by TUBITAK-MAM "Determination of Some Basin in Sensitive Areas and Water Quality Objectives in Turkey" SUSURLUK, Marmara and Meric-Ergene Rivers Basin, 2015

Keywords: Susurluk River basin, Bioindicators, Biological monitoring, benthic fauna

PP-353

Monitoring Water Quality Using Benthic Macroinvertebrates and Physicochemical Parameters of Simav StreamMustafa DURAN¹, Gürçay Kıvanç AKYILDIZ^{1,2}, Serdar POLAT¹, Recep BAKIR¹¹Biology Department, Hydrobiology Lab., Pamukkale University, Turkey²FAGUMER - Flora and Fauna Research, Development and Application Center of Pamukkale University
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Aim of the study: The main aims of this study were to determine the biological richness of the stream with particular emphasis on the relationship between the structure of the macroinvertebrate community and the physical and chemical features of their environment and to assess the water quality of the Simav Stream in Kutahya.

Material and Methods: Macroinvertebrate communities along the stream were sampled Spring, Summer and Autumn in 2015 at each of the five stations. In this project will be applied WFD (Water Framework Directive) standards 10870 BS EN ISO 2012, Water quality - selection of manual sampling methods and devices for benthic invertebrates in fresh water BARBOUR et. al. accepted after 1999 and multiple multi-habitat technique AQEM I/STAR protocol contains a selection of selected sampling areas to improve habitat diversity (Cheshmedjiev et al, 2011). In addition, TSE 6469 EN 27828, EN 28265, EN ISO 9391, EN 8689-1, EN 8689-2 selection standards taking into account the common sampling procedures and equipment will be monitored. All the animals collected were immediately fixed in formaldehyde (4%) in the field and then transferred to 70% ethyl alcohol. The macroinvertebrates were sorted, identified to the lowest possible taxon and counted under a stereomicroscope. BMWP, ASPT and Margalef index calculated.

Results: A total of 840 individuals were collected covering 25 families in five stations. Tubificida, Lymnaeida, Physida, Asellida, Ceratopogonidae, Chironomidae, Psychodidae, Simuliidae, Stratiomyida, Tabanidae, Tipulidae, Baetida, Caenida, Elmida, Dixidae, Calopterygidae, Ephemerellidae, Gomphidae, Hydrophychidae, Planorbidae, Potamanthidae, Sciomyzidae, Potamanthidae, Asellidae and Hydrophilidae families were identified. Average Biotic indices of five stations have moderate water quality and average 42,7 for BMWP and 4,85 for ASPT index score were calculated. Margalef average score for five stations was 2,96. The most dominant family for the first and fourth stations Chironomidae (27,2%) and (80,72%) were detected. Chironomidae family members of some types of beta-mezosaprobik includes taxa founded in alpha-mezosaprobik and polysaprobic stream zones. Simuliidae most dominant family for the second station (39,06%) were detected. Simuliidae family determined in oligosaprobic and beta-mezosaprobik feature rich environment. Baetida most dominant family for the third and fifth stations (64,31%) and (49,07%) were detected. Most Baetida family accessible in type beta-mezosaprobic and alpha-mezosaprobic environment.

Acknowledgements: This research was supported by TUBITAK-MAM "Determination of Some Basin in Sensitive Areas and Water Quality Objectives in Turkey" SUSURLUK, Marmara and Meric-Ergene Rivers Basin, 2015

Keywords: Susurluk River basin, Bioindicators, Biological monitoring, benthic fauna

PP-354

Antimicrobial Effects of Plants on Pathogens of Rainbow Trout (*Oncorhynchus mykiss*)Zeynep SAYIN¹, Gülşen ULUKÖY²¹Graduate School of Natural and Applied Sciences, Muğla Sıtkı Kocman University, Muğla – Turkey.²Department of Aquaculture, Faculty of Fisheries, Muğla Sıtkı Kocman University, Muğla – Turkey.zeynepsayin10@gmail.com

Aim of the study: One of the main problems in aquaculture of rainbow trout (*Oncorhynchus mykiss*) is diseases which cause by pathogenic microorganisms. Variable synthetic drugs have been used on fighting with these pathogens. The applying of drugs permanently and unconsciously leads to the occurrence of resistance in pathogens. Up to now, so many plant species that exist in nature, have been used on human and animals for treating of disease. Nowadays, the uncovering of the active ingredients that exist in plants by using different solvents are being a very important subject. There are so many studies about plants based on their natural substances that intended to be use protection against disease before it happens and for treatment after its happened. Our aim was to determine and evaluate antimicrobial effects of plants studies on fish pathogens.

Material and Methods: In this review, so many studies (articles, scientific papers, books etc) on antimicrobial activity of plants on rainbow trout pathogens which caused diseases and massive economical loss were investigated.

Results: It has been found that the natural products which obtained from plants and its parts causing antimicrobial effect on pathogens of rainbow trout at certain degree depending on solvents and ingredients of plants.

Keywords: *Oncorhynchus mykiss*, antimicrobial activity, fish pathogen, bacteria, rainbow trout.

PP-355

A study of Orchid Species (Orchidaceae) Distributed in the Black Sea RegionGülcan ŞENEL¹, Mustafa Kemal AKBULUT¹, Şenay SÜNGÜ ŞEKER¹, Öznur ERGEN AKÇİN²¹ *Department of Biology, Faculty of Arts and Sciences, Ondokuz Mayıs University, Samsun, Turkey*² *Department of Biology, Faculty of Arts and Sciences, Ordu University, Ordu, Turkey*gseinel@omu.edu.tr

Aim of the study: Orchidaceae has a rich biodiversity because of the location and climate condition in our country. Considering commercial value, several plants are removed from their natural environment and therefore are damaged. The orchid plant comes at the beginning of them. Orchidaceae is represented by 229 taxon belonging to 24 genus of orchids and contains many endemic species in Turkey. The Black Sea Region has also rich biodiversity because it contains 74 species. In this study, the distribution of orchid species in the Black Sea Region were determined in regard to the cities or geographical regions and the protection proposals were presented assessing the potential dangers.

Material and Methods: The distribution of the orchid species in the cities have been determined by reference to the studies in literature and the species which has been collected from the area for five years from 2011 to 2015. The species biodiversity in the cities and the geographical regions were evaluated using PAST software package.

Results: The Central, Eastern and Western Black Sea Sections were greatly vary in terms of the species they contain. Samsun in the Central Black Sea Section, Trabzon and Artvin in the Eastern Black Sea Section and Bolu and Kastamonu in the Western Black Sea Region are the cities at which the most species were detected.

Acknowledgements: This research was funded by a grant from the Scientific and Technological Research Council of Turkey (TUBITAK, 114Z702).

Keywords: Orchidaceae, Black Sea, endemic, salep.

PP-356

Species Diversity of Ground Beetles (Coleoptera: Carabidae) in Different Habitat Types of Kovada Lake National Park (Isparta)

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Aim of the study: The aims of this study are to determine the fauna of Carabidae; estimate habitat choices according to environmental variables such as temperature, vegetation, soil particle size, pH and moisture of soil etc. by the help of CCA (Canonical-Correspondence Analysis) and PCA (Principal Component Analysis); estimate species diversity of this group within Shannon-wiener and Simpson diversity indices; to present the faunal similarities within four different study area which are chosen from the Kovada Lake National Park by Sorensen and Jaccard indices, and to contribute to the literature on Carabidae Fauna of Turkey.

Material and Methods: The study was carried out in Kovada Lake National Park (Isparta, Turkey), located in Southern Turkey, in 2014. Four different habitat types in the study area were chosen. The specimens were collected by pitfall traps within the period of every fifteen days. Abundance category of the collected species was determined. MVSP (Multi-Variate Statistical Package) was used to compare species diversity. The similarity of the study areas was also estimated with MVSP and PAST softwares. Monthly average temperature values was recorded with the datalogger. Soil samples were taken from each study areas and was performed a soil analysis to determine physical (soil texture) and chemical (pH, organic matter, organic carbon, lime etc.) properties. PC-ORD software was used to perform a CCA (Canonical-Correspondence Analysis) and PCA (Principal Component Analysis) to determine relationship within soil analysis results and how it affects the ground beetles.

Results: Totally 36 of Carabidae species were recorded from the study areas. The most dominant species are *Calathus erratus* (24%), *Calathus fuscipes graecus* (16%) and *Carabus (Pachystus) graecus morio* (13%). The rare species in the study area are *Carabus scabrasus* (0,1%), *Leistus terminatus* (0,1%), *Ophonus ardosiacus* (0,1%), *Bembidion bodemeyeri* (0,2%), *Calosoma sycophanta* (0,2%), *Leistus spinibarbis rufipes* (0,2%), *Ophonus subquadratus* (0,2%). According to Shannon-Wiener and Simpson diversity indices, Study Area 1 was found to be most diversification area with the value of 2.61. Study Area 2, 3 and 4 have the values of 2.24, 2.04 and 0.92, respectively. As a result, Study Area 1 and 2 was found to be most similar areas with a rate 62-72%. Study area 1 and 2 was also found to be most species diversified areas within 25 and 27 species respectively. The most important factors that affects species composition of ground beetles are temperature and physical/chemical properties of soil. A positive correlation was found between temperature and the number of species. While *Carabus* species prefer dusty lands, *Cymindis* species usually prefer lime-rich soils. *Aptinus* species are prefer both dusty and lime-rich soils. *Calathus* and *Notiophilus* species was to be found preferring alcaline lands with rich-organic matter.

Acknowledgements: We would like to thank Department of Scientific Research Project Management of Suleyman Demirel University (SDU-BAP) for funding this research with project number 3761-YL-213.

Keywords: Carabidae, Ground beetles, Species diversity, Environmental variables.

PP-357

Microsatellite Genetic Variation and Population Differentiation of *Ceratitis capitata* in TurkeyErsin DOĞAÇ¹, Abuzer GÜLER², Vatan TAŞKIN³, Belgin GÖÇMEN TAŞKIN³¹*Köyceğiz Vocational School, Department of Medicinal and Aromatic Plants, Muğla Sıtkı Koçman University, Turkey*²*Department of Biology, Graduate School of Natural and Applied Sciences, Muğla Sıtkı Koçman University, Turkey*³*Department of Biology, Sciences Faculty of Science, Muğla Sıtkı Koçman University, Turkey*
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Aim of the study: The Mediterranean fruit fly (medfly) *Ceratitis capitata* (Wiedemann), is among the world's most substantial insect pests, because it damages a large variety of agricultural products, resulting in huge economic losses annually and widely distributed around the World. Microsatellite markers have been used in medfly to identify sources of origin, genetic structure, invasion phenomena, to design control strategies. The aims of this study are (I) to collect data on population genetic structure of *C. capitata* in Turkey. (II) to improve our understanding of gene flow in this invasive species and to contribute to the development of management strategies.

Material and Methods: Medfly samples were collected from four populations including Muğla, Aydın, İzmir and Antalya. DNA isolation was performed with the Lifton method. Collected samples were genotyped for 8 microsatellite markers. Forward primers were 5'-labelled with one of three fluorescent dyes (6-FAM, HEX or NED). From each location, 20 adult individuals were used for microsatellite analysis. Microsatellite loci were pooled for amplification and samples were genotyped on an ABI 3130 Automated Sequencer (Applied Biosystems). Alleles were scored using Applied Biosystems Peak Scanner program. Statistical analyses were determined using Popgene v. 1.31, Genetix v. 4.02, Populations v. 1.2.32, Arlequin 3.11, Structure v. 2.1 and Bottleneck softwares.

Results: High levels of diversity were found in studied populations. The number of alleles (n_a) per locus varied from 7 (Ccmic 14 and Medflymic 25) to 18 (Ccmic 9), with an average of 12.5 ± 4.17 . The mean number of effective alleles (n_e) defined per locus was 4.35 ± 1.32 . The highest number was observed at Medflymic 96 with 5.97; the lowest value was at Ccmic 14 with 2.58. Observed (H_o) and expected (H_e) heterozygosity values were 0.61 ± 0.12 and 0.75 ± 0.05 , respectively. H_o values changed from 0.32 (Medflymic 25) to 0.91 (Medflymic 96); H_e values changed from 0.61 (Ccmic 14) to 0.84 (Medflymic 96). The average F_{ST} over all loci and the number of effective migrants per generation, N_{em} , were 0.20 and 1.01 respectively. The F_{ST} values changed from 0.325 (between İzmir-Muğla) to 0.074 (between Antalya-Aydın). All F_{ST} values between populations found to be significant (P ; 0.05 significance level). The mean number of alleles (n_a) and mean number of effective alleles (n_e) values were 4.25 (Antalya), 8.13 (Aydın) and 2.44 (Antalya), 4.38 (Aydın), respectively. The expected and observed heterozygosity values changed from 0.52 (Antalya) to 0.70 (İzmir) and 0.53 (Antalya) to 0.71 (İzmir).

Acknowledgements: A part of this study was funded by the Research Fund of Muğla Sıtkı Koçman University (Grant number: BAP 15/016).

Keywords: *Ceratitis capitata*, Management strategies, Microsatellites, Genetic variation.

PP-358

**Synthesis and Characterisation of Symmetrical Porphyrazines Bearing Calixarene Moieties
Functionalized With “Click” Reactions**Nilgün KABAY¹, Yasemin BAYĞU², Yaşar GÖK²¹Department of Biomedical Engineering, Pamukkale University, TURKEY²Department of Chemistry, Pamukkale University, TURKEY ³Department/Research Institute,
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Aim of the study: Porphyrazines and phthalocyanines are macrocyclic compounds with high conjugations. These molecules are used in different application areas such as optical data storing, laser rays, nanotechnology, catalyst, chemical sensor technology, and photodynamic therapy. Click chemistry is a chemical philosophy introduced by K. Barry Sharpless in 2001 and describes chemistry tailored to generate substances quickly and reliably by joining small units together. Click chemistry is not a specific reaction; it is a concept that mimic nature. It is inspired by the fact that nature also generates substances by joining small modular units. This study aimed to synthesize novel magnesium porphyrazine derivatives.

Material and Methods: First of all, calix[4]arene compound will be synthesized as starting material. Followingly, calix[4]arene will be functionalized with p-toluene sulfonic acid, 2-(2-chloro ethoxy) ethyl ester and propargyl bromide. The chlorine atoms on the edges will be iodized with sodium iodide. Click reaction will be performed by 9-azidomethyl-antracene and substituted maleonitrile compound will be synthesized by reacting this calix[4]arene compound with dithiomaleonitrile disodium compound. Cyclotetramerization reaction of substituted maleonitrile compound in presence of magnesium butoxide will give us magnesium porphyrazine.

Results: Structures of synthesized compounds will be characterized by using FT-IR, ¹H NMR, ¹³C NMR, mass spectroscopy, UV-Visible and elemental analyses techniques.

Acknowledgements: This study was supported by the Research Fund of Pamukkale University, Project Number: 2011BSP031 (Denizli-Turkey).

Keywords: Porphyrazine, calix[4]arene, antracene, “click” chemistry.

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Occurrence of juveniles and egg capsules of *Dipturus oxyrinchus* from North-eastern Mediterranean SeaNuri BAŞUSTA¹, Asiye BAŞUSTA¹¹Fisheries Faculty, Firat University, TR-23119, Elazig, Turkey
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Aim of the study: The Long-nosed skate, *Dipturus oxyrinchus* is Found in the east Atlantic and Mediterranean. The Long-nosed skate is a bottom dwelling species that is found on sandy or muddy substrates at depths of 90-900m. This species is particularly vulnerable to fishing pressures due to its size and low rate of population increase. Very little data is available for the Mediterranean but the situation is probably similar with *D. oxyrinchus* being caught by multispecies trawl fisheries. The aim of this study is to report the existence of egg capsules, juveniles and adult females of *D. oxyrinchus* captured off the Antakya Bay, North-eastern Mediterranean.

Material and Methods: Generally, fishermen are fishing in the international waters during the season (15 April-15 July) in which fishing is prohibited in the continental shelf. *Dipturus oxyrinchus* have been captured as by-catch from commercial trawl fishing at 300-410 m and 360-400 depths, in the Antakya Bay of North-eastern Mediterranean (between 36° 06'200 N -35°35'432 E and 36° 03'795 N -35° 29'098 E) and (between 36°06'004 N -35°23'821 E and 36° 06'152 N -35° 36'966 E) on the 20th of May 2015. Fish samples were immediately transported in the Department of Fisheries Faculty ecophysiology laboratory (Firat University) where they were identified, sexed and photographed. Morphometric measurements of the specimens were taken to the nearest 1 mm and the weight of each specimen was measured with a digital scale to the nearest 0.01 g. *D. oxyrinchus* specimens were preserved at the Museum of Fisheries Faculty, Firat University.

Results: Total lengths and weights of females and males of *D. oxyrinchus* were 14.6 -21.8 cm, 9.53-26.03 g, respectively. Thus, this study provides the first record of egg capsules and juveniles long-nosed skate from the North-eastern Mediterranean Sea. This species is currently listed under "Near Threatened" on the [IUCN Red List of Threatened Species](#), because there is no evidence to indicate the population has declined significantly. The presence of juvenile individuals and adult females of *Dipturus oxyrinchus* in May and June, in the same area suggests that there is egg laying and nursery in the North-eastern Mediterranean.

Acknowledgements: A part of this work was supported by Scientific Research Projects Coordination Unit of Firat University. Project Number SUF.15.04.

Keywords: *Dipturus oxyrinchus*, long-nosed skate, egg capsule, juvenile, North-eastern Mediterranean.

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Effects of *Tricholoma caligatum* extract on mRNA expressions of cell cycle control and apoptosis related genes in A549 human lung cancer cellsMücahit SEÇME¹, Yavuz DODURGA¹, Gülseren BAĞCI¹, Kutret GEZER², Oğuzhan KAYGUSUZ²¹Department of Medical Biology, Faculty of Medicine, Pamukkale University, Turkey²Department of Biology, Faculty of Arts and Sciences, Pamukkale University, Turkey
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Aim of the study: The medicinal use of mushrooms has a very long tradition, especially in the Asian countries, due to their bioactivities such as anticancer, antioxidant, antidiabetic, antiviral, antimicrobial and immunological activities. Despite developed diagnosis and treatment methods, cancer is still one of the leading causes of death in the world. Lung cancer is one of the most common cancer type in the world. The aim of this study is to investigate the anticancer mechanism of *T. caligatum* mushroom extract via expression changes of apoptosis and cell cycle control genes.

Material and Methods: *Tricholoma caligatum* collected in the region of Denizli and its surroundings. A549 cells were cultured under suitable conditions. Cytotoxic effect of *T. caligatum* extract was determined by XTT method. Total RNA was isolated from cells with Tri-reagent to determine the apoptotic effect of extract and subsequent to cDNA was synthesized. *Bax*, *Bcl-2*, *caspase-3*, *caspase-9*, *caspase-8*, *p53*, *p21*, *Cyclin D1*, *CDK-4* and *CDK6* mRNA expression changes were determined by Real-Time PCR. Statistical analysis of findings has been performed with the $\Delta\Delta CT$ method from "RT²Profiles™ PCR Array Data Analysis", which is assessed statistically using the "Student t test".

Results: IC₅₀ dose of extract in A549 cells was detected 400 µg/ml at 48th hour. According to Real-time PCR results, mRNA expressions of *Cyclin D1*, *CDK-4*, *CDK-6* clearly decreased in dose group cells. *T. caligatum* extract may stimulates cell cycle arrest by down-regulating *Cyclin D1* and *CDK-4* expressions in A549 cells. It is thought that *Tricholoma caligatum* may be a potential agent for treatment of lung cancer and can be a guide for further studies will be done in this area.

Keywords: *Tricholoma caligatum*, A549 cells, mushroom extract.

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Lizard Care in Captivity: *Stellagama stellio* SampleMelodi YENMİŞ¹, Dinçer AYZAZ¹¹*Department of Biology/Science Faculty, Ege University, Turkey*
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Aim of the study: This study aims to offer alternative terrarium models to lizard captivity studies. Building artificial living spaces by comparing the different methods come with stress-free individuals and this would allow the experiments to be performed accurately.

Material and Methods: Terraria were built from two different materials: Glass and wood. Glass terrarium is the classical way to observe lizards in captivity; we also used wooden terrarium to increase the radius of action and to offer a new kind of living space of lizards in captivity. After the terraria was built the base filled with soil and sand, and on top of the soil rocks, gravels and plants which was brought from the habitat of the different populations were placed. For providing sun light in a regular order, UV-A and UV-B fluorescence lamps were placed. Also thermometer and hygrometer were placed to make the environment manageable. Glass terraria were called Type 1, and wooden terraria were called Type 2.

Results: Type 2 terraria are much more convenient to increase the radius of action. The individuals can climb on the sides of the terrarium, even to the cap surface. But since the all sides of the wooden terrarium were covered with perforated mesh lining managing the heat and the moisture were harder than glass terrarium.

Keywords: *Stellagama stellio*, captivity, terrarium, habitat.

PP-362

Revalidation of *Stachys glechomifolia* Nábělek (Lamiaceae, sect. *Fragilicaulis*)

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Aim of the study: *Stachys glechomifolia* Nábělek was collected by Frantisek Nábělek from Hakkari, Turkey in 1910. This species was included sect. *Fragilicaulis*. This section is divided into subsections as *Fragiles* and *Multibracteolatae*. And then, this species was made synonym of *Stachys mardinensis* (Post) R.Mill by R.Bhattacharjee. In herbarium studies, it was observed that the species differs from *S. mardinensis*. Also morphological characters revealed that these two species were different. In this study, IUCN red list category, distribution map and taxonomic status of *S. glechomifolia* are also given.

Material and Methods: During conducting research on genus *Stachys* in Herbaria, type specimen of *Stachys glechomifolia* was examined in detail. Also, this species was compared with *S. mardinensis* and morphological differences of two species were noted. Differences in morphological characters were observed such as corolla length and calyx-corolla rate between *S. glechomifolia* and *S. mardinensis*.

Results: *Stachys glechomifolia* Nábělek that was found as a synonym of *S. mardinensis* was became valid once again. The species grows on calcareous rocky slopes in Çığlı (Haşitha) village in Hakkari province. The species is suffrutescent saxatile perennials and Iran-Turan element. *S. glechomifolia* is similar to *S. mardinensis*, but it differs with its 7-14 mm (not 10-30 mm) long stem and 17-20 mm (not 12-15 mm) long corolla. *S. glechomifolia* is only known from the type locality in Turkey. Because of military zone of type locality, a comprehensive study could not be carried out.

Acknowledgements: We would like to thank TÜBİTAK KBAG (Project No: 112T139) for their financial support.

Keywords: *Fragilicaulis*, Hakkari, revalidation, *Stachys glechomifolia*, Turkey.

PP-363

Distribution and Threat Category of Endemic *Jurinea alpigena* (Asteraceae) in Turkey

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Aim of the study: The purpose of this study to report distribution and threat category of endemic *Jurinea alpigena*

Material and Methods: Between 2005 and 2007, as a part of a revisional study of *Jurinea* in Turkey, the author carried out extensive field studies and herbaria and collected a enough number of specimens. In the field, the specimens' GPS coordinates, habitat and relevant field observations were recorded. IUCN threat category was given.

Results: The genus *Jurinea* is one of the larger genera within Asteraceae, comprising about 200 species. *Jurinea* is naturally distributed in central Asia, Turkey, Iran and the Mediterranean region. *Jurinea* has 23 species within the Mediterranean and Irano-Turanian phytogeographic regions of Turkey. *Jurinea alpigena* is endemic in Turkey. It grows in Black Sea region. The present study reviews the chorology of the *Jurinea alpigena* in Turkey based on recent taxonomic revision and available specimen data.

Acknowledgements: I express my thanks to TUBITAK (Project no. 105T355) for financial support.

Keywords: *Jurinea alpigena*, Endemic, Turkey.

PP-364

Determination of Chemical Composition and Antimicrobial Activity of *Vitex agnus castus* L. Fruits Essential Oils grown under Aydın Ecological Conditions

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Aim of the study: In this study, antimicrobial effects of essential oils obtained from fruits *Vitex agnus-castus* L. plant distributed in Aydın ecological conditions were evaluated by using well method and disc diffusion method.

Material and methods: *Vitex agnus-castus* fruits were collected as study materials in September-October 2015 from Aydın-Koçarlı roadside. Essential oils of the fruits obtained with Clevenger apparatus. Essential oil composition of *V.agnus-castus* was determined with Gas Chromatography-Mass Spectrometry (GC-MS) device. The essential oils antimicrobial activity were tested by pathogen microorganisms; MRSA (Methicillin-resistant *Staphylococcus aureus*), *Staphylococcus aureus* ATCC 6538, *Pseudomonas aeruginosa*, *Enterococcus faecium* DSM 13590, *Escherichia coli* Q157:H7 and *Bacillus cereus* CCM99.

Results: According to the chemical composition analysis, totally 157 components were detected. 1.8 cineole (8.24%), propanamide (6.07%), bicyclogermacrene (5.51%), sabinene (5.37%), maleimide (5.28%), trans- β -farnesene (4.45%), α -pinene (3.98%) were detected as the major components. Antimicrobial activity analysis showed that zone diameters of the well and disc diffusion method were between 5.5 to 28 mm, and between 3.5 to 36 mm respectively. The highest resistance zone by the well method was against *Pseudomonas aeruginosa* with 28 mm diameter while against *Staphylococcus aureus* with 36 mm diameter.

The least resistance zone by the well method was against Methicillin-resistant *Staphylococcus aureus* with 5.5 mm diameter while against Methicillin-resistant *Staphylococcus aureus* with 3.5 mm diameter. As a result, it was concluded that the essential oils obtained from the plant fruit had inhibitory effect on the microorganisms by both antimicrobial activity methods.

Keywords: GC-MS, essential oil, antimicrobial activity *Vitex agnus-castus*, Turkey.

PP-365

Distribution and Threat Category of Endemic *Klasea kotschy* (Asteraceae) in TurkeyBekir DOĞAN¹, Ahmet DURAN²¹*Necmettin Erbakan University, A. K. Education Faculty, Department of Science Education, Konya, Turkey*²*Selçuk University, Science Faculty, Department of Biology, Konya, Turkey
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Aim of the study: The purpose of this study to report distribution and threat category of endemic *Klasea kotschy*.

Material and Methods: Between 2009 and 2012, as a part of a revisional study of *Klasea* in Turkey, the authors carried out extensive field studies and herbaria and collected a enough number of specimens. In the field, the specimens' GPS coordinates, habitat and relevant field observations were recorded. IUCN threat category was given.

Results: The genus *Klasea* is one of the larger genera within Asteraceae. *Klasea* is naturally distributed in central Asia, Turkey, Iran, Mediterranean region, China, Himalayas, SE Europe and Russia. *Klasea* has 15 species within the Mediterranean and Irano-Turanian phytogeographic regions of Turkey. *Klasea kotschy* is endemic in Turkey. It grows in Bitlis province. The present study reviews the chorology of the *Klasea kotschy* in Turkey based on recent taxonomic revision and available specimen data.

Acknowledgements: We express our thanks to TUBITAK (Project no. 109T243) for financial support.

Key words: *Klasea kotschy*, Endemic, Turkey.

PP-366

Determination of the Chemical Composition and Antimicrobial Activity of the Essential oils of Some Labiatae Species Grown Under Aydın Ecological ConditionsEmre SEVİNDİK¹, Çiğdem YAMANER¹, Muavviz AYVAZ¹, Cemal KURTOĞLU¹, Hüseyin UYSAL¹ Murat Kemal AVCI¹, Ayhan DAĞDELEN²¹Faculty of Agriculture, Department of Agricultural Biotechnology, Adnan Menderes University, South Campus, Çakmar, Aydın, Turkey²Department of Food Engineering, Faculty of Engineering and Architecture, Balıkesir University, Balıkesir, Turkey

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Aim of the study: In this study, chemical composition and antimicrobial activity of the essential oils some Labiatae (*Teucrium polium* L, *Origanum onites* L, *Mentha spicata* L.subsp. *temontosa* (BRIQ.) HARLEY, *Mentha pulegium* L., and *Thymbra spicata* L.var. *spicata*) towards some pathogens (gram + and gram -) microorganisms were investigated.

Material and methods: Aerial parts of the plants were collected as study materials in July and September 2015, which are their blooming periods from Aydın and its surroundings. Extractions were carried out with Clevenger apparatus and essential oil composition was determined by Gas Chromatography-Mass Spectrometry (GC-MS). Microorganisms used for the antimicrobial studies were Methicillin-resistant *Staphylococcus aureus* (MRSA), *Staphylococcus aureus* ATCC 6538, *Pseudomonas aeruginosa*, *Enterococcus faecium* DSM 13590, *Escherichia coli* Q157:H7 and *Bacillus cereus* CCM99.

Results: According to the results; *O. onites* and *T. spicata* var. *spicata* were found to be rich in carvacrol, (37.06% and 29.33%, respectively), and *M.pulegium* and *M.spicata* subsp. *spicata* were found to be rich in piperitenone oxide (72.77% and 28.84 %, respectively) and *T.polium* was found to be rich in germacren D (8.10%). Each of the essential oils was found to possess some antimicrobial properties by disc diffusion method. Essential oils obtained from five plants showed positive effect on all microorganisms. The most effective oils were those of *O. onites* and *T.spicata* var. *spicata*.

Acknowledgements: This research was supported by the TÜBİTAK 2209-A (Project no: 1919B011500907).

Keywords: GC-MS, essential oil, antimicrobial activity, Labiatae, Turkey.

PP-367

Amphibian, Reptile and Mammal Diversity of the Selimiye Dam and Its Surroundings (Yenişehir, Bursa)Pınar ÇAM¹¹*Department of Biology, Sinop University, Sinop*
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Aim of the study: This study aimed to identify wild life species (except Avian fauna) diversity of Selimiye Dam and its surroundings. Determination of the diversity will allow the monitoring of anthropogenic effects on the wild life.

Material and Methods: In this study, field and observational study was conducted during 2015, in different habitats in Selimiye Dam and its surroundings. During the field work, optical devices (cameras, telescopes) and *global positioning system devices* has been used. Live capture traps for capture small mammals and mist- net mechanism for capture bats and landing net for amphibians has been used. Individuals captured were released back to nature after species identification. Moreover, determination of wild life species has been used for animal tracks (footprint, feces etc.).

Results: This study documents the results of a one year, field study of these organisms conducted Selimiye Dam and its surroundings in Yenişehir, Bursa. A total of 18 species of amphibians, reptiles and small mammals were collected by trapping. Other species can not be trapped, observed and photographed. A total of 13 amphibian and reptile species and 9 mammal species were either collected or observed at the study area. This research resulted in the terrestrial and aquatic biotope of Selimiye Dam and its surroundings, is likely to spread 22 species were identified. This species belong to the following orders; Anura (Amphibia) (3 species), Testudinata (Reptilia) (1 species), Squamata (Reptilia) (9 species), Rodentia (Mammalia) (5 species), Chiroptera (Mammalia) (1 species), Lagomorpha (Mammalia) (1 species), Carnivora (Mammalia) (1 species) and Erinaceomorpha (Mammalia) (1 species). Wild life fauna of Selimiye Dam and its surroundings, evaluated by IUCN category. All species of study area are the LC (low risk, widely distributed) category. There are no endemic species.

Acknowledgements: This study was supported by Republic of Turkey Ministry of Forestry and Water Affairs. I wish to thank Esra TAŞ for her help in field work.

Keywords: Wildlife biodiversity, Selimiye Dam, Bursa.

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Molecular Characterisation of *Blastocystis* spp. in water samples collected from Yesilirmak River and Tersakan StreamZeynep KOLÖREN¹¹Ordu University, Faculty of Arts and Sciences, Department of Biology, Ordu
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Aim of the study: The aim of this study to perform molecular characterisation of *Blastocystis* spp. in water samples collected from Yesilirmak River and Tersakan Stream in Samsun and Amasya.

Material and Methods: One hundred twenty water samples were collected from 10 sampling sites in the investigated area on a monthly basis in the period between September and August 2011. All water samples were flocculated by Al₂(SO₄)₃ and the water pellets are purified by sucrose gradient method. DNAs were extracted from the purified pellets and they were used for SSU rDNA gene of *Blastocystis* PCR. Phylogenetic tree was performed by comparing all data sets between our sequences and the small subunit (SSU) rRNA references sequences from GenBank by Bioedit and MEGA version 5.05.

Results: Six of 120 (5%) environmental water samples were positive for *Blastocystis*. The water samples from Tersakan-Havza (A-1), Tersakan-Suluova-Celtek (A-2), Tersakan-Kanlıdere (A-3), Bogazkoy (A-4), Tersakan-Karasu (A-5), and Tersakan-Ist (A-6) sampling sites were found positive for the contamination of *Blastocystis*. Phylogenetic analysis showed that positive samples A-1 and A-2 were placed in the same lineage with subtypes 1 (ST-1) when A-3, A-4, A-5 and A-6 were similar with subtypes 3 (ST-3). Yesilirmak River was found to be used for drinking water, irrigation of agricultural land and using daily needs in Samsun and Amasya. The insufficient wastewater treatment plants has been observed in investigated area. The sewage water without being subjected to any treatment especially in Havza and Suluova Boroughs reach Tersakan Stream and pollution of this stream continues throughout the year with the addition of rainwater. This is the first study detecting of *Blastocystis* spp. in investigated area.

Acknowledgment: The author thanks Prof. Dr. Funda Dođurman-AI from Faculty of Medicine in Gazi University for providing *Blastocystis* subtypes.

Keywords: *Blastocystis* spp., Molecular Phylogeny, Amasya

PP-369

ISSR Fingerprinting of Some Turkish *Petrorhagia* (Caryophyllaceae) TaxaMuhip HİLOOĞLU¹, İlham ERÖZ POYRAZ², İsmail POYRAZ³, Ebru ATAŞLAR⁴, Emel SÖZEN¹¹Department of Biology, Faculty of Science, Anadolu University, Eskişehir, Turkey²Department of Pharmaceutical Botany, Faculty of Pharmacy, Anadolu University, Eskişehir, Turkey³Department of Molecular Biology and Genetics, Bilecik University, Bilecik, Turkey⁴Department of Biology, Eskişehir Osmangazi University, Eskişehir, Turkeymhilooglu@anadolu.edu.tr

Aim of the study: DNA markers were preferable to overcome the problems that are associated with phenotype-based classification. Among these, Inter-simple sequence repeats (ISSRs) is a simple and inexpensive technique and has been used in various fields of plant research including genetic relationship studies. *Petrorhagia* (Ser.) Link genus represented by 10 species which of 4 were endemic in Turkey. Along with this study, genetic relationships between nine *Petrorhagia* taxa, namely, *P. alpina* subsp. *alpina*, *P. alpina* subsp. *olympica*, *P. cretica*, *P. dubia*, *P. lycica*, *P. pamphylica*, *P. peroninii*, *P. prolifera* and *P. saxifraga* were estimated by using ISSR analysis.

Material and Methods: Plant samples for each species of *Petrorhagia* were collected at different locations from Turkey. Five individuals from each taxon were selected, so 45 individuals were used for DNA isolation along with two outgroup species (*Oryza sativa* and *Velezia rigida*). Genomic DNA was isolated the modified CTAB method. DNA quantifications and the purity were determined by Nanodrop spectrophotometer (260/280nm) and electrophoresis on 0.8% agarose gel. The final concentration of each DNA sample was diluted to 2 ng/ μ L. 24 ISSR primers were initially screened and 10 of the primers that produced clear and reproducible fragments were used: GAG(CAA)₅, VHV(GT)₇G, (GT)₈YC, (AG)₈T, (AG)₈C, (AC)₈C, (AGC)₆G, (AGC)₆C, BDB-(ACA)₅, DD-(CGA)₅. PCR reactions were made by using Techne TC-5000 gradient thermal cycler. PCR products and molecular marker (100bp DNA ladder, Fermantas) were loaded on 1.2% agarose gel and run at 90 volt for 50 minutes. A binary matrix was produced by scoring each amplified fragment as present (1) or absent (0) from each individual. The matrix was used to produce an input file and analyzed using the software programs; POPGENE 1.32, GenAlex, Mega and PAUP4.

Results: ISSR amplifications using ten primers generated a total of 409 well repeatable DNA fragments (ranged between 200 and 2500bp) from forty five individuals of nine *Petrorhagia* taxa. 112 bands (27,38%) were found to be species-specific. The lowest pairwise genetic distance was obtained between *P. alpina* subsp. *alpina* and *P. alpina* subsp. *olympica* (0.0336) at the subspecies level and between *P. dubia* and *P. peroninii* (0.0430) at the species level. The nine taxa were grouped into two major clusters by UPGMA analysis based on Nei's genetic distance along with two outgroup species, *Oryza sativa* and *Velezia rigida*. As expected, the outgroup species were clustered separately from the *Petrorhagia* taxa. Excluding outgroup species the dendrogram consisted of two main clusters. Cluster I included only *P. lycica* and cluster II contained all other *Petrorhagia* taxa which were further grouped in two sub-clusters. While *P. prolifera* and *P. saxifraga* constituted the first sub-cluster, the rest of *Petrorhagia* taxa (*P. alpina* subsp. *alpina*, *P. alpina* subsp. *olympica*, *P. cretica*, *P. dubia*, *P. peroninii* and *P. pamphylica*) formed the second sub-cluster. The study showed that ISSR markers are useful in species identification and determination of the genetic relationships between *Petrorhagia* species.

Acknowledgement: This study was supported by ESOĞÜ Scientific Research Found, Project No: 200319054.

Key words: Caryophyllaceae, *Petrorhagia*, ISSR, Genetic relationship

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ISSR-PCR Optimisation for Endemic *Teucrium leucophyllum* Montbret & Aucher ex Bentham.(Lamiaceae)Muhip HİLOOĞLU¹, Emel SÖZEN¹, Ali KANDEMİR²¹Department of Biology, Faculty of Science, Anadolu University, 26470, Eskisehir, Turkey²Department of Biology, Faculty of Science and Art, Erzincan University, 2400, Erzincan, Turkey
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Aim of the study: *Teucrium leucophyllum* (Lamiaceae) is endemic species having considerable narrow distribution in Erzincan (Turkey) region. According to the IUCN criteria, this species was evaluated as EX for many years. However, it has been rediscovered from its original localities. Estimation of genetic variation levels in endangered species is crucial to develop reliable conservation strategies. Inter simple sequence repeats (ISSR) have been widely used to research genetic diversity and individual differences. In this study, ISSR protocol was optimized for *Teucrium leucophyllum* based on concentrations of primer, MgCl₂, dNTP, template DNA and suitable ISSR primers were determined.

Material and Methods: A total of 81 plants were sampled from four populations (37°45' D, 43°67' K, 920-1300m). The distance between sampled plants was at least 10 m. The fresh leaves were placed in plastic bags containing silica gel and transferred to the laboratory. One individual from each population are randomly selected to ISSR-PCR optimisation. Genomic DNA was isolated using the CTAB method. The quantity and quality of DNA were determined by using a Nanodrop spectrophotometer and agarose gel electrophoresis. DNA samples were diluted to 2.5 ng/μL and stored at -20°C until PCR analyses. 45 ISSR primers were initially screened with different concentration of MgCl₂ (1-3 mM), template DNA (2-10 ng), dNTP (2.5-10 mM) ve ISSR primers (2.5-10 μM). PCR reactions were performed in a final volume of 25 μL and conducted in ABI gradient thermocycler using the following thermal profile: 3 min of predenaturation at 94°C, 40 cycles of 45 s at 94 °C, 45 s at the annealing temperature of 50°C to 64°C depending on the ISSR primers, 1 min at 72°C, with a final extension at 72°C for 5 min. The amplification products were separated on 1.4 % agarose gel containing EtBr at 90V for 70 min and digitally photographed.

Results: ISSR primer optimization is a procedure that needs to be repeated for each different plant species. In this study, among forty five ISSR primers tested, ten of them produced faint or no polymorphic bands and fifteen primers produced no bands. Rest of twenty primers produced clear and reproducible fragments: GAG(CAA)₅, VHV(GT)₇G, (GA)₈YC, (GA)₈T, (AG)₈T, (AC)₈C, (AGC)₆G, DBD(AC)₇, (AG)₈YT, (TG)₈A, (GACA)₄, (GTTC)₄, (GGAT)₄, (GGGTG)₃, (CT)₈G, (TC)₈C, (CA)₈RC, (ACC)₆, (AGC)₆, (CTC)₆. For PCR amplifications, the satisfactory results were obtained by using 2.0 mM MgCl₂, 2.0 μM primer, 10 mM of dNTPs (2.5 mM each) and 10 ng template DNA. In conclusion, this study is the first molecular-based study for endemic *Teucrium leucophyllum* species. Optimized ISSR-PCR protocols can be easily applied in further studies concerning genetic diversity of this rare and narrow endemic species.

Acknowledgement: This study was supported by Anadolu University Scientific Research Found (Project No: 1409F389) and TÜBİTAK (Project No: 110T912).

Keywords: ISSR-PCR optimisation, *Teucrium leucophyllum*, Genetic diversity, Erzincan.

PP-371

Newly Discovered Deutonymph of *Eupalopsellus rostridius* Summers (Acari: Eupalopsellidae) from Turkey

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Aim of the study: The members of the family Eupalopsellidae are predators, and feed on spider mites, false spider mites and various scale insects. This family currently comprises five genera. The genus *Eupalopsellus* Sellnick, one of genera of this family, consists of nineteen described species. Among them, three species have been found in Turkey: *E. olandicus* Sellnick, *E. rostridius* Summers and *E. prasadi* Bagheri & Khanjani. Deutonymph stage of *E. rostridius* has been found for the first time from the Harşit Valley (Turkey). In the present work we aimed to contribute to the knowledge on mite existence and biological diversity in Turkey.

Material and Methods: The mite specimens were collected from Harşit Valley. Deutonymph and female specimens of *E. rostridius* were extracted by using Berlese funnels, cleared in 60 % lactic acid and mounted on microscopic slides in Hoyer's medium under stereo microscope. Drawings were made with the aid of a Leica DM 4000 B phase-contrast light microscope. Photos were taken with the aid of a Olympus BX63 DIC microscopes. Body size and measurements of various structures of the body were taken in micrometers (µm) with the aid of the Leica Application Suite (LAS) Software Version 3.8.

Results: With this study, three deutonymph and twelve female specimens among mite specimens in litter under *Juniperus sabina* from the valley were identified as *E. rostridius*. The description, illustrations of the deutonymph and its measurements for some body parts were made, besides the morphological characters of the females were reviewed and the females were compared with known definitions of the species, and its distribution in the world of the species was also given. Deutonymph of the species is described here for the first time.

Acknowledgements: This study was supported by the Scientific and Technological Research Council of Turkey (TÜBİTAK), research project number 113Z094.

Keywords: Mite, *Eupalopsellus*, deutonymph, description, Harşit Valley.

PP-372

Phytoplankton Communities and Ecological Status of a Small Glacial Lake in the Giresun Mountains (NE-Turkey)Beyhan TAŞ¹¹*Department of Biology, Faculty of Arts and Sciences, Ordu University, Turkey*
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Aim of the study: The Giresun Mountains have the status of important nature area, found in the north eastern Black Sea region of Turkey. There are various glacial lakes in the Giresun Mountains. In this study, trophic structure and phytoplankton communities of Lake Aygır (Lake Elmalı) where was a glacial lake with extreme conditions was investigated.

Material and Methods: Lake Aygır where is study area is 2900 meter high from sea level. In the summer of 2010 on which is non-ice covered period, sampling was performed. The samples that are collected by plankton net from surface water were fixed via 4% formaldehyde and the samples that are taken for quantitative analysis were fixed with an alkaline lugol's solution. After the sedimentation process, phytoplankton abundance was determined with Sedgewick-Rafter counting chamber. Temperature, pH, dissolved oxygen, conductivity, TDS and light transmittance from physicochemical parameters were determined *in situ*. Suspended solids, total hardness, ammonium, nitrite, nitrate, sulphate and chloride were analysed in the laboratory spectrophotometrically. Photosynthetic pigments (chlorophyll-*a*) analysis were measured spectrophotometrically after extraction with acetone 90%. Carlson's Trophic Status Index to determine the trophic status of the lake (TSI) and the OECD criteria were used.

Results: A total of 48 taxa belonging to 8 phyla were recorded in the phytoplankton of Lake Aygır. Diatoms were the group that has the highest species diversity (21 taxa, 44%). This group was followed by Chlorophyta (10 taxa, 21%). *Lindavia comensis* (Grunow) T.Nakov, Guillory, Julius, Theriot & Alverson, *Achnantheidium minutissimum*(Kützing) Czarnecki, *Lindavia bodanica* (Eulenstein ex Grunow) T.Nakov, Guillory, Julius, Theriot & Alverson and *Diatoma mesodon* (Ehrenberg) Kützing from diatoms were the dominant taxa. Diatoms were occurred percent 77% of phytoplankton density. This was followed by Chlorophytes > Cyanophytes > Ochrophytes. The trophic structure of Lake Aygır where has neutral feature is ultra-oligotrophic character in terms of TSI and OECD criteria.

Keywords: glacial lake, cirque lake, high-mountain lake, phytoplankton, trophic state

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Chemical Composition and Activity of *Origanum solymicum*Büşra ÇABAŞ¹, Tuncay DIRMENÇİ², Sema ÇARIKÇI¹, Turgut KILIÇ³, Ekrem AKÇİÇEK²¹Chemistry Department/ Faculty of Arts&Science, Balıkesir University, Turkey²Biology Education Department/ Faculty of Necatibey Education, Balıkesir University, Turkey³Science Education Department/ Faculty of Necatibey Education, Balıkesir University, Turkeydirmenci@balikesir.edu.tr

Aim of the study: The genus *Origanum* L. (Lamiaceae) was represented in Turkey 23 species (26 taxa), 14 of which are endemic and mostly grow in the Mediterranean region of Turkey. Due to their antibacterial, antifungal, insecticidal, antioxidant, and anti-carcinogenic activities, the essential oil and its chemical composition of *Origanum* species is important. In this study, essential oil, phenolic profile and biological properties such as antioxidant, antimicrobial activities of *Origanum solymicum* P.H. Davis endemic to Turkey were determined.

Material and Methods: Essential oils and phenolic components of *Origanum solymicum* were studied. The oil was obtained by hydrodistillation method and analyzed by GC-MS/MS. The plant was extracted with chloroform, acetone and methanol. The phenolic profile of the extracts was analyzed by LC-MS/MS. Anti-microbial, antioxidant activity and anticholinesterase activity of the extracts were studied.

Results: The essential oil of *O. solymicum* was consisted of thirty-one compounds. Cymene (29.6%), Carvacrol (15.2%) and γ -terpinene (12.7%) were determined as main components of the oil. The main phenolic components of the extracts were as follows: for chloroform; Salvigenin, Penduletin and Chlorogenic acid, for acetone; Rosmarinic acid, Kaempferol and Ursolic acid, for methanol-1; Rosmarinic acid, ursolic acid and Fumaric acid, for methanol-2; Gallic acid, Kaempferol and Chlorogenic acid. The chloroform and methanol extracts have weak antimicrobial activity while other extracts were not active. Except chloroform, the extracts showed remarkable antioxidant activity especially in CUPRAC assay. While the extracts did not inhibit the enzyme AChE, they inhibited BChE enzyme weakly.

Acknowledgements: The authors would like to thank TÜBİTAK for financial support to our researches (project no. 113 Z 225)

Keywords: *Origanum solymicum*, essential oil, phenolic components, antimicrobial activity, antioxidant activity, anticholinesterase activity.

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Chemical Composition of *Origanum vulgare* subsp. *vulgare* with BioactivityMerve ÖNCÜ¹, Tuncay DIRMENCI², Sema ÇARIKÇI¹, Turgut KILIÇ³, Turan ARABACI⁴¹Chemistry Department/ Faculty of Art&Science, Balıkesir University, Turkey²Biology Education Department/ Faculty of Necatibey Education, Balıkesir University, Turkey³Science Education Department/ Faculty of Necatibey Education, Balıkesir University, Turkey⁴Department of Pharmaceutical Botany, Faculty of Pharmacy, İnönü University, Malatya, Turkey
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Aim of the study:The genus *Origanum* L. (Lamiaceae) is commonly known as *oregano*. *Origanum* is represented by 23 species (26 taxa), of which 14 species are endemic in Turkey. Among 52 known taxa of *Origanum*, 50% are growing in Turkey. This high rate shows that the gene centre of *Origanum* is in Turkey. They have several biological properties. This genus is used as anti-diabetic, carminative, tonic, digestive, stimulant, expectorant, menstrual regulator, diuretic, and for respiratory problems such as asthma. In this study, the essential oil and phenolic profile of *Origanum vulgare* L. subsp. *vulgare* was investigated.

Material and Methods:The oil was obtained by hydrodistillation method and analyzed by GC-MS/MS. The plant extracted with chloroform (C), acetone (Ac) and methanol (M). The phenolic profile of the extracts was analyzed by LC-MS/MS. Also anticholinesterase activity of extracts and anti-microbial activity of the oil were studied.

Results:The essential oil of *Origanum vulgare* subsp. *vulgare* was consisted of twenty-two compounds, and Myrtenal (28.5%), Cymene (26.1%), and Terpineol- γ (11.3%) were determined as main components of the oil. The main phenolic constituents of the extracts were as follow: for C; only determined Vanillin, for Ac; Rosmarinic acid, Ursolic acid and Caffeic acid, for M-1; Rosmarinic acid, Fumaric acid and t-Ferulic acid, for M-2 Rosmarinic acid, t-Ferulic acid and p-OH Benzoic acid. The anti-microbial activity of *Origanum vulgare* subsp. *vulgare* oil showed very weak activity only against *M. smegmatis*. While the extracts did not show any inhibition against AChE enzyme, they have very weak inhibition assay for BChE .

Acknowledgements:The authors thank TÜBİTAK for supporting this study as a part of the project 113 Z 225.

Keywords: *Origanum vulgare* L. subsp. *vulgare*, Essential oil, Phenolic profile, Anticholinesterase activity, Anti-microbial activity.

PP-375

Some Geophyte Plants from OrduÖznur ERGEN AKÇİN¹, Tuğba ÖZBUCAK²¹ Department of Biology, Faculty of Science and Art, Ordu University, Ordu, Turkey² Department of Biology, Faculty of Science and Art, Ordu University, Ordu, Turkey
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Aim of the study: Plants that have an underground storage organ are called geophytes. Geophyte plants have large and glamorous flowers. Geophytes can be used as ornamental plant, medicinal plant and food. We aimed to introduce some geophytes which spread around the Ordu vicinity.

Material and Methods: Specimens were collected from different localities. Their morphological features, general information, usage areas, scientific name and Turkish name were determined. Geophyte plants were photographed.

Results: There are about 50 geophyte plants in Ordu vicinity. In this study, common 12 geophyte plants were investigated. These plants are *Anemone coronaria* L., *Galanthus fosteri* Baker, *Leucojum aestivum* L., *Cyclamen coum* subsp. *coum* Mill., *Muscari neglectum* Guss., *Ornithogalum umbellatum* L., *Arum italicum* Mill., *Helleborus orientalis* Lam., *Lilium akkusianum* R. Gamperle, *Cephalanthera kotschyana* Renz & Taub., *Cephalanthera longifolia* L. Fritsch, *Ophrys oestriifera* subsp. *oestriifera* Bieb. *Ornithogalum umbellatum* and *Arum italicum* are consumed as food. Especially *O. umbellatum* species is sold in the bazaar. The other geophytes are used as ornamental plants or medicinal plants.

Keywords: Geophyte, Ordu, ornamental plant, usage areas.

PP-376

Some Wild Edible Plants from OrduÖznur ERGEN AKÇİN¹, Tuğba ÖZBUCAK², Gülcan ŞENEL³¹ Department of Biology, Faculty of Science and Art, Ordu University, Ordu, Turkey² Department of Biology, Faculty of Science and Art, Ordu University, Ordu, Turkey³ Department of Biology, Faculty of Science and Art, Ondokuz Mayıs University, Samsun, Turkey
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Aim of the study: Many local wild plants have been used as salad and vegetable dishes prepared in traditional recipes in Turkish cuisine. Wild edible plants are very widespread in Black Sea Region of Turkey and people has been consumed wild edible plants as food. In this study, some wild edible plants which used as food in Ordu were investigated and introduced.

Material and Methods: Specimens were collected from different localities in Ordu. Their morphological features, general information, parts used, methods of using, scientific name and Turkish name were determined. Plants were photographed. We interviewed about consumed types of plants with local people most of them are middle aged or older.

Results: There are about 50-60 wild edible plants in Ordu vicinity. In this study, common 12 wild edible plants were investigated. These plants are *Trachystemon orientalis* L.G. Don, *Ornithogalum umbellatum* L., *Arum italicum* Mill., *Galega officinalis* L., *Fumaria officinalis* L., *Salvia viridis* L., *Thymus pseudopulegioides* Klokov & Des-Shost, *Malva neglecta* Wallr., *Polygonum cognatum* Meisn., *Urtica dioica* L., *Cichorium intybus* L. and *Oxalis acetosella* L. Generally leaf, stem and above-ground parts of plant are used as food. *Galega officinalis* are stewed with different plants. *Fumaria officinalis*, *Trachystemon orientalis*, *Ornithogalum sigmoideum* are consumed as roastig and pie. *Urtica dioica* are used as meal and soup. *Salvia viridis* are used as hot drink. *Thymus pseudopulegioides* are consumed as spice. *Ornithogalum umbellatum*, *Trachystemon officinalis*, *Malva neglecta* and *Polygonum cognatum* are sold in the bazaar.

Keywords: Edible plant, Ordu, Turkey, spice, food.

PP-377

Chemical Composition, Anti-Alzheimer, Anti-Microbial and Antioxidant Activity of *Stachys sivasica* Kit Tan & YıldızHasibe YILMAZ¹, Ekrem AKÇIÇEK², Ahmet Ceyhan GÖREN¹, Turgut KILIÇ³, Özal GÜNER¹
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Aim of the study:The genus *Stachys* L. (Lamiaceae) consists of approximately 370 species (435 taxa) in the world. *Stachys* species are mainly in the warm temperate regions of the Mediterranean and southwest Asia, with secondary centres in North and South America and southern Africa. *Stachys* has 91 species (118 taxa) in Turkey. 57 of these taxa are endemic to Turkey. Pharmacological studies have shown that extracts or components of *Stachys* species have considerable antimicrobial, antiinflammatory, antitoxic, antimutagenic and antioxidant effects since *Stachys* species have been used traditionally as medicinal and culinary herbs. In this study, phenolic profile of *Stachys sivasica* Kit Tan & Yıldız was investigated.

Material and Methods:The plant was cutted in small pieces and then extracted with chloroform, acetone and methanol. The plant extracted with chloroform (C), acetone (Ac) and methanol (M). The phenolic profile of the extracts was analyzed by LC-MS/MS. Also anticholinesterase activity of extracts and antimicrobial activity of the oil were studied.

Results:The main phenolic constituents of the extracts were as follow: for chloroform Chlorogenic acid, isorhamnetin, for acetone chlorogenic acid, p-coumaric acid and fumaric acid, for methanol-1 and methanol-2 chlorogenic acid, fumaric acid and p-coumaric acid.

The extracts did not show antimicrobial activity against studied microorganism. For CUPRAC method both methanol extracts and acetone extract showed very remarkable activity. In DPPH and β -carotene-linoleic acid assay, the extracts have moderate activity especially at 100 μ g/mL concentration. The chloroform extract showed very weak activity for all methods. The anti-Alzheimer activity result showed that any of the extracts have not inhibited AChE or BChE significantly.

Acknowledgements:The authors thank TÜBİTAK for supporting this study as a part of the project 112T139.

Keywords:*Stachys sivasica*, Essential oil, Anticholinesterase activity.

PP-378

Comparison of DNA extraction methods from two oribatid mites species (Acari: Oribatida) from TurkeyNuri ERCAN¹, Sedat PER², Kübra Denli³, Fahriye ERCAN⁴¹Department of Agricultural Biotechnology/Faculty of Agriculture, Ahi Evran University, Turkey²Department of Biology/Faculty of Science and Arts, Bozok University, Turkey³Department of Biology/Institute of Science, Bozok University, Turkey⁴Department of Genetic and Bioengineering/Faculty of Engineering, Ahi Evran University, Turkey
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Aim of the study: We compared four DNA extraction methods; a Chelex resin (C100), Qiagen DNA extraction kit, EZNA DNA extraction kit and Cethyl Trimethyl Ammonium Bromide (CTAB) protocol that obtained from two mite species; *Platylodes doderleini* (Berlese, 1883) and *Acrotritia ardua* (Koch, 1841) preserved in ethanol. The aim of the study is to detect the most sufficient method for obtaining DNA from these two mite species.

Material and Methods: Mite species were collected from Sakarya province (Kılıçkaya Hill). Identification of samples was done by morphologically. Alcohol (75% ethanol) conserved individual specimens were used for DNA extraction methods. The DNA quantity and DNA purity ($A_{260/280}$: 1.8-2.0 values suggest "pure DNA") were measured to compare the extraction methods with a spectrophotometer (ACTGene Micro-Spectrophotometer). In Chelex protocol, individual mites were crushed in microcentrifuge tube containing 5% Chelex® solution (Sigma) and Proteinase K (10 mg/ml) and strenuously vortexed for 10 seconds than incubated at 56°C for 30 min and 100°C for 4 minutes. Suspensions were vortexed and centrifuged at 14.000 rpm for 4 min. The DNA solution transferred to another clean tube. The genomic DNA was extracted from two mite species using Qiagen and EZNA kit following the manufacturer's instruction manual. The last method, CTAB, was performed in extraction buffer and Proteinase K (10 mg/ml). Then, individual mite homogenate incubated at 65°C for 1 h. After this step an equal volume of chloroform/isoamyl alcohol was added and precipitation of DNA was done by adding one volume of 100% cold ethanol. After centrifugation DNA pellet was washed with 70% ethanol and dried. Finally, DNA was dissolved in TE buffer.

Results: This is the first report comparing four different extraction methods for obtaining DNA from *Platylodes doderleini* (Berlese, 1883) and *Acrotritia ardua* (Koch, 1841). Different extraction methods were successful but resulted in different DNA quantity and purity. The concentration and purity of DNA were determined by measurement of optical density (OD) at 260 and 280 nm. According to these results, amount of DNA obtained by Qiagen kit was found to be the lowest yield for both species. Good quality DNA was detected with the CTAB and Qiagen kit for both species, too. Highest yield of DNA was achieved by Chelex protocol. These results can be useful for later molecular analysis as molecular diagnosis and other molecular techniques.

Keywords: *Platylodes doderleini*, *Acrotritia ardua*, DNA extraction, Chelex, Acari.

PP-379

Chemical Composition, Antioxidant and Anticholinesterase Inhibition Activity of Various Extracts of *Thymus cariensis* Hub– Mor. Jalas

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Aim of the study: The genus *Thymus* L. is a member of Lamiaceae family and represented by 318 species in the world, 40 species in Turkey and 20 of them are endemic for Turkey. *T. cariensis* is endemic species for southwestern of Turkey. The plant is named as “Kekik” in Turkey and consumed as herbal tea, spicy and folk medicine. Alzheimer’s disease, which is a progressive neurological disorder in the brain, is one of the major health problems, in industrialized countries, because of ageing populations. Up to date, pathogenesis of Alzheimer’s disease has not been fully clarified. However, the valid hypothesis being accepted is the lack of in amount of acetylcholine which is a neuromediator. Herewith, acetylcholinesterase inhibitor drugs are used for treatment of Alzheimer's disease. In this study, the chemical composition of essential oils of “*Thymus cariensis*” was analyzed. As well as chemical composition, anticholinesterase enzyme inhibition activity and antioxidant activity of the hexane, acetone and methanol extracts from the aerial parts of the plant has been studied.

Material and Methods: The aerial parts of *T. cariensis* were identified and collected from southern of Turkey (Muğla-Köyceğiz) in July 2014. Essential oil was obtained using a Clevenger apparatus from the dried aerial parts of and *T. cariensis*. In addition to, Acetylcholinesterase and butyrylcholinesterase inhibitory activity was measured, by slightly modifying the spectrophotometric method developed by Ellman et al. (1961). Antioxidant activities of the extracts were determined by β -carotene linoleic acid bleaching assay, DPPH radical scavenging activity, ABTS cation radical scavenging activity methods. Chemical compositions of the essential oils analysed by GC-FID and GC-MS.

Results: Chemical compositions of essential oils analyzed by GC and GC-MS and total 34 constituents were identified. The main components of the essential oil were Germacrene D (33,59%), carvacrol (14,86%), β - Caryophyllene (6,21%) and Borneol (6,04%). In DPPH radical scavenging, ABTS++ scavenging and β -Carotene linoleic acid bleaching assay, the methanol extract of *T. cariensis* showed the best activity ($86,20 \pm 0,81$ %, $90,83 \pm 0,22$ % and $88,67 \pm 0,15$ % at 100 $\mu\text{g/mL}$ concentration, respectively) The acetone extract of *T. cariensis* among the extracts ($51,49 \pm 0,80$ %) showed the best inhibitory activity against AChE enzyme, and followed by the methanol extract ($50,77 \pm 0,86$ %) at 100 $\mu\text{g/mL}$ concentrations. The acetone extract of *T. cariensis* ($36,57 \pm 0,85$ %) exhibited the best BChE inhibitory activity, and followed by the essential oils of *T. cariensis* ($31,8 \pm 0,60$ %) at 200 $\mu\text{g/mL}$. At the same concentrations, the galantamine showed $80,41 \pm 0,98$ % and $82,23 \pm 2,67$ % inhibitory activities, respectively.

Acknowledgements: This study is supported by a grant (BAP-13/172) from Muğla Sıtkı Kocman University Research Found.

Keywords: *Thymus cariensis*, essential oil, antioxidant activity, anticholinesterase inhibition

PP-380

Radical Scavenging Activity and Antibacterial Effect of Three *Cyclamen* L. Tuber Extracts on Some Fish PathogensRamazan MAMMADOV¹, Zeynep SAYIN², Cennet ÖZAY¹, Gülşen ULUKÖY²¹Department of Biology, Pamukkale University, Turkey²Department of Aquaculture, Faculty of Fisheries, Muğla Sıtkı Kocman University, Turkey
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Aim of the study: Geophytes which have underground storage organs such as, tubers, bulbs and rhizomes, about 600 species belonging to 26 genera have been known for the flora of Turkey. *Cyclamen* L., belonging to the Primulaceae family, is a tuberous perennial geophyte, and some taxa of this genus have been used for their biological activities in folk medicine. Antibiotics play an important role in the disease management in aquaculture; however antibiotic resistance could be problem in pathogens following antibiotic treatment. Plant extracts would play an alternative role to deal with this problem. The aim of this study was to determine the radical scavenging activity and antibacterial effect of three *Cyclamen* species on some fish pathogens.

Material and Methods: In the present study, *Cyclamen* species; *C. cilicium* Boiss. & Heldr. (endemic), *C. pseudibericum* Hildebr. (endemic) and *C. hederifolium* Aiton were collected from different localities in Turkey. The tubers of plants were air-dried and grounded to fine powder and then extracted in ethanol. Radical scavenging activities of the tuber extracts were evaluated via two methods, known as DPPH (2,2-diphenyl-1-picrylhydrazyl) free radical scavenging activity method and ABTS (2,2-Azino-bis (3-ethylbenzothiazolone-6-sulfonic acid)) radical cation scavenging activity method. Antibacterial activity of the extracts were determined *in vitro* against five bacterial fish pathogens namely, *Vagococcus salmoninarum*, *Staphylococcus epidermidis*, *Lactococcus garvieae*, *Vibrio anguillarum* and *Yersinia ruckeri*. Antibacterial activities were obtained by the disc diffusion method. The inhibitory zone of bacterial growth for each extract was measured and compared to positive and negative control.

Results: When the three *Cyclamen* L. tuber extracts evaluated, the highest radical scavenging activity was obtained from *C. cilicium* extract in both methods ABTS and DPPH, and the values were found as 55.8% and 54.3%, respectively. *C. cilicium* tuber extract also had antibacterial activity on all tested pathogenic bacteria, except *V. anguillarum*. While the tuber extract of *C. hederifolium* showed 10 mm diameter zone of inhibition against *V. salmoninarum*, *Y. ruckeri* and *L. garvieae*, *C. pseudibericum* showed 12 mm inhibition zone against *S. epidermidis*. The results showed that all the tested tuber extracts exhibited antibacterial activity mostly against Gram positive bacteria. The preliminary screening assay indicated that some of the *Cyclamen* species which have antibacterial properties may offer alternative therapeutic agents against bacterial infections in aquaculture industry.

Keywords: *Cyclamen*, ABTS, DPPH, bacterial fish pathogen, disc diffusion.

PP-381

Antioxidant activity of *Ebenus laguroides* Boiss var. *laguroides*Meryem ORAKCI, Ferda CANDAN¹, Emre KOÇ¹¹ Department of Biochemistry/ Faculty of Science, University of Cumhuriyet, Sivas/Turkey,
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Aim of the study: It may be observed that in recent years many publications were focused on screening of unstudied or less studied genera and/or individual botanical species. These studies resulted in identification of new natural compounds and selection of promising species in terms of their expected use for the isolation of bioactive constituents. The aim of this study is to investigate in vitro antioxidant effect of methanolic extract of *Ebenus laguroides* Boiss var. *laguroides*

Material and Methods: We examined the in vitro radical scavenging and antioxidant capacity of *Ebenus laguroides* by using different in vitro analytical methodologies such as 1,1-diphenyl-2-picryl-hydrazyl free radical (DPPH) scavenging, 2,20-azino-bis (3-ethylbenzthiazoline-6-sulfonic acid) (ABTS) radical and N,N'-dimetil-p- fenilendiamin (DMPD) radical scavenging activity, total antioxidant activity determination by ferric thiocyanate, total reducing ability determination using by Fe³⁺-Fe²⁺ transformation method, hydrogen peroxide scavenging and ferrous ions (Fe²⁺) chelating activities. Also, The synthetic antioxidant butylated hydroxytoluene (BHT) and natural antioxidant such as curcumin and ascorbic acid were used as positive controls.

Results: In present study, antioxidant activities of *Ebenus Laguroides* was investigated. The extracts were found to possess radical scavenging and antioxidant activities, as determined by scavenging effect on the DPPH, ABTS, DMPD and hydrogen peroxide, reducing power, chelating effect on ferrous ions and total antioxidant activity. Generally, IC₅₀ values of lower than 30 mg/ml indicated that the extracts were effective in antioxidant properties. In the present study it is found that the methanolic extract of *Ebenus laguroides* contains substantial amount of phenolics and flavonoids and it is the extent of phenolics present in this extract being responsible for its marked antioxidant activity as assayed through various *in vitro* models. Thus, it can be concluded that methanolic extract of *Ebenus laguroides* could be used as an accessible source of natural antioxidants with consequent health benefits.

Acknowledgements: This research was part of the project number F-347 supported by the Research Council of Cumhuriyet University in Sivas / Turkey.

Keywords: *Ebenus Laguroides*; antioxidant activity, radical scavenging, metal chelating, reducing power.

PP-382

***Stachys benthamiana* Boiss. (Lamiaceae); A new record for flora of Turkey**

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Aim of the study: *Stachys benthamiana* Boiss. belongs to section *Fragicaulis* in genus *Stachys*. This section has been categorized under two subsections, namely *Fragiles* and *Multibracteolatae*. This species was identified by Boissier from West Iran in 1879. The species is distributed in Iran and Iraq. *S. benthamiana* is a new record for the flora of Turkey. The species was collected from Hakkari province which is neighboring North-West Iran and North Iraq. This species is closely allied to *Stachys ballotiformis* Vatke. Description, photographs and distribution map of the species are given in this study.

Material and Methods: During fieldwork on *Stachys* species in Hakkari, we collected some species which differ from present *Stachys* species in Turkey. As a result of studies carried out at the herbarium, it is understood that the specimens were *S. benthamiana*.

Results: *Stachys benthamiana* was collected from Veregöz Valley in Hakkari province as a new record. The species are suffrutescent saxatile perennials and its stems are fragile at base. It is Iran-Turan element. The most characteristic feature of *S. benthamiana* is its dense sessile glandular hairs. *S. benthamiana* differs from *S. ballotiformis* with dense sessile glandular hairs (not glabrous) and verticillasters congested (not remote, few upper approximate). Collection of this species as a new record resulted in sect. *Fragilicaulis* to be represented 26 taxa in Turkey.

Acknowledgements: We would like to thank TÜBİTAK KBAG (Project No: 112T139) for their financial support.

Keywords: *Fragilicaulis*, *Multibracteolatae*, *Stachys benthamiana*, Lamiaceae, Turkey.

PP-383

**Total phenolic-flavonoid content and anticholinesterase activities of the
Salvia siirtica and *Salvia kurdica* from East Anatolia**Hilal Saruhan FİDAN¹, Abdulselam ERTAŞ², Mehmet BOĞA³, Mehmet FIRAT⁶,
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Aim of the study: The aim of this study was to determine the total phenolic and flavonoid content and anticholinesterase activities of *Salvia siirtica* and *Salvia kurdica*.

Material and Methods: *Salvia siirtica* and *Salvia kurdica*, which was collected from east Turkey (Hakkari and Şırnak, respectively) in May 2015. Voucher specimens were deposited in the Herbarium of Van Yuzuncu Yil University, Faculty of Science (*S. siirtica* VANF 30755, *S. kurdica* VANF32564). The anticholinesterase potential of the extracts were indicated by Ellman method. The amounts of total phenolic and flavonoid components in crude extracts were determined by expressing as pyrocatechol and quercetin equivalents, respectively. A spectrophotometric method developed by Ellman et al. was established to indicate the acetyl- and butyryl-cholinesterase inhibitory effects. Aliquots of 150 µL of 100 mM sodium phosphate buffer (pH 8.0), 10 µL of sample solution and 20 µL BChE (or AChE) solution were stirred and incubated for 15 min at 25 °C, then DTNB (10 µL) is added to mixture. In the next step, by the addition of butyrylthiocholine iodide (or acetylthiocholine iodide) (10 µL) the reaction was started. At the end, final concentration of the tested solutions was 200 µg/mL. BioTek Power Wave XS at 412 nm was used to monitor the hydrolysis of these substrates. The experiments were carried out in triplicate. Galanthamine was used as a reference compound. Total phenolic and flavonoid contents expressed as pyrocatechol and quercetin equivalents respectively, were determined as reported in the literature. The following equations were used to calculate total phenolic and flavonoid contents of the extracts: Absorbance = 0.0123 pyrocatechol (µg) + 0.0349 (R² = 0.9916), Absorbance = 0.0233 quercetin (µg) + 0.0379 (R² = 0.9975).

Results: It was determined that the studied two *Salvia* species were found to be rich in total phenolic and flavonoid content. The amount of flavonoid content has been found much higher in chloroform extracts of *S. siirtica* species (62,70±1,21 mg QEs per g dry extract) however the amount of flavonoid content has been found much higher in ethanol extracts of *S. kurdica* species (38,67±1,00 mg QEs per g dry extract). Leaf extracts from the aboveground parts of the species also was found to have a richer content. When we look at the acetylcholinesterase enzyme activity of the two species, especially chloroform extract of *S. kurdica* (Inhibition: 25,93±1,68) and ethanol extract of *S. siirtica* (Inhibition: 68,17±1,32) was found to be more active.

Acknowledgements: The research was funded by grant: KBAG 114Z801 from TUBITAK, The Scientific and Technological Research Council of Turkey.

Keywords: *Salvia*, total phenolic, total flavonoid, anticholinesterase.

PP-384

A Preliminary Study of the *Lyristes* Horvath, 1926 (Hemiptera: Cicadoidea) Species for Anatolia, TurkeyAbbas MOL^{1,2}, Deniz ŞİRİN³, Mehmet Sait TAYLAN⁴¹Health Academy, Aksaray University, Aksaray/Turkey²Science and Technology, Application and Research Center, Aksaray University, Aksaray/Turkey³Department of Biology, Namık Kemal University, Tekirdag/Turkey⁴The Society of Anatolian Speleology Group (ASPEG), Istanbul/Turkey
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Aim of the study: Species of the genus *Lyristes* Horvath 1926, show its distribution from the Iberian Peninsula in Western Europe to Greece, Turkey and also in the Middle East. Three species of the genus distributed in Turkey and these are; *Lyristes plebejus*, *L. gemellus*, and *L. isodol*. The second and third species are endemic to Turkey and the calling songs knowledge of these species is very weak. In the present study, we conducted a preliminary work for the Anatolian species of *Lyristes* using behavioural characters. So far species of the *Lyristes* songs not recorded in Middle Anatolia. For aimed this, we recorded calling songs of three Anatolian species for the genus.

Material and Methods: This study was carried out 2015 in Eastern Mediterranean and Middle Anatolia in Turkey. We recorded calling songs of *Lyristes plebejus* (Scopol) in Tokat, *L. gemellus* Boulard in Konya, and *L. isodol* Boulard in Adana. During the field works, the songs of the *Lyristes* specimens were recorded and then specimens were collected by a sweep net. The first two songs recorded by first author the other second author. All specimens were identified by comparing with morphology and calling songs characters which were given in literature. All song records were carried out by Tascam Dr-100 recorder using Philips-SBC ME 570 condenser microphone. The microphone was kept about 5-15 cm away from the calling male and after recording surrounding temperature noted. The male songs were digitalized at 48000 Hz and analysed with Cool Edit and Turbo Lab 4.0 (Stemmer AG).

Results: Totally, five males of *Lyristes* spp. were studied from three populations. Analyses of song *Lyristes plebejus*, *L. gemellus*, and *L. isodol* always found allopatry. The songs of this genus has a complex structure. The songs of the species consists of phrases and echemes. A phrase lasting 10.50-16.40 sec, 8.60-14.70 sec, and 10.60-17.00 sec. for *L. plebejus*, *L. gemellus* and *L. isodol* respectively. Number of the syllables for per second are; 10-11.5, 4.0-6.5, and 11.0-13.5 for *L. plebejus*, *L. gemellus* and *L. isodol* respectively. The last echeme duration is; 2250-2600, 850-1900, and 950-1350 msec. for *L. plebejus*, *L. gemellus* and *L. isodol* respectively. Previous literatures reported that the frequency spectra are; 6.4-7.4 kHz, 4.5-5.6 kHz, and 5.4-7.75 kHz for *L. plebejus*, *L. gemellus* and *L. isodol* respectively. The alarm song of *L. plebejus* consists of irregular echemes. Our data revealed that, *L. plebejus* and *L. isodol* shows similarity, for phrases duration, number of the syllables for per second and the frequency spectra, while the *L. gemellus* and *L. isodol*, shows similarity for the last echeme duration.

Keywords: Hemiptera, Cicadidae, *Lyristes*, calling songs, Anatolia.

PP-385

Some Oribatid Mites (Acari) from the Harşit Valley (Turkey)Nusret AYYILDIZ¹, Ayşe TOLUK¹, Abdulkadir TAŞDEMİR², Mehmet TAŞKIRAN¹, Büşra ARIK²¹Department of Biology, Faculty of Science, Erciyes University, Turkey²Department of Biology, Institute of Natural and Applied Sciences, Erciyes University, Turkey
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Aim of the study: In order to contribute to the knowledge of the oribatid mite fauna of Turkey, the mites inhabiting in the Harşit valley were evaluated from the taxonomic point of view, based on samples collected between 2013 and 2015.

Material and Methods: In the extraction of mites from soil, litter, moss and lichen collected from the investigation area was used a Berlese-Tullgren funnel extractor. Extracted mites were killed, fixed and stored in 80% ethanol. The light and scanning electron microscopes (SEM) were used to examine mites. The compound microscopic examinations of specimens were made in lactic acid, mounted in temporary cavity slides. Scanning electron microscope images of all determined taxa were taken.

Results: In the present study, three species of oribatid mites, namely *Tricheremaeus serratus* (Michael, 1885), *Zetorchestes flabrarius* Grandjean, 1951 and *Oribatella (O.) nigra* Kulijev, 1967, were identified as new records for the Turkish fauna from the investigation area. Moreover, three species, namely *Platynothrus peltifer* (C. L. Koch, 1839), *Gustavia fusifer* (Koch, 1841), *Scutovertex sculptus* Michael, 1879 were determined as a previously reported from Turkey. In conclusion, the morphological features of the examined taxa were given along with the SEM images.

Acknowledgements: We are grateful to Dr Salih DOĞAN and researchers of Department of Biology, Erzincan University (Turkey), for their help with collecting mites.

Keywords: Oribatid mites, new records, Harşit valley, Turkey.

PP-386

New Records of Oribatid Mites (Acari) from Yozgat and Sakarya Provinces (Turkey)Sedat PER¹, Ayşe TOLUK², Kübra DENLİ³, Nusret AYYILDIZ²¹Department of Biology, Faculty of Art and Science, Bozok University, Yozgat, Turkey²Department of Biology, Faculty of Science, Erciyes University, Kayseri, Turkey³Department of Biology, Institute of Natural and Applied Sciences, Bozok University, Yozgat, Turkey
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Aim of the study: In order to contribute to the oribatid fauna of Turkey, two oribatid mites were evaluated by scanning electron microscope, based on samples collected from Yozgat and Sakarya provinces in 2014 and 2015.

Material and Methods: In the extraction of mites from soil samples collected from the investigation area was used a Berlese-Tullgren funnel extractor. Extracted mites were killed, fixed and stored in 80% ethanol. The light and scanning electron microscopes (SEM) were used to examine mites. The compound microscopic examinations of specimens were made in lactic acid, mounted in temporary cavity slides. Scanning electron microscope images of all determined taxa were taken.

Results: As a result of the evaluation of the examined mite samples, two species belonging to the genera *Cepheus* Koch, 1835 and *Lopheremaeus* Paschoal, 1987 were determined. These species, *Cepheus caucasicus* Sitnikova, 1975 and *Lopheremaeus laminipes* (Berlese, 1916) are new records for the Turkish fauna. In conclusion, their morphological features were reviewed along with the SEM images based on our samples.

Keywords: Oribatid mites, *Cepheus*, *Lopheremaeus*, new records, Turkey.

PP-387

Intron Analysis and Expression Pattern of *IF4E* gene from OliveSümeyye ALTUNOK¹ and Ekrem DÜNDAR²¹*Institute of Science, Balıkesir University, Turkey*²*Department of Molecular Biology and Genetics,
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Aim of the study: In this study, molecular characterization of olive (*Olea europaea* L.) putative eukaryotic translation initiation factor 4E (*OelF4E*) has been conducted with respect to intron analysis and (temporal and spatial) expression pattern. Determining the genomic and cDNA nucleotide sequence of the gene and detailed bioinformatic analyses including cellular location, hydropathy analysis, amino acid composition and predicted three dimensional structure were also conducted.

Material and Methods: In this study we used to bioinformatic tools such as nucleotide and protein BLAST, BioEdit, Primer3, FinchTV, CLC Genomic Workbench, ExPASy, TargetP, SOSUI, Web Promoter Scan. Expression levels of the gene in various olive tissues (and at different times) were determined by qRT-PCR (Real-time PCR). For determining its promoter, UTRs, exon and intron regions, cDNA sequenced were compared to genomic sequences amplified with the same primers that amplify the full length cDNA. Biochemical characterization with respect to enzyme activity, SDS and Western Blot analyses are being continued.

Results: A cDNA clone identified from a cDNA library previously done in our lab were labeled a putative translation initiation factor 4E (*IF4E*) based on its DNA sequence similarity to the previously described plant *EF4E* genes. This similarity was confirmed with detailed BLAST analyses. Primers through Primer3 software were designed based on this cDNA sequence and were utilized to detect the spatial and temporal expression pattern of *OelF4E*. The results revealed *OelF4E* expressed about 30 fold more than the housekeeping gene (ubiquitin) in leaves. Comparing the “on year” and “off year” leaves, the gene appeared to express more in “on year” leaves suggesting a role in nutrition supply for fruit formation and / or fruit development. *OelF4E* cDNA was transferred into bacteria to express the protein it encodes and the protein was visualized through SDS-PAGE and Western blotting analyses which will be followed by biochemical characterization assays.

Acknowledgements: This work was supported by TÜBİTAK with grant number 110O108.

Key words: *Olea europaea* L., Bioinformatic analyzes, Eukaryotic translation initiation factor 4E, Real-time PCR, SDS-PAGE.

PP-388

Isolation and Characterisation of Blade On Petiole 1 (BOP1) Gene from OliveBüşra ÇELİKKAYA¹, Ekrem DÜNDAR¹¹Balıkesir University, College of Arts and Sciences, Department of Molecular Biology and Genetics,
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Aim of the study: *Blade On Petiole 1 (BOP1)* gene controls growth and development of lateral organs in plants. It also supports the activity of cell division and cell differentiation. In this study, we aimed the molecular characterization of olive *BOP1* gene (*OeBOP1*) with respect to polymorphism, intron determination and number of alleles in olive cultivars.

Material and Methods: A cDNA molecule isolated from a previously constructed cDNA library in our lab was labeled *BOP1* based on its sequence similarity to *BOP1* genes from various plants. *OeBOP1* was first analyzed through various bioinformatics tools to find similarities with other organisms (using BLASTn and BLASTp) and construct a phylogenetic tree, amino acid composition, cellular location and predicted three dimensional function. To detect polymorphism, genomic DNAs (gDNA) from various olive cultivars were isolated. Primers to amplify the full length genomic region from these cultivars were designed through Primer3 software. PCR was conducted to amplify *OeBOP1* from different cultivars. DNA sequences of amplified PCR products were obtained and then utilized to conduct the polymorphism, allele variation and intron analyses.

Results: Bioinformatic analysis revealed that *OeBOP1* consisted of 1260 nucleotides coding 419 amino acids. The molecular weight was predicted to be 46 kD with a pI of 5.94. When the amino acid composition was inspected, leucine, alanine and valine were seen more than than other amino acids suggesting a hydrophobic structure for the encoded protein while Kyte and Doolittle hydropathy analysis revealed the protein was hydrophilic. From these analyses it is reasonable to suggest that the protein is likely to be a membrane bound protein. Analyses to uncover the detailed function and location of the gene are continuing.

Acknowledgements: This work was supported by TÜBİTAK with grant number 110O108.

Keywords: Olive, *Olea europaea* L, BOP1, Bioinformatics methods.

PP-389

Isolation and Diversity Analysis of Olive *APETALA3* GeneÇağla İlay CAMOĞULLARI¹, Ekrem DÜNDAR¹¹Balıkesir University, College of Arts and Sciences, Department of Molecular Biology and Genetics,
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Aim of the study: *APETALA3* has been reported to be a transcription factor involved in the genetic control of flower development. It is required for normal development of petals and stamens in the wild-type flowers. The aim of this study was to characterise olive (*Olea europaea* L.) *APETALA3* gene (*OeAP3*) using bioinformatics tools, sequence alignment and phylogenetic analysis.

Material and Methods: Nucleotide Blast (BLASTn) to compare nucleotide similarities with other organisms, protein BLAST (Blastp) to find similar proteins from other organisms, and six frame translation analysis (BLASTx) to determine alternative open reading frames of the gene were conducted. After the correct nucleotide and amino acid sequences of *OeAP3* were determined, nucleotide sequences were aligned using BioEdit and the number of alleles were recorded. The aligned sequences were also used to generate a phylogenetic tree utilizing MEGA7. Another phylogenetic tree was constructed using aligned amino acid sequences from multiple *APETALA3* genes of different plants using the same software. Amino acid composition, hydropathy analysis, isoelectric point (pI) and three dimensional structure of the protein were conducted using online software at ExPASy. The primers to amplify the full length open reading frame of the gene were designed using Primer3.

Results: Amino acid composition analysis revealed that *OeAP3* contained lysine and isoleucine predominantly while hydropathy analysis suggested it was an hydrophilic protein. Isoelectric point (pI) of the protein was calculated 9.78 which was little higher than average sitoplasmic proteins. The molecular weight of the protein was calculated as 20 kDa. The phylogenetic trees constructed using nucleotide and amino acid sequences, revealed multiple variants of the gene among other plants while the number of alleles were less in protein levels comparing to that of nucleotide. Analyses continue to determine the number and type of *OeAP3* alleles in olive cultivars and the phylogenetic structure of the gene.

Acknowledgements: This work was supported by TÜBİTAK with grant number 110O108.

Keywords: Olive, *Olea europaea* L., *APETALA3*, Allele diversity, Phylogenetic analysis.

PP-390

Bioinformatic and Allele Diversity Analyses of Olive Putative Polygalacturonase (OeQRT2) GeneEbru GÖKTÜRK¹, Ekrem DÜNDAR¹¹Balıkesir University, College of Arts and Sciences, Department of Molecular Biology and Genetics,
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Aim of the study: The polygalacturonase gene (*QRT2*) in plants has been reported to be required for pollen separation during normal development. In *qrt* mutants, the outer walls of the four meiotic products of the pollen mother cell are fused, and pollen grains are released in tetrads. Identification and characterisation of *QRT2* gene from olive has not yet been reported. The aim of this study was to characterize a putative olive polygalacturonase (*OeQRT2*) gene utilising bioinformatic analyses, polymorphism analysis, allele structure analysis and phylogenetic analysis.

Material and Methods: One of the clones isolated from a previously constructed cDNA library in our lab was analyzed and determined to be a homolog of *QRT2* gene based on its sequence similarity to *QRT2* genes from other plants. After the similarity was determined, further bioinformatic characterization was conducted through BLASTn, BLASTp, BLASTx and other similarity search programs of NCBI. Phylogenetic position of *OeQRT2* among other plants was conducted by aligning *QRT2* sequences of other plants via BioEdit program and generating the genetic tree using MEGA7 software. Primers to amplify *OeQRT2* from olive cultivars to detect polymorphism and multiple alleles were designed using Primer3 software. Cellular localization, glycosylation, amino acid composition, isoelectric point and molecular weight calculations were conducted using software in ExPASy.

Results: The nucleotide composition of *OeQRT2* was similar to most plant genes with an AT% of 60.47 while the amino acid composition analysis revealed a 40 kD protein (368 amino acids) with glycine and asparagines ratios were more than other amino acids. Hydropathy analysis, however, suggested *OeQRT2* was a hydrophobic protein and hence the high amount of hydrophilic amino acids (glycine and asparagines) may point the functionally different domains of the protein. The sequence alignment analysis revealed multiple SNPs and alleles of *OeQRT2* among other plants. Primers to amplify *OeQRT2* from multiple olive cultivars were synthesized and the investigations continue to detect *OeQRT2* alleles among olive cultivars.

Acknowledge: This work was supported by TÜBİTAK with grant number 110O108.

Keywords: Polygalacturonase (*QRT2*), *Olea europaea* L., Bioinformatic analyses, Blast (NCBI), Phylogenetic tree.

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Bioinformatic Analysis, Polymorphism and Allele Diversity of Olive Putative Connexin GeneSümeyye ALTUNOK¹, Ekrem DÜNDAR¹,¹Balıkesir University, College of Arts and Sciences, Department of Molecular Biology and Genetics,
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Aim of Study: Connexins are proteins that are found in animal gap junctions that are specialized type of tight connections between membranes of adjoining animal cells. Plants also have specialized connections between cells called plasmodesmata, and although they are morphologically different from animal gap junctions, interactions between cells share some common features between plants and animals. Connexins from plants, however, have not been reported widely and therefore characterization of an olive connexin (OeCnxn) will be a significant contribution to the molecular biology. Therefore the aim of this study was to characterize olive OeCnxn with respect to bioinformatics, polymorphism and allele diversity.

Material and Methods: To confirm the homology with plant connexins, BLAST analyses with nucleotide and protein databases (BLASTn, BLASTp, BLASTx) were conducted via NCBI. Nucleotide and amino acid compositions, molecular weight and isoelectric point of OeCnxn were done using BioEdit program. Phylogenetic trees from nucleotide and amino acid sequences were generated using MEGA7 and an online software (www.phylogeny.fr). To determine the polymorphism and allele diversity, primers to amplify the full length OeCnxn were designed using Primers3. Hydropathy analysis, cellular localization, and three dimensional structure were calculated using software at ExPASy.

Results: Translation of the cDNA sequence with BioEdit revealed 403 amino acid with an isoelectric point (pI) of 9.40, and a molecular weight of about 45 kDa. As most plant genes, OeCnxn had a higher AT rate comparing to GC content. According to amino acid composition analysis, proline (an hydrophobic imino acid) was found to be the most abundant amino acid. As expected, hydropathy analysis of the protein appeared to be hydrophobic pointing the possibility of at least some hydrophobic packets of the protein. This is in fact in accordance with its possible role as a membrane interacted protein. Amplifying OeCnxn sequences from multiple olive cultivars and determining polymorphism along with number and types of alleles are in progress.

Acknowledgements: This work was supported by TÜBİTAK with grant number 110O108.

Keywords: Olive, *Olea europaea* L., BLAST analysis, Connexin, Plasmodesmata.

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Bioinformatic Analysis and Allele Diversity of putative Olive PISTILLATA GeneHena DİZMEN¹, Ekrem DÜNDAR¹¹Balıkesir University, College of Arts and Sciences, Department of Molecular Biology and Genetics,
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Aim of the study: PISTILLATA participates in formation of petals and stamens in plants. It is a B-class floral organ identity gene required for the normal development of petals and stamens in *Arabidopsis*. PISTILLATA expression is induced in the stage 3 flowers (early expression) and is maintained until anthesis (late expression). By far, there is no report describing PISTILLATA gene in olive. In this study, we aimed to gather information about olive PISTILLATA gene (OePIST) function for the first time.

Material and Methods: Nucleotide BLAST (to find the similarity of genes in different organisms), protein BLAST (BLASTp and BLASTx to find the similarity of proteins in different organisms), BioEdit (to build the predicted protein, to prepare a hydropathy graph, to prepare graphs of amino acid composition and nucleotide composition), Phylogenetic analysis (to make a phylogenetic trees from the nucleotide sequence and from the predicted amino acid sequence), ExPASy software (to find isoelectric point and molecular mass of the predicted protein), and Primer3 (to design primers) program were utilized to conduct the analyses.

Results: BLAST analyses revealed OePIST had a diverse sequence structure among other plants. Amino acid composition analysis revealed OePIST was 24 kDa and it had 210 amino acids with a high leucine and lysine ratios. Its theoretical isoelectric point (pI) was calculated to be 6.18. Primers to amplify the full length sequence of OePIST were designed using Primer3 software. Phylogenetic analyses based on nucleotide and amino acid sequences revealed genetic trees that grouped plants based on OePIST. OePIST sequences from different olive cultivars are being obtained to determine the numbers and types of different alleles among olive cultivars.

Acknowledgements: This work was supported by TÜBİTAK with grant number 110O108.

Keywords: Olive, *Olea europaea* L., PISTILLATA, Bioinformatic analyses.

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Identification, Molecular Characterization and Allele Diversity of Late Embryogenesis Abundant (LEA) Protein from OliveMünevver NURÇİN¹, Ekrem DÜNDAR¹¹Balıkesir University, College of Arts and Sciences, Department of Molecular Biology and Genetics,
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Aim of the study: LEA proteins are mainly low molecular weight (10-30 kDa) proteins involved in protecting higher plants from damage caused by environmental stresses, especially drought (dehydration). LEA genes are of great value due to the potential to generate drought tolerant varieties in agriculture, and hence their characterization forms the basis of search for anti-drought inducible. LEA gene from olive, however, has not been characterized yet. The aim of this study was to conduct the molecular characterization of an olive late embryogenesis abundant gene (OeLEA) with respect to cDNA sequence, amino acid composition, intron analysis and allele diversity.

Material and Methods: A clone from an olive cDNA library constructed in our laboratory was analysed and found to be a homolog of LEA genes from other plant. To find similarities with other organisms based on this sequence (BLASTn and BLASTp) and to make phylogenetic trees (with nucleotide sequence and amino acid sequence), homologous sequences retrieved from GenBank, aligned with BioEdit program and phylogenetic trees constructed using MEGA7. Nucleotide composition, amino acid composition, isoelectric point and molecular weight calculation were conducted using BioEdit. Hydropathy analysis, cellular localization, three dimensional structure and glycosylation analyses were conducted using ExPASy software. Primers to amplify the full length cDNA sequence or around 1kb region of the genomic clone were designed using Primer3 software and obtained from Macrogen (Seul, Korea). Genomic DNA isolation, PCR and sequencing experiments are ongoing to detect the numbers and types of different alleles among olive cultivars.

Results: BLASTn and BLASTx results retrieved LEA genes from other plants further confirming OeLEA as a putative late embryogenesis abundant family protein. Phylogenetic analysis based on nucleotide sequences generated more clades than that of amino acid sequences probably due to the fact that amino acid polymorphisms are generally lesser than nucleotide polymorphisms. Amino acid composition analysis revealed 153 amino acids for OeLEA with a molecular weight of 16 kDa and an isoelectric point (pI) of 5.61. Kyte&Doolittle hydropathy analysis suggested OeLEA was a hydrophilic protein with no amino acids prominently abundant than others. On the contrary of many plant genes, OeLEA was determined to have a higher GC ratio than that of AT. Analyses to determine number and types of introns, polymorphism among olive cultivars, multiple allele types and numbers are continuing.

Acknowledgements: This work was supported by TÜBİTAK with grant number 110O108.

Keywords: Olive, *Olea europaea* L., LEA genes, Bioinformatics analysis.

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Chemical profile of two *Salvia* species by using LC-MS/MSMustafa Abdullah YILMAZ¹, Hilal Saruhan FİDAN², Abdulselam ERTAŞ³, Mehmet BOĞA⁴, Mehmet FIRAT⁵, Hamdi TEMEL¹¹Department of Pharmaceutical Chemistry, Faculty of Pharmacy, Dicle University, Turkey,²Department of Biochemistry, Faculty of Pharmacy, Dicle University, Turkey³Department of Pharmacognosy, Faculty of Pharmacy, Dicle University, Turkey,⁴Department of Pharmaceutical Technology, Faculty of Pharmacy, Dicle University, Turkey,⁵Department of Biology, Faculty of Education, Yüzüncü Yıl University, TURKEY

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Aim of the study: In this study, secondary metabolic profile of ethanol extracts of *Salvia siirtica* and *Salvia kurdica* were determined using LC-MS/MS. A comprehensive LC-MS/MS method validation was developed for the qualitative and quantitative analysis of 37 phytochemicals including 15 Phenolic acids, 17 flavonoids, 3 nonphenolic organic acids, 1 phenolic aldehyde and 1 penzopyrane.

Material and Methods: Preparation of plant extracts for LC-MS/MS: The powdered plants (stems, leaves, flowers, roots and mixed parts) were extracted three times with ethanol (50 mL each) at room temperature for 24 h. Afterwards, the extracts obtained were combined, filtered and evaporated under low pressure. Dry filtrates were reconstituted in ethanol at a concentration of 250 mg L⁻¹ and filtered through the 0.2 µm PTFE filter prior to LC-MS/MS analysis. Instruments and chromatographic conditions for LC-MS/MS: LC-MS/MS analyses of the phenolic compounds were performed by using a Nexera model Shimadzu UHPLC coupled to a tandem MS instrument. The liquid chromatograph was equipped with LC-30AD binary pumps, DGU-20A3R degasser, CTO-10ASvp column oven and SIL-30AC autosampler. The chromatographic separation was performed on a C18 reversed-phase Inertsil ODS-4 (100 mm×2.1 mm, 2 µm) analytical column. The column temperature was fixed at 35°C. The elution gradient consisted of mobile phase A (water, 10mM ammonium formate and 0.1% formic acid) and mobile phase B (acetonitrile). The gradient program with the following proportions of solvent B was applied t (min), 5-20 B% (0, 10), 20 B% (10, 22), 20-50 B% (22, 36), 95 B% (36, 40), 5 B% (40, 50). The solvent flow rate was maintained at 0.5 mL/min and injection volume was settled as 4 µL.

Results: The phenolic profile of the ethanolic extracts of different parts (stems, leaves, flowers, roots and mixed parts) of two *Salvia* species were determined quantitatively by LC-MS/MS. It is observed that both species contained high amount of rosmarinic acid. Especially, the root extracts of *S. siirtica* ve *S. kurdica* were determined to possess very high amounts of rosmarinic acid (12285.62±45.98 and 10536.04±38.04µg g⁻¹ extract, respectively). Besides, leaf and stem extracts of both species were rich in terms of fumaric acid.

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Keywords: *Salvia*, Phenolics, LC-MS/MS.

PP-395

Breeding for New Pepper Lines (*Capsicum annuum* L.) with Improved Nutraceutical ValueSemih ALAN¹, Ali Ramazan ALAN^{1,2}, and Fevziye CELEBI TOPRAK^{1,2}¹*Pamukkale University Plant Genetics and Agricultural Biotechnology Application and Research Center (PAU BIYOM), Kinikli, Denizli, Turkey*²*Pamukkale University, Department of Biology, Denizli, Turkey*
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Aim of the study: Turkey is among the leading pepper producing countries of the world. Pepper crop is grown both in the open fields and under protected areas. Many landraces and standard varieties of pepper are used in commercial pepper production. However, there is a high demand for new varieties with improved agronomical features. In the pepper breeding program, well characterized inbred lines are used as parents in controlled hybridizations to generate new pepper inbred lines with improved quality traits.

Material and Methods: PAU BIYOM (Pamukkale University, Denizli, Turkey) *Capsicum* germplasm collection consists over 500 genetically diverse landraces and breeding lines. In the pepper breeding program, well characterized pure lines developed by several generations of selfing were used as parents. An inbred line with compact plant habitus and producing small erect orange fruits with high brix, total phenolics and antioxidant activities was developed. This inbred line was used as a female parent in the cross with the pollen collected from a commercial standard variety producing long red fruits.

Results: All F1 plants obtained from the cross had compact plant habitus, an intermediate feature between female and male parents. However, they showed significant variations in their fruit characters. F2 obtained by selfing F1 plants provided plants with distinct fruit size, shape, and colours. F2 plants were divided into three groups. Group 1 consisted of semi-compact plants with erect small orange fruits. Group 2 consisted of semi-compact plants with erect small red fruits. Group 3 consisted of semi-compact plants with semi-erect medium size orange fruits. All plants of these groups were selfed to produce F3 generation. F3 plants showing typical features of selected groups were selfed to produce F4 generation whereas off types were eliminated. In F4 generation, majority of the lines were found to be phenotypically stable. New inbred lines developed in this breeding program can be used as parents in the production of pepper lines with improved quality features.

Acknowledgements: This research was supported by PAUBIYOM.

Keywords: Breeding, *Capsicum annuum* L., Inbred development, Nutraceuticals

PP-396

Sustainable Energy for Survival of Biosecure EnvironmentAysel KEKILLIOĞLU¹, H. Kübra KEKILLIOĞLU²¹ Dept. of Biology, Faculty of Science & Letters, Nevşehir HBV Uni., Turkey,² Dept. Of City Planning, Fac.ofEngineering and Architecture, Gazi Uni., Turkeyakekillioglu@hotmail.com

Aim of the study: Energy is one of the most critical resources for the welfare and prosperity of society. It also causes adverse environmental and societal effects, notably climate change which is the severest global problem in the modern age. Today's world energy systems, relying on fossil and nuclear fuels, endanger the very existence of humanity. The world is faced with a crisis that requires a total transformation in the way we create energy, shifting to sustainable energy that flows freely from the sun, the wind, the tides, and the center of the earth. Sustainable energy is energy which has minimal negative impacts, both in its production and consumption, on human health and the environment, and that can be supplied continuously to future generations.

Material and Methods: Human beings essentially use energy for two purposes: transportation and stationary power. In industrialized regions stationary power needs are met by electricity (or gas for cooking), which at present is supplied largely by burning coal or natural gas, in addition to using nuclear energy and large-scale hydropower. The exploitation of finite conventional resources for non-transportation energy has been ecologically catastrophic, and these resources cannot be made "green" or "environmentally friendly." Truly sustainable alternatives such as solar, wind, geothermal, and marine energy are abundant, reliable, ecologically responsible and technologically feasible today.

Results: Finding satisfactory solutions to the challenges ahead will need a linking of energy technology innovations, security, energy poverty, and environmental and climate impacts. The broad scope of energy issues demands collaboration between different disciplines of science and technology, and strong interaction between engineering, physical and life scientists, economists, sociologists and policy-makers.

Keywords:Energy, Environment, Biosecurity, Biodiversity, Reniwable, Sustainable.

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Clean Environment: Current Status and Future of Sustainable Development

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Aim of the study: Sustainable development refers to an economic, ecological and social development, which ensures the natural livelihood of present and future generations. In many nations, significant environmental problems such as rapid population growth, irregular urbanization, industrialization and tourism cause environmental problems and failure to protect the natural resources in a healthy way. Governments must take these problems seriously and get prepared to implement actions in order to prevent negative costs of development in environment.

Material and Methods: This study was carried out as a survey to be used in the preparation of “ECO-Center needs analysis” for Turkey in ECO-Center project (ERASMUS+ programme key action 2: cooperation for innovation and the exchange of good practices strategic partnerships in the field of education, training and youth. Project Number:2014-1-BG01-KA204-001645). “ECO-Center needs analysis” represents an important intellectual output of the project. The survey was conducted to gather up-to-date information and provide detailed analysis of the state of art in respect to the following main topics:

- Current status in clean environment sector with emphasis on shortcomings/risks.
- The potential of this sector in implementation of national policies for educating adults learning providers, employees, job seekers, workers at risk of losing their jobs, individuals affected by unemployment, restructuring and career transitions.
- Principles of adult education in the planning and development of programmes/courses.
- Environmental education: structure, operation and contribution to career development.
- Needs for up- and re-skilling of adults educators in clean environment.
- Bridge building between The European Qualifications Framework (EQF) and The European Credit System for Vocational Education and Training (ECVET) validation instruments and recognition of skills and competences adopted via adult education.

All data were analysed by descriptive statistics.

Results: Our survey showed that there is a great need for improvement of awareness in environmental issues and sustainable development among the Turkish people. In Turkey, a few people are aware of the environmental laws and how these laws are implemented. A major problem related to environmental issues and precisely education for sustainable development in Turkey is the lack of proper educational resources. Turkey's weaknesses in Environmental and Sustainable Development area connected with green production are linked with the lack of organized, adequate, and reliable data regarding pollution prevention, control, and disposal as well as for the country natural resources and values. The legal infrastructure has not been harmonized with the international obligations. Environmental knowledge and the importance of environment have not been understood adequately in all sections of society including decision-makers.

Acknowledgements: This research was funded by the ERASMUS+ programme key action 2: cooperation for innovation and the exchange of good practices strategic partnerships in the field of education, training and youth. Project Number:2014-1-BG01-KA204-001645.

Keywords: Adult education, Clean environment, Environmental education.

PP-398

Systematic significance of anatomy and trichome morphology in *Lamium* L. (Lamioideae; Lamiaceae)Zeynep ATALAY¹, Ferhat CELEP², Musa DOGAN¹¹Department of Biological Sciences/Middle East Technical University, Turkey²Department of Biology, Polatlı Faculty of Sciences and Arts, Gazi University, Turkeyzeynepatalay77@gmail.com

Aim of the study: *Lamium* L., the type genus of subfamily Lamioideae and the Lamiaceae, comprises 16-38 species, depending on the circumscription of the genus (Harley et al. 2004; Bendiksby et al. 2011). *Lamium* species are widely distributed throughout temperate Eurasia, where its center of diversity lies in the Irano-Turanian and Mediterranean region. The usefulness of anatomy and its implication in the systematics of Lamiaceae are well known from various comprehensive works. Therefore, a comparative anatomical study of the root, stem, leaf and petioles, as well as trichome characteristics of 33 *Lamium* taxa were carried out for addressing problems regarding generic delimitation, subgeneric classification and species delimitation.

Material and Methods: This study was conducted on fresh material collected from the field, during flowering period from natural populations between 2012 and 2015. A total of 33 taxa, including subspecies and varieties, were examined. For anatomical investigations, fresh materials were fixed in 70% ethanol and the paraffin wax method was applied for preparing cross-sections of roots, stems, leaves and petioles. Selected characters were measured using Carnoy 2.0 (Schols et al., 2002). Trichomes were obtained from stems, leaves and calyces and investigated with a stereo and scanning electron microscope (SEM). The SEM micrographs were taken with a JEOL-6060 scanning electron microscope at TPAO (Turkish Petroleum Anonymn Cooperation, Ankara). The general classification scheme and the terminology follow Cantino (1990), as well as Navarro & El Oualidi (2000) and Eiji & Salmaki (2016).

Results: Anatomical characters of taxonomic interest are as follows: the presence or absence of collenchymatous tissue at the corners of stems and petioles; the number of pith rays in the root; shape of the vascular bundles in petioles and characteristics of leaf mesophyll. Nonglandular trichomes can be short or long. Glandular trichomes can be stalked, sessile or sessile. Analysis show that; (1) latest infrageneric classification and recent phylogenetic analysis on the genus and our results are partly corroborated, (2) anatomy and trichome characters support the inclusion of *L. galeobdolon* (= *Galeobdolon*), *L. orientale* and *L. multifidum* (= *Wiedemaniana*) in *Lamium*. (3) Our investigation reveals the usefulness of such characters for providing taxon delimitation at various levels; especially, at the specific rank.

Acknowledgements: This study is supported by the Scientific and Technical Research Council of Turkey (project no: TUBITAK 112-T-131). We wish to thank the curators of ANK, BM, E, G, GAZI, HUB, K, KNYA and LE herbaria for their permission on the examination of *Lamium* collections.

Keywords: Lamiaceae, anatomy, trichome, systematics, taxonomy, scanning electron microscopy.

PP-399

Sequence Related Amplified Polymorphism and Elongation Factor 1- α Based Genotyping in *Fusarium graminearum* Species ComplexIşıl Melis ZÜMRÜT¹, Berna TUNALI², Bayram KANSU³, Gülşen UZ¹, Emre YÖRÜK¹, Bahram SHARIFNABI⁵, Fatih ÖLMEZ⁴, Ayşegül SARIKAYA¹¹Dept. of Molecular Biology and Genetics/Faculty of Arts and Science, Istanbul Yeni Yuzyil University, Turkey²Dept. of Plant Pathology/Faculty of Agriculture, Samsun Ondokuz Mayıs University, Turkey³Animal and Plant Production Department/Vocational School, Samsun Ondokuz Mayıs University, Turkey⁴Biotechnology Department/Field Crop Central Research Institute, Turkey⁵Dept. of Plant Protection/College of Agriculture, Isfahan University of Technology, Iran
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Aim of the study: *Fusarium graminearum* species complex (*Fgsc*) is predominating causal agent of head blight and crown rot in small grain cereals worldwide. These diseases lead to severe yield losses. Since *Fgsc* has a great level of genetic diversity, characterization of isolates from different regions is significant step in food safety. Novel approaches including genealogical concordance assays and coding DNA sites provide fast, reliable and reproducible data on genetic characterization of phytopathogenic fungi. Thus, it was aimed to characterize *Fgsc* isolates from Turkey and Iran as a complex member and to adapt sequence related amplified polymorphism (SRAP) markers in *Fgsc* genotyping.

Material and Methods: Totally 53 *Fgsc* isolates obtained from diseased cereals planted in Turkey and Iran were used in genotyping analysis. Fungal isolates were grown on potato dextrose agar (PDA) medium at 25°C for seven days. Genomic DNA molecules were extracted from seven-day-old fungal cultures using sodium dodecyl sulphate based protocol. Isolated DNAs were analysed by 1% agarose gel electrophoresis and spectrophotometer. Isolates were differentiated at species complex level via amplification of *elongation factor 1- α* (*Ef1- α*). Polymerase chain reaction (PCR) cycling conditions were as follows: 94°C for 1 min, 52°C for 1 min and 72°C for 3 min. PCRs were carried out in a reaction volume of 25 μ L containing 50 ng genomic DNA, 1X PCR buffer, 2.5 mM MgCl₂, 10 pmol primer, 0.2 mM of dNTPs and 1U of *Taq* DNA polymerase. PCR bands were subjected to sequencing analysis and then aligned. Three forward and three reverse primer sets for SRAP analysis were also used in genotyping analysis. Cycling conditions and mixtures were the same as given below. Presence/absence of bands was scored in genetic similarity assays.

Results: Fungal isolates were successfully grown on PDA medium and intact genomic DNA's were isolated in the amount range of 0.5-3 μ g/ μ L from 100 mg mycelia. *Ef1- α* amplification resulted with an bands of 700 bp from all isolates. Purified PCR fragments were sequenced and 648 bp region was used in multiple alignments. According to similarity alignment analysis 28 isolates were characterized as *F. graminearum sensu stricto* (*Fgss*), 16 isolates were of *F. asiaticum* (*Fa*) and 9 were as *Fusarium* sp. Each isolate was used in SRAP based genotyping assays with totally nine different primer combinations. Seven of primer sets yielded amplicons in all isolates whereas only some isolates gave amplicons with ME1/EM3 and ME5/EM6 primers. PCR product sizes were in the range of 0.1-2.5 kb. Minimum and maximum band numbers for single isolates were as 1 to 14, respectively. Findings showed that *Fgss* and *Fa* were predominating members in Turkey and Iran and SRAP-based markers could be useful in *Fgsc* genotyping.

Acknowledgements: This study was supported by board of regents of Istanbul Yeni Yuzyil University and TÜBİTAK 109O476 and 111O835 numbered projects

Keywords: *Fusarium graminearum sensu stricto*, *Fusarium asiaticum*, PCR, SRAP.

PP-400

Ecological Status of Marine Waters of Turkish Black Sea Assessed by the Ecological Evaluation Index (EEI) MethodErgün TAŞKIN¹, Ersin MİNARECİ¹, Orkide MİNARECİ¹¹*Department of Biology, Faculty of Arts and Sciences, Manisa Celal Bayar University, Muradiye, Manisa, 45140, Turkey.**orkideminareci@hotmail.com*

Aim of the study: Macroalgae and angiosperms were declared as one of the biological quality elements to assess the ecological status of coastal waters and transitional systems by the EU Water Framework Directive (WFD, 2000/60/EC). The aim of the present study is to assess the ecological status of the marine waters in the Black Sea coasts of Turkey by the Ecological Evaluation Index (EEI) method.

Material and Methods: One sample quadrat (20x20 cm) in July 2014 was taken from 13 stations of Black Sea coasts of Turkey at 0.5-1 m depth. Samples were studied using a light microscope (Nikon SE), and specimens were preserved in 2-5% formaldehyde in seawater. Taxa were split into two main ecological state groups (ESG I and ESG II) on the basis of Orfanidis *et al.* (2011). ESG I comprises thick perennial (IA), thick plastic (IB) and shade-adapted plastic species (IC), while ESG II comprises fleshy opportunistic (IIA) and filamentous sheet-like opportunistic (IIB) species.

Results: Marine benthic macrophytes (macroalgae and angiosperms) were declared as one of the biological quality elements to assess the ecological status of coastal waters and transitional systems by the EU Water Framework Directive (WFD, 2000/60/EC). In the present study, the Ecological Evaluation Index (EEI) is tested to measure the ecological status class (ESC) of marine waters of 13 sites in the upper infralittoral zone from the Black Sea coast of Turkey. Coverage data of macrophytes were analyzed by using cluster analysis and the Ecological Evaluation Index (EEI). The study showed that a high ecological quality for Sinop, a good quality for Şile (İstanbul), İnebolu (Kastamonu) and Rize, a moderate quality for Cide and Giresun and also a poor-bad quality for Sakarya River, Zonguldak, Samsun, Yeşilirmak, Ordu, Trabzon, Hopa.

Acknowledgements: The Project called "Integrated Pollution Monitoring in Seas" supported by the Ministry of Environment and Urbanization.

Keywords: EEI, ecological status, macroalgae, macrophytes, the Black Sea, Turkey.

PP-401

In vitro* and *in vivo* antibacterial activity of some herbal extracts and nano silver on rice-isolated *Xanthomonas oryzae pv oryzaeT.H. NGUYEN¹, T.Q. VU¹, H.T. DANG¹, E.A. KALASHNIKOVA²¹ Department of Plant Biotechnology, Faculty of Biotechnology, Vietnam National University of Agriculture² Department of Genetics, Biotechnology, Plant Breeding and Seed, Faculty Agronomy and Biotechnology, Russian State Agrarian University - Moscow Timiryazev Agricultural Academy
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Aim of the study: The present study aimed at evaluating the *in vitro* anti-bacterial effect of herbal extracts and nano silver to *Xanthomonas oryzae pv oryzae*. Experimental treatment rice blight disease caused by bacteria *Xanthomonas oryzae pv oryzae* in rice variety IR24 by *Piper betle* extract and nano silver.

Material and Methods: The studied result showed that in solvent ethanol 70% the extracted efficacy of 5 different herbs (*Piper betle*; *Allium sativum* L.; *Excoecaria cochinchinensis* Lour.; *Polyalthia longifolia* var. *pendula*; *Callisia fragrans* Lindl) were various from 9,687 % (*Allium sativum* L.) to 16,357% (*Excoecaria cochinchinensis* Lour.). At the concentration of 100 mg/ml, all the extracts showed good anti-bacterial effect with *Xanthomonas oryzae pv oryzae*. Diameter of the bacterial inhibition zones were from 15,67 mm (*Allium sativum* L. extract) to 24,33 mm (*Piper betle* extract). The *Piper betle* extract showed the best anti-bacterial effect.

Results: Evaluating the extracted efficacy of *Piper betle* with seven different solvents (distilled water, ethanol 35%, ethanol 70%, ethanol 96%, acid acetic 5%, aceton nitril 50% and aceton nitril 100%) showed that the extracted efficacy was various from 8,5 % (distilled water solvent) to 20,0% (ethanol 96% solvent). Reducing sugars, coumarin, polyphenols, flavonoids, tannins present in *Piper betle* extracts. At the concentration of 100 mg/ml, all the extracts (except extract with distilled water solvent) showed good anti-bacterial effect with *Xanthomonas oryzae*. Diameter of the bacterial inhibition zones were from 0 mm (distilled water solvent) to 26,33 mm (ethanol 96% solvent). The *Piper betle* extract solution with ethanol 96% showed the best anti-bacterial efficacy with bacterial inhibition zones 25,33 mm (isolate 04) and 26,33 mm (isolate 09). This extract maintained the anti-bacterial effect to *Xanthomonas oryzae pv oryzae* (isolate 04) at concentration 0.78mg/ml, and to *Xanthomonas oryzae pv oryzae* (isolate 09) at concentration 1,56 mg/ml. Antimicrobial of nano silver depends on the concentration and duration nano silver exposure to bacteria. The minimum concentration of antimicrobial nano silver is 6,25ppm. Collaborate *Piper betle* extract with nano silver 3,13 ppm gives higher antibacterial activity than using only extracts. Used separately or mixed nano silver and *Piper betle* extract (using ethanol 96 % solvent) at a concentration of MIC are capable of *Xanthomonas oryzae pv oryzae* bacteria inhibition *in vivo* on rice variety IR24. Using nano silver combines with *Piper betle* extract gives the best ability to inhibit rice blight disease *in vivo*. Lesion length was (9.55 cm) smaller than control (23.06 cm).

Keywords: Herbal extracts; *Piper betle*; *Xanthomonas oryzae pv oryzae*; nano silver

PP-402

Three New *Russula* Records from TurkeyÖmer Faruk ÇOLAK¹, Oğuzhan KAYGUSUZ², M. Halil SOLAK³, Mustafa İŞİLOĞLU⁴¹Vocational School of Health Services, Süleyman Demirel University, Isparta/Turkey²Department of Biology, Pamukkale University, Denizli/Turkey³Department of Biology, Muğla Sıtkı Koçman University, Muğla/Turkey⁴Program of Elementary Science Education, Muğla Sıtkı Koçman University, Muğla/Turkey
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Aim of the study: The genus *Russula* Pers. includes some very beautiful and interesting species, and a lot of hard to distinguish species. Because *Russulas* are typically fairly large, and because they are often brightly colored, amateur mushroomers are frequently interested in identifying them. There are about 750 taxa known worldwide. According to the present checklists, our mycota has been recorded that nearly 2500 macrofungi. In these, 136 taxa of *Russula* are known up to the present day for the Turkey. The aim of the present study was to add to the knowledge of Turkish mycota by a new *Russula* spp. records.

Material and Methods: The specimens were collected from different provinces (Muğla, Manisa and Kütahya) of Turkey in 2014. Morphological and ecological characteristics of the samples were photographed and noted in their natural habitats. After field studies, specimens were taken to the laboratory and microscopic characters were observed by using a light microscope with the help of some chemical reagents (Melzer's reagent and Congo red etc.). The identified and dried specimens were deposited at the Fungarium of Muğla Sıtkı Koçman University.

Results: After the laboratory studies *Russula campestris* (Romagn.) Romagn., *R. cistoadelpha* M.M. Moser & Trimbach and *R. galochroa* (Fr.) Fr. were identified. According to current checklists these species are new records for Turkish mycota. By adding new records of *R. campestris*, *R. cistoadelpha* and *R. galochroa* to the Turkish mycota, the number of species in the genus *Russula* has risen to 139 species.

Acknowledgements: We would like to thank BAP (The Scientific Research Projects of Muğla Sıtkı Koçman University) for supporting this project (13/140) financially.

Keywords: biodiversity, *Russula*, new records, Turkish mycobiota

PP-403

Rare Records for Turkish Mycota with Based on Morphological and Molecular EvidenceÖmer Faruk ÇOLAK¹, Oğuzhan KAYGUSUZ², Emre SEVİNDİK³, Kutret GEZER⁴, Gamze Betül BAYUK⁴¹Vocational School of Health Services, Süleyman Demirel University, 32260, Isparta, Turkey²Tavas Vocational High School, Pamukkale University, 20500, Denizli, Turkey³Faculty of Agriculture, Department of Agricultural Biotechnology, Adnan Menderes University, Aydın, Turkey⁴Department of Biology, Faculty of Science and Arts, Pamukkale University, 20020, Denizli, Turkey
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Aim of the study: Turkey is a natural habitat for a number of fungus species because of the suitable climate and the type of vegetation. It is known that studies about Turkish mycota are going on especially last 30 year. However, not all of the fungal diversity in different parts of Turkey has not been determined. With the increasing field works the number of new macrofungal records will rise simultaneously. These kinds of studies will be present Turkey's biological diversity.

Material and Methods: The specimens were collected from Denizli (Babadağ), Burdur (Yeşilova) and Bolu (Yedigöller) provinces of Turkey in 2015. Morphological and ecological characteristics of the samples were photographed and noted in their natural habitats. After field studies, specimens were taken to the laboratory and microscopic characters were observed by using a light microscope with the help of some chemical reagents (KOH and Congo red). Descriptions of the taxa were made in the light of the microscopic and morphological findings.

Genomic DNA was isolated from 1 g dried fungarium specimen from three collections (OKA 005, OKA 021 and OKA 440), with the ZR Fungal/Bacterial DNA MiniPrep Kit (Zymo research, CA, USA) according to manufacturer's instructions. PCR amplification of the complete ITS region was performed using universal primers ITS4 and ITS5m. For each sample, forward and reverse sequencing reactions were performed and the sequences checked on GenBank via blast search. Later obtained DNA sequences were edited both manually and by using the Bioedit 7,0.4.1, Sequencher 4.10.1 (Gene Codes) and FinchTV programs. Parsimony analyses were performed for these data using PAUP. The identified and dried specimens were deposited at the Fungarium of Mushroom Research Center in Pamukkale University (PAUF).

Results: The partial nucleotide sequences of two samples were obtained and analyzed with Basic Local Alignment Search Tool (BLAST) search program (National Center for Biotechnology Information (NCBI) site) against the whole GenBank data base of nucleotide sequences for identification. Each PCR product was sequenced using forward and reverse primers and both were used for BLAST. Size of our ITS sequences were 631 bp for *Clitocybe fragrans* (With.) P. Kumm., 597 bp for *Lepiota clypeolaria* (Bull.) P. Kumm. and 681 bp for *Leucoagaricus leucothites* (Vittad.) Wasser. Based on both morphology and molecular sequence data, the occurrence of these three taxa in Turkey was confirmed with 100% bootstrap values. These identified species was reported first time by using molecular techniques in our country.

Acknowledgements: The authors would like to acknowledge the financial support of the General Directorate of Agricultural Research and Policies (TAGEM) (project number: Tagem14/Ar-Ge/40).

Keywords: biodiversity, rare records, nrDNA, Turkish mycota.

PP-404

Two new records for Turkish AgaricalesKutret GEZER¹, Oğuzhan KAYGUSUZ², Ömer Faruk ÇOLAK³, Emre SEVİNDİK⁴, Gamze Betül BAYUK¹,
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Aim of the study: Turkey is a natural habitat for a number of fungus species because of the suitable climate and the type of vegetation. It is known that studies about Turkish mycota are going on especially last 30 year. However, not all of the fungal diversity in different parts of Turkey has been determined. With the increasing field works the number of new macrofungal records will rise simultaneously. These kinds of studies will be present Turkey's biological diversity.

Material and Methods: The specimens were collected from the town Nazilli and Kuşadası of province Aydın of Turkey in 2015. Morphological and ecological characteristics of the samples were photographed and noted in their natural habitats. After field studies, specimens were taken to the laboratory and microscopic characters were observed using some chemical reagents (Melzer's reagent, KOH and Congo red etc.) by light microscope. The identified and dried specimens were deposited at the Fungarium of Mushroom Research Center in Pamukkale University (PAUF).

Results: After the laboratory studies *Agaricus hondensis* Murrill and *Tephrocybe platypus* (Kühner) M.M. Moser were identified. According to current checklists these species are new records for Turkish mycota.

Acknowledgements: The authors would like to acknowledge the financial support of the Pamukkale University Scientific Research Projects Coordination Unit (PAUBAP) (project number: 2014FBE044).

Keywords: Agaricales, *Agaricus*, *Tephrocybe*, biodiversity, new records, Turkey.

PP-405

Three New Additions to Turkish *Helotiales*Kutret GEZER¹, Ömer Faruk ÇOLAK², Oğuzhan KAYGUSUZ³, Emre SEVİNDİK⁴, Gamze Betül BAYUK¹,
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Aim of the study: Turkey is a natural habitat for a number of fungus species because of the suitable climate and the type of vegetation. It is known that studies about Turkish mycota are going on especially last 30 year. However, not all of the fungal diversity in different parts of Turkey has been determined. With the increasing field works the number of new macrofungal records will rise simultaneously. These kinds of studies will be present Turkey's biological diversity.

Material and Methods: The specimens were collected from the Artvin, Bolu and Karabük provinces of Turkey in 2015. Morphological and ecological characteristics of the samples were photographed and noted in their natural habitats. After field studies, specimens were taken to the laboratory and microscopic characters were observed by light microscope. The identified and dried specimens were deposited at the Fungarium of Mushroom Research Center in Pamukkale University (PAUF).

Results: After the laboratory studies *Chlorociboria aeruginascens* (Nyl.) Kanouse ex C.S. Ramamurthi, Korf & L.R. Batra, *Coryne dubia* (Pers.) Gray and *Lachnellula agassizii* (Berk. & M.A. Curtis) Dennis were identified. According to current checklists these species are new records for Turkish mycota.

Acknowledgements: The authors would like to acknowledge the financial support of the General Directorate of Agricultural Research and Policies (TAGEM) (project number: Tagem14/Ar-Ge/40).

Keywords: Ascomycota, *Helotiales*, biodiversity, new records, Turkish mycota.

PP-406

Phytophagous and Entomophagous Insects Fauna of Wheat in DiyarbakirAdil TONGA¹, Ahmet BAYRAM²¹*Entomology Department/ Diyarbakir Plant Protection Research Institute, Turkey*²*Plant Protection Department/ Agriculture Faculty /Dicle University, Turkey*adil.tonga@gthb.gov.tr

Aim of the study: Determination of species community of phytophagous and entomophagous insect fauna of wheat present in Diyarbakir to provide more and up-to-date information to integrated pest management (IPM) strategies.

Material and Methods: During species samplings, three different sampling methods (plant sampling, sweep-net sampling and yellow-and-blue sticky trap samplings) were employed according to feeding behaviour of the species concerned. Thereafter, individuals of species were prepared to send taxonomists for identifications.

Results: Identification results revealed thirty-one insect species belong to twelve families of six orders; Aphididae, Pentadomidae and Scutelleridae from Hemiptera, Coccinellidae from Coleoptera, Chrysopidae from Neuroptera, Thripidae, Phlaeothripidae and Aelothripidae from Thysanoptera, Syrphidae from Diptera and Braconidae, Cephidae and Ichneumonidae from Hymenoptera. The proportional density and temporal presence period of species were observed. In addition, species belong to thirteen other families from five orders were not identified due to very low numbers and unsteady presence.

Acknowledgements: Authors thank to Prof.Dr. Ekrem Atakan (Cukurova University), Prof.Dr. Rüstem Hayat (Suleyman Demirel University), Prof.Dr. Petr Stary (Biology Centre of the Academy of Sciences of the Czech Republic) and Dr. Mahir Budak (Cumhuriyet University) for identifications. This study was supported by Dicle University, Scientific Research Projects Coordination (P.n.: 12-ZF-28).

Keywords: *Triticum aestivum*, Phytophagous, Entomophagous, Insect, Diyarbakir

PP-407

Two New Generic Records of *Entoloma* Based on Morphological and Molecular Data for Mycobiota of TurkeyOğuzhan KAYGUSUZ¹, Kutret GEZER², Emre SEVİNDİK³, Ömer Faruk ÇOLAK⁴, Gamze Betül BAYUK²¹Tavas Vocational High School, Pamukkale University, 20500, Denizli, Turkey²Department of Biology, Faculty of Science and Arts, Pamukkale University, 20020, Denizli, Turkey³Faculty of Agriculture, Department of Agricultural Biotechnology, Adnan Menderes University, South Campus, Çakmar, Aydın, Turkey⁴Vocational School of Health Services, Süleyman Demirel University, 32260, Isparta, Turkey
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Aim of the study: A large number of studies have been conducted recently on Turkey's macrofungi, and approximately 2500 taxa have been identified. In these, 47 taxa of *Entoloma* are known up to the present day for the Turkey. However, *Entoloma* (Fr.) P. Kumm is a large genus of the family Entolomataceae with about 1000 taxa known worldwide. This study aims to make a contribution to the mycobiota of Turkey by adding new generic records of *Entoloma*.

Material and Methods: The specimens of *Entoloma* were collected from Muğla (Köyceğiz) and Artvin (Hopa) provinces of Turkey in 2015. Morphological and ecological characteristics of the samples were photographed and noted in their natural habitats. After field studies, specimens were taken to the laboratory and microscopic characters were observed by using a light microscope with the help of some chemical reagents (KOH and Congo red). Descriptions of the taxa were made in the light of the microscopic and morphological findings. Genomic DNA was isolated from 1 mg dried fungarium specimen from two collections (OKA 171 and OKA 304), with the ZR Fungal/Bacterial DNA MiniPrep Kit (Zymo research, CA, USA) according to manufacturer's instructions. PCR amplification of the complete ITS region was performed using universal primers ITS4 and ITS5m. For each sample, forward and reverse sequencing reactions were performed and the sequences checked on GenBank via blast search. Later obtained DNA sequences were edited both manually and by using the Bioedit 7.0.4.1, Sequencher 4.10.1 (Gene Codes) and FinchTV programs. Parsimony analyses were performed for these data using PAUP. The identified and dried specimens were deposited at the Fungarium of Mushroom Research Center in Pamukkale University (PAUF).

Results: The partial nucleotide sequences of two samples were obtained and analyzed with Basic Local Alignment Search Tool (BLAST) search program (National Center for Biotechnology Information (NCBI) site) against the whole GenBank data base of nucleotide sequences for identification. Each PCR product was sequenced using forward and reverse primers and both were used for BLAST. Size of our ITS sequences were 640 bp for *Entoloma conferendum* (Britzelm.) Noordel. and 585 bp for *E. mougeotii* (Fr.) Hesler. Based on both morphology and molecular sequence data, the occurrence of these two taxa in Turkey was confirmed with 100% bootstrap values. By adding new generic records of *E. conferendum* and *E. mougeotii* to the Turkish macromycota, the number of species in the genus *Entoloma* has risen to 49 species.

Acknowledgements: The authors would like to acknowledge the financial support of the General Directorate of Agricultural Research and Policies (TAGEM) (project number: Tagem14/Ar-Ge/40).

Keywords: *Entoloma*, new records, nrDNA, biodiversity, Turkish mycobiota.

PP-408

Combined Effect of Salt Concentration and Temperature on Morphological Characters of MicrofungiOrkun KAYIS¹, Rasime DEMİREL², Semra ILHAN³ and Emine İRDEM¹¹Graduate School of Natural and Applied Sciences, Eskisehir Osmangazi University, 26480 Eskisehir, Turkey²Department of Biology, Faculty of Science, Anadolu University, 26470 Eskisehir, Turkey³Department of Biology, Faculty of Arts and Science, Eskisehir Osmangazi University, 26480 Eskisehir, Turkey

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Aim of the study: To investigate the combined effects of salt concentration and temperature on morphological characters of halotolerant/halophilic microfungi.

Material and Methods: Fungal isolates were isolated from Çamaltı/İzmir and identified with molecular methods. A total of 48 species as 13 species belonged to *Penicillium*, 13 *Aspergillus*, 7 *Cladosporium*, 3 *Alternaria*, 2 *Trichoderma*, 2 *Chaetomium* and 1 isolate belong to *Fusarium*, *Acremonium*, *Biscogniauxa*, *Phomopsis* and *Arthrinium* genera were used in this study. Using aseptic techniques, each of the microfungi were inoculated on Malt Extract Agar medium that was added 8%, 16%, 24% NaCl. The cultures were incubated at 17, 27, 37°C for 7 days. After incubation, each culture was examined in terms of spore formation type, mycelium diameter, colony front and back colour, colony texture, colony diameters, sclerotium and cleistothecium. All data were collected in a table and photographed.

Results: As a result of the study, we were showed that combination of NaCl concentrations and different temperatures affected on colony properties. Furthermore, these effects revealed morphological differences between closely related fungi such as members of section *Versicolor*, *Aspergillus*, *Clavati*, *Circumdati*, *Flavi*.

Keywords: halotolerant microfungi, halophilic microfungi, microfungi, combine effect.

PP-409

Genotypic Diversity of Holstein Bulls used as studs in Turkeyİlke ÜNLÜSOY¹, Özge ÖZMEN²¹ *International Livestock Centre for Research and Training, Ankara, Turkey*² *Ankara University Faculty of Veterinary Medicine, Ankara, Turkey*

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Aim of the study: Population analyses which performed by microsatellite data is one of the processes used frequently. In this study the biodiversity of 77 Holstein bulls used as studs in Turkey was evaluated via 10 microsatellite loci which have advised by FAO and ISAG. Those loci are BM2113, SPS115, TGLA53, TGLA122, INRA23, ETH225, BM1824, ETH10, TGLA126, and ETH3 which are frequently used for genotyping, parental and individual correction.

Material and Methods: The alleles determined by ABI3130 Genetic Analyzer were scored with Gene Mapper Software v4.0. For bioinformatics evaluation FSTAT, R and DarWin softwares were used. Accordingly the numbers of alleles, frequencies of alleles, genotypic variation, allelic richness, observed and expected heterozygosity and Fis value for each locus were computed. Eventually the population diversity was demonstrated with Neighbour-Joining (NJ) tree.

Results: While the expected heterozygosities of loci were between 0.65 and 0.87, the observed heterozygosities were between 0.53-0.81. In the evaluation considering Fis values, the highest heterozygosity was in the locus of BM2113, the highest homozygosity was in the locus of SPS115. The individuals homogeneously spread at the NJ tree which was colored according to 14 different cities that the bulls registered in.

The genotype of bulls which are commercial studs spread to distant areas. Therefore the diversity of those animals must be as much as possible in order to protect biodiversity. Usually studs are determined with selection of high productive bulls. The selection programs may increase homozygosity while may reduce the variation in the gene pool. In this study it was indicated that the bulls provided the diversity in terms of the microsatellite loci in question.

Keywords: Bioinformatics, microsatellite, population diversity.

PP-410

Occurrence and infection dynamics of *Eustrongylides* sp. (Nematoda: Dioctophymatoidea) in four endemic *Aphanius* (Cyprinodontidae) species from TurkeyDeniz İNNAL¹, Mahir YILDIRIM², Salim Serkan GÜÇLÜ³, Mehmet Can ÜNAL¹, Buğrahan DOĞANGİL¹¹ Mehmet Akif Ersoy University, Department of Biology, Burdur, Turkey² Cumhuriyet University, Department of Biology, Sivas, Turkey³ Süleyman Demirel University, Eğirdir Fisheries Faculty, Isparta- Turkeyinnald@gmail.com

Aim of the study: *Eustrongylides* sp Jägerskiöld, 1909 is a cosmopolitan genus, and its larva has been reported on several fish species as parasitizing. Its life cycle includes an aquatic oligochaete, a fish, and a piscivorous bird. Severe pathology is frequently observed in these hosts. In the fish, the larva migrates from the digestive tract to the cavity or musculature of the body wall. A study was undertaken to assess the prevalence, mean intensity and seasonality of *Eustrongylides* sp infestation of four endemic *Aphanius* species from southwest part of Turkey.

Material and Methods: Infection dynamics of *Eustrongylides* sp in *Aphanius transgrediens* (Lake Acıgöl), *Aphanius splendens* (Lake Salda), *Aphanius sureyanus* (Lake Burdur) and *Aphanius anatoliae* (Lake Eğirdir) were studied between March 2014 and February 2015. Specimens were placed in a well-aerated 20-L aquarium filled with stream water where they were maintained for 2–3 h. The fish were then anaesthetized with MS-222. The total length and sex of each fish was determined at necropsy. During the dissection, all internal organs were examined under a dissecting microscope. *Eustrongylides* sp was identified using selected identification keys. The levels of prevalence, intensity and mean abundance of the parasite species were calculated according to Bush et al. (1997).

Results: In total, 71 *A. transgrediens*, 65 *A. splendens*, 47 *A. sureyanus* and 143 *A. anatoliae* specimens were examined. The overall parasite prevalence and mean intensity (MI) respectively for the fish species were: 15.49 and 1.09; 7.69 and 1.00; 10.64 and 1.20; 2.80 and 1.25. The results show that highest prevalence of infection was recorded in *A. transgrediens*. Generally, prevalence of the infection was found higher during spring period. Infection dynamics of *Eustrongylides* sp have been recorded and is compared with other studies.

Acknowledgements: This research was financially supported by the MAEÜ (Mehmet Akif Ersoy University) under the Project numbered, 0205 NAP 13.

Keywords: Endemic, killifish, Nematoda, *Eustrongylides* sp

PP-411

Evaluation of Chemical Composition and Antimicrobial Activity of Genus *Dittrichia* L. (Asteraceae) Essential Oils

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Aim of the study: The chemical composition and antimicrobial effect of essential oils derived from *Dittrichia viscosa* L. and *Dittrichia graveolens* were investigated in the present study.

Material and methods: As a study material, *Dittrichia viscosa* (L.) Greuter and *Dittrichia graveolens* (L.) Greuter were collected in September-October 2015. Essential oils of the leaves were extracted by Clevenger apparatus. Essential oil composition was determined with Gas Chromatography-Mass Spectrometry (GC-MS) device. The essential oils antimicrobial activity were tested by pathogen microorganisms; MRSA (Methicillin-resistant *Staphylococcus aureus*), *Staphylococcus aureus* ATCC 6538, *Pseudomonas aeruginosa*, *Enterococcus faecium* DSM 13590, *Escherichia coli* Q157:H7 and *Bacillus cereus* CCM99.

Results: The results from the gas chromatography-mass spectrometry analysis showed that the obtained borneol acetate from *D. graveolens* was with the highest percentage (25.23%). The 2,4-Dioxo-3-methyl-6-isopropyl pyrido[2,3-b]-[1,4]pyrazine in *D. viscosa* was with the highest percentage (29.02%). In the antimicrobial studies, the essential oils effect against methicillin-resistant *Staphylococcus aureus* (MRSA), *S. aureus* ATCC 6538, *Pseudomonas aeruginosa*, *Escherichia coli* Q157:H7 and *Bacillus cereus* CCM 99 were investigated using the agar well method. *S. aureus* ATCC 6538 showed the biggest inhibition zones (30 mm), whereas MRSA showed the smallest inhibition zone (10 mm), each generated by using *D. graveolens* essential oils. *S. aureus* ATCC 6538 showed the biggest inhibition zone (38 mm), whereas MRSA showed the smallest inhibition zone (0 mm), both obtained by using *D. viscosa* essential oils. Therefore, it was concluded that the essential oils obtained from the two plant species had an inhibition effect on resistant microorganisms.

Keywords: GC-MS, essential oil, antimicrobial activity *Dittrichia*, Turkey.

PP-412

Investigation of Antioxidative and Anticancer Potentials of Two *Cyclamen* L. taxa from TurkeyEge Rıza KARAGÜR¹, Cennet ÖZAY², Hakan AKÇA¹, Ramazan MAMMADOV²¹Department of Medical Biology, Pamukkale University, Turkey²Department of Biology, Pamukkale University, Turkeyrmammad@yahoo.com

Aim of the study: Turkey is a rich country in geophyte plant species. Most of these plants have economical and medical importance. There are more than 500 geophyte species growing naturally in Turkey. *Cyclamen* L., belonging to the Primulaceae family, is a tuberous perennial geophyte, and some taxa of this genus have been used for their biological activities in folk medicine. In Turkey, this genus is represented with 12 taxa, 5 of which are endemic. The aim of the present study is to investigate the antioxidative potentials of two *Cyclamen* L. taxa using various methods and the effects of these plants on cytotoxicity, invasion, migration and expression levels of several invasion-migration related miRNAs for the non-small-cell lung carcinoma cells, PC9 and PC14.

Material and Methods: *C. pseudibericum* Hildebr. is flowering in early spring, which is endemic to the Amanus and Anti-Taurus Mountains in southern Turkey whereas *C. graecum* subsp. *anatolicum* Letsw. is flowering in autumn. The plants were collected from their natural habitats, air-dried in shade, powdered to a fine grain and then extracted with four different solvents (methanol, ethanol, acetone and water). The extracts prepared from tubers and leaves of two *Cyclamen* L. taxa were concentrated under vacuum at 40 °C by using a rotary evaporator. Remaining parts of the extracts were dissolved with water and the water in the extracts was lyophilized. Obtained extracts were stored at -20 °C until use. Antioxidant capacities of the extracts were evaluated by ABTS (2,2-Azino-bis (3-ethylbenzothiazolone-6-sulfonic acid)) radical cation scavenging assay, reducing power, phosphomolybdenum, and metal chelating assays. Folin-Ciocalteu assay and aluminium colorimetric method were used to detect total phenolic and flavonoid contents in the extracts, respectively. The phenolic profile was determined using HPLC. The brine shrimp lethality test was applied to screen for possible cytotoxic activity of the extracts. In vitro antiproliferative activity was determined by the luminometric method against NSCLC (non-small-cell lung carcinoma) cells (PC9 and PC14). The effects of extracts on cell invasion and migration were determined. Also, expression of several miRNAs for both PC9 and PC14 cells was evaluated by reverse transcriptase PCR (RT-PCR).

Results: Assessment of antioxidant features of plants cannot be carried out exactly by any single method because of complex nature of phytochemicals. Among the two *Cyclamen* taxa evaluated, the highest antioxidant activities were obtained from *C. graecum*. These results are in good agreement with HPLC analysis data report and total phenolic/flavonoid content in the extracts. Moreover, the antiproliferative and anti-invasive properties of *C. graecum* were found to be higher on PC9 and PC14 cells. Previous studies have shown that miRNAs participate in a wide range of biological functions and play important roles in various human diseases including cancer. Our data showed that miR-146 overexpression significantly reduced the abilities of migration and invasion of PC14 non-small cell lung cancer cells. miR-146 may be a potential therapeutic target for the lung cancer.

Keywords: *Cyclamen*, antioxidant activity, HPLC, NSCLC, invasion, miRNA.

PP-413

Biodiversity of Bacteria Isolated from Different SoilsFatma YAMAN¹, Betül AKTAŞ¹, Mustapha TOURAY¹, Esin POYRAZOĞLU ÇOBAN¹,
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Aim of the study: The aim of this study was to determine biodiversity of PHB producing bacteria isolated from soils where fruit and vegetable are cultivated (onion, grape, olive, mulberry and plum) in Aydın province. For identification, morphological, cultural, biochemical and molecular methods were used. These bacteria can produce Polyhydroxybutyrate (PHB) which is an organic polymer with commercial potential as a biodegradable thermoplastic. PHB can be used instead of petrol derived non-degradable plastics. For this reason, PHB producing microorganisms are substantial in industry.

Material and Methods: Soil samples were collected from ten different fruit gardens across Aydın province. Bacterial growth was realized on Nutrient Agar and Plate Count Agar (PCA) at 30°C for 48 h. After incubation each different colony were isolated and stocked in skim milk. Morphological, cultural and biochemical identifications were made according to the Bergey's Manual of Systematic Bacteriology. For molecular identification DNA isolation of the samples were made according to De Boer and Ward (1995). After isolations DNA concentration and purity was measured with nanodrop spectrometer (Thermo Scientific). 16S rRNA PCR reactions were carried out at initial denaturation 95°C 5 min, denaturation 94°C 40 sec, annealing 50°C 40 sec, extension 72°C 40 sec with 35 cycles and final extension at 72°C 10dk. Reagents concentrations were 10X Taq Buffer, 0.5M dNTP mix, 10 pM from each primer, 7.5 mM MgCl₂ and 1U Taq polymerase with the final volume of 25 µl. PCR products were sent to the sequencing (GATC BioTech, Germany) after electrophoresis at 1.4% agarose gel at 90 V 40 min.

Results: According to the morphological, cultural and biochemical tests 22 isolates were found to be *Bacillus* sp, 15 isolates *Pseudomonas* sp and 24 isolates are *Azotobacter* sp. *Pseudomonas* sp. are Gr(-) rod shaped bacteria, can ferment glycerol, lactose, sucrose and mannitol, produces H₂S, hydrolyse gelatine and can use citrate while *Bacillus* sp. were Gr (+) rod shaped, endospore forming bacteria with catalase, glucose, sucrose, mannitol, gelatine hydrolysis properties and is citrate positive, *Azotobacter* sp. are Gr (-) rod shaped bacteria with glucose, sucrose, mannitol, nitrate reduction properties, hydrolyses starch, citrate, Voges-Proskauer, hydrolyses gelatine and is catalase positive. PCR results of these samples were sent to GATC BioTech, Germany for sequencing. It is expected to be found *B. subtilis*, *B. cereus*, *B. megaterium*, *B. licheniformis*, *P. aeruginosa*, *P. fluorescens*, *P. putida*, *A. chroococcum*, *A. vinelandii*, *A. paspali*, *A. nigricans*. Molecular identification will be made by comparing sequence results with Genbank using BLASTn software.

Acknowledgements: This study was supported by TÜBİTAK-BİDEP (1919B011401614) and carried out at Adnan Menderes University Biology Department Microbiology Laboratory.

Keywords: Biodiversity, 16S rRNA, Bacteria, Molecular Identification, Soil.

PP-414

Larvicidal activity of *Cyclamen hederifolium* extracts against the larvae of *Culex pipiens*Murat TURAN¹, Hüseyin ÇETİN², Ramazan MAMMADOV¹,¹Department of Biology, Faculty of Art & Science, Pamukkale University, Denizli, TURKEY²Department of Biology, Faculty of Science, Akdeniz University, Antalya, TURKEYhadvidub@gmail.com

Aim of the study: The aim of this research was to evaluate the larvicidal activity of tuber ethanol extract of *Cyclamen hederifolium* Aiton on the larvae of *Culex pipiens* L. (Diptera: Culicidae).

Material and Methods: First-second instars larvae of the *Cx. pipiens* were exposed to various concentrations (100, 250, 500 and 1000 ppm) of the extract. After 48 h exposure larval mortalities were recorded. LC₅₀ and LC₉₀ values were determined by using StatPlus program.

Results: *Cyclamen hederifolium* methanol extract was found highly toxic and the LC₅₀ and LC₉₀ values of extract were 275.7 and 433.2 ppm against *Cx. pipiens*. This is the first study to report on the larvicidal activity of the extracts of *Cyc. hederifolium* against *Cx. pipiens*. More new researches should be made to identify the active components of test extract, their mode of action, and effects on mosquito species.

Keywords: *Culex pipiens*, *Cyclamen hederifolium*, insecticidal activity.

PP-415

Biodiversity of PHB Producing Bacteria from Fruit Garden Soils in Aydın Providence
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Aim of the study: The aim of this study was to determine biodiversity of PHB producing bacteria isolated from soils where fruit and vegetable are cultivated (fig, lemon, quince, pomegranate) in Aydın providence. For identification, morphological, cultural, biochemical and molecular methods were used. These bacteria can produce Polyhydroxybutyrate (PHB) which is an organic polymer with commercial potential as a biodegradable thermoplastic. PHB can be used instead of petrol derived non-degradable plastics. For this reason, PHB producing microorganisms are substantial in industry.

Material and Methods: Soil samples were collected from ten different fruit gardens across Aydın providence. Bacterial growth was realized on Nutrient Agar and Plate Count Agar (PCA) at 30°C for 48 h. After incubation each different colony were isolated and stocked in skim milk. Morphological, cultural and biochemical identifications were made according to the Bergey's Manual of Systematic Bacteriology. For molecular identification DNA isolation of the samples were made according to De Boer and Ward (1995). After isolations DNA concentration and purity was measured with nanodrop spectrometer (Thermo Scientific). 16S rRNA PCR reactions were carried out at initial denaturation 95°C 5 min, denaturation 94°C 40 sec, annealing 50°C 40 sec, extension 72°C 40 sec with 35 cycles and final extension at 72°C 10dk. Reagents concentrations were 10X Taq Buffer, 0.5M dNTP mix, 10 pM from each primer, 7.5 mM MgCl₂ and 1U Taq polymerase with the final volume of 25 µl. PCR products were sent to the sequencing (GATC BioTech, Germany) after electrophoresis at 1.4% agarose gel at 90 V 40 min.

Results: According to the morphological, cultural and biochemical tests 25 isolates were found to be *Bacillus* sp, 20 isolates *Pseudomonas* sp and 15 isolates are *Azotobacter* sp. *Pseudomonas* sp. are Gr(-) rod shaped bacteria, can ferment glycerol, lactose, sucrose and mannitol, produces H₂S, hydrolyse gelatine and can use citrate while *Bacillus* sp. were Gr (+) rod shaped, endospore forming bacteria with catalase, glucose, sucrose, mannitol, gelatine hydrolysis properties and is citrate positive, *Azotobacter* sp. are Gr (-) rod shaped bacteria with glucose, sucrose, mannitol, nitrate reduction properties, hydrolyses starch, citrate, Voges-Proskauer, hydrolyses gelatine and is catalase positive. PCR results of these samples were sent to GATC BioTech, Germany for sequencing. It is expected to be found *B. subtilis*, *B. cereus*, *B. megaterium*, *B. licheniformis*, *P. aeruginosa*, *P. fluorescens*, *P. putida*, *A. chroococcum*, *A. paspali*, *A. nigrificans*. Molecular identification will be made by comparing sequence results with Genbank using BLASTn software.

Acknowledgements: This study was supported by TÜBİTAK-BİDEP (1919B011401614) and carried out at Adnan Menderes University Biology Department Microbiology Laboratory.

Keywords: Biodiversity, 16S rRNA, Bacteria, Molecular Identification, Fruit Gardens Soil.

PP-416

Landmark based on Geometric Morphometric Analyses of *Dicranoptycha fuscescens*(Schummel, 1829) Populations in TurkeyOkan ÖZGÜL¹, Rahşan İvgin TUNCA¹, Ersin DOĞAÇ², Hasan KOÇ³, Gürkan NACAR⁴¹Department of Plant and Animal Breeding/Ula Ali Koçman Vocational School, Muğla Sıtkı Koçman University, Turkey²Department of Herbal and Animal Production/Köyceğiz Vocational School, Muğla Sıtkı Koçman University, Turkey³Department of Biology/Faculty of Science, Muğla Sıtkı Koçman University, Turkey⁴Department of Biology/Graduate School of Natural and Applied Sciences, Muğla Sıtkı Koçman University, Turkey
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Aim: Morphometric methods have been used for identify insect population for a long time. In order to determine the morphometric relationship between *Dicranoptycha fuscescens* (Schummel, 1829) populations collected from 5 provinces of Turkey between 1998 and 2015, geometric morphometric method was used.

Material Methods: Primarily, wings were prepared from museum materials and photographed under the microscope camera. A total of 23 landmarks were recognized on wing surface for geometric morphometric analysis and were added using TpsDig v.2.05. Shape variables are constructed using Procrustes superimposition. Canonical Variate Analysis (CVA), cluster analyses from geometric data and MANOVA test were done using NTSYS pc2.20e.

Results: CVA result for total individual values illustrated that Kutahya and Mugla populations are differentiated from other populations. First three eigen values of CVA explained 91.7 % of total variation. The distance values ranged between 0,0223 (Mugla and Canakkale) and 0.0601 (Bursa Kutahya) The dendrogram revealed two main branches based on geometric data from individuals values. The first branch consisted of Bursa populations; the second included other populations.

Keywords: *Dicranoptycha fuscescens*, museum samples, geometric morphometry, Turkey.

PP-417

Pollen and Achene Morphology of *Cardopatum corymbosum* and *Zoegea lepturea* (Tribe Carduae, Asteraceae) from TurkeyAyşe KAPLAN¹, Bekir DOĞAN², Esra MARTİN², Meryem ŞEKER³, Ahmet DURAN³¹Department of Biology, Bülent Ecevit University, Turkey,²Department of Secondary Science and Mathematics Education, Konya Necmettin Erbakan University, Turkey³Department of Biology, Selçuk University, Turkey
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Aim of the study: In this study, it is aimed to investigate pollen and achene morphology of *Zoegea lepturea* and *Cardopatum corymbosum* distributed in Turkey.

Material and Methods: *Zoegea lepturea* and *Cardopatum corymbosum* specimens collected from different parts of Turkey. Plant samples were dried and stored as herbarium specimens in Necmettin Erbakan University. Pollen samples were observed with light and Scanning Electron Microscope (SEM). Achene surfaces were examined by Scanning Electron Microscope. For SEM studies, dry achene and pollen samples directly placed on aluminium stabs and coated with gold by sputter coater. Pollen and achene ornamentations were analysed and photographed. Exine sculptures, shapes, apertures of pollen and achene surface ornamentations were described.

Results: Pollen of *Zoegea lepturea* and *Cardopatum corymbosum* are radially symmetric isopolar, tricolporate, exine ornamentations are echinate, interspinal ornamentations are micropeforate. Pollen shape of *Cardopatum corymbosum* is prolate spheroidal or subprolate, pollen shape of *Zoegea lepturea* is prolate spheroidal or oblate spheroidal. Pollen size of *Zoegea lepturea* (25 to 31 µm in polar diameter, 25 to 31 µm in equatorial diameter) smaller than the size of *Cardopatum corymbosum* (37 to 54 µm in polar axis, 32 to 43 µm in equatorial axis). Achenes are pilose or glabrous in *Cardopatum corymbosum*, but sparsely pilose in *Zoegea lepturea*. Achene surfaces are irregular or regular striate in *Cardopatum corymbosum*, but undulate in *Zoegea lepturea*. Palea surfaces are striate and hilums are obpyramidal in both species.

Acknowledgements: This study supported by TÜBİTAK (KBAG-113Z803). SEM analyses were done in Selçuk University Advanced Technology Research Center.

Keywords: *Zoegea lepturea*, *Cardopatum corymbosum*, pollen morphology, achene, Turkey.

PP-418

Ab-initio Study of Structural and Vibrational Properties of Coumarin and Cis-Coumaric AcidMurat TURAN¹, Sevgi ÖZDEMİR KART², Ramazan MAMMADOV¹¹Department of Biology, Faculty of Art & Science, Pamukkale University, Denizli, TURKEY²Department of Physics, Faculty of Art & Science, Pamukkale University, Denizli, TURKEY
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Aim of the study: Coumarin with cut grass nicely smell is a colorless and crystallic substance. Coumarin doesn't exist in plants, while the derivatives of coumaric acid is present. When plant tissue is damaged, coumaric acid is converted to coumarin. In this work, the ab-initio calculations based on Density Functional Theory (DFT) with the basis set of 6-31G(d,p) are performed to determine the molecular structural properties of coumarin and cis-coumaric acid. Moreover, FT-IR and NMR spectra of the molecules studied in this work are calculated and compared with those of the experiment. Assignments of the vibrational modes are made on the basis of potential energy distribution (PED).

Material and Methods: To characterize the structural properties and the fundamental vibrational modes of the molecules, we have performed quantum mechanical calculations with the Gaussian 09 program by using the DFT/B3LYP/6-31G(d,p) method. Molecular structure is optimized to get the global minima of the molecule by considering C₁-symmetry (no symmetry constraint). The vibrational spectra are predicted by using the optimized structures. The ¹H and ¹³C NMR shielding constants are obtained by applying the Gauge-Including Atomic Orbitals (GIAO) method in the ambient of ethanol. VEDA 4 (Vibrational Energy Distribution Analysis) package program has been used to calculate Potential Energy Distribution (PED) for each of the vibrational frequencies. The harmonic frequencies are multiplied with the appropriate scaled factors to compare with the experimental frequencies. We have used the scaled factor as 0.961 for DFT/B3LYP. Moreover, the observed vibrational wavenumbers of FT-IR are analyzed and assigned to different normal modes of the molecules.

Results: DFT calculations of the cis-coumaric acid and coumarin, which is formed by obtaining a water output from cis-coumaric acid, are presented in this work. The NMR spectrum, FT-IR spectrum, PED analysis and complete molecular structural parameters such as bond lengths, bond angles and dihedral angles of the molecules have been investigated by using the DFT/B3LYP/6-31G(d,p) method. The results of the physical properties for two molecules are compared each other.

Keywords: DFT, Coumarin, Cis-Coumaric Acid, NMR, FT-IR.

PP-419

Theoretical Investigations of Structural, NMR and FT-IR Spectra for Some Derivatives of MonoterpenesMurat TURAN¹, Hasan Hüseyin KART², Ismahan DÜZ², Ramazan MAMMADOV¹¹Department of Biology, Faculty of Art&Science, Pamukkale University, Denizli, TURKEY² Department of Physics, Faculty of Art&Science, Pamukkale University, Denizli, TURKEY
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Aim of the study: Monoterpenes are produced from acyclic, monocyclic and bicyclic agents such as olefin, alkaloids and ether of diphosphate for gymnosperms and angiosperms. They have considerable interests in the industrial applications because of their biological and pharmacological properties. Monoterpenes are considered as an alternative use in petrochemicals as renewable raw materials, in recent years. We tackle different derivatives of monoterpenes from α -phenyl cation in this study such as 3-carene, sabinene hydrate, (+)-sabinene, α -thujene, γ -terpinene, (-)- β -pinene. The main purpose of this study is to calculate the structural parameters and vibrational frequencies of these six molecules by performing ab-initio calculations based on Density Functional Theory (DFT) via Gaussian 09 program.

Material and Methods: In this study, we have used ab initio method based on DFT/B3LYP with the basis set of 6-31G(d,p) to get structural properties, FT-IR and NMR spectra of the six different monoterpenes. Potential Energy Distribution (PED) analysis are utilized to get FT-IR spectrum. ¹³C and ¹H NMR chemical shifts of the molecules studied in this work are predicted by using Gauge-Invariant Atomic Orbital approach (GAIO). The assignment of vibrational wavenumbers is done by using VEDA 4 (Vibrational Energy Distribution Analysis) program. The harmonic frequencies are multiplied with the appropriate scaled factors to compare with the experimental frequencies. We have used the scaled factor as 0.961 for DFT/B3LYP.

Results: We have carried out quantum computer calculations to obtain the ground state properties of the title molecules. The NMR spectrum, FT-IR spectrum, PED analysis, complete molecular structural parameters, such as bond lengths, bond angles and dihedral angles of the title molecules have been investigated.

Keywords: α -Phenyl Cation, DFT, Monoterpenes, NMR, FT-IR.

PP-420

Ex situ Conservation of Some Endemic and Threatened Plant Species in AnkaraŞenay BOYRAZ TOPALOĞLU¹, Canan YAĞCI TÜZÜN¹, Mecit VURAL², Kürşad ÖZBEK¹, Haşim ALTINÖZLÜ³, Barış ÖZÜDOĞRU³, Meral PEŞKİRCİOĞLU⁴¹ Department of Biodiversity and Genetic Resources/Field Crop Central Research Institute, Turkey² Department of Biology/ Faculty of Science/Gazi University³ Department of Biology/ Faculty of Science/Hacettepe University⁴ Department of Geographic Information Systems/Field Crop Central Research Institute, Turkey
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Aim of the study: In recent years, a large number of studies are undertaken to protect plant species growing in the world, especially endemic plants with the narrow and limited expansion. The species that still under pressure and threat of extinction are priority in measures to be taken. Within the context of conservation of plant genetic resources in Turkey are of utmost importance in this respect. This study was performed with the aim of collection of seed, herbarium specimen and DNA samples of endemic plant species grown in Ankara.

Material and Methods: Rare, endemic and threatened plant taxa grown in Ankara were material of this study. IUCN categories (CR, EN and VU) and previous records were considered for determination of the targeted taxa. Field studies were carried out between the years 2013 and 2015. Herbarium vouchers, DNA samples and seeds were collected for establishing *ex situ* collections. Herbarium samples were collected during the flowering time. Therefore, DNA samples from young leaves were taken and kept in re-sealable plastic bags containing silica gel (1:10 ratio of plant material to silica gel). DNA isolation was performed by using DNeasy PlantMiniKit according to the procedure described by manufacturer. Purity and amount of DNA samples were determined spectrophotometrically. Localities were visited again for collection of seed samples. Collected seeds were dried, packaged and stored according to gene bank standards. All of the data of collected seeds, herbarium and DNA samples was recorded on the Turkish Seed Gene Bank (TSGB) database.

Results: 22 taxa (12 of them are in CR category) were collected within this study. Collected seeds and plant samples were conserved in TSGB cold storage rooms and herbarium, respectively. Furthermore, within this project, DNA isolation from leaves of rare and endemic plant species was conducted that was the first step of establishing the DNA Bank in TSGB. The results of this study are important to hold key for revealing the uses of all of the complementary approaches of *ex situ* conservation and obtaining seed collection which can be used to conserve in botanical gardens.

Acknowledgements: This study has been supported by the General Directorate of Agricultural Research and Policies (Project Number: TAGEM/TBAD/13/A01/P01/004). The authors thank to Prof. Dr. Sadık ERİK (Hacettepe University) for contribution.

Keywords: *ex situ* conservation, biodiversity, Ankara, IUCN, endemic plants, genebank.

PP-421

Calliphoridae and Rhiniidae (Diptera: Oestroidea) Fauna of TurkeyGamze PEKBAY¹¹ Department of Plant Protection, Faculty of Agriculture and Natural Sciences, Bozok University, Turkey
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Aim of the study: The Calliphoridae and Rhiniidae exhibit diverse biology and they are very important agents of decomposition. The identification of blowfly species is important not only for basic entomology, but also for other fields of science, especially with regard to medical, forensic and veterinary entomology. But there are very limited and distributed knowledge about Turkish fauna and mostly as little parts of some general taxonomic or faunistic papers and forensic researches from Turkey. In present literature review, it is aimed to combine the Turkish species for the first time and provide facility the works that will be done in the future.

Material and Methods: The species of blowflies known from Turkey and their distributions were determined using the following publications of Rognes 1987, 1991, 2002, 2011; Verves 2003; Civelek & Tezcan 2005; Şabanoğlu & Sert 2010; Verves & Khrokalo 2010; Çoban & Beyarslan 2013; Szpila et al. 2013; Altunsoy et al. 2014 and Szpila 2015.

Results: According to the relevant literature totally 19 species of Calliphoridae; *Calliphora loewi* Enderlein, 1903, *C. vicina* (Robineau-Desvoidy, 1830), *C. vomitoria* (Linnaeus, 1758), *Chrysomya albiceps* (Wiedemann, 1819), *Lucilia caesar* (Linnaeus, 1758), *L. coeruleiviridis* Macquart, 1855, *L. cuprina* (Wiedemann, 1830), *L. illustris* (Meigen, 1826), *L. sericata* (Meigen, 1826), *Pollenia amentaria* (Scopoli, 1763), *P. angustigena* Wainwright, 1940, *P. dasypoda* Portschiński, 1881, *P. labialis* Robineau-Desvoidy, 1863, *P. pallida* Rohdendorf, 1926, *P. paupera* (Rondani, 1862), *P. pediculata* Macquart, 1834, *P. rudis* (Fabricius, 1794), *P. vagabunda* (Meigen, 1826) and *P. viatica* (Robineau-Desvoidy, 1830) and 5 species of Rhiniidae; *Rhinia apicalis* (Wiedemann, 1830), *Rhyncomyia cyanescens* Loew, 1844, *R. peusi* (Zumpt, 1956), *R. speciosa* Loew, 1844, *Stomorhina lunata* (Fabricius, 1805) have been determined from Turkey. And also, the possible occurrence of some calliphorids as *Cynomyia mortuorum* (Linnaeus, 1761), *Lucilia ampullacea* Villeneuve, 1922, *Phormia regina* (Meigen, 1826) and *Protophormia terraenovae* (Robineau-Desvoidy, 1830) were added by Szpila (2013).

Keywords: diptera, Calliphoridae, Rhiniidae, fauna, Turkey.

PP-422

Numerical Analysis of the Genus *Heptaptera* (Apiaceae) in Turkey

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Aim of the study: In the present study is to contribute to the classification of the genus *Heptaptera* using numeric taxonomic methods species of the genus *Heptaptera* Marg. & Reut. on the basis of numerical data which is generated from 57 characters (incl. morphological, anatomical, palynological).

Material and Methods: During field trips between the 2012 and 2013 vegetation periods, all specimens belonging to the genus *Heptaptera* collected different localities in Turkey. The specimens were kept in KNYA Herbarium. Standardized data were used which were generated from morphological, anatomical, palynological studies to determined phenetic relationships of the taxa of genus *Heptaptera*.

Results: Fifty seven morphological and palynological characters were determined from the taxa of the genus *Heptaptera* that are wild growing in Turkey. These characters were placed under nine headings and were included in the life form, root, stem, leaf characters, flower structure, flower, fruit and pollen characteristics. Data obtained from 5 taxa and a total of 57 traits were organized into a matrix of 57 × 5 dimensions. The mean of ten individual sample measurements related to the external morphologies were considered for every metric character of the taxa. Analyses of standardized data were conducted using the NTSYS-pc package programme (Applied Biostatistic, Exeter Software, Setauket, New York, USA). Similarity coefficients were calculated and phenograms were constructed using the unweighted pair-group method with the arithmetic mean (UPGMA) method. In order to determine the ability of numerical data to display the interrelationships among the samples, principle co-ordinate analysis (PCoA) of pairwise genetic distances was also conducted using NTSYS-pc package. According to our study results were supported that different species of the taxa of the genus *Heptaptera*.

Acknowledgements: We would like to thank to Selçuk University (BAP Project no: 14201010) for financial support during this study.

Keywords: *Heptaptera*, Umbelliferae, taksonomy, Oenantheae, Turkey.

PP-423

Pollen and Achene Morphology of *Amphoricarpus* (Tribe Carduae, Asteraceae) from TurkeyBekir DOĞAN², Ayşe KAPLAN¹, Esra MARTİN²,
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Aim of the study: Genus *Amphoricarpus* is represented two species including *A. exul* and *A. praedictus* in Turkey. Of these *A. praedictus* is endemic and only located in Antalya and Denizli. In this study, it is aimed to investigate pollen and achene morphology of *Amphoricarpus* species distributed in Turkey.

Material and Methods: *Amphoricarpus exul* and *A. praedictus* plants collected from different parts of Turkey. Plant samples were dried and stored as herbarium specimens in Necmettin Erbakan University. Pollen samples were observed with light and Scanning Electron Microscope (SEM). Achene surfaces were examined by Scanning Electron Microscope. For SEM studies, dry achene and pollen samples directly transferred on aluminium stabs and coated with gold by sputter coater. Pollen and achene ornamentations of two species of *Amphoricarpus* were analysed and photographed. Exine sculptures, shapes, apertures of pollen and achene surface ornamentations of both species were described.

Results: Pollen of *Amphoricarpus* are radially symmetric isopolar, tricolporate, exine ornamentations are echinate, interspinal ornamentations are microperforate or microperforate-rugulate. Pollen shape of *A. exul* is prolate spheroidal or oblate spheroidal, pollen shape of *A. praedictus* is oblate spheroidal. Pollen size of *A. exul* is 37 to 52 µm in polar diameter, 37 to 41 µm in equatorial diameter, but in *A. praedictus* is 35 to 44 µm in polar axis, 36 to 50 µm in equatorial axis. Pollen of *A. praedictus* is smaller than of *A. exul*. Achenes are pilose, palea are narrowly linear in both species.

Acknowledgements: This study supported by TÜBİTAK (KBAG-113Z803). SEM analyses were done in Selçuk University Advanced Technology Research Center.

Keywords: *Zoega lepturea*, *Cardopatum corymbosum*, pollen morphology, achene, Turkey.

PP-424

The effects of reforested applications on beetle communities in *Quercus coccifera* (L.) shrublandsMahmut TUNÇ¹, Burçin Yenisey KAYNAŞ²¹ Mehmet Akif Ersoy University, Faculty of Science and Arts, Department of Biology, İstiklal Campus, Burdur/Turkey² Mehmet Akif Ersoy University, Faculty of Science and Arts, Department of Biology, İstiklal Campus, Burdur/Turkey

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Aim of the study: *Quercus coccifera*, (Kermes oak) evergreen oak, grows in contrasting environments in the Mediterranean Basin. It distributes from Aegean and Mediterranean coasts to interior parts of this region in Turkey. In kermes oak shrublands as described degraded forests, reforestation applications were carried out as part of "Rehabilitation Action Plan of Forests of Burdur Province" in 2008-2012. Within these applications, some shrublands were planted by coniferous species. In this study, we aimed to investigate effects of reforestation applications on community structure of beetles.

Material and Methods: The study was carried out in kermes oak shrublands of Burdur Province and its surrounding areas. Two study sites (total 4 sites) were chosen randomly in shrubland and reforested sites. Beetles were sampled with three pit-fall traps that were placed along a transect at 5-m intervals. Three transects were used at every site. The traps consisted of plastic jars of about 7 cm in diameter buried in the soil up to the rim and half-filled with 50% ethylene alcohol. Sampling was carried out from May to October of 2014. At the end of each sampling period beetles caught in the pitfall traps were removed and brought to the laboratory for preparation. All caught beetles were sorted into morphospecies according to their external morphology and identified to family level.

Results: A total of 3425 beetles comprising 53 morphospecies from 21 families were collected. The most specious families were Carabidae, Scarabaeidae and Tenebrionidae. Of the beetles that could be placed into feeding guilds, there were more saprophagous than any other guild. Predators, xylophagous and herbivores were also represented. The total abundance and species richness of beetles in shrubland was found much higher than reforested site. This difference was much significant for Buprestidae, Carabidae, Scarabaeidae and Tenebrionidae families. Only two families that more caught in reforested stands were Chrysomelidae and Scolytidae. In terms of feeding groups, although herbivores caught in higher numbers in reforested site, saprophagous, xylophagous and predators were much more abundant in shrubland. As a results, kermes oak shrublands were supported more individuals belong to more species and were found important in terms of beetle diversity.

Acknowledgements: We thank Ayşe Çakırlar for her helps in the field and laboratory. The study was financially supported by Mehmet Akif Ersoy University Scientific Research Unit (Project no: 0286-YL-16).

Keywords: Beetles, Kermes oak, Reforestation.

PP-425

Genetic analysis among *Barbarea* (Brassicaceae) taxa in Turkey using with Inter Simple Sequence Repeats (ISSR) methodGüldane ORHAN¹, Meryem ŞEKER¹, Yavuz BAĞCI¹¹Department of Biology, Selçuk University, Turkeygldn_rhn_12@hotmail.com

Aim of the study: Based on our extensive literature review and our recent research within the framework of the revision taxa of the genus *Barbarea* R.Br, which growing naturally in Turkey and the out-group taxa belonging to the closest genera *Arabidopsis* Heynh., *Cardamine* L., *Rorippa* Scop. and *Chorispora* DC. were subjected to molecular ISSR analyses in order to characterize their phylogenetic relationships.

Material and Methods: The molecular characteristics of the tribes *Cardaminae* (*Cardamine* L., *Rorippa* Scop. and *Barbarea* R.Br), *Chorisporeae* (*Chorispora* DC.), *Camelinaeae* (*Arabidopsis* Heynh) were clearly revealed for the first time with the ISSR method. Phylogenetic relationships were determined by 202 polymorphic ISSR bands of nine primers. The molecular data sets were analysed with PAUP software.

Results: The genus *Barbarea* is still present in tribe *Arabideae* in Flora of Turkey, so we suggest with our findings *Barbarea* to be transferred into the tribe *Cardamineae*. According to the obtained molecular and morphological results it appears that *Barbarea sicula* occurs in Turkey. As a result of the evolution of revision findings in Turkey, *Barbarea duralii* Y. Bağcı & Savran was presented as a new species, *Barbarea anfractuosa* (Hartv.&Strid.) Y. Bağcı & Savran) have been described as combination et stat. nov. Also, *B. brachycarpa* Boiss. subsp. *minor* (C. Koch) Parolly & Eren var. *pilicarpa* Parolly & Eren has been replaced to synonym of *Barbarea brachycarpa* Boiss. subsp. *brachycarpa* var. *brachycarpa*. Consequently, *Barbarea* has been evaluated under 13 species in Turkey.

Acknowledgements: We express our thanks to The Scientific Investigation Projects Coordinate Office of The Selçuk University (Project no: 15201100) for financial support.

Keywords: *Barbarea*, Cruciferae, ISSR, Turkey.

PP-426

An Investigation into the Spermiotoxic and Embryotoxic Effects of Copper Pyrithione (CuPt) on *Paracentrotus lividus* (Lamarck, 1816)Ezgi TAŞCI¹, Sibel HAYRETDAG¹¹Biology / Natural and Applied Sciences, Çanakkale Onsekiz Mart University, Çanakkale
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Aim of the study: Copper pyrithione used in antifouling paints is a biocide serving as an alternative to the prohibited Tributyltin. Gametes and embryos of sea urchins were selected as model organisms due to their easy obtainability and quick and sensitive response. The present study conducted for these reasons and due to the absence of related research is intended to investigate the effects of CuPt on the sperm and embryonic development of *Paracentrotus lividus*.

Material and Methods: Sea urchins collected in Güzelyalı-Çanakkale (Turkey) were brought to the laboratory to obtain gametes and to run spermiotoxicity and embryotoxicity tests by using the standard protocols specified in Pagano (1986), EPA (2003) and ASTM (2007) in the phase of biocide application. The CuPT concentrations used on the obtained sperms and embryos amounted to 1, 10, 20, 40, 60, 80, and 100 µg/l. The sperms exposed to the chemical agent for 30 min to achieve sperm toxicity were allowed to inseminate the eggs for 30 min. 100 cells were enumerated for each group. A fertilization percentage of ≥ 70 was the acceptable validity rate for controls in sperm toxicity experiments. Subsequently, 100 larvae were randomly selected from each group and evaluated for normality, skeletal deformation and growth retardation. The experiments were carried out in triplicate, and CdCl₂ was used for positive control. The software programs (i) "Linear Interpolation Method, Version 2.0 and (ii) Trap (Version 1.22), developed by USEPA, were utilized to analyze the spermiotoxicity, and thusly IC50 and lower and upper confidence intervals were calculated. The statistical significance of the value difference between the control and experiment group was determined by non-parametric Kruskal-Wallis H test to analyze the embryotoxicity.

Results: The current study revealed that CuPt was not spermiotoxic. Because the number of the fertilized eggs were not below 50, EC50 was not calculated. The statistical analyses showed that the dose-based effect of CuPt on the skeletal growth of the embryos was significantly increased in contrast with the control group. The findings indicated that CuPt was highly toxic to sperms and embryos of *P. lividus*. A dose-based increase was observed in the skeletal deformation, but not a significant increase in the number of embryos with growth retardation.

Acknowledgements: We would like to thank Dr.T.J. NORBERG-KING (USEPA, Duluth, MN) for ICPIN (USEPA, Version 2.0), Dr.R. ERICKSON (USEPA, Mid-Continent Ecology Division, Duluth, MN) for TRAP (USEPA, Version 1.22), Prof. Figen ERKOÇ for her help with the statistical analyses, and Prof. C. Varol TOK for his support in the field research.

Keywords: Copper pyrithione, *Paracentrotus lividus*, spermiotoxicity, embryotoxicity.

PP-427

Macromycetes Determined in Aydınca (Amasya) Districtİbrahim TÜRKEKUL¹, Hakan IŞIK²¹*Gaziosmanpaşa University, Faculty of Arts and Science Department of Biology Tokat-Turkey*²*Social Science High School Tokat- Turkey**ibrahim.turkekul@gop.edu.tr*

Aim of the study: Turkey is among the richest countries in terms of macrofungi diversity due to its various climate and habitats. So far 2158 macrofungi species have been identified and this number is increasing with new studies (Sesli and Denchev, 2008). The aim of this study is to determine macromycetes of Aydınca (Amasya) district.

Material and Methods: The specimens were collected from different localities within Aydınca (Amasya) Province between 2011 and 2013. The field studies were conducted mostly in autumn and spring, since during these periods the climatic conditions are suitable for growth of fungi. In field studies morphological and ecological characteristics of the macrofungi were recorded and photographed. After field studies, specimens were taken to the laboratory for microscopically studies. Specimens were identified with the help of Phillips (1981), Marchand (1986), Moser (1983), Breitenbach and Kränzlin (1984–2000), Watling and Gregory (1987, 1989), and Brensinsky and Besl (1990). The fungi species identified are numbered in polyethylene pouches and saved in fungarium of Biology department of Gaziosmanpaşa University.

Results: In this study, 82 taxa belonging to 23 families were identified from Aydınca (Amasya) Province, eight of which belong to Ascomycota and 74 to Basidiomycota. All these taxa are presented with their habitats, collection dates, localities, and accession numbers. The taxa is given systematically according to fungorum (www.speciesfungorum.org; accessed 12 October 2015) indexes.

Keywords: Biodiversity, mushrooms, Amasya, Turkey.

PP-428

Pollination Biology of *Pancratium maritimum* (Sea daffodil)

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Aim of the study: *Pancratium maritimum* L. specified in EN and VU category regionally in the Mediterranean countries. Day by day with the intense pressure of the people, number of *P. maritimum* is reduced in a manner that danger due to its medicinal properties and having a sweet scent or made directly to habitat destruction. According to "Flora of Turkey" and other studies in the literature *P. maritimum* pollinates with moths. In Turkey, there are not any studies done about its pollination biology and pollinators. Because of that first aim of this study to explain pollination biology of *P. maritimum* in Turkey. With the data we have obtained on *P. maritimum*, which is about to be extinct increasingly, we aim to create a major infrastructure about conservation studies and species – actions plans in the natural areas and national parks.

Material and methods: This study was conducted in coast of Urla – İzmir. To determine the type of pollination, we made observations in some days of June – July – August (5 d/24 h, total 120 hours, at flowering time). Associated with it; pollinators which interact with plants were caught with bug net and were photographed for identify.

Results: According to literature about pollination of *P. maritimum* L. is only pollinated by moths (*Hippotion alecto cretica* Boisd., *H. celerio* L., *Daphnis nerii* L., *Herse convolvuli* L., *Deilephila euphorbiae* L., *Celerio lineata livornica* Esp.) and also bees (*Anthophora* spp., *Apis mellifera* L.) collecting pollens but not to cause pollination. Researchers noted that due to greater distance between the anthers to the stigma, bees failed touch to the stigma. As a result of our observations, 4 different type of bee species (*Xylocopa violacea* L., *Anthophora* spp., *Apis mellifera* L., *Anthophora bimaculata* Panzer) and 1 moth (*Agrius convolvuli* L. syn. *Herse convolvuli* L.) effective in pollination. Also 2 hoverfly species (*Sphaerophoria scripta* L., *Eristalinus taeniops* Wiedemann) visit *P. maritimum* to feed. Unlike other studies, the bee collects the pollen by rubbing against the anthers. The pollen collects on the hind legs (tibia) or abdomen, in a structure referred to as a "pollen basket". Bees rubbing 6 anthers respectively and then touch to the stigma and it makes the same movement and amount of time on it. In this way, bees assist in the transport of pollen to stigma. In addition of these species, ants also visit flowers to feed but it was observed to take any role in pollination.

Acknowledgements: This study supported by Ege University Faculty of Science (Project no:14 FEN 043)

Keywords: *Pancratium maritimum*, Pollination, Hymenoptera, Diptera, Lepidoptera.

PP-429

Chromosome numbers of some species of the genus *Origanum* in TurkeyEsra MARTİN¹, Tuncay DİRMENÇİ², Turan ARABACI³, Ekrem AKÇİÇEK²¹Necmettin Erbakan University, Science Faculty, Department of Biotechnology, Konya, Turkey²Balıkesir Erbakan University, Education Faculty, Department of Biology Education, Balıkesir, Turkey³İnönü University, Faculty of Pharmacy, Department of Pharmaceutical Botany, Malatya, Turkey

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Aim of the study: Karyological knowledge needs to be used in conjunction with other sources of data to achieve a better understanding of the cytologic relationship of *Origanum* L. species, leading to their natural classification. In this regard, chromosome numbers were determined in 15 taxa of *Origanum* growing naturally in Turkey.

Material and Methods: For chromosome analyses, root tips were obtained from seeds germinated for ten days on wet filter paper in petri dishes. Root tips were pretreated with α -monobromonaphthalene for 16 h at 4 °C, fixed in ethanol: glacial acetic acid (3:1) for 24 h and stored at 4 °C until use. Root tips were washed in distilled water to remove the fixative, hydrolysed in 1N HCl for 13 min at room temperature and stained in 2% aceto-orcein for 2 h. Permanent slides were made with the standard liquid nitrogen method; slides were dried for 24 h at room temperature and mounted in depex. Chromosome analyses were made using Bs200Pro Image Analysis Software.

Results: In this study, karyotype analyses of 15 taxa belonging to the genus *Origanum* (Lamiaceae) and growing naturally in Turkey were conducted. Squash preparation method was used for chromosome study in these taxa. Chromosome analyses of taxa were performed via an Image Analysis System (Bs200ProP). Diploid chromosome numbers of *Origanum acutidens* (Hand.-Mazz.) Ietsw., *O. majorana* L., *O. haussknechtii* Boiss., *O. bargyli* Mouterde, *O. munitiflorum* O.Schwarz & P.H.Davis, *O. bilgeri* P.H. Davis, *O. laevigatum* Boiss., *O. hypericifolium* O.Schwarz & P.H.Davis, *O. syriacum* subsp. *bevani*, *O. saccatum* P.H.Davis, *O. onites* L., *O. leptocladum* Boiss., *O. x intercedens* Rech.f. taxa were counted as $2n = 30$ while those of *O. sipyleum* L. and *O. rotundifolium* Boiss. taxa were $2n = 28$.

Acknowledgements: We express our thanks to TUBITAK (Project no.:113 Z 225) for financial support.

Keywords: Chromosome, Lamiaceae, *Origanum*, Turkey.

PP-430

Change of Antioxidant Vitamins during Drying in *Craterellus cornucopioides*Mahfuz ELMASTAS¹, İbrahim TÜRKEKUL²¹Department of Chemistry, Faculty of Arts and Science, Gaziosmanpaşa University, TOKAT/TURKEY²Department of Biology, Faculty of Arts and Science, Gaziosmanpaşa University, TOKAT/TURKEYmahfuz.elmastas@gop.edu.tr

Aim of the study: Edible mushrooms are used extensively in cooking as fresh or dried in the world. Fruit body of mushrooms are appreciated, not only for texture and flavour but also for their chemical and nutritional properties. Black trumpet (*Craterellus cornucopioides*) is a highly nutritious wild edible mushroom and is also considered as a source of valuable medicinal compounds. However, until now, information on antioxidant vitamins has not been published. The aim of the present study was to evaluate change of vitamin C and vitamin E in *C. cornucopioides* during drying proses.

Material and Methods: *Craterellus cornucopioides* was collected from the Black Sea region of Turkey and were authenticated. It has been stored at the Mycology Herbarium Laboratory of Gaziosmanpasa University. Parts of a portion of the mushroom sample were dried in the oven at 30°C. Both fresh and dried sample extracted with 3% metaphosphoric acid solution for Vitamin C. Extraction for Vitamin E is done with hexane/dichloromethane (3/1). Vitamin analysis was performed by HPLC using reverse phase C18 column and DAD detector. Vitamins amounts have been calculated as mg per kg of tissue using a calibration graph.

Results: The amount of vitamin C found 174.1 mg/kg in fresh mushroom sample whereas this value found 5.7 mg/kg in dried sample. The amount of vitamin E observed 48.7 mg/kg in fresh sample while this value found 46.8 mg/kg in dried sample. Dried mushrooms sample lost vitamin C almost all of them, while changing the amount of vitamin E is not statistically significant. The consumption of mushroom should be preferred as fresh instead of dried because of vitamin C losses. However these various reasons, there is a need for further investigation.

Acknowledgements: The authors are grateful to Gaziosmanpasa University for their support. They are also grateful to Zülfikar Karaçay for technical support.

Keywords: Mushroom, *Craterellus cornucopioides*, Vitamin C, Vitamin E.

PP-431

Comparison of Variation in Forewings of Mud Dauber Wasp (*Sceliphron curvatum*) (Hymenoptera) from Different Localities of Turkey by Geometric Morphometric AnalysisYaşar GÜLMEZ¹, İlyas CAN¹, Faruk Tolga ÇUBUK¹, Yahya TAYHAN²¹Biology Department, Faculty of Arts and Sciences, Gaziosmanpaşa University, Turkey²Center for Scientific and Technical Researches, Gaziosmanpaşa University, Turkeyyasar.gulmez@gop.edu.tr

Aim of the study: Forewing veins and their angles mostly included in keys which have been used to identify and distinguish between taxa in Hymenoptera. Geometric morphometrics make possible to reveal shape variations in different samples and compare them to each other. The aim of this study is to compare the amount of variation among the forewings of *Sceliphron curvatum* samples collected from different localities in Turkey by using geometric morphometry.

Material and Methods: Forewings of 45 samples from Amasya, Kocaeli, Samsun and Tokat provinces belonging to *Sceliphron curvatum* were photographed with Canon 650D camera. 25 landmarks were digitized on each picture using tpsDig2 (Thin Plate Spline Digitizer). Procrustean transformations were conducted with Morphoj software. Centroid size (CS) was used as a wing size index. Centroid size was compared by Kruskal-Wallis test. Shape variations between localities were examined through Procrustes analysis of variance. Additionally differences between wing shapes were grouped according to localities by canonical variate analysis (CVA).

Results: According to the results there was no significant difference among wing sizes (centroid size) ($P=0.356$), but wing shapes varied among localities ($P<0.05$). Canonic variate analysis showed that samples from Niksar were grouped independently from others. Moreover Amasya and Samsun samples were formed a group but Tokat and Erbaa formed another group. Because there is no clear geographic limitation among localities, the observed differences in wings of samples could arise from their ecological demands.

Keywords: *Sceliphron curvatum*, geometric morphometrics, forewing, variation.

PP-432

A Systematic Study on Water Mites (Acari, Hydrachnellae) of Tokat, Turkey, ProvinceAhmet BURSALI¹, Muhlis ÖZKAN²¹Department of Biology, Faculty of science and Arts/Gaziosmanpaşa University, Turkey, Tokat²College of Education/Uludag University, Bursa, Turkey

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Aim of the study: Water mites are commonly distributed among freshwater which can be used as indicator of clean water. So far, 236 species and subspecies and 23 families have been found from Turkey. The aim of this study is to determine the water mites fauna of Tokat province.

Material and Methods: Water mite specimens were collected from water lands of Tokat, Turkey and preserved as described earlier by Cook (1974) and Özkan (1981). Figures were drawn with a compound microscope (Olympus CX41, Japan with drawing attachment) and dimensions measured in micrometers (µm).

Results: It has been evaluated water mite species collected from Tokat province. Totally, determined 18 species belong to 10 families. Of these; *Hydravolzia plachopora*, *Sperchon verrucosa*, *Protzia roduntus*, *Protzia exima* are new for the province. The morphological characters, the measurements and drawing of various organs, habitats and distributions on the world of identified species was evaluated.

Acknowledgements: Authors thank to Gaziosmanpaşa University Scientific Research Council for supporting the research (grant no: 2004/22).

Keywords: Acari, Hydrachnellae, Tokat, Türkiye.

PP-433

Karyomorphological Analysis of *Muscari macrocarpum* and *Muscari racemosum* species (Asteraceae) From Turkey

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Aim of the study: In this paper, endemic and locally distributed two *Muscari* Miller taxa were examined in terms of their karyomorphology. The findings indicated that they are very similar in point of karyomorphologies as well as their morphologies.

Material and Methods: Plant materials consisted of bulbs belonging to the genus *Muscari* were collected from natural populations of Turkey. Root tips were pre-treated in 0.002 M 8-hydroxyquinoline at 4°C for 8 h. The material was fixed with Carnoy for 24 h at low temperatures (+4°C). Before staining, the material was hydrolyzed with 5 N HCl for 1h at room temperature, stained with 1% aceto-orcein and mounted in 45% acetic acid. At least 10 metaphases were examined per taxa; the best metaphase plates were photographed (100x) with a digital camera (Olympus DP-72), mounted on an Olympus BX53 microscope. Idiograms and karyotyping analyses were carried out using KAMERAM 2.9.4.0. We took into account five different asymmetry indices to analyze the karyomorphologies of the endemic *Muscari* species using KAMERAM.

Results: The basic chromosome number for all of the studied metaphase plate was concurrently determined as 9 ($x = 9$). The studied *Muscari* species are diploid ($2n=2x=18$). The karyotypes had a predominance of metacentric (m) chromosomes. Although *M. racemosum* had karyotype formula with $14m + 2st + 2sm$, *M. macrocarpum* had karyotype formula with $10m + 4sm + 4st$. Both of them could be characterized by having satellites in different chromosomes. However, they are separated easily according to the chromosomal measurements and the indices. When considering total haploid chromosome lengths (TCL) the studied taxa are seen very different that the values are interval in minimal and maximal values. *M. macrocarpum* had the highest TCL value (with 54.572 μm). Unlike, *M. racemosum* had the lowest TCL value (with 18.214 μm).

Acknowledgements: We thank the TÜBİTAK (Project No: 110T948) and Scientific Investigation Project Coordinator of Selçuk University (Project No: 15701301) for their financial support.

Keywords: Chromosome number, chromosome morphology, karyotype analysis, karyotype asymmetry, Turkey.

PP-434

**Root Anatomy of the Subgenus *Caropodium* (STAPF & WETTST.) TAMAMSCH. & V.M.VINOGR.
from the Genus *Grammosciadium* DC.**Fatma ULUSOY¹, Dudu Özlem MAVİ İDMAN², Muhammet Ali KARAKAYA¹, Barış BANİ¹¹ Faculty of Arts and Sciences, Kastamonu, Turkey² National Botanical Garden of Turkey, Turkeymaviozlem07@gmail.com

Aim of the study: The subgenus *Caropodium* (Stapf & Wettst.) Tamamsch. & V.M.Vinogr., which is one of the 2 subgenera of the genus *Grammosciadium* DC., is represented by 4 taxa all of which are distributed in Turkey. Because there are insufficient numbers of study about the anatomical properties of the genus, it is important to clarify these characters. This study includes the anatomical properties of roots of the taxa namely *G. platycarpum* Boiss. & Hausskn. ex Boiss., *G. pterocarpum* Boiss., *G. schischkinii* (V.M.Vinogr. & Tamamsch.) V.M.Vinogr. and *G. haussknechtii* Boiss. from the subgenus *Caropodium* (Stapf & Wettst.) Tamasch. & V.M.Vinogr.

Material and Methods: The materials used for anatomical studies were gathered from different 19 localities. For sectioning 10-15 µm thickness of slides from roots, freshly obtained samples were kept in 70 % Ethyl alcohol (EtOH) during the field trips. The root materials were sectioned by modified Paraffin Sectioning Method (Johansen, 1944; Algan, 1981; Mavi *et al.*, 2011) using Thermo SHANDON FINESSE325 microtome. After removing the paraffin from the sections, safranin and fast green dyes were applied (Algan, 1981). 10 slides for each taxa from each locality were prepared. The average diameters of roots, the average thickness of the cortex and the average thickness of the sclerenchymatous cells were measured from these slides. The images were gathered by using Leica DFC295 camera attached to Leica DM3000 microscope.

Results: The results show that the roots have periderm, cortex and vascular tissue with their vascular cambium respectively from the outermost layer. The general structure of the roots seems not so far different from typical Umbelliferae roots. Moreover, the measurements such as the diameters of roots and the thickness of the cortex are nearly equal for each taxon from their different localities. However, there are considerable layers, composed of densely arranged stone cells. The most important result of this study is that, the existence, the density and the arrangement of these polyhedral sclereids just under the periderm are remarkable characters. It seems that, the density of these sclerenchymatous layers is a diagnostic character for the subgenus. Also, this study will be useful for the next researches to use roots for taxonomic reasons.

Acknowledgements: We wish to thank the Scientific and Technological Research Council of Turkey (TUBITAK-114Z094) for their financial support.

Keywords: *Caropodium*, anatomy, root, stone cell, Turkey.

PP-435

Comparing pollution levels between Adıgüzel and Gökpınar Dams by measuring some biomarker levels in *Cyprinus carpio*Serdar POLAT¹, Mustafa DURAN¹, Adile SARI^{1,2}, Gürçay Kıvanç AKYILDIZ^{1,2,3}¹Hydrobiology Lab., Department of Biology, Faculty of Science and Arts, Pamukkale University, Turkey²Department of Electronic and Automation, Denizli Vocational School of Technical Sciences, Pamukkale University, Turkey³FAGUMER - Flora and Fauna Research, Development and Application Center of Pamukkale University Denizli - TURKEY

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Aim of the study: The main goal of this study was to measure the water quality of designated sampling sites by using biomarkers such as AChE, GST, EROD, TBARS, and MT in gill, liver, and muscle tissues of *Cyprinus carpio* and to provide information about the pollution levels of studied sampling sites.

Material and Methods: In this study, two sampling sites from Gökpınar and Adıgüzel Dams (Denizli) were studied. From these sampling sites, fishes (*Cyprinus carpio*) were caught monthly between May and October in 2014. These fishes were brought to the laboratory in a special box which enables them to stay alive and dissected at the same day. Homogenization and preparation of cytosolic and microsomal fractions of gill, liver and muscle tissues of the fishes were performed according to optimized method of Shenkman and Cinti (1978). Obtained fractions were used in order to measure AChE, GST, EROD, and TBARS enzyme activities. The protein amounts of cytosolic and microsomal fractions were measured according to Lowry et al. (1951) by using BSA standards. The activity of AChE was measured according to Ellman et al. (1961) method. The activity of GST was measured according to Habig et al. (1974) which was optimized by Şen and Kırıkbakan (2004). The activity of EROD was measured according to Burke and Mayer (1974) which was optimized by Arınç and Şen (1994). The products of lipid peroxidation (TBARS method) were measured according to Jain and Levine (1995). In addition to all these measurements, the method of Viarengo et al. (1997) was used in order to measure MT contents of the tissues.

Results: It was found that there were differences between both tissues and sampling sites in terms of some of these biomarker enzymes. After all evaluations made in this study, it can be suggested that the amount of pollution was higher in Adıgüzel Dam than Gökpınar Dam. We conclude that this study provided compelling evidence about the pollution in Adıgüzel Dam which is known as dirty colloquially.

Acknowledgements: This research was supported by Pamukkale University Scientific Research Project Coordination Unit as a MSc thesis (Grant number: 2011FBE067).

Keywords: Adıgüzel Dam, Gökpınar Dam, biomakers, biological monitoring, *Cyprinus carpio*, pollution.

PP-436

The Molecular Characterisation of *Centaurea pseudoscabiosa* and Its Subspecies By ISSR markers

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Aim of the study: The main aim of this study is to make the molecular characterisation of the *C. pseudoscabiosa* and its subspecies via ISSR markers. *C. pseudoscabiosa* is localised to east Anatolia in our country and its distribution area in most western is ended in near of Erzincan. During this study, the subspecies and their populations were collected from different localities. Particularly, different morph types were included in molecular studies.

Material and Methods: *C. pseudoscabiosa* and its subspecies used in this study were collected mainly from different locality of Turkey. Total genomic DNA was extracted following the 2x CTAB method of Doyle and Doyle as modified by Soltis et al. and Cullings from silica gel-dried leaves collected in the field. Our modified ISSR-PCR analyses were basically performed according to Zietkiewicz et al. During PCR-optimization reactions, some modifications were quantitatively carried out particularly for Mg and primer amounts as well as Tm selection. The designed ISSR primers by British Columbia University were preferred for PCR-amplifications. Amplification products were separated by electrophoresis in 1.2 % agarose gel run in TAE buffer at 100 V. Fragment size was estimated by using a 100-1500 bp molecular size DNA ladder. ISSR profiles were scored as present (1) or absent (0). Only reproducible bands were scored as monomorphic or polymorphic. Dendrogram was performed using NTSYS-pc version 2.1.

Results: During ISSR amplifications, totally, twelve primers were tested over the studied taxa, but five polymorphic primers worked efficiently in all. In total, 171 visible band were obtained by helping efficient primers. According to generated data matrix was conducted very fruitful dendrogram by NTSYSpc. From this dendrogram, It is seen that the studied taxa are placed together with seventy-five percent of the maximum distance. The obtaining patterns from ISSR markers revealed that the taxa and populations displayed a broadly differentiation in point of genetically distance. Moreover, it is seen possible that some subspecies may be exposed to new taxonomical regulations and they are attained to a new combination as a new species.

Acknowledgements: We thank to the Scientific Investigation Project Coordinator of Selçuk University (Project No: 15201051) for their financial support.

Keywords: *Centaurea*, endemic, ISSR, Turkey.

PP-437

Analysis of Phytoplankton Communities and Some Water Quality Parameters of Buldan Süleymanlı Lake (Denizli)

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Aim of the study: The aim of this study was to show the phytoplanktonic flora and intent to display the composition of phytoplankton in Buldan Süleymanlı Lake (Denizli). Evaluate seasonal alternation, physicochemical and biological feature of the lake.

Material and Methods: Samples was collected between April 2015 and March 2016 from 4 different station in natural Buldan Süleymanlı Lake. Samples of phytoplankton was collected with phytoplankton net (55µm) and tube for integrated water sampling. Once the sample has been collected from the field and poured into the sample bottle it should be immediately preserved using either; 0,2-0,5 MI Lugol's iodine solution per 100 MI water sample. Samples was examined using an inverted microscope. Phytoplankton cells counting and analysis were performed according to Utermöhl Method and WISER.

Results: This study was first carried out for the lake. 237 taxa belong to 34 families in four stations was recorded. Desmidiaceae, Closteriaceae, Euglenaceae, Phacaceae, Fragilariaceae, Naviculaceae, Pinnulariaceae, Sellaphoraceae, Tabellariaceae, Gomphonemataceae, Rhopalodiaceae, Gymnodiniaceae, Peridiniaceae, Glenodiniaceae, Chlamydomyxaceae, Pleurochloridaceae, Dinobryaceae, Synuraceae, Cryptomonadaceae, Chroomonadaceae, Nostocaceae, Coelosphaeriaceae, Chlamydomonadaceae, Volvocaceae, Selenastraceae, Scenedesmaceae, Chlamydomonadaceae, Oedogoniaceae, Hydrodictyaceae, Microsporaceae, Radiococcaceae, Botryococcaceae, Oocystaceae, Chlorellaceae. The relation between this families and water quality parameters was evaluated. The most dominant family Desmidiaceae through it was oligo-mesotrophic according to Reynolds (2002).

Acknowledgements: This research was supported by Pamukkale University, msc thesis numbered with bap 2015 FBE 007.

Keywords: Phytoplankton, season, planktonic flora, pollution, Turkey.

PP-438

Molecular phylogeny of genus *Minuartia* (Caryophyllaceae) inferred from trnLE-F sequence dataŞeyma ÇETİN¹, Meryem ŞEKER¹, Murat KOÇ², Ergin HAMZAOĞLU³, Ahmet AKSOY⁴¹Department of Biology, Selçuk University, Turkey²Department of Biology, Bozok University, Turkey³Department of Biology Education, Gazi University, Turkey⁴Department of Biology, Akdeniz University, Turkey

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Aim of the study: The taxa of the genus *Minuartia* L. (Caryophyllaceae) growing naturally in Turkey and with the out-group taxa were clearly revealed with sequence analyses of cpDNA trnLE-F region in order to characterize their phylogenetic relationships in Turkey.

Material and Methods: DNA was isolated from leaves of both herbarium specimens and fresh materials using the CTAB method (Sambrook et al., 1989). Total DNA was obtained from 50 to 75 mg of dried leaf tissue from 64 different samples. DNA concentrations were determined with NanoDrop. DNA samples were diluted to 25 ng/µL. Stock DNA solutions were kept at -86 °C. PCR amplification and sequencing reactions of cpDNA trnLE-F regions (max length 714 bp) were performed using special primers. The regions were conducted with the length marker Kb⁺ at 60 volts for 2 hours in a 1% agarose gel. The sequences are combined forward and reverse primers matched studies to read with the Sequencer 4.3 software. Sequences were used to generate dendrogram with PAUP software that revealed the phylogenetic relationships.

Results: In Flora of Turkey (1967) *Minuartia isaurica* reported as between *Minuartia* and *Sabulina* sections. In the current circumscription of the genus *Minuartia* subgen. *Minuartia* and subgen. *Sabulina* were evaluated. Based on our data *Minuartia isaurica* must be placed in *Minuartia* section. Besides *Minuartia anatolica* var. *tetrasticha* in *Minuartia* section and *Minuartia mesogitana* subsp. *brachycarpa* in *Sabulina* section transferred into species level.

Acknowledgements: We express our thanks to The Scientific Investigation Projects Coordinate Office of The Selçuk University (Project no: 15401178) and TUBITAK (Project no: 113Z260) for financial supports.

Keywords: *Minuartia*, Caryophyllaceae, Sequence, trnLE-F, Turkey.

PP-439

Macromorphological and Micromorphological Characters of *Acer platanoides* L. (Sapindaceae) in TurkeyNagihan SEKİ¹, Talip ÇETER², Nurcan YİĞİT¹, Hayri DUMAN³, Barış BANI²¹Department of Forest Engineering/ Institute of Sciences, Kastamonu University, Turkey²Department of Biology/ Institute of Sciences, Kastamonu University, Turkey³Department of Biology/ Institute of Sciences, Gazi University, Turkeynkose@kastamonu.edu.tr

Aim of the study: The members of genus *Acer* L., are generally distributed in of Northern Hemisphere. The genus is represented by nearly 160 species (241 taxa) in the World, consisting of 12 species (22 taxa) in Turkey and 7 of them are endemic to Anatolia. In this study, detailed macromorphological characteristics of leaves, buds, flowers and fruits and also micromorphological features of fruits, seeds and pollen grains of *Acer platanoides* L. are determined and presented.

Material and Methods: Plant materials were collected from 6 populations in Turkey between the years of 2014 and 2015. 80 specimens (10 individuals for each population) of the species were examined for the macromorphological studies. These specimens reflected the morphological variations exhibited by the species from throughout its geographic range. Micromorphological observations were undertaken on a JEOL JSM-6060 scanning electron microscope (SEM). Fruits, seed and pollen grains were placed directly on stubs and covered with gold.

Results: *A. platanoides* is a monoecious tree up to 30m long. Leaves 10-26x11-23 cm, 5 lobed with acuminate lobules, hastate at base. Petiole glabrous, 6-25 cm and lactiferous. Inflorescence corymbose, erect, with more than 20 flowers. Peduncle up to 2-7 mm, glabrous. Flowers cream-yellow; sepals and petals 5-merous, glabrous. Female flowers smaller than male ones. Fruit glabrous 7.5-9.5 cm long and has few stomata. Angle between outside edges of fruit wings about 120°. Nutlets ovate-orbicular, glabrous, flat and 9-10.5x9-10.5 mm. Loculus inside and outside glabrous. Pollen grains are radially symmetric, isopolar, tricolpate, pollen shape is suboblate. The grains are regular striate with dense perforation ornamented at equatorial and Rugulate-psilate at polar sections. Colpi long with acute ends and clear margins.

Acknowledgements: To the memory of our dear colleague Dr. Bilgehan Bilgili who passed away in 2015. He was the coordinator of the project of the taxonomic revision of the genus *Acer*. This study is supported by TUBITAK Project with number of 114Z203.

Keywords: *Acer platanoides*, morphology, micromorphology, SEM, Turkey.

PP-440

Insecticidal Effect and Biological Activity of Endemic *Cyclamen parviflorum*Murat TURAN¹, Ramazan MAMMADOV¹¹Department of Biology, Faculty Art & Science, Pamukkale University, Denizli, Turkey
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Aim of the study: *Cyclamen* belonging to geophyte group is a member of the family Primulaceae and is a genus of tuberous plants which open brightly colored flowers in spring and autumn in our country. One of the most important features of geophyte are used for treatment due to active substance which contains of their onions, tubers and rhizomes. In scientific researchs, it was determined that many geophyte species of plants and extracts have biological effects such as antioxidant, antimicrobial and insecticidal. In this study, insect activity with ethanol extracts and biological activity with ethanol, methanol extracts obtained from endemic *Cyclamen parviflorum* were investigated.

Material and Methods: Plant Material and Extraction: The plant parts (leaves and tuber) collected in Trabzon, Turkey and were air-dried under the shade and ground using a laboratory mill and a kitchen blender. The plant samples were extracted with ethanol in a vibrating water bath. Extract was filtered, then the solvents were evaporated and the water in each extract was frozen in Freeze-Drying machine and then drawn out.

Scavenging Activity on DPPH (2,2-diphenyl-1-picrylhydrazyl) Free Radical: 0.1 mM solution of DPPH in methanol was prepared and 4 mL of this solution was added to 1 mL (0.2 - 1.0 mg) of extracts in methanol, ethanol at different concentrations. Thirty minutes later, the absorbance was measured at 517 nm. Free radical scavenging activity was measured using the equation: Scavenging activity = $[A_{\text{blank}} - A_{\text{sample}} / A_{\text{blank}}] \times 100$. Insecticidal Effect of Plant Extracts: In this study, *Musca domestica* (housefly) was used. The blend which is obtained by mixing of sugar and milk for *Musca domestica* (housefly) culture was prepared as 1:3 ration and 50 grams. 25 pieces house flies which taken from their eggs were placed in a field of life. After 24-36 hours, the larvae were appeared. Larvacide effect was recorded within 3 weeks.

Results: Tubers and leaves extracts were generally more potent than the free radical scavenging activity. The DPPH free radical scavenging activity of *C. parviflorum* leaves ethanol and methanol extracts were found more effective than tubers. In insecticidal activity, we found that *C. parviflorum* have no insecticidal effect.

Keywords: *Cyclamen parviflorum*, *Musca domestica*, DPPH, Insecticidal Effect.

PP-441

Insecticidal Effect and Biological Activity of *Cyclamen alpinum*Murat TURAN¹, Ramazan MAMMADOV¹¹Department of Biology, Faculty of Art & Science, Pamukkale University, Denizli, Turkey
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Aim of the study: *Cyclamen* species are in the list of CITES (Convention on International Trade in Endangered Species of wild fauna and flora) several species are widely used in traditional folk medicine for their laxative and abortive, sedative, purgative, emmenagogue, anti-helminthic, insecticidal properties. Some species belonging to this genus were used for their biological activities in folk medicine. Antiinflammatory and antinociceptive activities and antifungal activity of *Cyclamen alpinum* reported. In this work, we were investigated biological activity of ethanol and methanol extracts of *Cyclamen alpinum* and insecticidal effect of ethanol extracts of *Cyclamen alpinum*.

Material and Methods: Plant Material and Extraction: The plant parts (leaves and tuber) collected in Denizli, Turkey and were air-dried under the shade and ground using a laboratory mill and a kitchen blender. The plant samples were extracted with ethanol and methanol in a vibrating water bath. Extract was filtered, then the solvents were evaporated and the water in each extract was frozen in Freeze-Drying machine and then drawn out. Scavenging Activity on DPPH (2,2-diphenyl-1-picrylhydrazyl) Free Radical: 0.1 mM solution of DPPH in methanol was prepared and 4 mL of this solution was added to 1 mL (0.2 - 1.0 mg) of extracts in methanol, ethanol at different concentrations. Thirty minutes later, the absorbance was measured at 517 nm. Free radical scavenging activity was measured using the equation: Scavenging activity = $[A_{\text{blank}} - A_{\text{sample}} / A_{\text{blank}}] \times 100$. Insecticidal Effect of Plant Extracts: In this study, *Musca domestica* (housefly) was used. The blend which is obtained by mixing of sugar and milk for *Musca domestica* (housefly) culture was prepared as 1:3 ration and 50 grams. 25 pieces house flies which taken from their eggs were placed in a field of life. After 24-36 hours, the larvae were appeared. Larvacide effect was recorded within 3 weeks.

Results: In experiment of DPPH free radical scavenging activity, activity free radical scavenging of leaves was found to be higher than tuber of *Cyclamen alpinum* in concentration of 1mg / ml both of ethanol and methanol. In insecticidal activity, we found that *C. alpinum* have no insecticidal effect.

Keywords: *Musca domestica*, *Cyclamen alpinum*, DPPH, Larvacide Effect.

PP-442

Biodiversity Study of *Fusarium* Species on *Orobancha cernua* in Erzurum, TurkeyTuba GENÇ KESİMCİ¹, İrfan ÇORUH², Cafer EKEN³¹Department of Plant Protection, Faculty of Agriculture, Iğdır University, Iğdır, Turkey²Department of Plant Protection, Faculty of Agriculture, Atatürk University, Erzurum, Turkey³Department of Agricultural Biotechnology, Faculty of Agriculture, Süleyman Demirel University, Isparta, Turkey

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Aim of the study: The parasitic flowering plants of the genus *Orobancha* are obligatory, chlorophyll-lacking, root-parasitic weeds that infest dicotyledonous plants and cause severe damage to vegetables and field crops in warm-temperate and subtropical regions. Nodding broomrape (*Orobancha cernua* Loeffl.) is one of the most important factors limiting sunflower (*Helianthus annuus* L.) yield in Turkey. Member of genus *Fusarium* are among the most widespread and important plant pathogens in the world. The objectives of this study were to determine the diversity of *Fusarium* species on *O. cernua*.

Material and Methods: Diseased nodding broomrape plants were collected from sunflower fields in Erzurum, Turkey. Pieces of stems and tubercles were first washed with running tap water, sterilized in 1% sodium hypochlorite solution for 2 min, and rinsed several times with sterile distilled water. Tissue fragments were placed on potato dextrose agar (PDA) in petri dishes. Plates were incubated at 25 °C and observed daily for fungal growth. Pure fungal cultures were maintained on PDA agar plates and stored at 4°C for use throughout the study. Water agar and PDA media were used for phenotype-based identification of the *Fusarium* isolates with emphasis for characterizations of the shapes and sizes of the macroconidia and microconidia, colony features, growth rates, conidiogenous cells and chlamydospores.

Results: Identification of all the isolates were based on phenotypic characterization. Four *Fusarium* species were identified namely, *F. acuminatum*, *F. equiseti*, *F. oxysporum* and *F. solani*. *Fusarium oxysporum* was most abundantly isolated (71,43%) followed by *F. solani* (14,29%), *F. acuminatum* (7,14%) and *F. equiseti* (7,14%). *Fusarium oxysporum* consists of pathogenic and non-pathogenic strains that are morphologically indistinguishable. Various strains of *F. oxysporum* have been shown to infect parasitic weeds of the Orobanchaceae, including the broomrapes (*Orobancha* spp.) and were suggested as potential agents for the control of these parasitic weeds in agricultural fields. *Orobancha cernua* was found to be a new host of *F. acuminatum*, *F. equiseti* and *F. solani* in Turkey.

Keywords: *Fusarium* species, identification, *Orobancha*, sunflower.

PP-443

Diversity of Fungi Isolated from *Medicago sativa* in Turkey

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Aim of the study: Alfalfa (*Medicago sativa* L.) is a perennial forage legume with a worldwide distribution consisting one of the world's most valuable forages. Different biotic and abiotic diseases can affect alfalfa production. Alfalfa is attacked by more than 70 fungi in addition to bacteria, phytoplasmas, viruses and nematodes. The objective of this paper is to summarize for the data on diversity of fungi on alfalfa in Turkey.

Material and Methods: Until now, no complete list of diversity of fungi on alfalfa in Turkey has been published. The available data from the literature have been used to compile this review paper.

Results: According to literature data, many fungal species have been reported from alfalfa which includes *Alternaria* sp., *Botryodiplodia* sp., *Colletotrichum* spp., *Curvularia inaequalis*, *Epicoccum* sp., *Fusarium* spp., *Leptosphaerulina briosiana*, *Leptotrochila medicaginis*, *Leveillula taurica*, *Macrophomina phaseolina*, *Peronospora trifoliorum*, *Phoma medicaginis*, *Pseudopeziza medicaginis*, *Phyllosticta medicaginis*, *Pythium* spp., *Rhizoctonia* spp., *Sclerotinia* spp., *Stemphylium* spp., *Stagonosporameliloti*, *Trematosphaeria circinans*, *Trichoderma* sp., *Uromyces striatus* and *Volutella colletotrichoides*.

Keywords: Alfalfa, *Medicago sativa*, fungi, diversity.

PP-444

Diversity of Fungi on *Onobrychis viciifolia* Seeds in Turkey

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Aim of the study: Sainfoin (*Onobrychis viciifolia* Scop.) is a perennial forage legume with a deep taproot. This plant is often grown in conjunction with forage grasses to reduce bloat in grazing animals, and to improve soil fertility due to its nitrogen fixing ability. Seed is the most important input for crop production. Seeds are carriers of several plant pathogens which are responsible for severe diseases leading to considerable loss of crop yield. Seed-borne fungi are one of the most important biotic constraints in seed production worldwide. The objective of this paper is to summarize for the data on diversity of fungi on *O. viciifolia* seeds in Turkey.

Material and Methods: Until now, no complete list of diversity of fungi on *O. viciifolia* seeds in Turkey has been published. The available data from the literature have been used to compile this review paper.

Results: In this paper, the former studies on diversity of fungi on *O. viciifolia* seeds in Turkey were summarized. A survey of literature showed that many fungal species have been reported from *O. viciifolia* seeds which include *Acremonium* spp., *Alternaria* spp., *Ascochyta fabae*, *Aspergillus* spp., *Botrytis cinerea*, *Cladosporium herbarum*, *Curvularia inequalis*, *Epicoccum* sp., *Fusarium* spp., *Gliocladium* spp., *Penicillium* spp., *Phoma* sp., *Rhizopus* sp., *Stemphylium* sp., *Trichothecium roseum* and *Ulocladium atrum*.

Keywords: Sainfoin, seed, fungi.

PP-445

The Synonyms for *Cryptochironomus* in Turkey and New Additions to Genus *Cryptochironomus* Kieffer, 1918Recep BAKIR¹, Gürçay Kıvanç AKYILDIZ^{1,2,3}, Serdar POLAT¹, Mustafa DURAN¹¹Hydrobiology Lab., Department of Biology, Faculty of Science and Arts, Pamukkale University, Turkey²Department of Electronic and Automation, Denizli Vocational School of Technical Sciences, Pamukkale University, Turkey³FAGUMER - Flora and Fauna Research, Development and Application Center of Pamukkale University Denizli - TURKEY

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Aim of the study: The genus *Cryptochironomus* is represented by six species in Turkey while it is represented by ten in Europe. Four of those species were recorded as larvae and two of them were recorded as mature from Turkey. It is clear that the recent studies performed on chironomids cause increasing in number of synonymous taxa. The aim of this study is updating the information on *Cryptochironomus* genus for Turkey and necessary additions by following the most recent studies.

Material and Methods: Chironomids were collected between 2010-2015 from various lakes and streams in Turkey. Chironomid larvae were separated from the sediment and detritus by using sieves with mesh size 250 µm. All the larvae samples were immediately fixed in 70% Ethyl-alcohol in the field. The larvae samples were sorted based on their systematic under the stereo microscope and then mounted permanent in the laboratory. All the morpho-metric measurements were taken for each individuals and mean values were taken in account. The recent *Cryptochironomus* identification manuals were followed.

Results: As the result of the current study, three of six species has been already given from the genus *Cryptochironomus* Turkey has been transferred to a different genus. *Cryptochironomus acutus* recorded as mature by Reis 1985 updated as *Harnischia acuta*, known as larval recorded *Cryptochironomus pararostratus* updated as *Parachironomus pararostratus*, and *Cryptochironomus rolli* updated as *Parachironomus rolli*. Reported as mature by Reis 1985 *C. rostratus* was founded first time as larva in Turkey. The larvae of *C. supplicans* and *C. obreptans* species was reported as new record for Turkish Limnofauna. This study revealed that *Cryptochironomus* genus represented by five species in Turkey.

Keywords: Diptera, *Harnischia acuta*, *Parachironomus rolli*, *Cryptochironomus supplicans*, *Cryptochironomus obreptans*.

PP-446

Using Morphometric Characters Combination to Identify *Chironomus* Species in TurkeyRecep BAKIR¹, Gürçay Kıvanç AKYILDIZ^{1,2}, Adile SARI¹, Mustafa DURAN¹¹Biology Department, Pamukkale University, Turkey²FAGUMER - Flora and Fauna Research, Development and Application Center of Pamukkale University
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Aim of the study: Use of this genus in ecological, environmental and paleoecological studies is hampered by the fact that *Chironomus* larvae are difficult to identify to species because the larvae of many species are morphologically similar. We used a combination of new morphological and morphometric characters to distinguish *Chironomus* larvae collected from 11 different located lakes in Turkey.

Material and Methods: Samples was collected between July and November (2010) from 11 different located lakes in Turkey which are natural lake. Samples of chironomid larvae were separated from the the sediment by using sieves with mesh size 250 μ m. All the larvae samples were immediately fixed in 70 % ethyl alcohol in the field. The larvae samples were sorted based on their systematics by using the stereo microscope before the permanent preparation in the laboratory. Epler (2001) was applied for preparation the larvae. The materials examined was mounted on slides in Euparal®. The general terminology and abbreviations follow Valenduuk and Pillot (2002) with regard to larvae. All measurements are in micrometers and the mean value of the larvae was taken into account for the mouthpart measurements. *Chironomus* identification manuals were followed as Webb and Scholl (1985), Vallenduuk and Pillot (2002).

Results: A total of 400 individuals were collected from sampling sites. Each individual firstly was classified by using gula pigmentation, mandibular teeth pigmentation, absence or presence of tubules on terminal segment and shapes of 3-4-5 lateral teeth. Mouthparts and the size of head capsule were measured. Fourteen species were identified based upon of all those characteristics and morphometrics and eleven of them are new record for Turkish limnofauna.

Keywords: Limnofauna, Morphometrics, Chironomidae, Head Capsule, Diptera.

PP-447

The availability of the Seaweed as Hormone

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Aim of the study: The oceans and seas are the sources of vitamin, mineral and trace elements. Seaweeds are capable of incorporating those elements in higher concentrations. According to the research around the world, the seaweed extracts have been used as fertilizer in agricultural products. However, new researches indicated the use of it as organic fertilizer in seed production. The seaweed thrown to the coast by the sea was used in this study.

Material and Methods: The seeds Acacia are used in the study. Seeds were sown in forest soil + perlite. Germination were observed and treated with seaweed in various periods (except the control samples). The collected seaweeds were cleaned, dried and grinded before they were sterilized in distilled water to obtain the extract.

Results: The results indicated that the seedlings treated with seaweeds outgrew 2-3 times faster in height and diameter than the seedling not treated with seaweeds, and the treated seedling were found to be stronger and healthy. In conclusion the seaweeds extracts could be used as organic fertilizer in Forest trees producing.

Keywords: Seaweed extract, Fertilizer, Acacia.

PP-448

The Effects of Topographic Factors on Soil Properties

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Aim of the study: Altitude, slope and direction are one of the factors affecting climate. Therefore these factors effect soil formation. The aim of this study was to investigate the effects of altitude, slope and direction on soil properties in the naturally growing beech habitat of Sinop region.

Material and Methods:The study has investigated in The Forest Management of Central Sinop. Soil samples were obtained from 5 different altitude groups at least 200 metres intervals. The samples were taken two north and two south directions from each altitude groups. It was selected total of 20 sample area for soil properties. Also, slope values were determined by tilt meter for in the each sample area. From 20 sample area; A_h, A_{el}, B_{st} ve C horizons were taken soil sample. The soil samples were made of Physical analyses (ratio of sand, silt, clay and FSK) and chemical analyses (pH, EC).

Results: The relationship between altitude, slope and soil characteristics were analysed correlation. The relationship between south-north directions and soil characteristics were tested Independent sample T test. That it was seen from the results of studies, there are significant relationships between topographic factors and soil properties.

Keywords: Beech, Soil properties, Altitude, Slope, Direction, Sinop.

PP-449

Phytochemical Analysis of *Taxa Crocus pallasii* subsp. *pallasii*Nahide DENİZ¹, Ramazan MAMMADOV¹¹Department of Biology, Faculty of Arts and Sciences, Pamukkale University, Denizli/Turkey.
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Aim of the study: Because of geographical position on the world Turkey's floristic structure shows a great richness and diversity. Geophytes are herbaceous plants which have specialized underground stems that store nutrition. *Crocus* species that belonging to *Iridaceae* and having economic value have used since the earliest years in the alternative medicine for the treatment of diseases. The *Crocus pallasii* spp. *pallasii* with variations that are type of *Crocus* L. genus from *Iridaceae* is a very rich type. Research of phytochemical analysis this plant is very important for medicine.

Material metod: After plants collected in suitable conditions and drying in the shade was pulverized. It was then extracted using ethanol as the solvent (55 °C ' twice in six hours in a shaking water bath). After removal of the solvent Rotary evaporator lyophilized sample was used in assays to phytochemical analysis. Phenolics contents of *C. pallasii* subsp. *pallasii* was also analyzed by HPLC. The phenolic compounds were recognized by comparing retention times and UV absorption spectra with those of pure standards. Gallic acid, 3,4dihidroksi, 4dihidroksi, chlorogenic acid, Vanilic acid, Caffeic acid, p-Coumaric acid, Ferulic acid and Cinnamic acid were used as Standard.

Results: Peaks identified by comparing retention times and UV spectra with authentic standards. The amount of each phenolic compound was expressed as µg/g per gram of the extract. . Maximum amount of phenolic content were found in *C. pallasii* subsp. *pallasii* was the richest species in Ferulic acid.

Acknowledgements: This work was supported by PAUBAP.

Keywords: *Crocus pallasii* subsp. *pallasii*, HPLC, Phytochemical Analysis.

PP-450

**Weight-Length and Length-Length Relationships of Endemic Species of Giant Spring Minnow
(*Pseudophoxinus anatolicus* Hanko, 1925)**

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Aim of The Study: At this study, weight-length and length-length relations of 113 sample of *Pseudophoxinus anatolicus* Hanko, 1925 population are found at the Kuğulupark area of Seydişehir district of Konya. Relations of length-weight parameters (a and b) enables to predict fishes' weight by using it's length, calculation of condition index and comparison of morphologies and lifetimes in populations of different habitats. Length-Length relations are important at comparison of growing studies using different length types.

Material and Methods: This study has been conducted by using 113 Giant Spring Minnow which caught at the Kuğulupark Area in May 2015. Weights of fishes are weighted by 0.01 g sensitive scales, lengths are measured by using 1 mm sensitive measurement board. Relations between Total Weight (TW)-Total Length (TL), Total Length (TL)-Fork Length (FL), Total Length (TL)- Standard Length (SL), Fork Length (FL) - Standard Length (SL) are calculated by using linear regression analysis method.

Results: Dispersions of samples; total body lengths are between 0.98-17.46 g, total lengths are between 4.60-11.20 cm, standard lengths are between 3.80-9.50 cm, fork lengths are between 4.20- 10.50 cm. Equation of relation between TW-TL is $TL = 0.4241(TW) + 5.1883$ ($R^2 = 0.8809$), equation of relation between TL-FL is $FL = 0.9488(TL) - 0.1467$ ($R^2 = 0.9977$), equation of relation between TL-SL is $SL = 0.8719(TL) - 0.1962$ ($R^2 = 0.9958$), equation of relation between FL-SL is $SL = 0.9182(FL) - 0.0553$ ($R^2 = 0.9963$)

Acknowledgements: The samples used at this study are provided from the preliminary study of TAGEM/HAYSUD/2016/A11/P-01/1 project of Fisheries Research Institute

Keywords: Giant Spring Minnow, *Pseudophoxinus anatolicus*, length-length relationship, length-weight relationship, endemic.

PP-451

**Otolith length, breadth and weight with total length of fish relation among of Anatolian endemics
Giant Spring Minnow (*Pseudophoxinus anatolicus* Hanko, 1925)**

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Aim of The Study: In this study, relation among live otolith weight, fish size and fish weight of 101 Anatolian endemics Giant Spring Minnow that were caught, at the Kuğulupark area of Seydişehir district of Konya-Turkey is studied. It is a frequent application to study the relation among bony structures, fish length and fish weight at the fish biology researches. Researching of only otoliths ables to guess the weight of the fish; by concerning the measurements of otoliths located at the head with the fish weights and fish legths

Material and Methods: This study is conducted at the beginning of May 2015 by using the samples taken from the Kuğulupark area at Seydişehir district of Konya city. Sizes of 101 Giant Spring Minnow caught are measured by using 1 mm sensitive measurement board, weights of the fishes are measured by using 0.001 g sensitive scales and otoliths are measured by using 0.0001 g sensitive scales after washing by pure water and dried. Relation among Total length (TL) –Right otolith breadth (OB), Total length (TL)- Right otolith length (OL), Total length (TL) –Right otolith weight (OW) are c by using linear regression analysis method.

Results: By the calculations, high correlation relations are identified among the compared specifications. Widths of right otolith are varied between 0.81-1.78 mm, right otolith lengths are varied between 0.82-1.89 mm, right otolith weights are varied between 0.0002-0.0014, total fish lengths are varied between 4.60-11.20 cm. Difference between right otolith widths-left otolith widths , right otolith lengths-left otolith lengths , right otolith weights-left otolith weights, are evaluated as statistically insignificant ($P>0.05$). The equation of relation between (TL)-(OB) is found as $(OB) = 0.1256 (TL)+0.2421 (R^2 = 0.9034)$, the equation of relation between (TL)-(OL) is found as $(OL) = 0.1421(TL)+0.2185 (R^2=0.8875)$, the equation of relation between (TL)-(OW) is found as $(OW) = 0.0002(TL) -0.0007(R^2 = 0.9114)$.

Acknowledgements: The samples used at this study are provided from the preliminary study of TAGEM/HAYSUD/2016/A11/P-01/1 project of Fisheries Research Institute.

Keywords : Giant Spring Minnow, *Pseudophoxinus anatolicus*, otolith, length, weight.

PP-452

Antioxidant Activity and Phenolic Contents of Cherry VarietiesAli ÇELİK¹, Emine Nur HERKEN², Aysun Yurdunuseven YILDIZ²,
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Aim of the study: In this study, it was aimed to investigate the total phenolic content and antioxidant activity of six different varieties of *Prunus avium* L.

Material and Methods: The samples were collected in upland of Kahramanmaraş in July 2015. Fruit samples were shade dried and pitted. The residue fruit part was crushed and extracted with methanol (1g/10 ml) in a sonicated water bath. Total phenolic content, ABTS and DPPH radical scavenging activities were determined. A commercial kit was used for ABTS radical scavenging activity.

Results: With respect to total phenolic content results, the highest value (22,819 mg GAE/g) was found in black cherry. Ziraat type cherry had the highest ABTS (0,130 µmol TE/g) and DPPH (0,864 µmol TE/g) scores.

Keywords: Cherry, Antioxidant activity, Phenolic content.

PP-453

New Breeding Site of Eleonora's Falcon (*Falco eleonora*) in South-Western Turkey

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Aim of the Study: The medium-sized long-distance migrant, Eleonora's falcon (*Falco eleonora* Gene, 1839), breeds exclusively in the Mediterranean basin, Canary islands and Northwest coast of Africa. They overwinter in Southeast Africa, Madagascar and on the island of Indian Ocean. Although the breeding distribution of the species is well defined, in Turkey there is still unexplored breeding and/or overwintering sites of species. Here, I described the new breeding site of Eleonora's falcon in Southwestern Turkey.

Material and Methods: The study area is around Adrasan bay (36°20'06" N, 30°31'57" E), Kumluca, Antalya, Turkey. In this region, suitable breeding sites for the species such as high cliffs and small rocky islands between Olympos and Kumluca roughly 30 km area. Field work carried out between March-September in 2013-2014. During breeding season, we monitored 2 through 4 days/week, found the nests and observed their daily activities regularly.

Results: We observed 4 pairs regularly in both study years, found 1 nests in 2013 and 2 nests in 2014 on the cliffs in 6 km part of the area between Olympos and Adrasan. First year from the first nest, two chicks hatched and both could survived, Second year, totally 4 fledgling were observed from 2 nests. The other part of the area from Adrasan through Kumluca, we recorded 5 more adults after unregularly observations. Eleonora's falcon mainly breeds on the cliffs of small islands in the Mediterranean in large colonies of up to 630 pairs (Morocco). Two-thirds of the World's population breeds on the islands of Aegean Sea in Greece and Turkey. However, there is only one study about the distribution and the breeding site of the species in western Turkey and of course it is not enough to understand the number of the breeding pairs. Moreover, there is no data from the southwestern Turkey. In spite of the unregularly observations of the other part of the area, we observed 5 adults only around one island. If we think about the other 5 large and small islands, we estimated over 30 pairs could breed.

Acknowledgement: This results have been attained within the project, which supported by Akdeniz University Scientific research Projects Coordination Unit (Project No: 2014.01.0154.001).

Keywords: Eleonora's falcon, *Falco eleonora*, Breeding, Southwestern Turkey.

PP-454

Inhibition and Docking Studies of New Pyrimidinyl Acyl Thioureas Compounds as HSP90 Inhibitorsİrfan KOCA¹, Aykut ÖZGÜR², Muhammet ER¹, Mehmet GÜMÜŞ¹, Kübra Açıkalin COŞKUN², Yusuf TUTAR³¹Department of Chemistry, Faculty of Arts and Sciences, Bozok University, Yozgat, Turkey²Department of Bioengineering, Faculty of Natural Sciences and Engineering, Gaziosmanpaşa University, Tokat, Turkey³Division of Biochemistry, Faculty of Pharmacy, Cumhuriyet University, Sivas, Turkey
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Aim of the study: Many oncogenic client proteins involved in formation of metastatic pathways. Stabilization, regulation, and maintenance of these oncogenic client proteins are provided with Heat Shock Protein 90 (Hsp90). We designed novel pyrimidinyl acyl thiourea derivatives to selectively inhibit Hsp90 alpha in human invasive ductal breast (MCF-7) and human bone osteosarcoma (Saos-2) cell lines. Molecular docking studies of human Hsp90 alpha protein were also performed to determine interaction between Hsp90 ATPase domain and pyrimidinyl acyl thiourea derivatives.

Material and Methods: MCF-7 (human invasive ductal breast carcinoma) and Saos-2 (human bone osteosarcoma) were cultured in DMEM supplemented with 10% heat-inactivated fetal bovine serum, 1% L-glutamine, 100 IU/mL penicillin and 10 mg/mL streptomycin in 75 cm² polystyrene flasks. Cells were cultivated at 37°C in a humidified atmosphere with 5% CO₂. Anticancer activity assay was performed using the colorimetric XTT cell proliferation kit. Cells were seeded at approximately 10×10⁴ cells/well in a final volume of 200 µl in 96-well flat-bottom plates with different concentrations of the pyrimidinyl acyl thioureas (100µM-50µM-25µM-12,5 µM-6,25 µM-3,125 µM). Plates were incubated at 37°C in a 5% CO₂ incubator for 48 hours. At the end of the incubation times, wells were washed with PBS and 50 µl XTT reagent (in 100µl colorless DMEM) was added to each well. Plates were incubated at 37°C for four hours and optic density of drug-treated cells and control cells were measured using micro plate reader (Thermo) at 450 nm. The 50% inhibition concentration (IC₅₀) values of compounds were calculated for MCF-7 and Saos-2 cell lines by GraphPad Prism 5 software. Docking calculations were performed using Docking Server. The coordinates of crystal structure of Hsp90 were extracted from Protein Data Bank (pdb code: 1UYM). The molecular structures of all the compounds were drawn using MarvinSketch software.

Results: In this study, cytotoxicity assay of ten novel pyrimidinyl acyl thiourea derivatives against MCF-7 and Saos-2 cell lines demonstrated that all the compounds have potent antitumor activity. Side groups of compounds and the orientation of these groups alter anticancer activity. Especially, halogenated compounds exhibited the highest cytotoxicity in cancer cells. Furthermore, addition of phenyl ring and methyl group, alteration of methyl orientation from *-para* to *-orto* on phenyl ring decreased anticancer activity. The molecular docking results revealed that compounds bind and block Hsp90 ATP binding site specifically. Halogenated compounds orient Hsp90 NTD like geldanamycin however, unlike geldanamycin halogenated compounds effectively inhibit both invasive ductal breast carcinoma and bone metastasis as shown by *in vitro* and *in silico* experiments. These findings may emerge new therapeutic perspective for drug design studies in the treatment of invasive ductal breast carcinoma and bone metastasis.

Acknowledgements: This work was funded through a seed grant from Bozok University and Turkish National Academy of Sciences for YT.

Keywords: Pyrimidine, thiourea, breast cancer, bone cancer, Hsp90, client proteins.

PP-455

Inhibition Studies of Novel Coumarine Derivatives as HSP90 and HSP70 InhibitorsMehmet GÜMÜŞ¹, İrfan KOCA¹, Kübra Açıklan COŞKUN², Yusuf TUTAR³, Ali DİŞLİ⁴¹Department of Chemistry, Faculty of Arts and Sciences, Bozok University, Yozgat, Turkey²Department of Bioengineering, Faculty of Natural Sciences and Engineering, Gaziosmanpaşa University, Tokat, Turkey³Division of Biochemistry, Faculty of Pharmacy, Cumhuriyet University, Sivas, Turkey⁴Department of Chemistry, Faculty of Sciences, Gazi University, Ankara, Turkey
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Aim of the study: Cellular proteins need proper three-dimensional structures and must keep their native structures in order to participate in biological processes. Cells are exposed to various types of stress (i.e. malignancy, heat, infection, fever, hypoxia and oxidative stress) and consequently properly folded proteins may lose their native conformations. Therefore, cells require heat shock proteins (Hsps) for maintaining the stability, conformation, function, and integrity of the substrate proteins. Hsps are conserved protein family which is classified according to their molecular weights: small Hsps (<40 kDa), Hsp40 (40 kDa), Hsp60 (60 kDa), Hsp70 (70 kDa), Hsp90 (90 kDa) and Hsp100 (100 kDa). Hsps play indispensable roles in folding nascent and misfolded proteins to their native state and prevent their aggregation in different cellular compartments. Therefore, the expression level of Hsps is closely related to various diseases and has shown great promise as therapeutic targets. Coumarines are classified as member of the benzopyrone family of compounds which possess a wide spectrum of biological activity as anti-cancer. In this study, a novel set of coumarine derivatives were tested *in silico* to understand their inhibition of Heat Shock Proteins (HSP).

Material and Methods: Inhibition of the Hsp90 and Hsp70 function is an essential therapeutic approach and several inhibitors were designed as anti-cancer agents. The coding region of human Hsp90 and Hsp70 was inserted into Champion pET Gateway Expression Kit (P161) (Invitrogen) to skip sub-cloning steps. Then the plasmid transformed into BL21 (DE3) cells. His tagged Hsp proteins were purified with FPLC (GEHealthcare) and were eluted with imidazole gradient. ATPase activity of Hsp90 and Hsp70 was determined by coupling method. Basically, Pyruvate kinase (PK) converts one molecule of phosphoenolpyruvate (PEP) to pyruvate. Pyruvate is converted to lactate by L-lactate dehydrogenase (LDH) and oxides NADH. This coupled to ATP hydrolysis. For a typical reaction, 10 µg/µl purified nucleotide free Hsp90 was incubated at 37 °C for 5 minutes in 500 µl, pH 7.4 reaction mixture (50 mM HEPES, 50 mM NaCl, 4 mM MgCl₂, 0,2 mM NADH, 0,5 mM PEP, 18 unit LDH, 24 unit pyruvate kinase/1 ml). In the reaction mixture, different concentrations of coumarine compounds and 0.5 mM ATP were used and spontaneous ADP formation was measured indirectly with NADH optical density at 340 nm and ATP hydrolyzes was calculated.

Results: HSP90 and HSP70 proteins are overexpressed in cancer cells and prevents apoptosis of the cancer cell as well as curing aggregated substrate proteins to their native folded-functional state. The substrate proteins are commonly involved in signaling pathways and therefore it is essential to inhibit HSPs. In this study, the novel coumarine compounds (K1-K15) effectively inhibit both HSP90 and HSP70. Binding energies and inhibition constants of the compounds give promise to prepare effective drug templates.

Acknowledgements: This study was supported by Bozok University Scientific Research Center (Project Number: 2015FEF/A172).

Keywords: Coumarine, Hsp90, Hsp70

PP-456

Assessment of Water Quality Parameters Using Multivariate Analysis for Marmara Basin, TürkiyeGürçay Kıvanç AKYILDIZ^{1,3}, Mustafa DURAN², Serdar POLAT², Recep BAKIR²¹*Program of Biomedical Device Technology/Vocational High School of Technical Sciences, Pamukkale University, Turkey*²*Biology Department/Faculty of Science & Arts, Pamukkale University, Turkey*³*FAGUMER - Flora and Fauna Research, Development and Application Center of Pamukkale University Denizli - TURKEY
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Aim of the study: The study was aimed to assess the significant water quality parameters of Susurluk Basin (Türkiye) using multivariate analysis.

Material and Methods: The study was carried out between the years 2012 and 2015. In total, 16 sampling sites from 9 creeks were selected based on different water mass with a common formation of drainage, depth, width and altitude. The methods and equipments given by TS6469, EN27828, TS EN 28265, TS EN ISO 9391, TS EN 15196, TS EN 8689-1 and TS EN 8689-2 standards were applied for collecting benthic macro-invertebrates. Environmental parameters measured are: water temperature (WT), pH, Conductivity, dissolved Oxygen (dO₂), Ammonium-Nitrogen (NH₃-N), Nitrate-Nitrogen (NO₃-N), Total Phosphor (TP), Total Dissolved Solids (TDS), Total Organic Carbon (TOC), Total Nitrogen (TN) and Ortho-Phosphate (PO₄P). Benthos was identified at family-level. Observed dissimilarity and ordination distance was calculated using Non-Metric Multidimensional Scaling (NMDS). Significant environmental variables were selected by forward selection while p values based on 999 permutations. Inflated variation parameters (VIF) over 10 were excluded. Canonical Correspondence Analysis (CCA) was applied to figure out ordination between biological parameters, environmental variables and sampling sites. All statistical analysis were calculated and graphed by R.

Results: As the result of the current study, 50 families were identified from 17,192 benthos. The most dominant family groups are Chironomidae, Oligochaeta, Simuliidae, Corixidae, Asellidae, Baetidae, Ephemerellidae, Lymnaeidae, Physidae, Daphniidae, Dytiscidae, Platycnemididae, Ceratoponidae, and Hydropsychodidae respectively. Expanded scores based on NMDS are non-metric R² = 0.986 and linear fit R² = 0.945. Environmental variables except WT and NO₃-N were found significant (p<0.05). NH₃-N, TOC and PO₄P were excluded from the ordination analysis because of VIF > 10. Permutation test for CCA under reduced model was Pr = 0.03 (p<0.01). pH, Conductivity, TP, TDS and TN were the most significant environmental variables that affected benthos and water quality.

Acknowledgements: This research was supported by TUBITAK-MAM "Determination of Some Basin in Sensitive Areas and Water Quality Objectives in Turkey" Susurluk, Marmara and Meric-Ergene Rivers Basin, 2015

Keywords: Benthos, Macroinvertebrate, Canonical Correspondence Analysis, R.

PP-457

Assessment of Water Quality Parameters Using Multivariate Analysis for Meriç-Ergene Basin, TürkiyeGürçay Kıvanç AKYILDIZ^{1,3}, Mustafa DURAN², Serdar POLAT², Recep BAKIR²¹*Program of Biomedical Device Technology/Vocational High School of Technical Sciences, Pamukkale University, Turkey*²*Biology Department/Faculty of Science & Arts, Pamukkale University, Turkey*³*FAGUMER - Flora and Fauna Research, Development and Application Center of Pamukkale University Denizli - TURKEY*
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Aim of the study: The study was aimed to assess the significant water quality parameters of Meriç-Ergene Basin (Türkiye) using multivariate analysis.

Material and Methods: The study was carried out between the years 2012 and 2015. In total, 30 sampling sites from 15 creeks were selected based on different water mass with a common formation of drainage, depth, width and altitude. The methods and equipments given by TS6469, EN27828, TS EN 28265, TS EN ISO 9391, TS EN 15196, TS EN 8689-1 and TS EN 8689-2 standards were applied for collecting benthic macro-invertebrates. Environmental parameters measured are: water temperature (WT), pH, Conductivity, dissolved Oxygen (dO₂), Ammonium-Nitrogen (NH₃-N), Nitrate-Nitrogen (NO₃-N), Total Phosphor (TP), Total Dissolved Solids (TDS), Total Organic Carbon (TOC), Total Nitrogen (TN) and Ortho-Phosphate (PO₄P). Benthos was identified at family-level. Observed dissimilarity and ordination distance was calculated using Non-Metric Multidimensional Scaling (NMDS). Significant environmental variables were selected by forward selection while p values based on 999 permutations. Inflated variation parameters (VIF) over 10 were excluded. Canonical Correspondence Analysis (CCA) was applied to figure out ordination between biological parameters, environmental variables and sampling sites. All statistical analysis were calculated and graphed by R.

Results: As the result of the current study, 48 families were identified from 24,727 benthos. The most dominant family groups are Chironomidae, Gammaridae, Baetidae, Asellidae, Dytiscidae, Caenidae and Corixidae respectively. Expanded scores based on NMDS are non-metric $R^2 = 0.977$ and linear fit $R^2 = 0.905$. Environmental variables except pH and TOC were found significant ($p < 0.05$). However, Conductivity, NH₃-N and PO₄P were excluded from the ordination analysis because of VIF > 10. Permutation test for CCA under reduced model was Pr = 0.66 ($p < 0.05$). WT, NO₃-N and TP were the most significant environmental variables that affected benthos and water quality.

Acknowledgements: This research was supported by TUBITAK-MAM "Determination of Some Basin in Sensitive Areas and Water Quality Objectives in Turkey" Susurluk, Marmara and Meric-Ergene Rivers Basin, 2015

Keywords: Benthos, Macroinvertebrate, Canonical Correspondence Analysis, R.

PP-458

Assessment of Water Quality Parameters Using Multivariate Analysis for Susurluk Basin, TürkiyeGürçay Kıvanç AKYILDIZ^{1,3}, Mustafa DURAN², Serdar POLAT², Recep BAKIR²¹*Program of Biomedical Device Technology/Vocational High School of Technical Sciences, Pamukkale University, Turkey*²*Biology Department/Faculty of Science & Arts, Pamukkale University, Turkey*³*FAGUMER - Flora and Fauna Research, Development and Application Center of Pamukkale University Denizli - TURKEY
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Aim of the study: The study was aimed to assess the significant water quality parameters of Susurluk Basin (Türkiye) using multivariate analysis.

Material and Methods: The study was carried out between the years 2012 and 2015. In total, 41 sampling sites from 16 creeks were selected based on different water mass with a common formation of drainage, depth, width and altitude. The methods and equipments given by TS6469, EN27828, TS EN 28265, TS EN ISO 9391, TS EN 15196, TS EN 8689-1 and TS EN 8689-2 standards were applied for collecting benthic macro-invertebrates. Environmental parameters measured are: water temperature (WT), pH, Conductivity, dissolved Oxygen (dO₂), Ammonium-Nitrogen (NH₃-N), Nitrate-Nitrogen (NO₃-N), Total Phosphor (TP), Total Dissolved Solids (TDS), Total Organic Carbon (TOC), Total Nitrogen (TN) and Ortho-Phosphate (PO₄P). Benthos was identified at family-level. Observed dissimilarity and ordination distance was calculated using Non-Metric Multidimensional Scaling (NMDS). Significant environmental variables were selected by forward selection while p values based on 999 permutations. Inflated variation parameters (VIF) over 10 were excluded. Canonical Correspondence Analysis (CCA) was applied to figure out ordination between biological parameters, environmental variables and sampling sites. All statistical analysis were calculated and graphed by R.

Results: As the result of the current study, 59 families were identified from 27,805 benthos. The most dominant family groups are Chironomidae, Baetidae, Gammaridae, Oligochaeta, Caenidae, Lymnaeidae, Simuliidae, Corixidae, Asellidae, Physidae, Ephemerellidae and Psychodidae respectively. Expanded scores based on NMDS are non-metric R² = 0.972 and linear fit R² = 0.915. Environmental variables except WT, pH, NO₃-N and TDS were found significant (p<0.05). TP and TN were excluded from the ordination analysis because of VIF > 10. Permutation test for CCA under reduced model was Pr = 0.34 (p<0.05). WT, pH and dO₂ were the most significant environmental variables that affected benthos and water quality.

Acknowledgements: This research was supported by TUBITAK-MAM "Determination of Some Basin in Sensitive Areas and Water Quality Objectives in Turkey" Susurluk, Marmara and Meric-Ergene Rivers Basin, 2015

Keywords: Benthos, Macroinvertebrate, Canonical Correspondence Analysis, R.

PP-459

Sex differences in immunity in a bushcricket (Orthoptera: Phaneropterinae)Hasan SEVGİLİ¹¹Ordu University, Faculty of Art and Science, Department of Biology, Ordu, TURKEY
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Aim of the study: Like many other traits, immune functions are often different between males and females and the investment in immune functions for females are predicted to be higher than the investment for males, at least among many vertebrates. Thus, I addressed a question. Are there any sex differences in both humoral (Phenoloxidase-PO and lytic activity-LY) and cellular (encapsulation) immunity in a bushcricket population?

Material and Methods: The specimens of *Isophya reticulata* were collected in 2014 from Ordu province during breeding season (54 males, 44 females). To collect hemolymph, bushcrickets were anesthetized and 5 µl of hemolymph were removed from abdominal sternite using a microsyringe. Hemolymph was then expelled into a chilled microcentrifuge tube containing PBS. Each hemolymph sample was used to estimate an individual's PO and LY. To measure of encapsulation ability, bushcrickets were implanted with a 3 mm long nylon monofilament fishing line and the implant was inserted into the bushcricket's abdominal cavity. After dissection, each implant was photographed and the encapsulation ability was measured as the darkness of each implant.

Results: Males had significantly less phenoloxidase activity than females (Wilcoxon rank sum test, $W=1712.5$, $p<0.001$). There was no difference in LY activity between sex ($W=940.5$, $p=0.437$). The male bushcrickets were stronger encapsulation abilities than females ($W=649.5$, $p<0.001$). Femoral melanisation was positively correlated with encapsulation ($R=0.20$, $p=0.041$), while there was no correlation between femoral melanisation and both PO and LY. The results of this study are consistent with immune defense being different between the sexes. The sex-biased immunity is also plastic trait, and suggest that because of genetic and life-history differences, males and females differ in their investment in humoral and cellular immune responses.

Acknowledgements: I thank Nilgün Tokgöz for assistance with experimental assay.

Keywords: phenoloxidase, lysozyme, insect immunity, encapsulation, bushcricket.

PP-460

Antioxidant Activity and Total Phenolic Content of *Erysimum kotschyannum* ExtractsÖzge KILINÇARSLAN¹, Ramazan MAMMADOV¹*Pamukkale University, Faculty of Science&Art, Department of Biology, Denizli/Tukey.*
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Aim of the study: The aim of this study, some biological activity of *Erysimum kotschyannum* extracts which were prepared with different solvent, were examined.

Material and Methods: Plant samples which were used in this research, were collected from Denizli. Plant extracts were prepared using ethanol, acetone and water. DPPH and β -Carotene-Linoleic Acid methods were used for determinate antioxidant activity of this plant species extracts.

Results: The highest antioxidant activity (%80,47) was obtained from water extracts. The lowest antioxidant activity (%54,96) was seen on ethanol extracts. According to the results of the experiment performed by using DPPH metod, the highest free radical removal activity was determined in ethanolic extracts which prepared with 1 mg/ml concentration. the lowest free radical removal activity was found in water extracts with 0,2 mg/ml concentration. In addition, total phenolic content in all extracts were determined as gallic acid (GAE) equivalents Folin Ciocalteu method. The highest phenolic amount was found in ethanolic extracts and the lowest phenolic amount was determined in water extracts.

Acknowledgements: This work was supported by Chairman of The Scientific Research Projects grant from Pamukkale University. I would like to thank Msc. Nahide DENİZ and Msc. Semih AKGÜN for help.

Keywords: biological activity, antioxidant activity, total phenolic content, *Erysimum kotschyannum*.

PP-461

Determination of Some Biological Activities of Different Solvent Extracts from *Stellaria media*Akgul RAKHİMZHANOVA¹ Ozge KİLİNCARSLAN¹, Nahide DENİZ¹ and Ramazan MAMMADOV¹¹*Pamukkale University, Faculty of Science and Art, Department of Biology,**Kinikli, Denizli/Turkey*akgul.r.m@gmail.com

Aim of the study: This study was aimed to determine the some biological activities of various solvent (ethanol, water and chloroform) extracts which obtained from *Stellaria media*. The extracts were screened for their possible some biological activities by two complementary tests; DPPH (2,2-diphenyl-1-picrylhydrazyl) freeradical-scavenging and β -carotene-linoleic acid assays.

Material and Methods: After plants collected in suitable conditions and drying in the shade was pulverized. It was then extracted using ethanol, water and chloroform as the solvent (55 °C twice in six hours in a shaking water bath). After removal of the solvent Rotary evaporator lyophilized sample was used in assays to some biological activities by two complementary tests; DPPH (2,2-diphenyl-1-picrylhydrazyl) freeradical-scavenging, β -carotene-linoleic acid assays.

Results: The results of this study indicate that the highest biological activity observed in ethanol extracts. The greater activity of free radical sweep was in chloroform extracts.

Keywords: Biological activity, *Stellaria media*, DPPH, β -carotene-linoleic acid.

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Screening of *Heliotropium europaeum* L. Extracts for Antioxidant ActivityCennet ÖZAY¹, Yağmur AYAES¹, Ramazan MAMMADOV¹¹Department of Biology, Pamukkale University, Turkeyrmammad@yahoo.com

Aim of the study: *Heliotropium* is a genus of flowering plants, belongs to Boraginaceae, and commonly known as forget-me-not family, which has 100 genera distributed throughout Mediterranean and temperate regions. In Turkey, this genus is represented with about 17 species. *Heliotropium* species are known to contain pyrrolizidine alkaloids which have a wide variety of biological activities such as antitumor, antibacterial, antifungal, insecticide, antispasmodic, mydriatic, mutagenic, teratogenic and hepatotoxic activity. The purpose of this study is to determine the antioxidant activities of methanol, ethanol, *chloroform* and water extracts obtained from aerial parts of *H. europaeum*.

Material and Methods: Antioxidant activities of various solvent extracts from *H. europaeum* were evaluated via multiple methods, including radical scavenging (DPPH and ABTS), ferric ion reducing power, phosphomolybdenum, β -carotene/linoleic acid bleaching and metal chelating assays. In addition, Folin-Ciocalteu assay and aluminium colorimetric method were used to detect total phenolic and flavonoid contents in the extracts, respectively. *H. europaeum* was collected from Denizli-Turkey, air-dried in shade, powderized to a fine grain and then extracted with four different solvents (methanol, ethanol, *chloroform* and water). The solvents were evaporated by using a rotary evaporator. Remaining parts of the extracts were dissolved with water and the water in the extracts was lyophilized. Obtained extracts were stored at -20 °C until use.

Results: There are several methods for determination of antioxidant activities. The chemical complexity of extracts, often a mixture of dozens of compounds with different functional groups, polarity and chemical behavior, could lead to scattered results, depending on the test employed. Therefore, an approach with multiple methods for evaluating the antioxidant potential of extracts would be more informative and even necessary. In this study, mainly six methods were used. Total phenolic and total flavonoid contents of the extracts were also evaluated as gallic acid and quercetin equivalents, respectively. Generally, methanol and ethanol extracts exhibited good biological activities. These extracts were rich in phenolic and flavonoid content.

Keywords: *Heliotropium europaeum*, solvent extracts, antioxidant activity, phenolics.

PP-463

Theoretical Studies on a compound formed by Ca⁺² and FlavonoidAslı ÖZTÜRK KİRAZ¹, Fatih YALÇIN¹, Ramazan MAMMADOV²¹Physics/Faculty of Science&Lettes, Pamukkale University, Turkey²Biology/ Faculty of Science&Lettes, Pamukkale University, Turkeyaslio@pau.edu.tr

Aim of the study:Flavonoids are generally composed of polyphenol compounds of plant origin with various biological and chemical activities. Since the presence of carbonyl and hydroxyl groups they can coordinate metal ions and form complexes. Metal complexes of flavonoids have many interesting properties: they are colored, often fluorescent, anti-oxidant or pro-oxidant, antimicrobial, antiproliferative and biologically active in many other ways. Therefore, we need to know physical properties of metal complexes of flavonoids as well as chemical properties.

Material and Methods:In this study, geometric parameters (bond lengths and bond angles), the highest occupied molecular orbital (HOMO) energies, the lowest unoccupied molecular orbital (LUMO) energies, the electronic properties (total energy, dipole moment, electronegativity, chemical hardness and softness), NBO analysis and optical properties of a compound formed by Ca⁺² and flavanoid have been performed by using Gaussian 09.C1 package. The structural and spectroscopic data of the molecule in the ground state and excited state have been calculated by using density functional method (DFT/B3LYP) with the CEP-121G basis set.

Results: The HOMO–LUMO gap (ΔE) of the compound is calculated 2.14 eV. This result represent that the compound is generally unstable and reactive. For this reason, this compound recommended for the fotovoltaic devices.

Acknowledgements:The authors are grateful to PAUBAP (Project No. 2012BSP004) and TUBITAK (Project No. 107T606).

Keywords: Flavonoid, Chelation, Density Functional Theory (DFT), Structural Properties, Electronic Properties.

PP-464

Ecological analysis of floral biodiversity of mountainous part of LankaranElshad GURBANOV¹, Sanubar ASLANOVA²¹*Institute of Dendrology, Azerbaijan Republic*²*Baku State University, Azerbaijan Republic*elshad_g@rambler.ru

Aim of the study: In order to study ecological biodiversity of flora of mountainous part of Lankaran, various plant-climate condition of plants in natural phytocenosis was especially divided into demand for water and humidity.

Material and Methods: 1071 sorts of species including into 102 seasons and 437 generics were found in flora of mountainous part of Lankaran. 1047 of them are angiosperms (840 sorts are dicotyledonous and 207 sorts are monocotyledonous), 19 sorts are ferns, 1 sort is loment and 4 sorts are gymnosperms.

Results: Percentage of common number of ecomorph sorts or ecological spectrum systematized is described as: Xerophyte (number: 548, %for common number :51,2), Mesoxerophyte (number: 288, %for common number: 26,9), Mesophyte (number: 197, %for common number: 18,4), Hydrophyte (number: 38, %for common number: 3,5); so totaly number : 1071; % for common number: 100. According to percentage, 4 groups were found as a result of analysis of ecological groups of area flora. There are 548 sorts or 51.2% xerophyte in ecological spectrum. Rest of them are 288 sorts of mesoxerophyte (26,9%), 197 sorts mesophyte (18,4%) and 38 sorts of hydrophyte (3,5%).

Keywords: phytocenosis, flora, ecomorph, mesophyte.

PP-465

Systematic significance of nutlet morphology in Turkish *Lamium* L. species (Lamiaceae)Ferhat CELEP¹, Zeynep ATALAY², Çiğdem Can³, Musa DOĞAN²¹Department of Biology, Polatlı Faculty of Sciences and Arts, Gazi University, Turkey²Department of Biological Sciences/Middle East Technical University, Turkey³Department of Biology, Faculty of Sciences and Arts, Nevşehir Hacı Bektaş Veli University, Turkey
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Aim of the study: *Lamium* L is the well-known genus with 16-38 species, depending on the circumscription of the genus. Turkey is center of diversity with ca. 25 species and 36 taxa for the genus. The usefulness of nutlet morphology in the systematics of Lamiaceae is not well documented. Therefore, the main objective of this study is to provide a detailed investigation of nutlet morphology of the genus *Lamium* and to determine whether nutlet morphological data can be of value in the taxonomy of the genus.

Material and Methods: This study was conducted on herbarium materials collected from the field, during fruiting period from natural populations between 2012 and 2015. Nutlets were investigated with a stereo and scanning electron microscope (SEM). The SEM micrographs were taken with a JEOL-6060 scanning electron microscope at TPAO (Turkish Petroleum Anonymn Cooperation, Ankara).

Results: Nutlets ranged from 1.70 (*L. orientale*) to 5.29 mm (*L. cymbalarifolium*) in length and 1.01 (*L. orientale*) to 2.63 mm (*L. cymbalarifolium*) in width. Six different nutlet shapes were recognized as obovate, triangular-obovate, widely obovate, oblong, oblong-obovate and rounded. Testa sculpturing patterns exhibit variation as penta-hexagonal colliculate, reticulate, rugose or verrucate types. In some cases, nutlets have white spots. The overall evaluation on the nutlet morphological data pointed out that the results have provide limited information for distinguishing sections, on the other hand it can be used for separating some species groups or similar species.

Acknowledgements: This study is supported by the Scientific and Technical Research Council of Turkey (project no: TUBITAK 112-T-131). We wish to thank the curators of ANK, BM, E, G, GAZI, HUB, K, KNYA and LE herbaria for their permission on the examination of *Lamium* collections.

Keywords: Lamiaceae– Nutlet– Morphology– Systematics– Taxonomy– Scanning Electron Microscopy.

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Where may *Cricotopus sylvestris* have entered to Turkey from?Adile SARI^{1,2}, Mustafa DURAN²¹Department of Electronic and Automation, Denizli Vocational School of Technical Sciences, Pamukkale University, Turkey²Hydrobiology Lab., Department of Biology, Faculty of Science and Arts, Pamukkale University, Turkey
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Aim of the study: The family Chironomidae, which includes *Cricotopus sylvestris*, is one of the most species rich and widely distributed insect families of Diptera. It is well known that this family distributed from the tropics to the Arctic in lakes, streams and puddles. In this study, we aimed to determine the dispersal of *C. sylvestris* not only in Turkey but in the world, and to reveal from where this species may have entered to Turkey in the past.

Material and Methods: In this study, *C. sylvestris* larvae were collected from 8 lakes across Turkey. Genomic DNA was extracted from body of larvae and a 653-bp fragment of mitochondrial *COI* gene was amplified with the primer pairs 911 and 912. Several mitochondrial *COI* sequences of *C. sylvestris* from different countries of different continents such as South Korea, Japan, Canada, Denmark, and Sweden were obtained from GenBank. All sequences including the ones from GenBank were used for phylogenetic analyses. 512-bp nucleotide sequences of mitochondrial *COI* gene were aligned using MEGA 5Beta#7. Neighbour-joining (NJ) and maximum parsimony (MP) trees were created in MEGA 5Beta#7 and PAUP *4.0b10 (License code; ADU B418788) (Swafford, 2002) with 1000 bootstrap replicates. Maximum likelihood (ML) analyses were performed in MEGA 5Beta#7 and RAXMLGUI 1.0 using GTRGAMMA model with 1000 bootstrap replicates. BEAST v1.8.0 was used for Bayesian analysis. TreeAnnotator v1.8.0 was used to analyse the sample of trees generated by BEAST and FigTree v1.4.0 to view the trees.

Results: In our ML analysis, Japanese and South Korean *C. sylvestris* clustered with Baltimorean and Canadian ones (American) and formed a sister group to the European and Turkish members. The Japanese and South Korean *C. sylvestris* were different from American, European and Turkish members according to our Bayesian, NJ and MP analyses. Additionally, Baltimorean and Canadian *C. sylvestris* formed a sister group to European and Turkish members. Within the European *C. sylvestris*, Danish one was older than the Swedish and Finn ones according to our all phylogenetic analyses. In Turkish members, *C. sylvestris* collected from Hazar Lake was more ancient than those from Marmara, Sapanca, Çıldır, Aygır, Beyşehir, Eğirdir and Sihke Lakes. In several of previous studies, it has been suggested that Australian members of chironomids are ancestral and they are moved from there to the North and other continents. Our results clearly suggest that several transoceanic dispersal events may have occurred among the continents. In conclusion, all trees produced in phylogenetic analyses indicate that Turkish *C. sylvestris* are closely related to European ones and the entrance of Turkish *C. sylvestris* to Turkey may be from southeast of the country.

Acknowledgements: This research was supported by Pamukkale University Scientific Research Project Coordination Unit as a PhD thesis (Grant number: 2009FBE013).

Keywords: *Cricotopus sylvestris*, cytochrome c oxidase subunit I, Turkey, phylogeography.

PP-467

The Diversity of Exopolysaccharide Producer Lactic Acid Bacteria in Tarhana FermentationDuygu ZEHİR¹, Ömer ŞİMŞEK¹¹ Department of Food Engineering, Pamukkale University, Denizli, Turkey
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Aim of the study: Tarhana is a traditional fermented food produced by its natural fermentation with a mixture of wheat, yogurt and vegetables. Lactic acid bacteria (LAB) having wide genetic resources, are the main members of this fermentation. Evidently these bacteria can produce capsular or extracellularly exopolysaccharide (EPS). Since the consumers demand on additive free and minimum processed foods, EPS produced by LAB are considered intensively due to their availability to use naturally at food systems. The aim of this study was to determine and to screen the diversity the EPS producers of LAB among the isolates collected from the tarhana dough produced by natural fermentation.

Material and Methods: In this study 1400 isolates isolated from tarhana dough and stored in University of Pamukkale, Department of Food Engineering Culture Collection (PUFECC) were evaluated for EPS production. EPS producing phenotype were determined by observing sliming properties of each colonies spread on MRS agar. Afterwards, the selected isolates were identified according to 16 rRNA genes sequence ultimately.

Results: Total 11 isolates (1%) were detected showing sliming phenotype among 1400 isolates which were scanned for EPS production on agar plates. Subsequently these were observed Gram positive and bacillus morphology with microscopic examination. According to 16S rRNA gene sequences, 8 of isolates were identified *Lactobacillus plantarum* whereas 3 of isolates were identified *Lactobacillus brevis* more than 97% homology. As a conclusion these results indicated that *L. plantarum* and *L. brevis* were the dominant EPS producer at tarhana fermentation.

Keywords: Tarhana fermentation, Exopolysaccharides, *Lactobacillus plantarum*, *Lactobacillus brevis*

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The Diversity of Bacteriocin Producing Lactic Acid Bacteria in Tarhana FermentationHalil İbrahim KAYA¹, Ömer SİMSEK¹,¹Food Engineering Department, Pamukkale University, Turkey,
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Aim of the study: Tarhana is a fermented food product that has been consumed often and produced by Anatolian people at summer for winter. Tarhana dough fermentation has a competitive microflora including lactic acid bacteria and yeast species. In this flora LAB can exhibit antimicrobial activity by bacteriocin production. The aim of this study was to determine the diversity of bacteriocin producer lactic acid bacteria at the fermentation of tarhana.

Material and Methods: In this study, lactic acid bacteria were isolated from tarhana dough samples collected from Uşak provinces. To determine the antimicrobial activity of isolated lactic acid bacteria, agar spot and well diffusion tests were applied. Genomic DNA of bacteria showing antimicrobial activity was isolated. For identification of lactic acid bacteria 16S rDNA sequence was used.

Results: *Lactobacillus*, *Lactococcus*, *Pediococcus*, *Leuconostoc* genus lactic acid bacteria are capable of producing bacteriocin. In this study, *Lactococcus lactis*, *Lactobacillus paralimentarius*, *Pediococcus acidilactici*, *Lactobacillus namurensis* and *Lactobacillus plantarum* were isolated bacteriocin producing lactic acid bacteria from tarhana. All strains have medium and high level antimicrobial activity against the indicator microorganisms. *Lactococcus lactis* strain has the highest antimicrobial activity. As a conclusion, tarhana fermentation includes different species of bacteriocin producer lactic acid bacteria. *Lactobacillus namurensis* is the first strain reported as a bacteriocin producer.

Keywords: Tarhana, lactic acid bacteria, bacteriocin producer, diversity.

PP-469

Histological Activity of Extracts Isolated from *Crocus pallasii* spp.*pallasii* and *Crocus cancellatus* spp.*mazziaricus* Species on Rat

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Aim of the study: *Crocus* species that belonging to *Iridaceae* and having economic value have used since the earliest years in the alternative medicine for the treatment of diseases. The *Crocus pallasii* spp.*pallasii* and *Crocus cancellatus* spp.*mazziaricus* with variations that are type of *Crocus* L. genus from *Iridaceae* is a very rich type. Researching of histological activity of this plants are very important for medicine.

Material metod: After plants collected in suitable conditions and drying in the shade was pulverized. It was then extracted using ethanol as the solvent (55 °C ' twice in six hours in a shaking water bath). After removal of the solvent Rotary evaporator lyophilized sample was used in assays to histological activity. Treating the resulting solution was drunk to rats for about four weeks. Initially, at the second week and fourth week, blood samples were taken. ALT(alanine aminotransferase) and AST(aspartate amino transferase) and changes in the value of UREA to check renal function was observed.

Results: The effects of ethanolic extracts(leaf and corm), which prepared with different concentrations (%0,5 and %1) obtained from studied species, on rat blood tissues were determined. According to the results, at the groups which were treated *C. cancellatus* spp. *mazziaricus* and *C.pallasii* spp. *pallasii* species extract with %1(corm) concentration, decreased ALT was obtained. Also *C. cancellatus* spp. *mazziaricus* of %0,5(corm)concentration and *C.pallasii* spp. *pallasii* of %1(corm) concentration and %0,5(leaf) concentration extract treated group increased AST was detected.

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Keywords: *C. cancellatus* spp. *mazziaricus* and *C.pallasii* spp. *pallasii*, histological activity.

PP-470

The Histopathological Effects of Diazinon on Gills of *Oreochromis niloticus*Pelın UĞURLU¹, Elif İpek SATAR², Tarık ÇİÇEK³,¹Science and Technology Application and Research Center, Dicle University, Turkey²Pharmaceutical Toxicology, Faculty of Pharmacy, Dicle University, Turkey³Biology Department, Science Faculty, Dicle University, Turkey

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Aim of the study: It is aimed to determine possible alterations in gill histology of *Oreochromis niloticus* individuals exposed to certain concentrations of Diazinon technical formulation with light microscope.

Material and Methods: At 7th, 14th and 21st days fish exposed to 280 µg/L diazinon were taken from the test solution. The gills were fixed with formalin, dehydrated with ethanol, cleared in xylene, embedded in paraffin. The sections were stained with hematoxylin-eosin and examined.

Results: At 7th, 14th and 21st days the most common histopathologic alteration was separation of epithelium from secondary lamella. The severity of histopathological alterations were increased with the duration of exposure.

Acknowledgements: This study was supported by TÜBİTAK under grant number 114-Z-730.

Keywords: *Oreochromis niloticus*, atrazine, histopathological effect, gill, separation of epithelium from secondary lamella.

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Histopathological Changes in the Kidney of *Anabas testudineus* Exposed to CypermethrinElif İpek SATAR¹, Babu VELMURUGAN², Senthil KUMAAR²¹Department of Pharmaceutical Toxicology, Faculty Pharmacy, Dicle University, Diyarbakir, Turkey²Department of Zoology, P.G and Research and Biotechnology, Sir Theagaraya College, Old Washermenpet, Chennai- 600 021. Tamil Nadu, India

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Aim of the study: The present study was undertaken to assess the toxicity of sublethal concentrations (0.015, 0.030 and 0.045 ppm) of cypermethrin (a pyrethroid pesticide) in the kidney of *Anabas testudineus* for 7, 14 and 21 days.

Material and Methods: On 7th, 14th and 21st days, kidney tissues were removed and dropped in Bouin's fluid. After fixation for 24-30 hours, the kidney samples were dehydrated with increasing concentrations of ethanol, transparented into xylene, embedded in paraffin. Sections of 5 µm were prepared from paraffin blocks using a rotary microtome. These sections were then stained with hematoxylin-eosine. The histopathological changes in the kidney were observed using light microscope.

Results: On 7th day, narrowing of the tubular lumen, hemosiderine granules and epithelial hypertrophy were observed at 0.015 ppm cypermethrin. On 7th day, the contraction of glomerulus, expansion of space inside the Bowman's capsule, hemosiderine granules and narrowing of the tubular lumen were recorded at 0.030 ppm and 0.045 ppm cypermethrin concentrations. On 14th day, hemosiderine granules and cloudy swelling at 0.015 ppm concentration, cloudy swelling, hemosiderine granules and contraction of the glomerulus at 0.030 ppm concentration and contraction of the glomerulus, expansion of space inside the Bowman's capsule at 0.045 ppm concentration were observed in the kidney tissues. In the kidney tissues of *Anabas testudineus* exposed to 0.015 ppm, 0.030 ppm and 0.045 ppm cypermethrin for 21 days recorded hemosiderine granules, cloudy swelling, contraction of the glomerulus and expansion of space inside the Bowman's capsule.

Acknowledgements: This study was financially supported by Jawaharlal Nehru Memorial Fund (SU/1/192/2006-2007/646).

Keywords: histopathology, kidney, cypermethrin, *Anabas testudineus*.

PP-472

Genetic Characterization of Field Populations of *Culex pipiens* Sampled From Aegean Region of Turkey

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Aim of the study: Mosquitoes are one of the organisms subjected to frequent insecticide application due to their status as vectors which carry a wide range of life threatening diseases. Turkey has climatic and other ecological features required for breeding and living of 50 species from 8 genera and the members of *Culex pipiens* complex is the dominant mosquitoes among these groups. Genetic characterization of *C. pipiens* populations is critical for insecticide resistance studies to assess resistance gene dispersal and to determine effective insecticide management strategies. The aim of this study is the characterization of field populations of *C. pipiens* sampled from Aegean region of Turkey by using RAPD markers, especially to contribute insecticide resistance studies by assessing the role of migration in resistance gene dispersal.

Material and Methods: *C. pipiens* populations were sampled from Muğla, Aydın, İzmir, Balıkesir and Çanakkale provinces that have a coastal site on Aegean Sea and have Mediterranean Climatic conditions, and also from Denizli province that has a relatively mild continental climate. From each province 4 sub-locations were sampled (only for İzmir province 5 sub-locations were sampled); 2 of them being under intense agricultural activities and 2 of them being under intense tourism activities. From each sub-location 15 individual flies were used in the analysis (a total of 375 individual flies were used). Firstly, 80 OPERON RAPD primers were screened on a sub-set of DNAs. Among them reproducible and clear band producing 20 polymorphic primers were selected and applied to all study material. Data analysis was performed by using POPGENE Version 1.32 program.

Results: Among the 80 primers screened on the sub-set, 45 did not yield any RAPD bands and 35 were observed to be producing at least 3 polymorphic bands. Application of the 20 primers to the 375 samples resulted in 252 RAPD loci. Only one of these loci was polymorphic, so the polymorphic loci ratio was 99.63%. The level of gene flow between populations was calculated as $Nm = 6.61$ and the genetic differentiation coefficient between populations was found as $G_{ST} = 0.037$. 96.43% of total genetic variation was due to within population genetic variation.

Acknowledgements: As part of a comprehensive project, this study was financially supported by The Scientific and Technological Research Council of Turkey (TUBITAK-KBAG), project number 111T387, and Muğla Sıtkı Kocman University Scientific Research Funds (project numbers MUBAP-2012/71).

Keywords: *Culex pipiens*, Genetic characterization, Gene flow, RAPD.

PP-473

A Preliminary Linkage Map and Possible QTLs for Yellow Rust (*Puccinia striiformis*) Disease in a Durum Wheat Population Derived from Kunduru-1149 x Cham-1 Cross Based on Gliadin, *HMW*-Glutenin and RAPD markersBelgin GÖÇMEN TAŞKIN¹, Özlem ÖZBEK², Sibel KESKİN ŞAN³, Zeki KAYA⁴¹Department of Biology, Middle East Technical University, Ankara / Turkey.

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Aim of the study: The rust diseases are a major constraint to wheat production in Turkey, as in all wheat growing regions of the world. Among the rust diseases, stripe or yellow rust (*Puccinia striiformis*) is by far the most important, causing yield losses in all parts of the country. A significant yellow rust epidemic can occur once or twice every decade, often more frequently. Since 2000, the Central and West Asia region (including Turkey) has been plagued by severe epidemics of yellow rust, due to new virulent isolates of the fungus emerging. Effective use of mapped genetic markers has significant advances in plant improvement and selection strategies. RAPDs have been used for a variety of purposes including the construction of genetic linkage maps and it was shown that RAPD technology is satisfactory for its use in tetraploid wheats. Gliadins and glutenins have been considered as the important biochemical markers of wheat. However, so far only a limited number of wheat traits, such as gluten strength of durum wheat, have been associated with these seed storage proteins of wheat. QTL mapping involves detecting the existence of QTLs and estimating their exact positions. The purpose of this study was to construct a preliminary genetic linkage map and determine possible QTLs for yellow rust disease in a durum wheat population composed of 144 lines of F₆ progeny, derived from Kunduru-1149 x Cham-1 cross, based on gliadin, *hmv*-glutenin and RAPD markers.

Material and Methods: 144 genetic lines of F₆ progeny of Kunduru-1149 x Cham-1 cross were used in this study. Kunduru-1149 is a variety developed by Anatolia Research Institute in Eskisehir, Turkey and Cham-1 is a variety developed by International Center for Agricultural Research in the Dry Areas (ICARDA) in Aleppo, Syria. This material was specifically developed in ICARDA for the purpose of marker development and subsequently QTL mapping of some important traits of durum wheat e.g. cold tolerance, disease resistance, high yield and high quality. In current study, QTLs were determined for only the yellow rust (*Puccinia striiformis*) disease. For yellow rust tests, determination of gliadin, *hmv*-glutenin and RAPD markers special protocols cited in related literature were performed.

Results: For the mapping population, 53 gliadin, 6 *hmv*-glutenin and 33 RAPD markers were developed. Of these (92 markers), 62 were mapped to 8 linkage groups, while the remaining 30 were remained unlinked, using the linkage criteria of LOD=2.00 and Max Distance=26.00cM. The 8 linkage groups covered a total of 804.2 cM in the durum wheat genome, which is approximately 1/16 of the total durum wheat genome. Two gliadin (Gli-19.5 and Gli-25.0 in linkage group 1), 1 glutenin (Glu-B1(6+8) in linkage group 2) and 2 RAPD (opm-18/1250 and opm-18/900 in linkage group 8) markers were associated with yellow rust resistance, indicating the most probable QTLs of this trait.

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Keywords: Linkage map, QTL, yellow rust (*Puccinia striiformis*) disease, RAPD, gliadin, *hmv*-glutenin.

PP-474

Inhibitory Effect of Isovitexin on Human Colon Carcinoma *in vitro*Kadriye Özlem SAYGI, Ramazan ERENLERGaziosmanpasaUniversity, Art and Science Faculty, Department of Chemistry, 60240 Tokat, Turkey
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Aim of the study: Antiproliferative effect of isovitexin isolated from *Origanum syriacum* L. on human colon carcinoma. Drug discovery from natural products for confronting cancer has bring in the rational opportunity to attain most new clinical applications of plant secondary metabolites and their derivatives. *Origanum* genus includes twenty four species and 6 hybrids. Sixteen species are endemic for Turkey. *Origanum* used in traditional medicine, food and pharmaceutical industries is significant aromatic and medicinal plant. Due to the spicy fragrance, *Origanum* has been widely used in food products as flavouring and perfumery.

Material and Methods: Aerials part of plant material were extracted with hexane and methanol sequentially. Chromatographic techniques (Column chromatography, preparative HPLC) were used to isolate the isovitexin and spectroscopic methods (1D-, 2D-NMR, LC-TOF/MS) were used to identify the compound. Antiproliferative effect of isovitexin was applied on HT29 (human colon carcinoma) cell lines. Isovitexin revealed excellent antiproliferative activity on this cell lines.

Results: Isovitexin has excellent antiproliferative effect against HT29 cell lines. Thus, further investigation should be carried out to present the drug potency of isovitexin.

Acknowledgements: The author thanks to the Scientific and Technological Research Council of Turkey (TUBITAK, No: 113Z195) for financial support.

Keywords: Isovitexin, *Origanum syriacum*, HT29.

PP-475

Comparison of ELISA and HPLC-DAD methods for the detection of acetamiprid and imidacloprid residues in different agricultural productsKadriye Özlem SAYGI¹, Emel CANPOLAT², M. Senay SENGUL²¹ *Gaziosmanpaşa University, Faculty of Arts and Sciences, Department of Chemistry, 60250 Tokat, Turkey*² *Gaziosmanpaşa University, Faculty of Arts and Sciences, Department of Molecular Biology and Genetics, 60250 Tokat, Turkey*
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Aim of the study: Increasing attention has been paid recently to pesticide residues because they have potential risk to human health and the environment. Pesticides such as imidacloprid and acetamiprid have been widely used to control insects in Hemiptera, Thysanoptera, and Lepidoptera. Current methods for detecting pesticides include HPLC and GC-MS. These methods are effective but expensive for high-input detection. Therefore it is necessary to develop a rapid, sensitive and cost-effective method for acetamiprid and imidacloprid detection. In this study, we propose to use ELISA technique for the measurement of imidacloprid and acetamiprid levels on agricultural samples as an alternative to HPLC technique.

Material and Methods: Imidacloprid and acetamiprid were of analytical grade. ELISA kits were obtained from commercially. The quantitative analysis was performed on a SHIMADZU CTO-20AC HPLC. As stationary phase a Dionex bonded silica C 16 (4.6X150 mm, 3 micron) was used. ELISAs were carried out on 96-well microtiter plates (Nunc-Immuno plate, MaxiSorp surface, Roskilde, Denmark) and read spectrophotometrically with a microplate reader, Thermo Scientific Multiskan GO. Commercially available vegetables and fruits were homogenized in the blender. An aliquot (10 g) of the homogenate fortified with a pesticide in methanol, was stirred with 30 ml of methanol and then extracted for 30 min. The mixtures were filtrated and analysed.

Results: The results obtained from ELISA and HPLC methods were compared in terms of sensitivity and selectivity considering the time interval for detection and the analysis.

Keywords: Imidacloprid, acetamiprid, HPLC, ELISA, food safety.

PP-476

The distributions of three invasive fish species (*Carassius gibelio* (Bloch, 1782); *Pseudorasbora parva* Temminck & Schlegels, 1846; *Gambusia holbrooki* Girard, 1859) in Central Anatolia, Marmara, Western Black Sea and Aegean regions of Turkey

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Aim of the study: In this study it was aimed to present the distribution maps of 3 invasive fish species in Central Anatolia, Marmara, Western Black Sea and Aegean regions of Turkey

Material and Methods: A total of 94 sampling stations consisting of 30 lakes and 64 rivers were sampled with gillnets (5 to 50 mm mesh size) and electroshock equipment (Samus 725MP) where applicable. Fish were preserved in formalin (%10 formalin) and soon after transferred to alcohol (70%) and transferred to laboratory and identified to the species level.

Results: It was found that *C. gibelio* was observed in 45 (22 lakes, 23 rivers), *P. parva* in 16 (11 lakes, 5 rivers) and *G. holbrooki* in 15 stations (5 lakes, 10 rivers). In 74 stations (38 lakes and 38 rivers) at least one of those invasive species were observed. Only in 1 station all of those 3 fish species were observed. *C. gibelio* was found to co-occur with *P. parva* in 8 stations (6 lakes and 2 rivers) and with *G. holbrooki* in 7 stations (2 lakes and 5 rivers). However, *P. parva* and *G. holbrooki* were never co-occurred in the same habitat.

Acknowledgements: A part of the study was supported by the Republic of Turkey Ministry of Forestry and Water Affairs (Basin Monitoring and Determining Reference Points Project).

Keywords: Invasive, Prussian carp, Stone moroko, Mosquitofish, distribution map.

PP-477

Comparative studies of photosynthetic apparatus parameters and yield in old and new Ukrainian winter wheats varieties

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Aim of the study: Wheat constitutes to more than a quarter of the total grain production. Its grain provides about 20% of calories and protein in the diet of people. At present the average yield in the world is near 3 t/ha, but the differences between countries are significant: from 1.64 t/ha in Australia to 8.12 in New Zealand. According to various researchers, the genetic contribution to wheat yield increase may vary from 30 to more than 80%. The aim of this study was to identify the traits of photosynthetic apparatus in high-yielding winter wheat crops based on comparative analysis of new and old winter wheat varieties.

Material and Methods: The studies of features of photosynthetic apparatus of leaves and canopies of winter wheat were performed on two varieties with the difference in date of origin more than 40 years: Favoritka (2005) and Myronivska 808 (1963). Studies were made in small plot experiments in different weather conditions, and mineral nutrition levels (Kiev, Ukraine). Area of plots ranged from 2 to 3 m² (depending on year of studies) in triple replication. Seeding rate was 550 grains/m². Doses of fertilizers in 2006-2008 were identical and consisted of 120 kg of nitrogen (by active substance) and 90 - phosphorus and potassium per 1 hectare (N₁₂₀P₉₀K₉₀). In 2011 and 2012 the plants were grown at contrasting levels of mineral nutrition: N₂₆P₂₆K₂₆, N₁₂₀P₁₁₀K₁₁₀ and N₂₅P₂₅K₂₅, N₁₁₀P₁₀₀K₁₀₀, respectively. Chlorophyll content in the leaves was measured by spectrophotometry using Wellburn's coefficients to calculate the content of the pigment. The leaf samples xanthophyll cycle pigments determination by HPLC system in the field immediately offer positing were frozen in liquid nitrogen.

Results: In the reproductive period of ontogeny, the variety Favoritka differ from variety Myronivska 808 by in 1.3-3 times higher content of chlorophyll in the leaves and its quantity in leaves per 1 m² of soil of all growing conditions. Radiation use efficiency in the canopy of modern variety was higher than in the old one by 69% in the period from flowering to milky stage of grain and 107% - from milk to milk-wax stage at high-level nutrition. De-epoxidation state of xanthophyll cycle pigments in the flag leaves of variety Favoritka at all levels of mineral nutrition under changing light conditions was lower than in Myronivska 808. This indicates that the efficiency of use of absorbed light energy in the photosynthetic processes in modern variety was higher, while the losses of absorbed energy in non-photosynthetic processes in the old variety were large. The variety Favoritka has also by 46-104% higher yield than Myronivska 808 at different weather conditions and by 12-93% - at different mineral nutrition. It was established a close positive relationship ($r = 0,80 \pm 0,13$) between grain yield and total the amount of chlorophyll in the leaves of plants per 1 m² during period flowering - milk-wax ripeness. Obtained data shown that photosynthetic activity during the reproductive period in winter wheat variety Favoritka contributed to the formation of crops with high efficiency use of FAR. Thereby, modern Ukrainian winter wheat varieties is a valuable source of useful genetic traits.

Keywords: *Triticum aestivum* L., photosynthetic pigments, high productivity.

PP-478

The Clonal Variability of the Growth Parameters for Poplars and Willows in Field and Laboratory Conditions

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Aim of the study: Poplars and willows are forest trees used in many countries as fast growing timber species for production of timber, veneer, furniture, matches and other valuable products in long rotation forests and agroforestry systems as well as wood chips and pellet production in short rotation plantations (SRP) that can be considered as a renewable source of energy. Poplar genus is highly diverse, and different poplar hybrids are often used in intensive breeding and selection for different purposes and traits. The requirements for plant material for SRP differ from those for traditional forestry: plant material for SRP should be cheap, must have high rooting ability and demonstrate fast growth immediately from the start of planting [Bartko, 2011], while plant material for reforestation should meet ecological requirements of high genetic diversity, adaptability, etc. However, SRP can substitute harvesting natural populations and release pressure on native forests helping to protect their biodiversity. To estimate the clones of poplars and willows available in Ukraine suitable for SRP by their growth characteristics.

Material and Methods: Rooting ability of cuttings in water for 15 poplar and 3 willow clones was determined on 12, 19 and 25 days after starting soaking. The collection of fast growing trees was established at the National Botanical Gardens. Currently, it includes 21 *Populus* and 10 *Salix* clones, many of them were provided by the Institute of Forestry and Forest Melioration, and they are mostly hybrids of Ukrainian origin. Cuttings of 20-25 cm length were planted very densely, and the established plot was watered every week through spring and summer, which was very important because of extreme summer drought. At the end of the first growing season the height, base diameter, number of branches per each plant and biomass weight were measured.

Results: Poplar and willow clones differed a lot by growth parameters in the field conditions and rooting ability in water. Rooting ability of poplars varied across different clones. Five poplar and three willow clones formed a lot of roots already on 12 day, others did it by 7 days later, while five poplar clones were quite rigid and no roots were formed in water. Thus, the clones, which readily formed roots are more suitable for SRP. Average height of the best clones reached more than 2 m while the lowest were around 1 m height and less. Diameter variations ranged within 4–19 mm, while number of branches per plant varied between 1,00 and 2,22, and fresh biomass weight – between 23–341 g. Comparing to others, willow clone Zhytomyrska-1 was the most intensively growing during the first planting season. Other perspective clones of poplar and willows were also determined. To finally recommend the best clones to farmers, the experiments should be continued at least for the next two years until the first rotation will be harvested.

Acknowledgements: This study was carried out in the frame of inter-institutional research supported by a grant from National Academy of Sciences of Ukraine for 2013-2017.

Keywords: Fast-growing trees, Short rotation plantations, *Populus*, *Salix*.

PP-479

Mutual relation of halophyte and glycophyte in chloride saltiness condition: Biological meliorationKhuraman KHALILOVA, Dariko RASULOVA, Sima QANI-ZADE, Zumrud ABBASOVA, Elmira ZEYNALOVA*Institute of Botany, National Academy of Sciences of Azerbaijan, Baku, Azerbaijan*
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Aim of the study: In this work has been investigated the increasing ways of the adaptive defense functions (resistance) of *Secale cereale* L. which belong to glycophyt plants in the soil culture (weak 0.3%, middle 0.6%, high 0.9%) of chloride saltiness condition. For this purpose, the cultivation with halophyte *Salicornia europaea* L. extract as biomeliorator and the joint sowing combined methods have been tested. Both method has resulted with superiority of all morpho-physiological parameters of the experiment plants.

Material and Methods: The salts influence mechanism on plant organism is explained by most investigators with formation unspecifically compounds which toxically influenced to the plant organism in result of disturbed of the normal function of the fermentation systems. It has been learnt the activities of the antioxidant enzymes as catalase (CAT), ascorbate peroxidase (APO), superoxide dismutase (SOD) in this work. It has been observed the decreasing of the enzymes activity when concentration of salt increases. But in the plants which influenced by 0.9% NaCl+halophyte extract and combined sowing plant with halophytes it has been registered the raising activities of shown enzymes. This affirms the increasing resistance of glycophyte plant. Defense functions of the learning enzymes, as if distributed on development phases of the experiment plants, CAT - in the stage of booting, APO - in the stage heading, SOD - in the stage flowering have demonstrated of higher activity (responsibility).

Results: The getting results allow to consider about possibility of using of the ecologically clean biological meliorant plants as natural protector which helped adaptation to the salt stress. It is suitable as component of soil melioration and as feed component.

Keywords: saltiness, biomeliorator, halophyt, glycophyt, antioxidant enzymes.

PP-480

Effect of nitrogen supply on the vegetation shift of two halophyte species: *Sarcocornia perennis* and *Halimione portulacoides*Nihan BÖREKÇİ¹, Lale Yıldız AKTAŞ¹, Volkan EROĞLU², Serdar Gökhan ŞENOL²¹Ege University, Faculty of Science, Department of Biology, Botany Section, Turkey²Ege University Botanical Garden & Herbarium Research and Application Center, Turkey

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Aim of the study: *Sarcocornia perennis* (Mill.) A.J.Scott and *Halimione portulacoides* (L.) Aellen are halophyte species common in Egean region salt marshes in Turkey. Distribution of these species is regulated by their salt tolerance degree being euhalophyte *Sarcocornia* spreads out salt affected shores as a first species while *Halimione* grows inner parts of shores under lower salt concentrations. This distribution pattern is observed to shift around the treated waste water discharge area where *Halimione* species grows closer to the shore than *Sarcocornia*. The aim of this study is to describe the impact of nitrogen supplement caused by treated waste water discharge on the distribution of *Sarcocornia* and *Halimione* species with some physiological parameters.

Material and Methods: Nitrogen supplied samples of *Sarcocornia* and *Halimione* plants were collected from the Izmir Municipality waste water treatment discharge area (IZSU) and the control plants were obtained from the natural saline habitats of Gediz Delta, Izmir. Leaf chlorophyll (Chl) and carotenoid (Car) content was measured by the methods of Nagata and Yamashita (1992). Extent of stress was determined by measuring hydrogen peroxide (H₂O₂) content (Patterson et al., 1984) and membrane hazard determined by the method of Cakmak ve Horst (1991). Proline content of plants was measured based on Bates et al. (1973) method. Shoot radius of *Sarcocornia* was measured using caliper. Leaf area of *Halimione* was quantified by Dino-Lite digital microscope.

Results: Nitrogen supplied environment affected growth in both species with an increase in leaf area of *Halimione* and shoot radius of *Sarcocornia*. The Chl content of *Halimione* increased depending on nitrogen in the growth area about 50% in comparison to its control samples while *Sarcocornia* maintained similar level of Chl content irrespective to nitrogen. The Car content of both species enhanced under nitrogen supplement, the increment was more prominent in *Halimione* than *Sarcocornia*. The extent of stress caused by salt and/or nitrogen presented with H₂O₂ content which decreased depending on nitrogen in *Halimione*, however, it remained in the control level in *Sarcocornia*. Lipid peroxidation level being a marker of membrane hazard, increased in nitrogen supplement in both species. Proline level of both species was similar under control conditions, however, the raised nitrogen supplement caused almost three times higher proline level in *Halimione* comparing with its control and *Sarcocornia*. In conclusion, *Halimione* exhibited increasing salt tolerance over *Sarcocornia* in nitrogen supplied environment, which may be related with higher potential of transformation nitrogen to osmolyte e.g. proline to counteract the adverse effects of high salinity.

Acknowledgements: The authors thank to Izmir Municipality Waste Water Treatment Management Office for permission to collect samples (IZSU-Izmir) and Dr A. Emre Yaprak for taxonomical support. This work was supported by the BAP Project of Ege University (Grant No. 15-FEN-048).

Keywords: *Sarcocornia*, *Halimione*, salt tolerance, nitrogen.

PP-481

Geochemical features of Antimony mineralization in Hasköy-Dereağzı (Nazilli-Aydın), Menderes Massif, Western TurkeyBarış SEMİZ¹, Gürkan SEMİZ^{2,3}, Gürçay Kıvanç AKYILDIZ^{2,3}, Mustafa DURAN²¹Department of Geology Engineering, Pamukkale University, Turkey²Department of Biology, Chemical Ecology Lab, Pamukkale University, Turkey³FAGUMER - Flora and Fauna Research, Development and Application Center of Pamukkale University Denizli - TURKEY

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Aim of the study: Study area is located in the Menderes massif and the northern part of Nazilli (Aydın, SW Turkey). The aim of the study is to investigate the geochemical properties of the antimony mineralization and determination of its possible impact on the environment.

Material and Methods: Mineralogical properties and geochemical characteristics of all samples were determined by using optical microscopy and major element analyses (XRF) respectively. SPECTRO XEPOS model Polarized Energy Dispersive X-ray Fluorescence (PEDXRF) spectrometer can analyze elements from sodium (Na) with atom number 11 to uranium (U) with atom number 92, and it can accurately measure heavy elements up to 0.5 ppm and light elements up to 10 ppm. For the XRF analyses, samples were crushed in a tungsten carbide crushing vessel, and 6.25 g of powdered sample was mixed with 1.4 g of wax. The mixture was pressed at 18 N in an automatic press to obtain a pressed disc.

Results: The basement of the area is consisted of gneiss of Precambrian age and schist of Paleozoic age. Type of mineralization are known as a stratabound antimony which is related to quartz veins (approximately 50 cm thickness) within graphitic schists. Major minerals in the stratabound antimony mineralization are pyrite, arsenopyrite, galena and sphalerite. The host graphitic schist consists of quartz, feldspars, and graphite with sphene as accessory minerals. The ore minerals are concordant to the schistosity. Graphitic schist hosted mineralization, is characterized by As (94220-95980 ppm), Pb (9490-9740ppm), Sb (638-678 ppm), Hg (50-62 ppm), and silver (3.8-10.3 ppm). According to chemical analyses results, As mineralization is found to be high and it is thought that this situation could be dangerous for the plants and water supplies.

Keywords: Antimony, arsenopyrite, Hasköy, Nazilli, Menderes Massif.

PP-482

Antimony and arsenic concentrations in soil samples around the abandoned Hasköy-Dereboğazi mine (Nazilli-Aydın)Barış SEMİZ¹, Gürkan SEMİZ^{2,3}¹ Department of Geology Engineering, Pamukkale University, Turkey² Biology Department, Chemical Ecology Lab, Pamukkale University, Turkey³ FAGUMER - Flora and Fauna Research, Development and Application Center of Pamukkale University Denizli - TURKEY

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Aim of the study: Antimony pollution soils and waters is of increasing environmental concern. The objective of this research was to evaluate the degree of soil contamination with arsenic and antimony in Hasköy-Dereboğazi, a noneconomic and abandoned mine located in the northern area of Nazilli-Aydın and in the Menderes massif.

Material and Methods: The soil samples were taken at 3 locations (mine entrance, agricultural field above the mine gallery and control sample from 200 meters distance) around mine. The arsenic (As) and antimony (Sb) determinations were carried out by a SPECTRO XEPOS model Polarized Energy Dispersive X-ray Fluorescence (PEDXRF) spectrometer. This spectrometer can analyze elements from sodium (Na) with atom number 11 to uranium (U) with atom number 92, and it can accurately measure heavy elements up to 0.5 ppm and light elements up to 10 ppm.

Results: The As and Sb concentrations in soil collected from mine entrance has the highest concentration (441 ppm and 168 ppm, respectively), while the As and Sb concentrations in the soil from agricultural field has moderate concentrations (172 ppm and 56 ppm, respectively). Therefore, there is severely the soil contamination with copper, zinc and lead around the mine. We did not found any significant soil contamination in control sample. This study clearly indicated that there are still serious soil pollution with arsenic and antimony in abandoned Hasköy-Dereboğazi district even the mine has closed down a few decades ago.

Keywords: Antimony, arsenic, soil contamination, Hasköy, Nazilli.

PP-483

Antimony and arsenic accumulation in some plants growing in abandoned Hasköy-Dereboğazi mining area (Nazilli-Aydın)Gürkan SEMİZ^{1,3}, Barış SEMİZ²,¹ Department of Biology, Chemical Ecology Lab, Pamukkale University, Turkey² Department of Geology Engineering, Pamukkale University, Turkey³FAGUMER - Flora and Fauna Research, Development and Application Center of Pamukkale University Denizli - TURKEY

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Aim of the study: Antimony and arsenic toxicity and contamination have become a growing concern in recent years. Phytoremediation techniques are emerging as a cost effective alternative for either cleaning or stabilizing contaminated soil. In this study, antimony (Sb) and arsenic (As) accumulation by *Asplenium ceterach* L. and *Olea europaea* L. around abandoned Hasköy-Dereboğazi mining area (Nazilli, Aydın) were investigated.

Material and Methods: Plant samples were taken at different locations (mine-close and several meters distance from mine as control) from mining area with different concentrations of Sb, As, and polymetallic contamination. The arsenic (As), antimony (Sb) and other potentially toxic elements (mainly Zn, Pb and Cu) determination was carried out by a SPECTRO XEPOS model Polarized Energy Dispersive X-ray Fluorescence (PEDXRF) spectrometer. This spectrometer can analyze elements from sodium (Na) with atom number 11 to uranium (U) with atom number 92, and it can accurately measure heavy elements up to 0.5 ppm and light elements up to 10 ppm.

Results: *Asplenium ceterach* has the highest concentration of As and Sb because this plant collected from mine entrance. Additionally, mine-close *Olea europaea* samples also showed higher amount of Sb with respect to control sample. Our results show that the plants were severely polluted with the average Sb and As concentrations. Those observations would be significant to ecological and environmental risk assessment in Sb and As contaminated areas. As conclusion, translocation and tolerance mechanisms of these elements in plant-soil complex deserve further detailed analyses.

Keywords: Antimony, arsenic, plant, *Asplenium ceterach*, *Olea europaea*, Hasköy, Nazilli

PP-484

How is global warming affecting the distribution of the species? An example of *Origanum minutiflorum* Schwarz & P. H. DavisCanan DÜLGEROĞLU¹, Ahmet AKSOY¹, Orhan ÜNAL¹¹Akdeniz University, Faculty of Science, Department of Biology, Antalya, TURKEY
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Aim of the study: Global warming is a significant driver for biodiversity loss, which is increasing exponentially, as it may affect species' natural distribution. To reduce the impacts of climate change on ecosystems, biodiversity conservation is very important. Ecological niche modeling (ENM) has become an important part of biodiversity conservation in recent years. In order to reveal the impacts of climate change on the distribution of the species *Origanum minutiflorum* Schwarz & P. H. Davis, an endemic taxon of Antalya that is very important from an economic point of view, is used as an example.

Material and Methods: Current and future potential distributions of *O. minutiflorum* were predicted with ENM, according to current climate and MIROC5 (Model for Interdisciplinary Research On Climate) climate change scenario for the year 2070, which was created based on fifth IPCC report, by combining known occurrence records of *O. minutiflorum* with digital layers of climatic variables. Current and future potential distributions of the species were predicted with Maximum Entropy algorithm by Maxent software.

Results: According to eventual models, while probability of occurrence of the species may reduce in the current habitat in 2070, it will be a remote possibility to shift its habitat towards North. Consequently, *O. minutiflorum* will be under local extinction risk because of the climate change in the future.

Keywords: Climate change, Maxent, *Origanum minutiflorum*, ecological niche modeling.

PP-485

Essential oil contents and compositions of *Hypericum scabrum* L. and *Hypericum linarioides* BOSSEAyşe Betül AVCI¹, Mustafa KORKMAZ²¹ Odemis Vocational School, Ege University, Izmir, Turkey² Biology Department of Arts and Sciences, Faculty of Erzincan University, Erzincan, Turkey
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Aim of the study: *Hypericum* L. is an important genus of Gluciaceae (Guttiferae, Hypericaceae) family. The genus contains more than 450 species throughout the world. It distributes in the Mediterranean and the Near East areas, tropic and subtropic regions, Europe, Asia, Africa, and North America. There are 105 taxa belonging to 95 species in Turkey. Hypericin was first identified in *Hypericum* species as a chemotaxonomic marker of the genera. The purpose of the study was to investigate the essential oil content and composition of *Hypericumscabrum* and *Hypericum linarioides* collected from Erzincan and Sivas, Turkey. Most of the species of *Hypericum* genus are known as “Kantaron” in Turkey. In Eastern Anatolia region *Hypericum scabrum* is also called as “Kantaron, Sarı kantaron” by the local public. Different vernacular names (Kepir otu, Kızılcık otu, Mayası otu, Koyunkıran, Kuzukıran, Karahasañçayı) are used in other parts of Turkey. *Hypericum linarioides* is also called as “Mide otu”. Many studies have been performed on antimicrobial, antifungal, antiviral, antioxidant, and antidepressant activities of *Hypericum* species.

Material and Methods: *Hypericumscabrum* and *Hypericum linarioides* were collected Erzincan and Sivas, Turkey. The essential oils were extracted by hydro distillation for 3 h using a Clevenger type apparatus with 20 g of the oven-dried samples at 30°C for 72 h. Essential oils of inflorescence and leaves were extracted separately. The essential oils were stored in dark glass bottles at 4°C until analysis. The essential oil compositions were performed with Thermo Scientific Trace GC Ultra gas chromatograph (ThermoScientific, Ltd., Rodano, Milan, Italy) and was also performed using the same Thermo Scientific Trace GC Ultra gas chromatograph (ThermoScientific, Ltd.) coupled with a Thermo Scientific DSQ II mass detector (Thermo Scientific, Ltd.) and a Thermo TR-Wax (ThermoScientific, Ltd.) fused silica capillary column (60 m–0.32 mm i.d. film thickness, 0.25 mm) set at 70 eV.

Results: The essential oil contents of inflorescence of *Hypericumscabrum* and *Hypericumlinarioides* was found higher than leaves. The average content of essential oil was found as 0,1% in inflorescence and 0,05 % in leaves of Sivas population of *Hypericumscabrum* and was found as 0,04 % in inflorescence and trace amounts in leaves of *Hypericumscabrum* in Erzincan populations. The average content of essential oil was found as 0,02 % in inflorescence and trace amounts in leaves of Sivas population of *Hypericumlinarioides*. The main constituents of *Hypericumscabrum* L. was determined as delta-3-carene with an average of 83,89% in Sivas and 55,70% in Erzincan populations. The main constituents of *Hypericumlinarioides* was detected as caryophyllene oxide (33,85%) and delta-3-carene (16,76%).

Keywords: *Hypericum*, essential oil, delta-3-carene, caryophyllene oxide.

PP-486

Micropropagation of Some Fern Species Grown Naturally in TurkeyTolga İZGÜ¹, Başar SEVİNDİK², Pembe ÇÜRÜK², Ehsan Mohammad TAGİPUR³,
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Aim of the study: The aim of this study was to propagate some fern species (*Asplenium adiantum-nigrum* L., *Asplenium trichomanes* L., *Asplenium septentrionale* (L.) Hoffm. subsp. *septentrionale*, *Dryopteris filixmas*, *Pteris vittata* L., *Asplenium scolopendrium* L. subsp. *Scolopendrium* and *Polystichum aculeatum*) which are grown naturally in our country using spore culture technique and to observe the stages of germination, gametophyte emergence, sporophyte and plantlet formation.

Material and Methods: *In vitro* regeneration experiments were conducted using spore explants belong to different fern species to search micropropagation possibilities of this plant which is a valuable genetic resource of Turkey.

Results: In the experiments, different plant growth regulators; BA (0, 0.5, 1.0 mg L⁻¹) and K (0, 0.5, 1.0 mg L⁻¹) combinations and concentrations were used to determine the growth and development of plants, As a result, ratio of spore germination, structure of gametophyte and sporophyte and their differentiation to plantlet were determined statistically.

PP-487

Redescription of *Dysdera sultani* Deeleman-Reinhold, 1988 (Araneae: Dysderidae) with the first description of the femaleRecep Sulhi ÖZKÜTÜK¹, Gizem KARAKAŞ¹¹ Department of Biology, Faculty of Science, Anadolu University, TR- 26470 Eskişehir, Turkey
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Aim of the study: The aim of this study is to describe female of *D. sultani* for the first time which was described through from single sex by Deeleman-Reinhold from Turkey and to expand this species' distribution area.

Material and Methods: Examined specimens were collected from Western Central Anatolia region of Turkey using a litter reducer (sifter) and pitfall traps. The specimens were preserved in 70% ethanol. Digital images of the copulatory organs were taken with a Leica DFC295 digital camera attached to a Leica S8AP0 stereomicroscope and 5-15 photographs were taken at different focal planes and combined. All measurements are in mm.

Results: Deeleman-Reinhold&Deeleman separated genus *Dysdera* into 9 groups according to male and female copulatory organs and some morphological characters. These groups are the *crocota* group, the *erythrina* group, the *longirostris* group, the *ninnii* group, the *punctata* group, the *lata* group, the *asiatica* group, the *aculeate* group and the *festai* group. *Dysdera sultani* belongs to *asiatica* group. Female copulatory organ of *D. sultani* is conform with *asiatica* group. With this study also Uşak and Kütahya Province's added to the distribution of this species which is only known from its type locality.

Acknowledgements: This study was supported by Anadolu University Scientific Research Projects Commission under the grant no: 1508F592)

Keywords: *Dysdera sultani*, Araneae, Dysderidae, Turkey.

PP-488

Investigation on possible damages of most commonly used pesticides on the growth of tomato plants grown in Muğla provinceMahmut YILDIZTEKİN¹, Atilla Levent TUNA², Mehmet Ali ÖZLER^{1,3}, Said NADEEM^{1,3},^{1*}Department of Herbal and Animal Production, Koycegiz Vocational School, Muğla Sıtkı Kocman University, Köyceğiz-48800, Muğla, Turkey²Department of Biology, Faculty of Science, Muğla Sıtkı Kocman University, Muğla-48000, Muğla, Turkey³Department of Chemistry, Faculty of Science, Muğla Sıtkı Kocman University, Muğla-48000, Muğla, Turkey

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Aim of the study: The present study was aimed to determine the effects of pesticides on tomato plants around Muğla province. Plants anatomy, physiology and biochemistry were compared with control group those were not treated with any pesticides.

Material and Methods: The study was carried out in Köyceğiz area on Hazera 5656 F1 (*Lycopersicon esculentum* Mill.) variety of tomato that is widespread Muğla; Köyceğiz, Ortaca and Fethiye. Various systemic insecticides applied were Acetamiprid (ABA), Imidacloprid (IM), Abamectin (ABA), Thiomethoxam (THM) ve Abamectin+Chlorantraniliprole (ABAC). Each pesticide was applied in 3 different doses by spraying (prescribed dose, its two and four times of amount) with 4 repetitions; as a whole 60 samples. The control group was only irrigated by water without any pesticides used. During the study, dry matter %, morphological observations, total protein and proline, chlorophyll-carotenoid amount, MDA (Lipid Peroxidation), hydrogen peroxide and SOD (superoxide dismutase), POD (peroxidase), CAT (catalase) activity, were analysed in the leaves.

Results: MDA, proline and H₂O₂ amount, SOD, POD and CAT activities were increased with the increase of dose amount when the control group was compared with the tomato seedlings of the sample leaves. On the other hand, % dry matter, total chlorophyll, carotenoid and protein contents were notably decreased. Amount of total chlorophyll highest decrease was observed in IM-3 (58.21 %) while less decrease was observed in ABA-1 (6.73 %). Carotenoids were similarly decreased with the amount of total chlorophyll. Highest content of proline was found after the treatment of ABAC-3 (49.33 unit mg protein⁻¹) while least decrease was observed in the IM-1 treated samples (24.89 unit mg protein⁻¹). ABA-3 treated samples showed highest increase in SOD activities (91.44 %) while least decrease was shown by THM-1 treated samples (8.56 %). POD activities showed highest increase by ABAC-3 (12.04 %) while least amount by THM-1 (3.03 %). ABA-3 caused highest increase in CAT activities (82.62 %) while IM-1 caused least (7.34 %).

Acknowledgements: We are thankful to BAP (Scientific Research Projects) Muğla Sıtkı Koçman University Muğla Turkey (Project No: BAP-2011/15) for their financial support.

Keywords: Oxidative stress, Antioxidative enzymes, *L. esculentum*, Insecticides, MDA.

PP-489

Soil Properties and Mineral Nutrients of Clementine Mandarin (*Citrus reticulata* Blanco) Grown in The Köyceğiz Region of Muğla ProvinceSemir KUZU¹, Mahmut YILDIZTEKİN²¹Department of Biology/Graduate School of Natural and Applied Sciences, Muğla Sıtkı Koçman University, Muğla, Turkey²Department of Herbal and Animal Production, Koycegiz Vocational School, Muğla Sıtkı Koçman University, Muğla, Turkey
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Aim of the study: This study was aimed to analyze the nutrients (macro- and microelements) in the clementine mandarin (*Citrus reticulata* Blanco), grown in the Köyceğiz region of Muğla Province, Turkey. The soil on which the tree grows was also analyzed for its chemo- and physio- properties.

Material and Methods: Mandarin tree leaves and soil samples were collected from 10 different gardens, which represents the Köyceğiz area, to analyze their nutrients. Out of minerals, P, K, Mg, Ca, Fe, Zn, Mn, Cu and B were analyzed by drying at 70 °C while N was analyzed by drying followed by Kjeldahl procedure. Soil was analyzed for sand, silt, and clay by using hydrometer. pH and salt analyses of the soil were performed by using 1:2.5 soil-water method. Organic material in soil was determined by aging, calcium carbonate by calcimetry, phosphorus by spectrophotometry, K, Ca, Mg, Fe, Zn, Mn, Cu and B amounts were determined ICP-OES instrument.

Results: The soil under study showed 13-53 % sand, 7.46-8.56 pH, 0.08-0.27 (mS/cm) EC, carbonates 1.4-14.8 % and 0.54-2.77 % organic materials. Soil analysis also suggested that N, K and Mn amounts were insufficient in all fields while Fe and Mg were found in higher amounts. Analysis of mandarin tree leaves reflected N 1.97-2.84 %, K 0.73-1.18 %, P 0.13-0.19 %, Mg 0.6-1.11 %, Ca 1.61-2.91 %, Fe 180-294 (mg kg⁻¹), Mn 10.45-218 (mg kg⁻¹), Zn 16.92-281 (mg kg⁻¹), Cu 7.09-23.99 (mg kg⁻¹) and B 17.68-236 (mg kg⁻¹).

Acknowledgements: We are thankful to the BAP (Scientific Research Projects) Muğla Sıtkı Koçman University, Muğla-Turkey (Project No: BAP-2015/078) for their financial support.

Keywords: Muğla, Köyceğiz, Clementine Mandarin, Mineral Nutrition, Soil.

PP-490

Micropropagation of Some Fern Species Grown Naturally in TurkeyTolga İZGÜ¹, Başar SEVİNDİK², Pembe ÇÜRÜK², Ehsan Mohammad TAGİPUR³,
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Aim of the study: The aim of this study was to propagate some fern species (*Asplenium adiantum-nigrum* L., *Asplenium trichomanes* L., *Asplenium septentrionale* (L.) Hoffm. subsp. *septentrionale*, *Dryopteris filixmas*, *Pteris vittata* L., *Asplenium scolopendrium* L. subsp. *Scolopendrium* and *Polystichum aculeatum*) which are grown naturally in our country using spore culture technique and to observe the stages of germination, gametophyte emergence, sporophyte and plantlet formation.

Material and Methods: *In vitro* regeneration experiments were conducted using spore explants belong to different fern species to search micropropagation possibilities of this plant which is a valuable genetic resource of Turkey.

Results: In the experiments, different plant growth regulators; BA (0, 0.5, 1.0 mg L⁻¹) and K (0, 0.5, 1.0 mg L⁻¹) combinations and concentrations were used to determine the growth and development of plants, As a result, ratio of spore germination, structure of gametophyte and sporophyte and their differentiation to plantlet were determined statistically.

PP-491

Quantitation of gallic acid of three *Origanum* species from south-eastern TurkeyAslı SEMİZ¹, Gürkan SEMİZ^{2,3}, Gurbet ÇELİK-TURGUT², Erhan GÖNEN²¹ Medical Laboratory Techniques, Pamukkale University, Turkey,² Department of Biology, Pamukkale University, Turkey³ FAGUMER - Flora and Fauna Research, Development and Application Center of Pamukkale University
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Aim of the study: *Origanum* is a member of *Lamiaceae* family and herbaceous plant native to the Mediterranean and Euroasia. Due to variability in chemical and aroma characteristics, *Origanum* plants are widely used in agriculture and the pharmaceutical and cosmetic industries. *Origanum* has potential health-promoting benefits and antioxidant properties from phenolic contents. Gallic acid is one of the most biologically-active phenolic compounds of plant origin. Present study was designed to specifically investigate the content of gallic acid in extracts of three species of *Origanum* (*Origanum majorana*, *Origanum onites*, and *Origanum hypericifolium*) from south-eastern Turkey.

Material and Methods: *O. majorana* was collected from Antalya, *O. onites* and *O. hypericifolium* were collected from Denizli. All extracts were filtered through a 0.2 µm nylon syringe filter before further use in experiments. Gallic acid contents of the extracts were estimated spectrophotometrically according to the Folin-Ciocalteu colorimetric method. The reaction mixture was prepared by mixing 0.5 ml of methanolic solution (1 mg/ml) of extract, 2.5 ml of 10% Folin-Ciocalteu's reagent dissolved in water and 2.5 ml 7.5% NaHCO₃. The samples were incubated at 45 °C for 15 min. The absorbance was determined at λ_{max} = 765 nm. In order to quantify the amount of free gallic acid, its calibration curve was determined. The results were expressed as gallic acid equivalent (GAE, milligrams of gallic acid per gram of extract). Data presented are average values of three measurements for each sample.

Results: The gallic acid contents ranged between 19.36 to 34.45 mg of GAE/g of extract. According to the results, the highest amount of gallic acid were observed in *O. majorana* and *O. onites* (34.51 mg of GAE/g of extract, 27.36 mg of GAE/g of extract, respectively) and the lowest amount was found in *O. hypericifolium* (19.36 mg of GAE/g of extract). It is well known that phenolic substances such as flavonoids, phenolic acids, gallic acids and tannins contribute directly to the antioxidant capacity of plants. Plant materials rich in phenolics are increasingly being used in food industry because they retard oxidative degradation of lipids and improve the quality and nutritional value of food. As a result of all these *O. majorana* and *O. onites* can be a good source of polyphenols.

Acknowledgements: The authors are thankful to TUBITAK (Project No: 110T976) and Pamukkale University, Scientific Research Project Unit for financial support to collect plant samples and laboratory analysis.

Keywords: Gallic acid, phenolic compound, *Origanum majorana*, *Origanum onites*, *Origanum hypericifolium*, microwave.

PP-492

Determination of gallic acid content of microwave-assisted *Salvia tomentosa* Mill. extractGurbet ÇELİK-TURGUT², Asli SEMİZ¹, Gürkan SEMİZ^{2,3}¹ Medical Laboratory Techniques, Pamukkale University, Turkey,² Department of Biology, Pamukkale University, Turkey³FAGUMER - Flora and Fauna Research, Development and Application Center of Pamukkale University
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Aim of the study: The genus *Salvia* is represented by about 900 species throughout the world. Various species of the *Salvia* genus are economically important, have been used since ancient times in folk medicine. In particular, the genus *Salvia* has been subject of intensive study in the past decades for its antioxidative and anti-inflammatory effects in relation to the active constituents, including the phenolic contents. Gallic acid is one of the most biologically-active phenolic compounds of plant origin. Particularly, the species *Salvia tomentosa* is one of the most commonly consumed herbal teas. Accordingly, the present study was designed to determine the gallic acid content of *S. tomentosa* extract.

Material and Methods: *S. tomentosa* was collected from Honaz Mountain in Denizli, Turkey. The extract was filtered through a 0.2 µm nylon syringe filter before further use in experiments. A gallic acid content of the extract was estimated spectrophotometrically according to the Folin-Ciocalteu colorimetric method. The reaction mixture was prepared by mixing 0.5 ml of methanolic solution (1 mg/ml) of extract, 2.5 ml of 10% Folin-Ciocalteu's reagent dissolved in water and 2.5 ml 7.5% NaHCO₃. The samples were incubated at 45 °C for 15 min. The absorbance was determined at λ_{max} = 765 nm. In order to quantify the amount of free gallic acid, its calibration curve was determined. The result was expressed as gallic acid equivalent (GAE, milligrams of gallic acid per gram of extract). Data presented is average value of three measurements for sample.

Results: Based on the absorbance value of the extract solution, reacting with Folin-Ciocalteu reagent and compared with the standard solutions of gallic acid equivalents, as described above, result of the colorimetric analysis of gallic acid content was found 24.54 mg of GAE/g of extract. It is well known that phenolic substances such as flavonoids, phenolic acids, gallic acids and tannins contribute directly to the antioxidant capacity of plants. Crude extracts of herbs rich in phenolics are increasingly being used in food industry because they retard oxidative degradation of lipids and thereby improve the nutritional value of food. As a result of all this *S. tomentosa* can be a good source of polyphenols. Therefore, *S. tomentosa* could be used for sustainable economic medicinal plant production by public purposes and pharmaceutical industry.

Acknowledgements: The authors are thankful to TUBITAK (Project No: 110T976) and Pamukkale University, Scientific Research Project Unit for financial support to collect plant samples and laboratory analysis.

Keywords: Gallic acid, *Salvia tomentosa*, phenolic compound, microwave extraction.

PP-493

The current situation of *Teucrium sandrasicum* O. Schwarz and *Teucrium alyssifolium* Staph. and their conservation categories from Sandras Mountain

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Aim of the study: This study presents the distribution and conservation status of the following serpentinophyt endemic species for Sandras Mountain: *Teucrium alyssifolium* Staph. and *Teucrium sandrasicum* O. Schwarz.

Material and Methods: The threat categories for these species are proposed according to the IUCN Red List Criteria. Taxonomic notes and habitat preferences of these endemic plants are given, and environmental impacts on their habitats and population sizes are described.

Results: The current situation of these three endemic plants has been threatened by human activities; habitat destruction through heavy grazing, expansion of mining quarries, gathering some medicinal and aromatic plants by native people for their health and cultural needs.

Acknowledgements: This research has been partly supported by TUBITAK-(110T976) and by Pamukkale Scientific Research Unit.

Keywords: *Teucrium alyssifolium*, *Teucrium sandrasicum*, endemic, conservation status.

PP-494

Contribution to awareness of nature and environment: A nature science campGürkan SEMİZ^{1,3}, Gürçay Kıvanç AKYILDIZ^{2,3}¹Biology Department/Faculty of Science & Arts, Pamukkale University, Turkey,²Program of Biomedical Device Technology/Vocational High School of Technical Sciences, Pamukkale University, Turkey³FAGUMER - Flora and Fauna Research, Development and Application Center of Pamukkale University Denizli - TURKEY
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Aim of the study: Nature education is a field of inquiry that seeks to promote understanding of the interrelationship of humans and the environment. The present study is aimed at teaching and providing self awareness high school students with nature and their environment by using interdisciplinary science programs.

Material and Methods: Topuklu Plateau located in Beyağaç Township of province Denizli was preferred as the camping site. It is located in a partially undulating plateau about quarter hectares. The plateau is 21 km far from downtown at an altitude 1700 m. Many black pines (*Pinus nigra*) around the age of 1000 years are dispersed around the area. There are also lots of natural sources of potable water and other affordable requirements for accommodation. Materials and equipments used for educational activities were obtained within the project of TUBITAK 4004 (The Scientific and Technological Research Council of Turkey) and Pamukkale University.

Results: The project was held for four times between 2011 and 2015. Including 40 students in each annual camp, a total of 160 high school students has been trained so far. Various activities considering the readiness levels of students were organized during the 7-day-stay nature science camp. The most potential activities are Biology, Environment, Education, Physics, Philosophy, Sport Training and Geology respectively. An atelier was conducted in order to give theoretical training and seminars while the practical training was held in nature under the supervision of trainers. A variety of assessment methods (t-test and Chi-square) for evaluating pre-after camp performance of students were applied. Feedbacks on university choices of those students who have received training in the nature science camp were evaluated too.

Acknowledgements: This study was fully supported by The Scientific and Technological Research Council of Turkey (TUBİTAK).

Keywords: Education, readiness level, t-test, chi-square, self awareness.

PP-495

Larvicidal activity of *Pinus brutia* Ten. Seed Oil against to *Thaumetopoea wilkinsoni* Tams.Kübra KOCABIYIK¹, Erhan GÖNEN¹, Gürkan SEMİZ^{1,3}, Hüseyin ÇETİN²¹ Department of Biology, Faculty of Arst & Science, Pamukkale University, Turkey² Department of Biology, Faculty Science, Akdeniz University, Turkey³FAGUMER - Flora and Fauna Research, Development and Application Center of Pamukkale University
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Aim of the study: The aim of this research was to determine the larvicidal activity of essential oil obtained from the seed of Turkish Red Pine (*Pinus brutia* Ten.) on Pine Processionary moth (*Thaumetopoea wilkinsoni* Tams.).

Material and Methods: Third and fourth instar larvae of pine processionary moth were collected from infested trees in the forest area of Babadağ (Denizli). The essential oil of seed oil obtained by using hydrodistillation method with Clevenger apparatus. Third and fourth instar mortalities from seven concentrations of seed oil were compared with those of a standard larvicide. Larval mortality were recorded at 24, 48 and 76 hours.

Results: In the experiment results, it was observed larvicidal effect of the oils obtained from pine seeds on pine processionary moth compared with the control group. In the results of analysis, seed oil showed strong larvicidal activity, with LC50 values of 187.88, 122.83, 68.77 ppm at 24, 48 and 72 hour intervals, respectively. Essential oil of *Pinus brutia* has potential to be used in the search for chemical components as new larvicides.

Acknowledgements: This research has been partly supported by TUBITAK-(110T976) and by Pamukkale Scientific Research Unit

Keywords: *Thaumetopoea wilkinsoni*, *Pinus brutia*, essential oils, larvicidal activity.

PP-496

Biological figures on archaeological ruins at Tripolis City (Yenicekent-Denizli)Gürkan SEMİZ^{1,3}, Bahadır DUMAN²¹ Pamukkale University, Department of Biology, TURKIYE² Pamukkale University, Department of Archeology, TURKIYE³FAGUMER - Flora and Fauna Research, Development and Application Center of Pamukkale University
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Aim of the study: Turkey is a rich country in terms of historical features. Especially Anatolia has hosted many civilizations for centuries. The ancient city of Tripolis is located in the municipality of Yenicekent, in the town of Buldan in the Denizli Province. The city has been mentioned by many ancient writers, most importantly by Plinius and Ptolemaios. The city lived its time of splendour during the Roman Period. After the 2nd century CE a new period of construction work begun in the city and new public buildings such as city gates, streets, baths, stadiums, theaters and council halls were built. During the Roman Period, Tripolis was once included in the Sardeis Conventus and another time it was a part of the Apameia Conventus. Hermolaos of Tripolis, who was a senate in Roma in the 3rd century CE, must have played an important role in the development of the city. In this study, biological figures found on ruins at Tripolis Ancient City was studied.

Material and Methods: By this study, animal and plant figures on a total of 10 ruins belonging to the Hellenistic and Roman Periods in the Tripolis Ancient City was evaluated. Photographs were taken of all figures. Identification of the plants was performed using related references, the herbarium specimens and fresh leaves and fruits.

Results: As a results, we found many different biological figures on the walls of ancient city and some other ruins excavated. In particular, a total of 10 different types of figures were identified, such as pomegranate (*Punica granatum*), apricot (*Prunus armeniaca*), pumpkin (*Cucurbita pepo*), thistle leaves (*Gundelia* sp.), parrot (*Psittacula* sp.), Güvercin (*Columba* sp.), pheasant (Phasianinae member) and partridge (*Alectoris chukar*). We have discovered the figure of a leopard (*Panthera pardus*) on the wall of a shop that was located next to the market area. An important question is related to the illustrated of leopard figure on the wall. Although, today there is no more leopard in the area, we predict that it was familiar to the Romans by approximately the 3rd century AD. The plant figures that were observed on walls and other ruins excavated could also provide information about the flora representative of the places where they were built. For example, pomegranate figures were found on the ancient city, show clearly that it was an aesthetical plant for related period.

Acknowledgements: This research has been partly supported by Pamukkale Scientific Research Unit.

Keywords: Biological figures, Tripolis Ancient City, Denizli, Turkey.

PP-497

Short-Term Effects of Thinning on Forest Soils of Oriental Beech Plantations in Different SitesAyhan USTA¹, Murat YILMAZ¹, Selvinaz YILMAZ², Esengül Benli KENÇ¹¹Department of Forest Engineering, Karadeniz Technical University, Turkey²Trabzon Forest District Directorate, General Directorate of Forestry, Turkeyesen.benli1234@gmail.com

Aim of the study: Oriental Beech (*Fagus orientalis* Lipsky) is the most important species of broad-leaved trees that spread in our country. Oriental Beech, in addition to providing an important contribution to Turkey's economy is among the most important raw material for the forest products industry. Oriental Beech from broad-leaved species (1.96 million hectares) is placed on the top in terms of distribution area and growing stock. Aim of the study is to investigate short-term effects of thinning on forest soils of Oriental Beech plantations in different sites.

Material and Methods: Sample plots were chosen from unthinned Oriental Beech plantation areas which are within the boundaries of two forest sub-district directorates (Maçka–Yeşiltepe Trabzon-Vakfıkebir) of Trabzon Regional Directorate of Forestry. It was built Vakfıkebir plantation area in 1986 and Yeşiltepe plantation area in 1991. Physiographic characteristics (slope, aspect, elevation, etc.) of the sample plots obtained from sites are similar. In two sites, 12 parcel (20x20 m) were established. With removing of 0%, 25% and 40% of basal area in hectare of stands which are in sapling stage, sample plots were established by applying thinning which are in four different intensities. Thinning were performed in 2010. A total of 24 soil profiles were excavated in plantation areas in different sites. A total of 48 soil samples were gained from 0-10 and 10-20 cm depths of soil profiles. In soil samples was analyzed sand, silt, clay, soil organic matter, pH (in water, KCl), total nitrogen, available phosphor and exchangeable bases (Ca, Mg, K, Na). In this study, short-term effects of thinning (0%, 25%, 40%) on forest soils of Oriental Beech were evaluated for 0-10 and 10-20 cm depths by variance analysis. Soil samplings were performed in 2010 and 2012.

Results: In study, short-term effects of thinning (0%, 25%, 40%) on forest soils of Oriental Beech were investigated. Short-term effects of thinning on soil properties of Oriental Beech was revealed with variance analysis. Variance analysis was applied absolute differences (2012) of some soil properties in 0-10 cm and 10-20 cm depths. For both plantations, thinning significantly increased soil properties whereas there were no significant changes. In general, increase of thinning intense showed decreases in another soil properties (pH, soil organic matter, total nitrogen, Ca⁺⁺, Mg⁺⁺, K⁺, Na⁺) except available phosphor. Sand (%) rate of soils was determined 83% in Vakfıkebir site and 74% in Yeşiltepe site. Because of permeable soils and increase of thinning intense increased nutrition losses (eluviation) in forest soils of Oriental Beech. These results suggested that thinning seemed to regulate soil chemical properties for Oriental Beech plantations established in different sites.

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Keywords: Oriental beech, thinning, soil properties, short-term effects, sites.

PP-498

**Investigation of Biomorphological Characteristics and Impacts on Health of
Hirudo medicinalis (Annelida, Hirudinea)**Ayse KEKILLIOĞLU¹, Fatma Seçil KOÇ²,¹ Dept. of Biology, Faculty of Science & Letters, Nevşehir HBV Uni., Turkey,² Dept. of Biology, Institute of Science, Burdur M.A Ersoy Uni., Turkeyakekillioglu@hotmail.com

Aim of the study: Over 500 species, leeches have fresh water, sea and land forms. *Hirudo medicinalis* L., 1758 (Annelida: Hirudinea) is the most important the health of this species. Since ancient times, the leeches with therapeutic aspects of both vertebrate and invertebrate animals known as parasites. . The use in modern medicine and economical importance that increases the importance of the work on this subject. Therefore, in this study, biological and morphological characteristics, ecological and economic importance; leech therapy with effects on human health and also the use of traditional and modern medicineof. *H. medicinalis* L., 1758 is aimed.

Material and Methods: *H. medicinalis* species biological, morphological Characteristics are analyzed with health factors. These species have long, segmented body. Their bodies are dorso-ventrally flattened in the way. Surface of the body is covered with a thin flexible cuticle. Lengths from 1 to 20 cm. varies between. Sensory organs consist of chemical sensory parts and eyes. Leeches salivary gland secretions included more than 100 bioactive substance. Leeches secrete hirudin; anti-clotting, muscle relaxant, analgesic, antibacterial, immune system has a regulatory and blood pressure regulatory effects. Various clinics (cardiology, gynaecology, urology, surgery, traumatology, dentistry, ophthalmology, etc.) is increasing the use of leeches as an aid to treatment.

Results: *H. medicinalis* is terms of our country has both medical and economical importance. But, modern medicine is in danger of extinction due to excessive use of *H. medicinalis* is in Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) as attached to the contract for the collection and export quota is applied.

Keywords: *H. medicinalis*, Biomorphology, Ecology, Economy, Leech.

PP-499

Levant Voles *Microtus guentheri* (Danford and Alston 1880) prefer Southerly-Facing Slopes in Habitats at Feke/Adana, TURKEY¹Mustafa YAVUZ¹ Department of Biology, Akdeniz University, 07058 Antalya, Turkey
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Aim of the study: In this study, *Microtus guentheri*'s preferred habitat type and characteristics (aspect, slope etc.) were studied.

Material and Methods: 84 (38 ♀♀; 46 ♂♂) individuals were caught as dead and 55 (24 ♀♀; 31 ♂♂) as living, then living individuals were marked, measured, and released. The samples were taken from the various habitats found within the county of Feke at Province of Adana (Turkey), during July 2011 to August 2011. The samples for calculating trapping efforts and density in habitats were taken, in Antalya and surrounding areas by placing 100 snaptraps and 20 Sherman live traps in each site, independently trap type of each other, specified according to the degree of its slope and its exposure. Fifty snaptraps were set on south-facing slopes and fifty snaptraps set on north-facing slopes at suitable locations two hours before sunset on the day of arrival in the field and checked the following morning one hour before sunrise or at sunrise (snaptrapping). All of the live traps were set in the morning and checked the following morning (livetrapping). Only one trap was placed in 10 m², approximately. If any live individuals were caught, the dorsal fur was dyed for calculating population density (see below), and it was noted if these voles were recaptured. The bait used in the traps consisted of roasted peanuts mixed with some chewed bread. Each site was surveyed for a total of twelve days (per four days x three years), for a total of 1200 snaptrap-nights and 240 sherman live trap-nights per site, and 7200 snaptrap-nights and 1440 sherman live trap-nights in the study as a whole. In addition, data were collected on the population density and degree of slope of the site in which the voles were caught. Population density was calculated with Mark-Recapture Population Sampling Method of Lincoln-Peterson. According to this method, during the first trapping, an initial random sample of individuals was captured in live traps.

Results: Respectively, among the 84 dead and 55 living voles, 38 (45.24%) and 23 (41.82%) were from agricultural areas, 41 (48.81%) and 18 (32.73%) from roadsides near to agricultural areas, 5 (5.95%) and 9 (25.45%) were caught in grasslands. In the sample of 84 dead and 55 living voles, 66 (78.57%) and 33 (60.00%) were caught in areas with slopes of 31-60°. In those areas with slopes of 0-45°, there were strong positive correlations between the capture frequency in traps and the slope (r-snaptrapping=0.936; p<0.0001 and r-livetrapping=0.901; p<0.0001). On the other hand, a very strong negative correlations were found between capture frequency and slope for the areas with slopes of 46-90° (r-snaptrapping= -0.942; p<0.0001 and r-livetrapping= -0.903; p<0.0001). Most of the individuals in traps (n-snaptrapping= 71; 84.52% and n-livetrapping=49; 89.09%) were captured on south, southeast, and southwest exposures, but did not differ between east and west. Also, the highest mean temperature were found on slopes of 30-60° in the south-facing sites. Moreover, there are significant positive correlations between altitude of sites and frequency of capture in snaptraps and Sherman livetraps (r-snaptrapping=0.899; n=22; p=0.001, r-livetrapping=0.913; n=22; p=0.0001, respectively). So, while altitude of sites increase, trapping success and population density (rdensity=0.932; n=22; p=0.0001) are on the increase.

Acknowledgements: This work was partly supported by the Akdeniz University Scientific Research Projects Coordination Unit with 2009.01.0105.005 project number.

Keywords: *Microtus guentheri*, Feke, Adana, Ecological Preferences, Exposure, Slopes

PP-500

Levant Voles *Microtus guentheri* (Danford and Alston 1880) Prefer Southerly-Facing Slopes in Habitats at Mut/Mersin, Turkey¹Mustafa YAVUZ, Mehmet Rızvan TUNÇ¹ Department of Biology, Akdeniz University, 07058 Antalya, Turkeymyavuz2002plus@yahoo.com

Aim of the study: In this study, *Microtus guentheri*'s preferred habitat type and characteristics (aspect, slope etc.) were studied. 116 (42 ♀♀; 74 ♂♂) individuals were caught as dead and 78 (33 ♀♀; 45 ♂♂) as living, then living individuals were marked, measured, and released.

Material and Methods: The samples were taken from the various habitats found within the county of Mut at Province of Mersin (Turkey), during June 2011 to July 2011. The samples for calculating trapping efforts and density in habitats were taken, in Antalya and surrounding areas by placing 100 snaptraps and 20 Sherman live traps in each site, independently trap type of each other, specified according to the degree of its slope and its exposure. Fifty snaptraps were set on south-facing slopes and fifty snaptraps set on north-facing slopes at suitable locations two hours before sunset on the day of arrival in the field and checked the following morning one hour before sunrise or at sunrise (snaptrapping). All of the live traps were set in the morning and checked the following morning (livetrapping). Only one trap was placed in 10 m², approximately. If any live individuals were caught, the dorsal fur was dyed for calculating population density (see below), and it was noted if these voles were recaptured. The bait used in the traps consisted of roasted peanuts mixed with some chewed bread. Each site was surveyed for a total of twelve days (per four days x three years), for a total of 1200 snaptrap-nights and 240 sherman live trap-nights per site, and 7200 snaptrap-nights and 1440 sherman live trap-nights in the study as a whole. In addition, data were collected on the population density and degree of slope of the site in which the voles were caught. Population density was calculated with Mark-Recapture Population Sampling Method of Lincoln-Peterson. As no burrow systems were found on slopes from 81-90°, the temperatures here were measured by placing a thermometer in the soil at a depth of 25 cm.

Results: Respectively, among the 116 dead and 78 living voles, 53 (45.69%) and 35 (44.87%) were from agricultural areas, 46 (39.66%) and 27 (34.62%) from roadsides near to agricultural areas, 17 (14.66%) and 16 (20.51%) were caught in grasslands. In the sample of 116 dead and 78 living voles, 72 (62.07%) and 44 (56.41%) were caught in areas with slopes of 31-60°. In those areas with slopes of 0-45°, there were strong positive correlations between the capture frequency in traps and the slope (rsnaptrapping=0.893; p<0.001 and rlivetrapping=0.923; p<0.0001). On the other hand, a very strong negative correlations were found between capture frequency and slope for the areas with slopes of 46-90° (rsnaptrapping= -0.906; p<0.001 and rlivetrapping= -0.917; p<0.0001). Most of the individuals in traps (nsnaptrapping= 84; 72.41% and nlivetrapping=53; 67,95%) were captured on south, southeast, and southwest exposures, but did not differ between east and west. Also, the highest mean temperature were found on slopes of 30-60° in the south-facing sites. Moreover, there are significant positive correlations between altitude of sites and frequency of capture in snaptraps and Sherman livetraps (rsnaptrapping=0.912; n=19; p=0.0001, rlivetrapping=0.934; n=19; p=0.0001, respectively). So, while altitude of sites increase, trapping success and population density (rdensity=0.955; n=19; p=0.0001) are on the increase.

Acknowledgements: This work was partly supported by the Akdeniz University Scientific Research Projects Coordination Unit with 2009.01.0105.005 project number.

Keywords: *Microtus guentheri*, Mersin, Mut, Ecological Preferences, Exposure, Slopes

PP-501

Heavy Metal Accumulation and the Road Effect: In Social Voles (*Microtus socialis* (Pallas, 1773) at the Feke/Adana, Turkey¹Mustafa YAVUZ, ¹Özgür AKTAŞ¹ Department of Biology, Akdeniz University, 07058 Antalya, Turkey
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Aim of the study: In this study, the levels of some heavy metals (Cr, Mn, Fe, Co, Ni, Cu, Zn, As, Cd, Hg, Pb, B and Al) in the muscle tissues of *Microtus socialis* (Social Vole) from roadside of Feke at Adana Province (Turkey), were investigated. Samples (n=23), caught from the sites close to roadside during July 2011 to August 2011.

Material and Methods: After dissection of the individuals and getting the muscle sample tissues. Samples were dried till and comes to constant weight. Microwave method was applied for the digestion produce of samples. From each tissue, 0.5 g homogenates were placed in a teflon digestion vessel with concentrated nitric acid (HNO₃)/hydrogen peroxide (H₂O₂). The samples in the vessels were then digested using an optimized microwave method. After digestion the samples were cooled to room temperature and diluted with ultra pure water. Then, samples were analysed by Inductively coupled plasma mass spectroscopy (ICP-MS).

Results: The mean concentrations of the metals accumulated in *M. socialis* on the areas close to roadside as follows: Cr; 0.88±0.05, Mn; 2.11±0.34, Fe; 68.57±3.62, Co; 0.09±0.01, Ni; 0.16±0.12, Cu; 1.04±0.08, Zn; 14.23±1.36, As; 0.38±0.02, Cd; 0.88±0.02, Hg; 0.79±0.02, Pb; 0.74±0.07, B; 0.04±0.01 and Al; 41.93±2.27 ppm. The order of concentration of the heavy metals in the muscle samples from the areas close to roadside was Fe>Al>Zn>Mn>Ni>Cu>Cr=Cd>Hg>Pb>As>Co>B.

Acknowledgements: This work was partly supported by the Akdeniz University Scientific Research Projects Coordination Unit with 2009.01.0105.005 project number.

Keywords: Heavy metal accumulation, *Microtus socialis*, Roadside, Feke, Adana

PP-502

Heavy Metal Accumulation and the Road Effect: In Persian Voles (*Microtus irani* Thomas, 1921) at the Dörtyol/Adana, Turkey¹Mustafa YAVUZ, ¹ Mehmet Rızvan TUNÇ¹ Department of Biology, Akdeniz University, 07058 Antalya, Turkey
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Aim of the study: In this study, the levels of some heavy metals (Cr, Mn, Fe, Co, Ni, Cu, Zn, As, Cd, Hg Pb, B and Al) in the muscle tissues of *Microtus irani* (Persian Vole) from roadside of Dörtyol at Hatay Province (Turkey), were investigated. Samples (n=16), caught from the sites close to roadside during June 2011 to July 2011.

Material and Methods: After dissection of the individuals and getting the muscle sample tissues. Samples were dried till and comes to constant weight. Microwave method was applied for the digestion produce of samples. From each tissue, 0.5 g homogenates were placed in a teflon digestion vessel with concentrated nitric acid (HNO₃)/hydrogen peroxide (H₂O₂). The samples in the vessels were then digested using an optimized microwave method. After digestion the samples were cooled to room temperature and diluted with ultra pure water. Then, samples were analysed by Inductively coupled plasma mass spectroscopy (ICP-MS).

Results: The mean concentrations of the metals accumulated in *M.irani* on the areas close to roadside as follows: Cr; 1.04±0.06, Mn; 4.08±0.46, Fe; 76.31±3.02, Co; 0.12±0.02, Ni; 0.11±0.02, Cu; 1.76±0.05, Zn; 13.17±1.02, As; 0.44±0.02, Cd; 0.83±0.02, Hg; 0.86±0.03, Pb; 0.79±0.03, B; 0.08±0.01 and Al; 57.38±2.02 ppm. The order of concentration of the heavy metals in the muscle samples from the areas close to roadside was Fe>Al>Zn>Mn>Cu>Co> Ni>Cr>Hg>Cd>Pb>As>B. The values show that, the heavy metal pollution began at the vicinity of Dörtyol which is 210 m altitude. In this case, probably, In this case, probably, is thought to be due to water and soil pollution from road effect, industry (especially stone quarries).

Acknowledgements: This work was partly supported by the Akdeniz University Scientific Research Projects Coordination Unit with 2009.01.0105.005 project number.

Keywords: Heavy metal accumulation, *Microtus irani*, Roadside, Dörtyol, Hatay

PP-503

Some Endemic Chasmophytes of Antalya (Turkey) Province and Theirs Threat Status¹R. Süleyman GÖKTÜRK¹ Akdeniz University, Faculty of Science, Department of Biology, Antalya - TURKEY
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Aim of the study: In this study, some endemic chasmophytes plants of Antalya province were collected and identified. The plant specimens prepared for herbarium collections have been stored in Akdeniz Univ. Herb. Description, images and International Union for Conservation of Nature and Natural Resources (IUCN) threat status of twenty-three endemic chasmophytes are given. These plants are as follows; *Clinopodium pamphylicum* (Boiss. & Heldr.) Govaerts subsp. *davisii* (Contandr. & Quézel) Govaerts, *Stachys aleurites* Boiss. & Heldr., *Stachys antalyensis* Ayaşlıgil & P.H.Davis, *Stachys butleri* R.R.Mill, *Stachys chasmosericea* Ayaşlıgil & P.H.Davis, *Teucrium montbretii* Benth. subsp. *pamphylicum* P.H.Davis, *Alkanna macrophylla* Boiss. & Heldr., *Alkanna oreodoxa* Hub.-Mor., *Omphalodes luciliae* Boiss. subsp. *luciliae*, *Onosma strigosissima* Boiss., *Echinops onopordum* P.H.Davis, *Helichrysum chasmolyticum* P.H.Davis, *Globularia davisiana* O.Schwarz, *Globularia dumulosa* O.Schwarz, *Hypericum pamphylicum* N.Robson & P.H.Davis, *Hypericum ternatum* Poulter, *Kundmannia anatolica* Hub.-Mor., *Arabis davisii* H.Duman & A.Duran, *Campanula davisii* Turill, *Dianthus elegans* D'Urv. var. *cous* (Boiss.) Reeve, *Erica bocquetii* (Peşmen) P.F.Stevens, *Geranium glaberrimum* Boiss. & Heldr. and *Galium canum* Req. ex DC. subsp. *antalyense* Ehrend.

Material and Methods: The research material consist of 40 herbarium specimens collected between 2010 and 2015 in Antalya province. Plant samples which have been collected from rocky places. Collected samples were dried in accordance with standard herbarium techniques and stored in Akdeniz University Herbarium. After they had been dried, the specimens were first classified at family level and the classification at the generic, species, subspecies (if exists) and variety levels was carried out. In identification of the plants, we have benefited primarily from Turkey Flora (Davis, 1978; Davis, 1984; Davis et al., 1988; Güner et al., 2000), from floristic studies (Peşmen 1980; Göktürk and Sümbül 1997; Göktürk and Sümbül 2002; Göktürk and Sümbül 2006; Düşen and Sümbül 2002; Düşen and Sümbül 2007; Deniz and Sümbül 2004, Çinbilgel 2005), with color plant handbook (Sümbül et al., 1998a; Sümbül et al., 1998b; Sümbül et al., 2005; Tekin, 2005; Sümbül et al., 2006; Tekin, 2007) and related study (Özhatay et al., 2005). Threat categories of the twenty-three endemic chasmophytes were assessed according IUCN Criteria. (IUCN 2001).

Results: During the period 2010 and 2015, by evaluating the collected 40 herbarium specimens, 12 families, 17 genera, 18 species, 4 subspecies and 1 variety were identified. Total number of taxa are 23. Of the 23 taxa determined, all of taxa are endemic. Fourteen of the 23 taxa are endemic to Antalya province. Nine of the 23 taxa are endemic to Turkey. Twenty-three of the 23 taxa are elements of the Mediterranean Phytogeographical Region. Examination of the threat categories of the endemic chasmophytes taxa showed that 2 of them are CR, 8 of them EN, 10 of them VU, 1 of them LC and 2 of them in NT.

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Keywords: Antalya, Biodiversity, Chasmophyte, Endemic, IUCN, Turkey.

PP-504

Monitoring *Caretta caretta* (Linnaeus, 1758) Population at Bostanlık Beach in Phaselis/Antalya in Summer 2015Recep GÜLER¹, Mustafa YAVUZ¹, Mehmet ÖZ¹¹ Akdeniz University, Faculty of Arts and Sciences, Biology Dept. 07058, Antalya, TURKEY
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Aim of the study: In this study, status of the loggerhead sea turtle (*Caretta caretta*) population nesting at Bostanlık Bay Beach in Phaselis Ancient City was investigated.

Material and Methods: The reproduction of the sea turtle population at Bostanlık Beach in Phaselis/Antalya west-southern Turkey was investigated in 2015. The study was conducted from the last week of May to mid-September in 2015. The beach, is divided into two sections (eastern section about 350 m and west approximately 500 m) because of the tor which extends from near the middle section. The beach was patrolled early in the morning for record any loggerhead turtle activity. All the activities from the previous night were accepted and evaluated as the next day's activity. A nest was recorded when a track led to an area of disturbed sand where digging and covering had occurred. All the nests were left in situ. False crawls were recorded in one of two ways: when some digging in the sand, if only slight, occurred but no covering was apparent (i.e., an attempt to dig a body pit and (or) egg chamber by the female) or when a sea turtle made no nesting or digging attempts but simply crawled on the beach and then crawled back to the sea. Species identification was possible using the criteria of track and nest-pit morphology (Groombridge 1990).

Results: In this preliminary study it has been identified in the breeding season Bostanlık Beach is a total of 12 nests in the western section and hatchling occurred in 8 of these nests. The remaining 4 nests were excavated by predators. On the other hand, in the east section which is using extensively by tourists and local peoples was not found any nest.

Acknowledgements: This work was partly supported by the Akdeniz University Scientific Research Projects Coordination Unit.

Keywords: Phaselis, Bostanlık Beach, *Caretta caretta*, Antalya.

PP-505

Diversity and Ecology of Algae from the Ilica Stream, Eastren Black Sea Basin, Turkey

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Aim of the study: Algae are the key factor of primary production in streams and other lotic systems. Streams, like all other ecosystems, have biotic communities that rely upon carbon supply to fuel food webs and maintain the organisms that live in them. Algae, particularly diatoms are widely used in Europe to assess ecological status of running waters. The aim of this work was to evaluate the algal flora of Ilica Stream. The study was carried out to provide information on the algal communities of Ilica Stream including status, spatial and temporal variations in terms of their distribution, abundance and the ecological implications.

Material and methods: The algae of Ilica Stream were investigated in the collected samples from different habitats (epilithic and phytoplankton) in three stations during the period April 2011 to March 2012. Identification of algae species was made with the help of the relevant literature. Phytoplankton monthly samples were collected from three stations using plankton net and preserved in 4% formalin (identification of phytoplankton) and lugol's iodine solution (quantification of phytoplankton). Sedimentation method was used for the phytoplankton quantitative study. Sedgewick-Rafter counting chamber was used for phytoplankton total number counting. Epilithic algae from submerged stones were collected monthly. Diatoms were then treated for identification by boiling in acid mixture. Diatom slides were mounted in Entellan. The community structure (Shannon-Wiener diversity index and evenness index) was analysed using Biodiversity Pro.2 software.

Results: A total of 142 species belonging to six taxonomic groups were identified. Bacillariophyta had the highest number of species (114 taxa; 80%) of the total composition by number. The distribution other species found in Ilica Stream was Chlorophyta (12 taxa, 8%), Cyanobacteria (8 taxa, 6%), Charophyta (5 taxa, 4%), Euglenophyta (2 taxa, 1%) and Haptophyta (1 taxa; 1%), respectively. *Navicula* and *Nitzschia* in the epilithic flora were genus with the most taxa. An increase was seen in the total number of organisms in July, September and March. *Navicula* spp. and *Achnanthydium minutissimum* were dominant in the algal biomass. Diatoms had a high positive relation with chlorophyll-*a* and chlorophyll-*c* ($p < 0.001$). Shannon diversity index and evenness changed between 1.361-1.145 and 0.956-1.081, respectively. The general water quality of the research area had mesotrophic (moderate) character. Besides, it was determined that the stream has first class water quality characteristics apart from nitrogen and phosphorus.

Keywords: Bolaman River Basin, stream, algae, ecology, taxonomy, water quality.

PP-506

A New Record for the Turkish Mite Fauna: *Ledermuelleriopsis tamariski* Maleki and Bagheri (Acari: Stigmaeidae)

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Aim of the study: The members of the genus *Ledermuelleriopsis* Willmann live in soil, litter, grass, moss, lichen, decayed stump, bark trees, old dune sand. Up to now 33 species belonging to the genus *Ledermuelleriopsis* are known in the world. To date, 10 species of *Ledermuelleriopsis* have been reported from Turkey. *L. tamariski* Maleki and Bagheri has been found for the first time from the Erzincan (Turkey). In the present work we aimed to contribute to the knowledge on mite diversity in Turkey.

Material and Methods: The mite specimens were extracted from soil by Berlese funnels. The mites were cleared in %60 lactic acid and mounted in Hoyer's medium on microscope slides. The collected mites were examined and illustrated under Leica DM 4000 B phase-contrast microscope. Identification of mites was done using the relevant literature.

Results: In the present work, it has been evaluated mite specimens collected from Erzincan province (Turkey). Two female mite specimens from litter and soil under *Juglans* sp. were identified as *Ledermuelleriopsis tamariski* Maleki and Bagheri. Drawings and measurements for some body parts of the species were made, besides its morphological characters were reviewed and compared with known definitions of the species. As a result of this work, *L. tamariski* is a newly recorded for the Turkish fauna.

Keywords: Acari, *Ledermuelleriopsis*, new record, Erzincan.

PP-507

The Determination of the Indicator Microorganisms in Black Mussels (*Mytilus galloprovincialis*) Associated With Fecal ContaminationBülent KAFA¹, Berna KILINÇ²¹Food Control Department, Izmir/Bornova Veterinary Control Institute, Turkey²Fish Processing Technology Department/Aegean University Fisheries Faculty, Turkey
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Aim of the study: Indicator microorganisms are very important to give the source of contamination. They are also very important to hygiene and sanitation practices. Foods can not be contaminated with fecal microorganisms at hygienic conditions. Otherwise, these contaminated foods with pathogen microorganisms can be a problem with food consumption. The main objective of this current study was to determine the microbiological quality and fecal contamination level of black mussels harvested from Aegean Sea. For this purpose; microbiological contamination levels and pathogenic bacteria of harvested black mussels from Aegean Sea were determined in accordance with the public health. The risk factors of harvested black mussels related to pathogenic bacteria were determined.

Material and Methods: Black mussels were harvested from the location of (Çandarlı, Bostanlı, Narlıdere, Urla ve Mordoğan) in Aegean Sea. A total of 45 black mussels were harvested in December and examined the microbiological contamination level of black mussels. After black mussels were harvested, they were brought to the microbiological laboratory in 1 hour. For determining the microbiological quality and the contamination level of pathogenic bacteria of harvested black mussels; total aerobic bacteria count, psychrotrophic bacteria count, coliform, fecal coliform, *E. coli*, *Salmonella* spp., coagulase positive *Staphylococci*, *Listeria* spp. and *Vibrio* spp. were examined. Preparation of test samples, initial suspension and decimal dilutions for microbiological examination to performed TS EN ISO 6887-2 method. Aerobic plate counts were done by the pour plate method on plate count agar (PCA, Liofilchem, Italy), followed by incubation at $30 \pm 1^\circ\text{C}$ for 72 h (ISO 4833-1:2013). For the psychrotrophic duplication, these samples on the same agar were incubated in a refrigerator $2-8^\circ\text{C}$ for 7 days. Total coliform, fecal coliform and *E. coli* and *Salmonella* analysis were performed according to the Bacteriological Analytical Manual. The analysis of coagulase positive *Staphylococci* were done by the pour plate method on Baird parker agar with Rabbit Fibrinogen (RFBPA, Liofilchem, Italy) followed by a incubation period at $37 \pm 1^\circ\text{C}$ for 48 h (TS 6582-2 EN ISO 6888-2). The analysis of *Salmonella* species were performed TS EN ISO 6579. The analysis of *Listeria monocytogenes* was done according to the ISO 11290-1 method. The analysis of *Vibrio* species was determined according to the ISO/TS 21872-1:2007 method.

Results: In this study; the harvested time of black mussels were determined very important because of not including pathogenic bacteria in December. Total aerobic bacteria count of harvested forty five black mussels range from 2,81 Log₁₀cfu/g to 2,98 Log₁₀cfu/g. The maximum level of psychrotrophic and coliform bacteria counts of harvested black mussels were determined as 3,27 Log₁₀cfu/g, and 3,46 Log₁₀cfu/g., respectively. Fecal coliform, coagulase positive *Staphylococci*, *Vibrio*, *Salmonella*, *Listeria* spp. was not determined any of harvested black mussels. Black mussels were determined safety because of not including fecal contamination and pathogenic bacteria. The microbiological contamination level and also pathogenic bacteria of harvested black mussels should be examined for the other months and compared with other months. The risk factors of harvested black mussels from Aegean Sea should also be determined in summer months. As a result; black mussels harvested from Aegean Sea in December were determined acceptable according to the results of microbiological analyses because of not containing fecal and pathogenic microorganisms.

Keywords: black mussel, *mytilus galloprovincialis*, pathogenic bacteria, quality

PP-508

The Relationship Between the Algal Blooms and Microbiological Loads of Harvested Black Mussels (*Mytilus galloprovincialis*)Bülent KAFA¹, Berna KILINÇ²¹Food Control Department, Izmir/Bornova Veterinary Control Institute, Turkey²Fish Processing Technology Department/Aegean University Fisheries Faculty, Turkey
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Aim of the study: The main objective of this study was to determine the relationship between the algal blooms and microbiological loads of harvested black mussels from Aegean Sea. Algal blooms can be appeared in sea sides because of the growing phytoplankton species in spring months. This situation causes pollution as known red tide. In this study the risk factors in accordance with pathogenic bacteria and microbiological contamination level of harvested black mussels related to algal blooms were determined.

Material and Methods: Black mussels were harvested from the Aegean sea where red tide can be appeared in spring months (March, April and May). A total of 60 black mussels were harvested and examined in spring months to find relationship between algal blooms and microbiological contamination level of black mussels. After black mussels were harvested, they were brought to the microbiological laboratory in 1 hour and analysed for determining the microbiological loads and pathogenic bacteria of harvested black mussels; total aerobic bacteria count, psychrotrophic bacteria count, coliform, fecal coliform, *E. coli*, *Salmonella spp.*, coagulase positive *Staphylococci*, *Listeria spp.* and *Vibrio spp* were investigated. Preparation of test samples and decimal dilutions for microbiological examination were performed according to the method of TS EN ISO 6887-2. Aerobic plate counts were done by the pour plate method on plate count agar (PCA, Liofilchem, Italy), followed by incubation at 30 ± 1 °C for 72 h (ISO 4833-1:2013). For the psychrotrophic bacteria counts; the same agar was used and incubated in a refrigerator 2-8 °C for 7 days. Total *coliform*, fecal *coliform* and *E. coli* and *Salmonella* analysis were performed according to the method of Bacteriological Analytical Manual. The analysis of coagulase positive *Staphylococci* were done by the pour plate method on Baird parker agar with Rabbit Fibrinogen (RFBPA, Liofilchem, Italy) followed by a incubation period at 37± 1 °C for 48 h (TS 6582-2 EN ISO 6888-2). The analysis of *Salmonella* species were performed according to the method of TS EN ISO 6579. The analysis of *Listeria monocytogenes* was done according to the method of ISO 11290-1. The analysis of *Vibrio* species was done according to the method of ISO/TS 21872-1:2007.

Results: In this study; the harvested time of black mussels is very important because of appearing algal blooms in spring months. For this reason, people should be more attention for not being consumed of black mussels in the season of algal blooms. In this paper, the relationship between the algal blooms and microbiological loads of harvested black mussels (*Mytilus galloprovincialis*) were investigated. The risk factors of black mussels related to the algal blooms in the spring months and the microbiological contamination levels with bacteria were also determined.

Keywords: black mussel, microbiological load, algal blooms

PP-509

The Investigation of *Vibrio* spp. on Black Mussels (*Mytilus galloprovincialis*) for Human Health and Shellfish IndustryBülent KAFA¹, Berna KILINÇ²¹Food Control Department, Izmir/Bornova Veterinary Control Institute, Turkey²Fish Processing Technology Department/Aegean University Fisheries Faculty, Turkey
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Aim of the study: The aim of this study was to examine *Vibrio* spp. on harvested black mussels from Aegean Sea. Several species of *Vibrio* can be caused food infections because of eating uncooked or undercooked shellfish and fish. *Vibrio* species are found in salt water and shellfish can be contaminated with pathogenic *Vibrio* spp. easily. Shellfish contaminated with pathogenic *Vibrio* spp. can be a problem for human health and also shellfish industry while exporting. For this purpose, in this study black mussels were examined associated with pathogenic *Vibrio* spp.

Material and Methods: Black mussels were collected from Aegean Sea and analysed. For this purpose fifty black mussels were examined for *Vibrio* spp. Black mussels were harvested and they were brought to the microbiological laboratory in sea water within 1 hour. For this purpose, in this study black mussels were examined associated with pathogenic *Vibrio* spp. For the analysis of *Vibrio* spp., samples collected by analytical portions (25 g) of mussel bodies and intervalve water were aseptically removed and collected in a sterile bag with 225 ml of alkaline saline peptone water (ASPW) pH 8.6 (Liofilchem, Italy). The fresh samples were homogenized using a stomacher (Masticator, IUL Instruments, Barcelona, Spain) at 1 minute and incubated at 41,5±1°C for 6 ±1 h. A further enrichment was performed with employing 1 ml of the first enrichment and 9 ml of ASPW. This broth culture was incubated at 41,5±1°C for 18 h. After enrichment procedure, samples were plated onto thiosulphate-citrate-bile salt sucrose (TCBS) (LabM, Lancashire, UK) agar and incubated at 37 ±1 °C for 24 ±3 h. At least five colonies (green, blue-green or yellow-green colonies, 2–3 mm in diameter on TCBS agar plates) presumptively selected as *V. parahaemolyticus* colonies, were transferred onto Saline Nutrient Agar plates (NaCl 1%) (LabM, Lancashire, UK) and incubated at 37 ±1 °C for 24 ±3 h according to ISO/TS 21872-1:2007 method. After the incubation period, the isolates were subjected to the Gram stain, the oxidase test using Oxidase Sticks (LabM, Lancashire, UK), Triple-Sugar-Iron (TSI) (LabM, Lancashire, UK) for further biochemical identification.

Results: If harvested black mussels are contaminated with pathogenic *Vibrio* spp., these shellfish will be a problem for human health and shellfish industry while exporting. Because of this, It is very important to harvest shellfish from clean waters where are not mixing with sewer system. In this study; the acceptability of black mussels for human health and shellfish industry according to pathogenic *Vibrio* spp. was examined. A total of examined fifty black mussels were determined safety for not including pathogenic *Vibrio* spp. According to the results of the analyses of pathogenic *Vibrio* spp., harvested black mussels from Aegean Sea were determined safety for human health and also shellfish industry.

Keywords: mussel, *Vibrio*, shellfish, contamination, industry, health

PP-510

The Determination of Microbiological Security of Fried Black Mussels Related to Pathogenic BacteriaBülent KAFA¹, Berna KILINÇ²¹Food Control Department, Izmir/Bornova Veterinary Control Institute, Turkey²Fish Processing Technology Department/Aegean University Fisheries Faculty, Turkey
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Aim of the study: Microorganisms are found in foods. These microorganisms are contaminated to foods from waters, soil, the areas, humans, ingredients, equipments etc. Foods can be spoiled in a short time because of the effects of bacteria. Especially, If foods are contaminated with pathogenic bacteria, these bacteria can be make us to be illnesses. For this reason it is very important that safety foods should be eaten for human health. The aim of this study was to examine the security of fried black mussels, which were sold in the restaurants for human health.

Material and Methods: Fried black mussels were purchased from the fish restaurants for determining the microbiological quality. A total of sixty fried mussels were examined. Fried black mussels were brought to the microbiological laboratory within 30 minutes. Microbiological examinations were performed by using TS EN ISO 6887-2 method after preparation of test samples, initial suspension and decimal dilutions. Aerobic plate counts were done by using the pour plate method on plate count agar (PCA, Liofilchem, Italy). After the inoculation, inoculated petridishes were incubated at $30 \pm 1^\circ\text{C}$ for 72 h (ISO 4833-1:2013). For determining psychrotrophic bacteria count, plate count agar (PCA, Liofilchem, Italy) was used. The inoculated petridishes were incubated in a refrigerator at 2-8 °C for 7 days for psychrotrophic bacteria count. Total *coliform*, fecal *coliform* and *E. coli* analysis were investigated according to the method of Bacteriological Analytical Manual. The analysis of coagulase positive *Staphylococci* were done by the pour plate method on Baird parker agar with Rabbit Fibrinogen (RFBPA, Liofilchem, Italy) followed by a incubation period at $37 \pm 1^\circ\text{C}$ for 48 h (TS 6582-2 EN ISO 6888-2). The analysis of *Salmonella* species were investigated by using TS EN ISO 6579 method. The analysis of *Listeria monocytogenes* was performed according to the method of ISO 11290-1. The analysis of *Vibrio* species were examined according to the method of ISO/TS 21872-1:2007.

Results: In this study; the average mean values of total aerobic and psychrotrophic bacteria counts of sixty fried black mussels were determined as 2,40 Log₁₀cfu/g and 2,18 Log₁₀cfu/g, respectively. Fecal coliform, Total coliform bacteria, *E.coli*, *S. aureus*, *Salmonella*, *Listeria* and *Vibrio* spp. was not determined any of examined sixty fried black mussels. Fried black mussels, which were sold in the restaurants, were determined safety for human health because of not containing pathogenic bacteria.

Keywords: fried, mussel, microbiological, security, human, consumption

PP-511

***Stachys distans* Benth. var. *distans* (Lamiaceae, Sect. *Olisia*): A New Record for the Flora of Turkey**Ekrem AKÇIÇEK¹, Tuncay DİRMENCI¹, Özal GÜNER¹, Ekrem DÜNDAR²¹Biology Education Department / Faculty of Necatibey Education, Balıkesir University, Turkey²Biology Department / Faculty of Arts and Science Balıkesir University, Turkey
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Aim of the study: *Stachys distans* Benth. var. *distans* is reported for the first time from Turkey. This new record is confined to Erdemli in Mersin. The diagnostic morphological characters, description, detailed illustrations of this new record are given. The geographical distribution of the variety is mapped.

Material and Methods: During the field studies for the revision of *Stachys* sections *Setifolia*, *Stachys*, *Fragilicaulis* and *Olisia* in Turkey, some *Stachys* specimens were collected from Erdemli: Mersin, Turkey. The specimens were examined using relevant literature and compared with specimens at the following: ANK, BM, E, EGE, G, HUB, ISTE, K, LI, MA, W, WU. As a result, we concluded that the specimens belong to *S. distans* var. *distans*, previously unknown in Turkey.

Results: *Stachys distans* Benth. in DC., Prodr. 12: 472 (1848). var. *distans*, Type: In monte Libano (Auch. n. 1753), in Syria (Pinard 1846) (E!, G!). Habitat: Rocky places, garigue, macchie. Distribution: E. Mediterranean (S. Turkey, Syria, Palaestine, Lebanon). *Stachys distans* var. *distans* belongs to the sect. *Olisia*, subsect. *Distantes*. It grows in rocky places, garigue and macchie. It is distributed in South Turkey, Syria, Palaestine and Lebanon. It was not previously recorded in Turkey. The variety was found in Erdemli, Mersin province. Var. *distans* can be distinguished from var. *cilicica* by the following features: calyx 7-9 mm, short glandular hairy; teeth lanceolate, shorter than calyx tube, 2-3 mm long, mucro 0,7-1 mm.

Acknowledgements: We would like to thank the Research Fund of Balıkesir University (Project no: BAU-BAP 2015/122) and TÜBİTAK – KBAG (Project no: 112T139) for their financial support of our research, and to artist Bahar Kaptaner İğci for her illustration.

Key words: *Stachys*, Lamiaceae, new record, Turkey.

PP-512

The Geographical Distribution of *Stachys* L. (Lamiaceae) sect. *Olisia* Dumort. in Turkey

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Aim of the study: *Stachys* has 91 species (118 taxa) belonging 14 section in Turkey. Of the 118 taxa, 57 (48 %) are endemic to Turkey. The species of sect. *Olisia* Dumort. were brought together for the first time by Dumortier (1827) in the flora of Belgica at generic level. Bhattacharjee (1980) divided the sect. *Olisia* into four subsections: subsect. *Rectae*, *Distantes*, *Annuae*, *Rosulatae*. It is mainly distributed in Mediterranean Europe and Asia Minor, extending into Iran and Caucasia. The sect. *Olisia* comprises 15 species (21 taxa) in Turkey. Subsect. *Rectae* has 6 species, *Distantes* 3 species, *Annuae* 2 species and *Rosulatae* 3 species in Turkey.

Material and Methods: *Stachys* specimens were collected during the field studies for the revision of *Stachys* sect. *Setifolia*, *Stachys*, *Fragilicaulis* and *Olisia* in Turkey. Species of sect. *Olisia* were collected from especially type localities and various localities. The specimens were examined using relevant literature and compared with specimens at the following: ANK, BM, E, EGE, G, HUB, ISTE, K, LI, MA, W, WU. Voucher specimens were deposited in the herbaria of Herb. Akçiçek.

Results: Sect. *Olisia* is distributed in mainly Mediterranean Europe and Asia Minor, extending into Iran and Caucasia. The species of subsect *Rectae* (*S. recta* subsp. *subcrenata*, *S. atherocalyx*, *S. angustifolia*, *S. sparsipilosa* and *S. iberica*) grow in majority of Anatolia. Subsect. *Distantes* species (*S. aleurites*, *S. bombycina* and *S. distans*) is distributed South & Southwest Anatolia. Subsect. *Annuae* (*S. maritima* and *S. annua*) occurs in throughout the range of the section. Subsect. *Rosulatae* species (*S. inanis*, *S. munzurdagensis* and *S. diversifolia*) grow on Anatolian Diagonal in South & East Anatolia.

Acknowledgements: We would like to thank the Research Fund of Balıkesir University (Project no: BAU-BAP 2015/122) and TÜBİTAK – KBAG (Project no: 112T139) for their financial support of our research.

Keywords: Lamiaceae, *Stachys*, *Olisia*, Geographical distribution.

PP-513

The Determination of Life Forms of Common Plants in Melet River (Ordu/Turkey)Tuğba BAYRAK ÖZBUCAK¹, Öznur ERGEN AKÇİN¹, Gülaycan POLAT¹, Metin Deveci², Selahattin ÖZBUCAK³¹ Ordu University, Faculty of Science & Arts, Department of Biology, Turkey² Ordu University, Faculty of Agriculture, Department of Field Crops, Turkey³ Başöğretmen High School, Turkeytsiozbucak@hotmail.com

Aim of the study: The aim of our study is to determination of life forms and length in common plants in Melet River which is located in Ordu province and mainly in the Euxine province of Euro-Siberian phytogeographical region. The Black Sea Region is divided to two subregions as Euxine and Colchic sectors. The study area lies between A6 and A7 squares according to Davis 's grid system.

Material and Methods: The life forms and length of plants were determined to Flora of Turkey (Davis, 1965-1988), A Checklist of the Flora of Turkey (Vascular Plants) (Güner ve ark., 2012) and various scientific publications.

Results: The common plants in the area are represented by Brassicaceae, Caryophyllaceae, Geraniaceae, Fabaceae, Asteraceae, Boraginaceae, Lamiaceae and Poaceae families. The distribution of taxa according to life-form is as follows: Therophytes 47(48,45%), Hemicryptophytes 42 (43,3), Geophytes 3 (3,09%), Phanerophytes 1 (1,031%) and Chameophytes 4 (4,123%). In the research area determined 97 taxa of which 45(46,39%) are annual,41(42,27%) are perennial and 11(11,34%) are biannual.

Keywords: Melet River, Life forms, Ordu, Turkey

PP-514

Morphological and Molecular Identification of Scenedesmaceae Members Isolated from River Basin of Ergene (Thrace, Turkey)Füsun AKGÜL¹, İnci TÜNEY², Rıza AKGÜL³, Hüseyin ERDUĞAN⁴¹*Mehmet Akif Ersoy University, Department of Molecular Biology and Genetics, Faculty of Science and Arts, 15030 Burdur, Turkey*²*Ege University, Department of Biology, Faculty of Science, 35000, İzmir, Turkey*³*Kastamonu University, Faculty of Fisheries, 37200 Kastamonu, Turkey*⁴*Çanakkale Onsekiz Mart University, Department of Biology, Faculty of Science and Arts, 17020 Çanakkale, Turkey*fakgul@mehmetakif.edu.tr

Aim of the study: Microalgae are responsible for primary production in aquatic systems, with a high degree of diversity, structures of economic and biotechnological aspects of chemical substances, and therefore contain organisms that are valuable. However, inadequate information about microalgae taxonomy and the difficulty of morphological identification by microscopes, it is hard to determine the exact taxonomic identification of microalgae. In this study, the species of microalgae from inland waters in River Basin of Ergene were made more accurate determination and taxonomic mistakes of the algae species that have economic and commercial importance in Turkey, have been eliminated with the molecular techniques.

Material and Methods: Water samples were collected from inland waters in River Basin of Ergene (Thrace, Turkey) in May of 2012. Microalgae isolation was done and culture tubes were grown. When the biomass was reached the late exponential growth phase, algae biomass was harvested and used in molecular and microscopy analysis. Morphological identification was performed according to basic systematic literature. Total genomic DNA from cultured samples were isolated for polymerase chain reaction (PCR) analysis. Sequence analyses of ITS regions were performed and obtained sequences were compared with data from Gen Bank. Aligned data set was used for creating phylogenetic trees. Unweighted Pair Group Method with Arithmetic Mean (UPGMA) and Neighbor Joining (NJ) algorithms were used for inferring the phylogenetic relationships.

Results: According to our results; there is a discrepancy between morphologic and molecular identifications. Because of the samples that used in this study are microscopic and have very similar morphological characters; some mistakes may be made. To eliminate these errors, molecular researches are essential for these taxa to detect their accurate systematic regions.

Acknowledgments: This research was supported by The Scientific and Technological Research Council (TÜBİTAK), project number 211T181.

Keywords: Microalgae, isolation and culture, molecular taxonomy, phylogenetic.

PP-515

Genotoxic Effect of Water Soluble Fractions of Crude Oil in Molly Fish (*Poecilia sphenops*)Özlem ÖNEN¹, Cennet ÖZAY², Sema İŞİSAG ÜÇÜNCÜ³¹Department of Biology, Kafkas University, Turkey²Department of Biology, Pamukkale University, Turkey³Department of Biology, Ege University, Turkeycennetozay@hotmail.com

Aim of the study:Crude oil and derivatives consist mainly of hydrocarbons and complex chemical mixtures. *Their composition varies considerably depending on where the oil is taken out and how it is used.* Harmful effluents discharged into the environment have the potential to reach waterbodies and disturb aquatic ecosystems. Numerous spills and leakages involving crude oil and its derivatives have recently occurred in the world. The aim of the present study is to evaluate the genotoxic potential of water soluble fraction of crude oil in *P. sphenops* fish, using the micronucleus assay.

Material and Methods:This study was carried out in accordance with the Animal Ethics Committee Report (No. 2008-49) based on Decisions of Ethical Committee for Experimental Animals prepared by Faculty of Pharmacy, Ege University. The genotoxic potential of water soluble fraction of crude oil (WSF), was investigated in tropical fish *P. sphenops* in the present study using micronucleus (MN) assay. Fishes were exposed for 24, 48, 72 and 96 h to 40% of WSF. The exposure was continued up to 96h (4 days) and blood sampling was done at the intervals of 24, 48, 72 and 96 h. On each sampling day, peripheral blood samples obtained from the caudal vein were collected and immediately processed for MN. From each slide, 1000 erythrocyte cells were scored under light microscope and determined the MN frequency. The criteria used for the identification of MN were; their smaller size, one-third of the main nucleus, same color, intensity and no attachment with the main nucleus.

Results:The results indicated genotoxic damage in erythrocytes of *P. sphenops* exposed to WSF. The relative frequencies of micronucleated erythrocytes for *P. sphenops* exposed to WSF under acute exposure were significantly higher than their respective negative controls (fish exposed to clean water for the same period). In parallel with increased exposure time, the micronucleated erythrocytes were increased in number. These results showed that acute exposure to water soluble fraction of crude oil produces genotoxic effects on the blood cells of *P. sphenops* and the micronucleus assay proved to be suitable and useful in the evaluation of the genotoxicity of crude oil.

Acknowledgements:Thanks to Tüpraş Anonymous Company for the crude oil support and Ege University, Faculty of Science, Biology Department, Zoology Section, for all of the facilities offered.

Keywords: *Poecilia sphenops*, crude oil, genotoxicity, MN assay.

PP-516

Using Living Microalgae *Tetracystis isobilateralis* R.M.Brown & H.C. Bold (Chlorococcales) in the Removal of Heavy MetalsCumhur MIÇOĞULLARI¹, Rıza AKGÜL², Füsün AKGÜL³, Hüseyin ERDUĞAN¹¹Çanakkale Onsekiz Mart University, Faculty of Arts and Sciences, Department of Biology, Çanakkale, Turkey² Kastamonu University, Faculty of Fisheries, Department of Basic Sciences, Kastamonu, Turkey³Mehmet Akif Ersoy University, Faculty of Arts and Sciences, Department of Molecular Biology Genetics, Burdur, Turkeyrakgul@kastamonu.edu.tr

Aim of the study:Determining the algal vegetation is simpler and more economic in comparison with many chemical methods used in measuring water quality. Many tangle taxons, small and large, are identified to be a potential heavy metal biosorbant. As a result of the literature review, it is found that no studies have been made on microalgal biotechnological field about the species *Tetracystis isobilateralis* R. M. Brown & H. C. Bold.In the study made, it is observed that the removal of heavy metals by the algae concerned in OTM (Our Tetracystis Medium) changes depending on the metal density in the medium and time.

Material and Methods:In this study, the taxon *T. isobiletaralis* which was isolated from Turkey and sent to Ege University Microalgae Culture Collection and then given the catalog number MACC63 was used. In the determination of absorption capacity of the algae, the metal ions Co (II), Cd (II), Pb (II), Zn (II) and Mn (II) were used.Three different concentrations (5, 20 and 40 ppm) of each metal ions from each of these stocks separately were added in the cultivation medium. Samples were taken from the cultures at minutes 0, 10, 30 and at hours 1, 2, 12, 24.In order to determine the amounts of absorption, the analyses were carried out in the central laboratories in Çanakkale Onsekiz Mart University using the device ICP-AES and the amounts of absorption of heavy metals were determined in 3 repetitions.

Results:The heavy metal with the highest removal amount is manganese and zinc, lead, cobalt and cadmium follows it in order. All these data show that the taxon *T. isobilateralis* can be used in the refinement of heavy metals in wastewaters through biosorption.

The study results show that the taxon *T. isobilateralis* can be used in microalgal biotechnological studies due to its heavy metal absorption capacity.

Considering the increasing world population, inadequacy of cultivated areas or failure to utilize them effectively and low quality agricultural products, this microalgae type which can be presented as the alternative of a few nutritional algae types can be used in the biological removal of heavy metals released into the water sources through natural and human activity.

Acknowledgements:The authors gratefully acknowledge the financial support provided by Scientific Research Commission of Canakkale Onsekiz Mart University (Project number: 2009/20).

Keywords:Tetracystis isobilateralis, removal, heavy metals, microalgae.

PP-517

Biochemical characteristics of microalgae *Tetracystis isobilateralis* R.M. Brown & H.C. Bold (Chlorococcales)Cumhur MIÇOĞULLARI¹, Rıza AKGÜL², Füsün AKGÜL³, Hüseyin ERDUĞAN¹¹Çanakkale Onsekiz Mart University, Faculty of Arts and Sciences, Department of Biology, Çanakkale, Turkey² Kastamonu University, Faculty of Fisheries, Department of Basic Sciences, Kastamonu, Turkey³ Mehmet Akif Ersoy University, Faculty of Arts and Sciences, Department of Molecular Biology Genetics, Burdur, Turkeyrakgul@kastamonu.edu.tr

Aim of the study: Recent studies in the field of phycology have shown that algal biomass is mainly used for the production of different compounds such as hydrogen and hydrocarbons using polysaccharides, oils, proteins, carotenoids, pigments, vitamins, sterols, enzymes, antibiotics and many other chemicals (or their precursors). This study used *Tetracystis isobilateralis* R. M. Brown & H. C. Bold biochemical properties such as total protein amount, total oil amount, types and amounts of fatty acids, vitamin A, E and β -Carotene amount were examined.

Material and Methods: In this study, the taxon *T. isobiletaralis* which was isolated from Turkey and sent to Ege University Microalgae Culture Collection and then given the catalog number MACC63 was used. The sample was harvested after reaching a certain concentration in OTM (Our Tetracystis Medium) medium. The sample was dried at 50 °C in vacuum incubator for 3 hours and was kept at -20°C. Biochemical analyses were conducted to determine oil, fatty acids, proteins, carbohydrates, vitamins and ash amounts. Total protein analysis was performed according to Kjeldahl method (AOAC, 2000) in three stages and with three repetitions including wet burning, distillation and titration. Raw oil amount was determined according to Folch et al., (1956) Fatty acid analyses were carried out using GS-MS device. Vitamins analysis in the collected hexane phase was conducted using HPLC device.

Results: Analysis has shown that total protein amount was 38.73%; total oil amount was 16.37%; vitamin E amount was 301.8 mg/kg, vitamin A amount was 28.40 mg/kg and β -carotene amount was 815.4 mg/kg. Amounts of palmitic, linoleic, oleic, stearic fatty acid types were found to be 40.99%, 6.34%, 35.89% and 16.64% respectively.

Acknowledgements: The authors gratefully acknowledge the financial support provided by Scientific Research Commission of Çanakkale Onsekiz Mart University (Project number: 2009/20).

Keywords: *Tetracystis isobilateralis*, protein, vitamin, β -Carotene, fatty acid, microalgae.

PP-518

Two new subspecies records of *Ziziphora clinopodioides* Lam. (Lamiaceae) from TurkeyTuncay DIRMENCI¹, Ferhat CELEP², Murat Ünal³, Taner ÖZCAN¹¹ *Biology Education/Necatibey Education Faculty, Balıkesir University, Turkey*² *Biology/Polatlı Science and Arts Faculty, Department of Biology, Gazi University, Ankara, Turkey*³ *Department of Biology, Yüzüncü Yıl University, Van, Turkey*dirmenci@balikesir.edu.tr

Aim of the study: The genus *Ziziphora* L. (Lamiaceae) is represented five species (one of them, *Z. clinopodioides*) in Turkey. During the herbaria studies in Vienna on the genus, two interesting herbarium specimens, collected from Van province in eastern Turkey, were taken an extra attention by us. Then, we have learned that one of them also collected by M. Ünal from the Van province. Though the specimens are similar to known type subspecies of *Z. clinopodioides*, they seem to be different. One of the specimens is similar to *Ziziphora clinopodioides* subsp. *rigida* and another one is similar to *Z. clinopodioides* subsp. *elbursensis* which are also known from the neighbouring countries, i.e. Iran and Iraq. The objective of the study is to add two new subspecies records of *Z. clinopodioides* for the Flora of Turkey.

Material and Methods: The specimens belonging to *Ziziphora clinopodioides* subsp. *rigida* (W herbarium) were collected from Van-Gürpınar province in 1984 by F. Sorger and the specimens belonging to *Z. clinopodioides* subsp. *elbursensis* were collected in 1966 by J. Eiselt. The specimens were identified using the Flora of Iran and Flora of Turkey and East Aegean Islands.

Results: Literature surveys and herbarium studies shown that *Ziziphora clinopodioides* subsp. *rigida* is known from Transcaucasus to Afghanistan and *Z. clinopodioides* subsp. *elbursensis* is known from Iran and Iraq. Herbarium studies by T. Dirmenci in the Vienna herbarium and literature surveys confirmed that both subspecies are also distributed in the Van province in eastern Turkey. This is the first records of both taxa from Turkey.

Acknowledgements: We wish to thank the curators of following herbaria K and W for allowing us to study their *Ziziphora* collections

Keywords: *Ziziphora*, New records, Turkey.

PP-519

Distribution, Habitat Preference and Threats on Rare Blenniid Fish *Coryphoblennius galerita* (Linnaeus, 1758) in the Southern Black Sea

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Aim of the study: It is aimed to determine the actual distribution, threats, habitat preferences of the *Coryphoblennius galerita* which is known from only one location in Southern Black Sea.

Material and Methods: The fieldworks were carried out in the Southern coasts of Black Sea (İğneada-Hopa). Total 61 stations were studied by SCUBA diving. The underwater observations have been recorded to the underwater boards and the specimens were photographed in their natural habitats.

Results: *C. galerita* have been observed only in three stations. The specimens were found in small cracks and crevices of formed on natural rocks. It is observed that their distribution is restricted to 0-120 cm depth. During the sampling *C. galerita* specimens tried to hide by leaping if they perceived a danger. The cryptic *C. galerita* species prefers only natural rocky habitats. Therefore the sediment transportation and suspended material could affect their natural habitats by filling the cracks and crevices.

Acknowledgements: This study has been supported by TUBITAK 112T924 project.

Keywords: Blenniidae, *Coryphoblennius galerita*, blenny, Black sea, conservation, rare.

PP-520

Some Ecological Features and Distribution of the Black Sea Endemic Cling Fish *Diplecogaster euxinica* Murgoci, 1964 (Gobiesocidae)

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Aim of the study: In this study it is aimed to determine, habitat preferences, environmental threats and distribution of the Black Sea endemic cling fish *Diplecogaster euxinica* in the southern coast of Black Sea.

Material and Methods: The fieldworks were carried out along the Southern coast of Black sea (İğneada-Hopa). Totally 61 stations in the range of 0-30 m were studied by SCUBA diving. Different depth ranges and habitat types were investigated. The observations were recorded to the underwater boards.

Results: The presence of *D.euxinica* was determined in 11 stations. While the abundant distribution of this species is 0-10m depth, it was observed up to 30 m depth. It is observed that *D.euxinica* species prefers especially shell gravel habitats but it could be epibenthic in sandy areas. This benthic spawner species has settled lifestyle and low mobility and these features make *D.euxinica* is sensitive to pollution and sediment transportation. Besides, invasive *Rapana venosa* predation on Mediterranean mussells have negative effects on *D.euxinica* habitats.

Acknowledgements: This study has been supported by TUBITAK 112T924 project.

Keywords: Gobiesocidae, *Diplecogaster euxinica*, endemic fish, Black sea, conservation.

PP-521

**Established population of lessepsian dragonet *Synchiropus sechellensis* Regan, 1908
(Callionymidae) in the Northern Levantine Coast**

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Aim of the study: It is aimed to reveal the actual status of drogonet *Synchiropus sechellensis* which is recently reported from the Mediterranean in 2014.

Material and Methods: Samplings were carried out seasonally during 2014-2015 in Taşucu-mersin with trawl net in order to determine distribution of the lessepsian fishes. Totally 32 hauls were done at 0-20, 20-50, 50-100 m depth. Besides, underwater observations were carried out at 0-40m depth ranges by SCUBA diving.

Results: As a result of the study totally 21 specimens of *Synchiropus sechellensis* were obtained from the fieldworks. In winter period no specimens were caught while vast of the samples were obtained in spring. The occurrence frequency of *Synchiropus sechellensis* were denser than the day time, therefore it is thought that this species could have nocturnal behaviour. All samples were obtained at 12-13 m depth from vegetated substrate. In underwater surveys, there is one specimen was observed in winter period at 6m depth. As a result of the study it is determined that lessepsian *S. sechellensis* have established populations in Northern Levantine coasts.

Acknowledgements: This study has been supported by 2014-1-SUÜ-08 (IKC BAP UNIT) project.

Keywords: Callionymidae, *Synchiropus sechellensis*, lessepsian, Levantine, dragonet.

PP-522

Investigation of Some Medicinal Activities of *Viburnum opulus* from Tokat- TurkeyCanan USTA¹, Ahmet SİMSEK²¹Gaziosmanpasa University, Science & Art Faculty, Dep. Of Biology/Microbiology, TOKAT²Gaziosmanpasa University, Science & Art Faculty, Dep. Of Molecular Biology & Genetic, TOKAT
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Aim of the study: In this study, some medical uses of *Viburnum opulus* from Tokat was investigated with respect to their potential antimutagenic and antibacterial effects. The *Viburnum opulus* (common name guelder-rose) is a species of flowering plant in the family *Adoxaceae* (formerly *Caprifoliaceae*) native to Europe and central Asia. It has biologically active components (generally hydrokinons, arbutins, cumarins like skopoletin & skopolin and tanins, vitamin K, salicin, salicylic acid and rosin) which must have been investigated, that the DNA acting or some antimutagenic affects need to be analyzed as well.

Materials and Methods: Air-dried herb material (leaves and barks; 100 g) was powdered and extracted with different organic solvents. Thereafter, the extract was filtered and evaporated to dryness in vacuo at 40°C. The antibacterial activity was tested against 11 human pathogenic bacterial strain. The antimutagenic effects of the same solvent extracts have been observed in both fruit and bark extracts of the plant. Before, *S. typhimurium* strains TA98 and TA100 were checked for their viable counts and genotype characteristics. Plate incorporation using histidine-dependent strains of *S. typhimurium* in the presence (antimutagenicity) and absence of standard mutagenic chemicals sodium azide and 4-nitroquinolene-1-oxide for TA 100 and TA98 respectively. The solvent extracts of our *Viburnum opulus* spp. were tested for mutagenic properties at five different concentrations 5, 2.5, 1.25, 0.625 and 0.312 mg/plate. 100 µl of various concentrations of 2 ml top agar mixed with 100µl of the bacterial culture and then poured onto a MGA plate. For antimutagenic assays preincubation were applied.

Results: The bark hexane and dichloromethane extracts (0,4mg/ml) showed highest inhibition zones (14.00mm and 15 mm against *Staphylococcus aureus* ATCC 25923 and *Streptococcus pneumoniae* ATCC 19615 respectively), also intermediate activities have been observed in Gram- bacterial strains (13mm, *Escherichia coli* ATCC 25922 and *Enterobacter cloacae* ATCC 23355; 12mm *Klebsiella pneumoniae* ATCC 13883 and *Pseudomonas aureginosa* ATCC 27853; 11 mm *Serratia marcescens* ATCC 8100. Hexane and DMSO bark extracts showed mutagenicity up to 2.5 mg/plate when tested with *Salmonella typhimurium* TA98 and TA100 strains without metabolic activation. In addition, DMSO bark and fruit extracts demonstrated a significant protective effect against mutagenicity induced by mutagen sodium azide in *S. typhimurium* TA100 strain. The results of these studies indicate that plant is non-mutagenic according to the increased back mutation, instead exhibited protection against the mutagenicity induced by 4-nitroquinolene-1-oxide for TA 98 and sodium azide for TA 100 strain.

Acknowledment: In this study all the culture media and some specific chemicals used in the antimutagenicity assays were shared with another project supported by the BAP of Gaziosmanpasa University.

Keywords: *Salmonella typhimurium* TA 98 & TA 100, Antimutagenicity, Antibacterial.

PP-523

A Preliminary Study on the Parasite Fauna of Large-Eye Dentex, (*Dentex macrophthalmus* Bloch,1791) (Teleostei: Sparidae) Collected in Çanakkale and İzmir Regions, Aegean Sea, from TurkeySerdar DÜŞEN^{1,2}, F. Banu YALIM³, Hesna YAKA GÜL¹, Tuğba SAĞLAM¹, Ayşe KARAMAN¹¹ Pamukkale University Faculty of Arts & Sciences Department of Biology Denizli-TURKEY² FAGUMER - Flora and Fauna Research, Development and Application Center of Pamukkale University Denizli - TURKEY³ Mediterranean Fisheries Research Production and Training Institute, Kepez Antalya -TURKEY
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Aim of the study: In this study, was aimed the parasite fauna of Large-eye dentex(*Dentexmacrophthalmus*) collected from Çanakkale and İzmir Regions from Aegean Sea region.

Material and Methods: In this study, Large-Eye Dentex (*Dentex macrophthalmus*) samples collected in Çanakkale and İzmir regions in Aegean Sea were investigated monthly between October 2014 to March 2015. Fish specimens freshly obtained by the local fishermen. During the study, a total of 30 fish samples were examined for endo and ectoparasites. Fish specimens were dissected for parasites. The helminths were fixed with 5% glycerol 70% ethyl alcohol for nematodes and 70% ethyl alcohol for digeneans. Also, Isopoda and Copepoda samples were fixed with 4% formaldehyde 70% ethyl alcohol. Helminths were stained with acetocarmine, dehydrated, cleared in cedar oil or xylol, and mounted in entellan®. The preparations and identifications of the parasites by using relevant papers. Voucher parasite specimens were deposited in Pamukkale University, Faculty of Sciences and Arts, Department of Biology, Denizli, Turkey.

Results: A total of 8 taxon of parasites were encountered on the large-eye dentex (*Dentex macrophthalmus*). 4 species of nematode (*Contracaecum* sp., *Hysterothylacium aduncum*, *Philometra* sp., and *Anisakis* sp.), 1 species Digenea (*Holorchis* sp.), 1 species of Isopoda(*Gnathia* sp.), and 2 species of Copepoda(*Clewellotis pagri*, and *Caligus* sp.). All parasite species recorded first time for *D. macrophthalmus* from Turkey.

Keywords: Aegean Sea, Copepoda, *Dentex macrophthalmus*, Endoparasite, Isopoda, Turkey.

PP-524

A Preliminary Helminthological Study of *Pelophylax caralitanus* (Arikan, 1988) from Beyşehir Lake, Konya, TurkeySerdar DÜŞEN^{1,2}, Hesna YAKA GÜL¹, Murat SELVİLİ¹, Nihal KAYMAK KUZU¹¹ Pamukkale University Faculty of Arts & Sciences Department of Biology Denizli -TURKEY² FAGUMER - Flora and Fauna Research, Development and Application Center of Pamukkale University Denizli - TURKEY

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Aim of the study: In this study, Anatolian frog-Beyşehir frog, *Pelophylax caralitanus* (formerly known as *Rana caralitana*) were collected in from Beyşehir lake in Konya province, Turkey, examined for first time for helminths.

Material and Methods: A total of 26 *P. caralitanus* samples (14 ♀♀, 12 ♂♂) were collected from Beyşehir lake Konya Province, Turkey between 2010 and 2011 and examined for helminths. Frogs were overanaesthetized in ether-filled containers, and the body cavity was opened by a longitudinal ventral incision, and the alimentary tract was excised by cutting the anterior esophagus and rectum. Organs were examined under a stereomicroscope. Digeneans and Acanthocephalans were immobilized by heat, fixed, and stored in 70% ethanol. Nematodes were straightened by heat, fixed, and stored in 70% ethanol with 5% glycerol. Helminths were stained with acetocarmine, dehydrated, cleared in cedar oil or xylol, and mounted in entellan®. Voucher parasite specimens were deposited in Pamukkale University, Faculty of Sciences and Arts, Department of Biology, Denizli, Turkey.

Results: According to the results obtained, *P. caralitanus* harbored six species of Digenea (*Codonocephalus urniger*, *Diplodiscus subclavatus*, *Encyclometra colubrimurorum*, *Gorgoderia cygnoides*, *Skrjabinocetes breviansa* and *Opisthioglyphe ranae*), four species of Nematoda (*Cosmocerca ornata*, *Oxysomatium brevicaudatum*, *Eustrongylides* sp., and *Abbreviata* sp. [cyst form]), and one species of Acanthocephala (*Acanthocephalus ranae* [cyst form]). All helminths recorded first time for *P. caralitanus* from Beyşehir lake, Konya, Turkey. Also, *C. urniger*, *D. subclavatus*, *E. colubrimurorum*, *G. cygnoides*, *O. ranae*, *O. brevicaudatum*, and *Eustrongylides* sp. recorded first time for *Pelophylax caralitanus*.

Acknowledgements: We thank, for their permission and helps, the Department of National Parks and Wildlife of the Republic of Turkey Ministry of Forestry and Water Affairs.

Keywords: Anatolian frog, Anura, Beyşehir frog, Helminth, *Pelophylax caralitanus*, Turkey.

PP-525

A Preliminary Helminthological Study of Eurasian Marsh Frog (*Pelophylax ridibundus* Pallas, 1771) in Seyhan River Collected from Adana Province, TurkeyHesna YAKA GÜL¹, Serdar DÜŞEN¹, Elife Buket TOPAL¹, Nesrin CEYLAN GÜRKAN¹¹ Pamukkale University Faculty of Arts & Sciences Department of Biology Denizli - TURKEY² FAGUMER - Flora and Fauna Research, Development and Application Center of Pamukkale University Denizli - TURKEY

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Aim of the study: The aim of this study was to present a preliminary knowledge of the helminth of *Pelophylax ridibundus* (formerly known as *Rana ridibunda*), distributed in Eurasian marsh frog Seyhan river of Adana province in Turkey.

Material and Methods: A total of 58 Eurasian marsh frogs, *P. ridibundus* (49 ♂♂; 9 ♀♀) samples were collected between 2014 and 2015 years from different localities of Seyhan river in Adana province. Frogs were overanaesthetized in ether-filled containers, and the body cavity was opened by a longitudinal ventral incision, and the alimentary tract was excised by cutting the anterior esophagus and rectum. Organs were examined under a stereomicroscope. Digeneans and Acanthocephalans were immobilized by heat, fixed, and stored in 70% ethanol. Nematodes were straightened by heat, fixed, and stored in 70% ethanol with 5% glycerol. Helminths were stained with acetocarmine, dehydrated, cleared in cedar oil or xylol, and mounted in entellan®. Voucher parasite specimens were deposited in Pamukkale University, Faculty of Sciences and Arts, Department of Biology, Denizli, Turkey.

Results: 5 species of Digenea (*Skrjabinoeces breviansa*, *Prosotocus confusus*, *Pleurogenoides medians*, *Opisthoglyphe ranae*, and *Gorgoderia cygnoides*), 4 species of Nematoda (*Cosmocerca ornata*, *Rhabdias bufonis*, *Oswaldocruzia filiformis*, and *Neoxysomatium* sp.), and 1 species of Acanthocephala (*Centrorhynchus* sp.) were found. All helminths recorded first time for *Pelophylax ridibundus* from Adana province.

Acknowledgements: We thank, for their permission and helps, the Department of National Parks and Wildlife of the Republic of Turkey Ministry of Forestry and Water Affairs.

Keywords: Adana, Anura, Eurasian marsh frog, Helminth, *Pelophylax ridibundus*, Turkey.

PP-526

Helminth Fauna of Atlantic Horse Mackerel (*Trachurus trachurus* L., 1758) from the Marmara Sea, İstanbul, TurkeySerdar DÜŞEN^{1,2}, Hesna YAKA GÜL¹, Berkay DOBRUCALI¹, Orlanda DARALI¹, Ahmet KOŞAR¹, Gülşah ÖZÜLKE¹¹ Pamukkale University Faculty of Arts & Sciences Department of Biology Denizli -TURKEY² FAGUMER - Flora and Fauna Research, Development and Application Center of Pamukkale University Denizli -TURKEY

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Aim of the study: The purpose of this work is to determine the endohelminth fauna of Atlantic horse mackerel (*Trachurus trachurus* L.) from the Marmara Sea İstanbul, Turkey.

Material and Methods: During the period from September 2014 to May 2015, 100 Atlantic horse mackerel (*Trachurus trachurus* L.) were freshly obtained by the fishermen. Fish specimens were dissected and the helminths were fixed with 5% glycerol 70% ethyl alcohol for nematodes and 70% ethyl alcohol for digeneans. Helminths were stained with acetocarmine, dehydrated, cleared in cedar oil or xylol, and mounted in entellan®. The preparations and identifications of the parasites by using relevant literatures. Voucher parasite specimens were deposited in Pamukkale University, Faculty of Sciences and Arts, Department of Biology, Denizli, Turkey.

Results: Atlantic horse mackerel (*Trachurus trachurus* L.) harboured 4 species of Nematoda (*Metabronema* sp., *Contracaecum* sp., *Philometra* sp., and *Hysterothylacium aduncum*), 3 species of Digenean (*Prodistomum polonii*, *Haplocladus* sp., and *Magnacetabulum trachuri*). Also, this study *Metabronema* sp., *Philometra* sp., and *Magnacetabulum trachuri* recorded first time for helminth fauna of *T. trachurus* from Marmara Sea in Turkey.

Keywords: Atlantic horse mackerel, Digenea, Marmara Sea, Nematoda, *Trachurus trachurus*, Turkey.

PP-527

A Preliminary Research on The Protozoa Existence in Raw Milk Samples in Denizli City CenterTuğba SAĞLAM¹, Serdar DÜŞEN^{1, 2}¹ Pamukkale University, Science - Faculty of Arts, Department of Biology, Department of Zoology,
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Aim of the study: This study aimed to determine protozoan parasites (*Cryptosporidium* sp., and *Blastocystis hominis*) found in raw milk samples in Denizli city center.

Material and Methods: In this study, 52 raw milk samples were examined obtained from local milk producers in Denizli. Milk samples were collected in 0.5 ml vials. Modified acid fast (MAF) method was used in order to detect *Cryptosporidium* sp. oocysts. Also, Giemsa dyeing and lugol-iodine method was used in order to detect and *Blastocystis hominis* cysts.

Results: The result of this first preliminary study, *Cryptosporidium* sp. and *Blastocystis hominis* parasites were determined by using counting method in some raw milk samples. Afterwards, the molecular protozoans identification methods will be planned on this study. Because of the first study about determination of parasite in raw milks in Turkey.

Acknowledgements: We would like to thank Prof. Dr. Tonay İNCEBOZ, Başak GÜLABİ, Hesna YAKA GÜL, Emre GÜDÜCÜ and Yağmur ÖZYILMAZ and for supports of this study.

Keywords: *Blastocystis hominis*, *Cryptosporidium* sp., Denizli, Protozoa, Raw milks, Turkey

PP-528

The Taxonomical Situation of the Genus *Colchicum* (Colchicaceae) in TurkeyOlca DÜŞEN^{1,2}¹*Pamukkale University, Faculty of Arts & Sciences, Department of Biology, Kinikli,
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Aim of the study: *Colchicum* L. is a taxonomically very difficult genus of the family Colchicaceae. The c. 100 species of the genus *Colchicum* (incl. *Merendera* Ram. and *Bulbocodium* L.) are unevenly distributed. The high frequencies of species and of endemics in Turkey indicate these regions as major centers of diversity and speciation for this genus. In this study, aimed to determine the current nomenclatural status of *Colchicum* genus in Turkey.

Material and Methods: In this study are composed of literature studies, field studies, related databases (such as World Checklist of Selected Plant Families, Euro Med Plant Base, The Plant List) and different international (such as E, K, W, P and Z) and national (such as ANK, EGE, GAZI, HUB and ISTE) herbarium materials.

Results: The genus *Colchicum* was first described by DeCandolle in 1804. Brickell (1984) recognized 35 species (36 taxa) of *Colchicum* in the Flora of Turkey and the East Aegean Islands. Although *Merendera* and *Colchicum* are separately in Flora of Turkey, today these genus are under the *Colchicum* genus as a result of molecular studies. According to, Turkey Plant List which was written by Güner *et al.* *Colchicum* is represents 47 species and 49 taxa. Subsequently, three new species have been described from Turkey by Özhatay and Kaya. According to nomenclatural status of current *Colchicum* genus is represent 50 species and 52 taxa.

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Keywords: *Colchicum*, taxonomy, Colchicaceae, Turkey

PP-529

The Evaluation of Floral Motifs on the Archaeological Architectures in Stratonikeia Ancient City (Muğla / Turkey)Uygar SARP KAYA¹, Betül GÜRCAN¹, Olcay DÜŞEN^{1,2}¹ Pamukkale University, Faculty of Arts & Sciences, Department of Biology, Kinikli, Denizli/ TURKEY² FAGUMER-Flora and Fauna Research, Development and Application Center of Pamukkale University Denizli/TURKEYusarpkaya05@posta.pau.edu.tr

Aim of the study: In this study, the floral motifs which were located on the Archaeological Architectures has been evaluated in the Stratonikeia Ancient City (Muğla / Turkey). These floral motifs have been identified for what purpose it is used in ancient times.

Material and Methods: The flora of Stratonikeia Antique City was investigated between 2010-2012. In research area, 453 specimens have been collected. These specimens were mainly identified using the Flora of Turkey and the East Aegean Islands and other related resources. The identified species were compared with the motif on the Archaeological Architectures.

Results: As result of this study, ten floral motifs were associated with respect to today's floral richness of Stratonikeia Ancient City. The plants were examined for what purpose they are used. After then, we have suggested opinions about use of plant at antique times. Some of these plant motifs was found to have the meanings like abundance, richness and peace. This study would be an important contribution for further studies.

Acknowledgements: This study was supported by Pamukkale University Scientific Research Projects Coordinatorship (Project no: 2010FBE073). We also thank to Pamukkale University, Department of Archeology for their help during the study.

Keywords: Archaeological Architectures, Floral Motifs, Muğla, Stratonikeia, Turkey

PP-530

Additional Lichen Records from Denizli Province, TurkeyÇağrı GEDİZ¹, Özge TUFAN ÇETİN², Olcay DİNÇ DÜŞEN^{1,3}¹Pamukkale University, Faculty of Arts and Science, Department of Biology, Kınıklı Campus 20017
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Aim of the study: The aims of this study are to report 4 lichen taxa that were identified as new record for Denizli and give information about these species.

Material and Methods: 110 lichen samples were collected from various localities in Denizli in years 2012 and 2013. Of these total samples, 4 taxa were determined as new records for Denizli Province. These taxa examined morphological by stereo microscope; anatomically by light microscopy and were taken their structural photographs. Also, detailed descriptions of the taxa were made. The samples are stored in the herbarium of Pamukkale University.

Results: Of these 4 taxa, *Lecanora albellula* Nyl. is epiphytic crustose lichen that prefer to live on very acidic substrates and in sun-exposed sites. The other epiphytic taxa is *Rinodina sophades* that can live a wide ecological amplitude on smooth barks. Third taxa, *Hypogymnia physodes* (L.) Nyl. has a World wide distribution which was found for the first time from Denizli. The last record us, *Porpidia cinereoatra* (Ach.) Hertel & Knoph was collected on siliceous rock, from non-eutrophic area of Denizli Province.

Keywords: Denizli, Lichen, New Records, Turkey

PP-531

The Nomenclatural Situation of the Genus *Potentilla* (Rosaceae) in TurkeyUygar SARP KAYA¹, Olcay DÜŞEN^{1, 2}¹*Pamukkale University, Faculty of Arts & Sciences, Department of Biology, Kinikli,
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Aim of the study: *Potentilla* is one of the most difficult genus in Turkey. In this study we aimed to actual nomenclatural situation of genus *Potentilla*.

Material and Methods: This study is consist of compiled literatures, related database such as Euro Med Plant Base, The Plant List, The International Plant Name Index and different herbarium (ANK, EGE, GAZI, HUB and ISTE) materials.

Results: As a result of this study, a total of 82 studies has been reached about *Potentilla* genus. 53 of them taxonomical studies and 4 of them in these taxonomic studies belong to monographs and 1 of them revision. In addition, 10 of them molecular studies, 9 of them cytological studies, 5 of them anatomical studies, 2 of them micromorphological studies, 1 of them palynological study, 1 of them ecological study and 1 of them phylogenetic study were determined. Also, Four taxonomic letters have been reached between George Engelmann (who has been made revisions of many genus in Europe) and young botanists about problems of genus *Potentilla*. The Genus of *Potentilla* is represents 53 species and 55 taxa in Flora of Turkey (Volume 4 th). Considering the supplements (4 taxa in Volume 10 th and 4 taxa in Volume 11 th) a total issue of *Potentilla* is represents 63 taxa. According to Turkey Plant List which was written by Güner *et al* *Potentilla* is represents 60 species and 61 taxa. According to nomenclatural status of current *Potentilla* count is represent 55 species and 59 taxa in result of this study.

Acknowledgements: The authors gratefully thank to Prof. Dr. Ramazan Süleyman Göktürk and Prof. Dr. Ramazan Mammadov for their constructive comments.

Keywords: nomenclature, *Potentilla*, Rosaceae, Turkey

PP-532

Morphological, Anatomical and Palynological Features of Some *Rhododendron* Species (Ericaceae) in TurkeyBetül GÜRCAN¹, Uygur SARP KAYA¹, Olcay DÜŞEN^{1,2}, Yücel SEMİZ¹¹ Pamukkale University, Faculty of Arts & Sciences, Department of Biology, Kinikli, Denizli / TURKEY² FAGUMER - Flora and Fauna Research, Development and Application Center of Pamukkale University Denizli / TURKEY

Aim of the study: In this study, morphological, anatomical and palynological properties of some *Rhododendron* species were investigated. In morphological studies, these species were determined by using Flora of Turkey and related articles. In anatomical studies, the transverse sections were taken from the leaves of the *Rhododendron* species. In palynological studies, polar diameter, equatorial diameter and apertures were measured. Microphotographs of the anatomical and palynological structures were represented.

Material and Methods: *Rhododendron* is perennial genus which contains nine species in Turkey. The samples were collected from Rize and Artvin provinces and were prepared according to standard herbarium techniques. In this research five species (one species of them endemic) and two hybrid species were collected. Typifications, synonym lists, ecology and phytogeography are given for all *Rhododendron* species. Anatomical studies were carried out on fresh samples preserved in 70% alcohol. Wodehouse technique (1935) were used for palynological studies. Measurements of pollen were based on twenty or more for per specimen. Anatomical and palynological findings photographed with Olympus CX31 light microscope which attached to Olympus CAM-LC20 camera.

Results: The results of this study, the morphological differences were compared with the Flora of Turkey. The anatomy of transverse section of these *Rhododendron* species's leaf and petiole were determined. Pollen grains of *Rhododendron* species were tetrahedral tetrad and pollen shapes were oblat-sferoidal.

Keywords: Anatomy, Morphology, Palynology, *Rhododendron*, Turkey

PP-533

Lichens of Stratonikeia Ancient City (Muğla/Turkey)Çağrı GEDİZ¹, Özge TUFAN ÇETİN², Olcay DİNÇ DÜŞEN^{1,3}¹*Pamukkale University, Faculty of Arts and Science, Department of Biology, Kınıklı Campus 20017
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Aim of the study: This study aimed to *determine the lichens of Stratonikeia Ancient City, in Muğla in Turkey.*

Material and Methods: Field works were carried out during 2013–2014 for collecting lichen samples in *Stratonikeia Ancient City*. Localities were selected according to different habitat types in the study area. Geographical information of localities are such as the latitudes, longitudes, and altitudes were calculated by GPS. The lichen samples were investigated using stereomicroscope and lightmicroscope for morphological and anatomical observations, respectively. While identifying the lichen species, up-to-date keys were used in articles and books.

Results: This study is the first study were conducted on lichens in Stratonikeia Ancient City. Totally, 175 lichen samples were collected in years 2013 and 2014. All determinated taxa are within Ascomycetes. Of these total samples, 30 species and 2 varieties were identified belong to 19 genus. Also based on this results, the distribution of taxa according to substrate types, were examined area. With reference to 22 taxa (70%) are epiphytic, 8 taxa (25%) are saxicolous and 2 taxa (2%) are terricolous. Epiphytic lichens often prefer the clean air conditions. Due to the most of the determined lichens are epiphytic, it can be stated that air quality was good in the area.

Keywords: Biodiversity, Lichen, Muğla, Stratonikeia, Turkey

PP-534

Two Years Data of Breeding Ruddy Shelducks (*Tadornaferruginea*) in Lake Acıgöl (Denizli-Afyonkarahisar/Turkey)Merve TEPE¹, Mehmet Ali TABUR², Raşit URHAN³, Cemil Ozan AKBULUT⁴¹Biology Department/Faculty of Arts&Sciences, Pamukkale University, Denizli, Turkey²Biology Department/Faculty of Arts&Sciences, Süleyman Demirel University, Isparta, Turkey³Biology Department/Faculty of Arts&Sciences, Pamukkale University, Denizli, Turkey⁴Biology Department/Faculty of Arts&Sciences, Pamukkale University, Denizli, Turkey
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Aim of the study:The aim of this study is to determine the breeding ruddy shelduck population inhabiting Lake Acıgöl and its vicinity. We also aim to detect the population size, breeding success, interspecific and intraspecific relations, behaviour and threatening factors of ruddy shelducks in the research area.

Material and Methods:In this study, field trips are made between February 2015-April 2016 by point counting method in 3 stations detected in Lake Acıgöl and its vicinity from sunrise to sunset twice a month. Data about breeding, nestling, resting and feeding location preferences, behavior against threatening factors and circadian and seasonal cycles of ruddy shelducks are recorded by photographing and filming.

Results:At a result of this study two different groups of ruddy shelducks using different locations of Lake Acıgöl are detected with 104 and 223 adults and 78 and 113 immature individuals consequently. From 327 adults, 218 individuals (106 pairs) completed breeding successfully and 318 chicks are raised. Highest number of chicks in single nest is detected as 6 and lowest number of chicks in single nest is detected as 2 (3 on average) and survival rate is found to be 48% in crowded nests. Lowest breeding rate is observed in 2015 with 207 chicks and it is thought to be due to illegal hunting and anthropological nest disturbance.

Acknowledgements:This research is financially supported by Pamukkale University Scientific Research Projects Supporting Department (PAUBAP, Project Number: 2015FBE044).

Keywords:*Tadorna ferruginea*, Lake Acıgöl, Denizli, Afyonkarahisar, Turkey, Breeding Biology.

PP-535

Method for Treating Trichophytoses of Large and Small Cattle

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Aim of the study: The aim of our study was to increase the efficiency of the treatment method, reducing the spread of the disease and expanding the range of therapeutic agents for trichophytosis of animals.

Materials and methods. When treating trichophytosis foci on the body surface of animals 5.3% aqueous solutions composite agent consisting of ammonium persulfate, ammonium and hydrogensulfate and cetylpyridinium bromide (CPB) is used for rubbing and local irrigation as an effective fungicide.

Results: The results of the study showed that better therapeutic effect comprising reduce of the treatment duration and rapid recovery of skin and hair coverings was achieved with the help of treatment of trichophytoses animals by offered products. The data show the effectiveness of the test fungicidal composition and can serve as a basis for the development of various therapeutic agents. This method of treatment was used by us for the first time, a positive result was obtained. The application of the proposed treatment method based on the use of the new fungicidal composition will yield economic benefits in agriculture by preventing the damage caused by animals' trichophytosis.

PP-536

Bioecological features of *Eucalyptus* L'Herit. genus species in Absheron conditionsT.S.Mammadov¹, S.B.Baqirova²^{1,2}*Institute of Dendrology Azerbaijan National Academy of Sciences
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Aim of the study: There are rare scientific studies appeared in our republic cultural flora belonging to Myrtaceae Juss.family, *Eucalyptus* L.Herit genus new perspective, valuable 5 species: *Eucalyptus albens* Benth., *Eucalyptus algariensis* Trabut., *Eucalyptus umbellata* Dom., *Eucalyptus leucoxydon* F.Muell., *Eucalyptus polyanthemos* Schauer. In Absheron conditions their bioecological features, propagation methods, agrotechniques and use in greening during 2012-2015 years. Research work has been implemented in below noticed sections: Researched *Eucalyptus* species bioecological features, especially the morphology of shoots, overground and underground organs growth and development dynamics, phenological development levels; Useful propagation methods for Absheron climate conditions; Determination of resistance criterions in environmental factors; Selection for Absheron greening resistant and perspective species Research works have been implemented in Institute of Dendrology of ANAS experimental territory flora. As researched species we have used for seed propagation in Absheron condition seeds brought from Batumi (Georgia) Botanical Gardens since 2012. There are sown in both special prepared experimental places useful for Absheron conditions seeds of *Eucalyptus* species in spring and autumn.

Material and methods: Morphological features of germinations are studied by I.T.Vasilchenko, I.G.Serebryakov methods. By plants annual growth and development are used methods of V.V. Smirnov, A.A.Molchanov. There are carried out measurements after beginning of vegetation by every 10 days to determine 1-3 year plants growth development dynamics. Therefor there are used in plants phenological stages by Beydemanin, Buligin atlas determinants. There are observed below noticed stages: swelling of buds, open of buds, becoming of petioles and formations, begin of annual young shoots growing and end, open of flowers buds, begin of flowering and end, formation of fruits and become full ripe, change of leaves color and continuously fallen of leaves.

Results: As a result of research work it is noticable that in Absheron condition propagation plants by seed is very suitable as by grafting methods. Results of research works are reflected. By observed shoots obtained from seeds are defined the first petals of leaves white fringed rootlets depending on sorts and they are come into full leaf forms after 5-12 days. Petal leaves formation and falls are stued, the obtained results are shown. The most time of duration life of petal leaves are observed in *E.albens* və *E.umbellata* species in 94-85 days, the less time are observed in *E. polyanthemos* species in 52 days. There are analyzed growth and development phases of overground spaces of researched species, there are obtained following results during study of growth dynamics among 1-3 yearling *Eucalyptus* species. In Absheron condition among of studied *Eucalyptus* species the intensive growth are many times observed in I-III yearlings. There are noticed that the intensive growth in *Eucalyptus* species are defined in may and july months, it consists of 60-70% of annual growth. Researches on *Eucalyptus* species in Absheron have shown that instead of reaching maximum height in growth in young (5-10 yearling) 5-10 il) growing of stem in width gets slowly. But in further years growth in height gets slow and the growth of stem width are increased. Cause of them is to have a tight, loam, lime, rocky soil in Absheron. An intensive growth of 1-3 year seedlings are started depending on environmental factors since end of april and beginnig of may, it has continued to 180-210 days. It is defined that biological features of species are depending not only on cultivated conditions and they are depending also on environmental factors.

Keywords: *Eucalyptus*, dynamical development, root system, fenology, reproduction, environmental factors.

PP-537

Natural plant covers of Lesser Caucasus Mountains

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Aim of the study: Tovuz region of Azerbaijan is rich and diverse in natural plant cover and has different types of vegetations. The climate of the region is influenced by winds from the South Caucasus (Transcaucasia). The region is also one of the Caspian's richest agrarian centers, perfect for nature lovers who want to explore rugged mountain lands or Alpine forests teeming with oak, beech, walnut, hornbeam and iron trees as well as wild fruit shrubs. In this respect, the present study was aimed to determine the biodiversity and bio-ecological features of the Tovuz region's flora.

Material and Methods: Plant cover has been influenced by ecological condition and soil structure. In this study, the plant cover, vegetation ecology and its relationships with the Tovuz region of Azerbaijan were investigated. The differences between growth and development of plants are observed according to fruits and formation of leaves.

Results: In the territory of Shamlig, Asrik, Boyuk Gishlag of Tovuz region, 4 species of *Euonymus* L. were observed. At the south slope, there were some species of trees and shrubs including, *Tilia* L., *Pyrus* L., *Ulmus* L., *Fraxinus* L., *Acer* L., *Mespilus* L., *Carpinus* L., *Quercus* L., *Clematis* L., *Hedera* L., and *Vitis* L. Some species were from Azerbaijan flora – *Taxus baccata* L., *Pinus kochiana* Klotzsch ex C. Koch, *Cotoneaster saxatilis* Pojarketc. Some mesophyte species were also observed including *Elaeagnus* L., *Ulmus* L., *Rhamnus* L., *Cotoneaster* L., *Pyrus* L., *Rhus* L., *Cotinus* L., *Tamarix* L., *Morus* L., *Pyracantha* M.Roem., *Rosa* L., *Rubus* L., *Euonymus* L., *Mespilus* L. etc. There are prepared concrete measures on protection of representatives of higher spores, gymnosperms and angiosperms. For conservation of Genofund is organized seed bank, therefore rare and endangered species are included to the Red book of Azerbaijan Republic. The result of these researches is the inventory of middle and high mountain zones of Tovuz region. Because of the inadvisable and intensive forest cutting some valuable species of trees and shrubs are changed: *Quercus macranthera*, *Ulmus scabra* *Acer trautvetteri*, *Betula pendula*etc.

Keywords: Xerophyte, mesophyte, hydrophyte.

PP-538

Phytocenological Grouping of Yalama ForestsK. A. MAMMADOVA

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Aim of the study: The shrub (bush) species such as *Rhamnus* L., *Cydonia* Mill, *Cornus* L., *Enonymus* L., *Ligustrum* L., *Mespilus* L., *Crataegus* L., *Malus* Hill, *Pyrus* L., *Rubus* L., *Rosa* L. are growing in Yalama forests.

Material and Methods: It was observed that result of researches of several types of forests species were formed in Yalama forests. The main species which forms the forest are *Quercus* L. species. The edificatory type of these forests is *Q. pedunculiflora* C. Koch. In individual cases there are found *Q. iberica* Stev, *Q. pubescens* Willd. *Fraxinus excelsior* L., *Acer campestre* L., *A. laetum* C.A.Meyer, *Ulmus foliaceae* Gilib were spread in the structure of oak forests. The species formats in which the second forest is *Carpinus* L.. The forests consisting of *Salix* L. and *Alnus* Hill types which are in a narrow strip form in the outside of small rivers; the poplar forest types consisting of *Populus hybrida* M.B. which are in humid hollow places of relief.

Results: As a result of revision which done in the Yalama forests, the phytocenological groupings and species content of research areas were revised.

Keywords: Forest, species, *Carpinus* L., *Quercus* L.

PP-539

Chrysomphalus dictyospermi as Harmful Pest of Eucalyptus in Absheron

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Aim of the study: The aim of this study is to investigate the effects of *Chrysomphalus dictyospermi* on *Eucalyptus* trees in Institute of Dendrology.

Material and Methods: This is the pest-insecta class, of *Homoptera* group, *Coccinea* semi-group, *Coccidae* family, *Chrysomphalus* genus, *Chrysomphalus dictyospermi* species. *Chrysomphalus dictyospermi* Morgan – is the polifaq insect, as well as damaging many evergreen deciduous plants. Pest has fused to plant leaf surface, it absorbs the leaf juice with its whole body surface and as a result the chloroplasts shattered at the top layer of the leaf epidermis, it appears spotted shapes on the surface of the leaves, then this parts begin to dry and leaves disappear their green color. There are broken down the processes of *photosynthesis*, also it is weakened the processess collection in shoots the creating of organic substances. Young shoots and branches are easy withered on winter frost impacts by reason of not well formation. There are ocured cracks in body shell in low and medium level of hard infected trees, gradually joined cracks lead to peel off the shell in the body, as a result of this weakened year by year infected trees are destructed. 4 grade scale were used by evaluation of different *Eucalyptus* trees damage degrees and pest congestions. Also infection degree by the *Chrysomphalus dictyospermi* of different *Eucalyptus* species were determined. It was found that *Eucalyptus camaldulensis* and *Eucalyptus viminalis* were hard infected than another species. The phenological development of *Chrysomphalus dictyospermi* in *Eucalyptus* trees was investigated. *Chrysomphalus dictyospermi* was given 3 generations in one year. Establishment of the I generation period of pest's larvas were ocured at the end of May and the start of June, the II generation of larvas were at the middle of August, III generation of larvas are at the end of October. The agrotechnical and chemical methods are used on pests control. As chemical control on pest's larvas poliqr (40% e.c.) and desis (25% e.c.) preparation are used. It gives biological effects by using of decoctions on pest's larvas control of Poliqr preparations in dose of 0.1% - biological effects in 87-90%, desis in 0.2% - biological effects in 73-75%.

Results: Most pests of *Eucalyptus* in Absheron are *Chrysomphalus dictyospermi*, they are in internal quarantine in our republiuc. Pests have appeared in 3 generations in *Eucalyptus* in Absheron, they are hibernated as female adult. Using poliqr preparation in 0.1% in pest's larvas control gives good effects. It is advisable the using of integrated methods in pest control.

Keywords: *Eucalyptus*, *Chrysomphalus dictyospermi*, larva, chemical control, poliqr (new Bi-58), quarantined object

PP-540

Introduction of Some Species of *Tamarix* in Absheron and Their Meaning

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Aim of the study: The climatic features of the Absheron peninsula bring it to the regions of the subtropics. The peninsula draws special attention as climate analog of subtropical regions of Africa, Asia, the Mediterranean countries, California, Mexico and as well as geographical stage for the transfer of new plants in other regions of the country. Soil and climatic conditions of the Absheron are favorable for the cultivation of many plants. The climate of the Absheron peninsula of the Mediterranean type that is characterized by the soft subtropical winter, hot long dry summer, clear the sun in autumn and cold in spring. The main adverse of natural factors for the region is very low humidity of the air and of the soil, high solar radiation in the summer, the poor, highly calcareous, gray, loamy soil, frequent northern winds. For many years the conducted researches have been worked on the study of the bio-ecological features, propagation, reproduction, agriculture and composition of biologically active substances in Absheron conditions. The aim of the study is introduce some *Tamarix* species in Absheron conditions.

Materials and Methods: Institute of Dendrology has been introduced these species: *Tamarix ramosissima* L., *T. pentandra* L., *T. meyeri* Boiss. Genus *Tamarix* L. belongs to the family Tamaricaceae Link. There are more than 80 species of *Tamarix*. The natural habitat of these species extends from Europe to East Asia. *Tamarix ramosissima* L. in nature is found in the south of Russia and the Caucasus. The most species spread in the valleys of the northern and the southern part of the Republic. Shrubs or small trees are up to 3 m height, its numerous shoots forming a spreading crown. These bushes drought-resistant, takes saline soil and strong wind. Small pink or white blossoms are collected in the large racemose inflorescences. Painting of leaves the *Tamarix* in the green, yellowish-green, the blue-gray, and some species it changes during of the year: Spring emerald-green, and in the summer of the appeared on the leaves of small salt crystals becomes bluish or even a whitish color. *Tamarix meyeri* Boiss. shrub with gray or brown- gray crown. The naked and bluish plant leaves lancelet or linear- lancelet, slightly heart-shaped, the upper part of the branches obtuse and protruding. It is especially rich in tannins. It is honey bearing.

Results: *Tamarix* is different forms of leaves and fruits, rather decorative during flowering. Mostly it is used in landscaping planted as a hedge, in collaboration with other shrubs. Not demanding of soil, light-requiring and drought resistant. This species is resistant to soil and climatic conditions of Absheron and it is representing of great interest for landscaping.

Keywords: Introduction, *Tamarix ramosissima*, *T. pentandra*, *T. meyeri*, phenological observations, propagate.

PP-541

Biocontrol against toxic influence of Traheomikoz in Solanaceae family plants

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Aim of the study: During pathological processes fungus are excreting different ferments, toxins, antibiotic compounds, substances possessing toxic impacts. They are split up complex polymers of plant tissues and organic substances. Fungus connected to *Fusarium* and *Alternaria* are excrete different toxic substances (*Fusarium* acids, *Yavanizin*, *Martizin*, *Enniatin* and etc). There are decreased activity levels of fungal toxins impacts to plant cells oxidation processes provided by enzymes. The nucleus structure is changed and the activity of mitochondria is diminished. In connection with toxic impacts are spread propagated use of biological control methods among of natural antibiotics against plants poisoned disease derivations, antagonists, hyperparasites, phytohormones, phytoncides. Zircon preparation obtained from *Echinacea purpurea* are used to increase plant anti stress increasing resistance, as the growth and development regulator. Zircon is used as stimulator in different plants immune system regulation.

Material and Methods: The phytotoxic impacts of *Alternaria* sp, *Fusarium solani* and *F.oxysporum* f.sp. *licopersici* fungus on *S.tuberosum*, *S. lycopersicum*, *S. melongena*, and *Capsicum annum* species were studied. Phytotoxic abilities were determined by measuring of the growth and development of seeds after moistened by pathogenic cultural decoction (CD). Results, calculated by the formula: $A_f = 100 (D_x - D_n) / D_k - D_n \cdot 100$ Therein, A_f – phytotoxic activity, %, D_x – length of germinations after 24, 48 and 72 hours later, in mm; D_k – length of germinations in control version, in mm; D_n – initial length of germinations, in mm. Experiments were put in 5 variants: 1. Zircon 10 ml/ha; 2. Zircon 12,5 ml/ha; 3. Zircon 15 ml/ha; 4. Standard: Megafol 0,1 l/ha; 5. Control: no acts proceeded. Experiments were done in 4 repeats.

Results: After 72 hours, size of germinations in control were found as 26 mm, moistened in *Alternaria solani* by cultural decoction (CD), the size of germinations were in 8 mm, moistened in *Fusarium solani* fungus by cultural decoction (CD) the size of germinations were in 13 mm, moistened in *F.oxysporum* f.sp. *licopersici* by cultural decoction (CD) the size of germinations were in 12 mm. The seed germinations were 69,2% less than compared with the results of the control options by moistened in *Alternaria solani* cultural decoction (CD), the growth and development of seed germinations were 50% less than by moistened in *Fusarium solani* fungus cultural decoction (CD), the growth and development of seed germinations were 53,8% less than by moistened in *F.oxysporum* f.sp. *licopersici* cultural decoction (CD). There are accrued the stagnation in growth and development of seeds by impacts of pathogen toxins nevertheless to sharp difference in control compare under the same germination condition belonging to the same seeds exposures. It has shown by microscope definition under experiments in germinations width ends that *Fusarium solani* and *F.oxysporum* fibers are spread in xylema pipes. Fungus candida and fruit particles are clear shown in *Alternaria solani* grown germinations under microscope observations. Zircon is tested as bio-control against propagation of pathogens. Obtained results have shown in control version the distribution of Alternarioz is in 34,6%, in standard version 20,9%, in control of Fuzarioz against withering disease 42,6%, by use of Zircon in normal version to 15 ml/ha, it was 16,2%, intensity was in 4%. The high biology benefits are observed in 61,9%. Zircon can be mixed in neutral condition (pH=6-7) with most preparation. Application with biological preparation is profitable in products maturity periods.

Keywords: Tomato, *Fusarium*, *Alternaria*, mycotoxin, *Echinacea purpurea* L., Zircon.

PP-542

Edible Mushrooms from the Kale (Denizli) RegionKutret GEZER¹, Oğuzhan KAYGUSUZ², Semih AKGÜN¹, Dilek ŞENKAYA¹, Ebru DEMİR¹, Mine BEŞTAŞ¹, Yasir IBRAHEEM¹¹*Department of Biology, Faculty of Science and Arts, Pamukkale University, 20020, Denizli, Turkey*²*Tavas Vocational High School, Pamukkale University, 20500, Denizli, Turkey*
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Aim of the study: Turkey has a very rich edible macrofungal flora because it possesses favourable environmental and climatic conditions for the growth of edible macrofungi. The identification of these species and the culture is very important for the country's economy. This study aimed to determination of edible mushroom in the Kale region which is host to many species macrofungus.

Material and Methods: The specimens were collected from the Kale of provinceDenizli of Turkey between the 2015-2016 years.Morphological and ecological characteristics of the samples were photographed and noted in their natural habitats. After field studies, specimens were taken to the laboratory and microscopic characters were observed by light microscope. The identified and dried specimens were deposited at the Fungarium of Mushroom Research Center in Pamukkale University (PAUF).

Results: In the result of macroscopic and microscopic studies, 41 taxa of macrofungus belonging to Pezizomycetes ve Agaricomycetes classes were determined. 21 taxa belonging to Agaricales order, 6 taxa belonging to Boletales order, 5 taxa taxa belonging to Russulales order and 3 taxa belonging to Polyporales order from Agaricomycetes were found out. 6 taxa belonging to Pezizales order from Pezizomycetes class were determined

Keywords: Edible mushroom, Kale, Denizli.

PP-543

***Cyclamen pseudibericum* Extracts Induces, miR-146 and miR-200c Expression is Strongly Inhibited Invasion and Migration Capacity on PC9 and PC14 NSCLC Cells**Ege Rıza KARAGÜR¹, Hakan AKÇA^{1,3} and Ramazan MAMMADOV²¹ Department of Medical Biology, School of Medicine, Pamukkale University, Denizli, TURKEY² Department of Biology, Faculty of Science and Literature Pamukkale University, Denizli, TURKEY³ Cancer Research Center, Pamukkale University, Denizli, TURKEYhakca@pau.edu.tr, hakanakca@yahoo.com

Aim of the study: In this study, Activities of ethanol solvent extracts obtained from tubers of *C. pseudibericum* Hildebr (Primulaceae) were investigated antiproliferative activities and miRNA expression that related cellular invasion and migration on PC9 and PC14 non-small cell lung cancer cells.

Metarial and Methods: Proliferation and viability were analysed by the luminometric method using a CytotoxGlo[®] kit (Promega, Madison, WI, USA). Values for the concentration at which 50% inhibition occurred (IC₅₀) were calculated for extract. *C.pseudibericum* extract effects on cellular invasion and migration capacity of PC14, PC9 NSCLC were determined by using boyden chamber. miRNA related cellular invasion and migration expression were determined by QRT-PCR.

Results: We found that extracts has cytotoxic effects on PC9 and PC14 NSCLC cells. The extract inhibited the invasion and migration ability of PC9 and PC14 cell lines. In addition, we performed real-time PCR assays to determine the expression of invasion and migration related several miRNAs on PC9 and PC14 cell lines. We observed that expression levels of miR-200c significantly increased on PC14 cell lines, treated with *C. pseudibericum* extract. Also, expression levels of miR-146 increased in PC14 and PC9 cell lines when *C. pseudibericum* extract treated. We evaluated that the extracts can suppress NSCLC invasion by induction of miR-146 and miR-200c microRNA expression.

Acknowledgements: *C. pseudibericum* extract have great potential for inhibition of cellular invasion and migration through on induction of miR146 and miR200c expression in PC14 and PC9 cell. Therefore, in this study we indicate that miR146 and miR200c can be a new target for NSCLC treatment.

Keywords: *Cyclamen*. Invasin, Migration, miRNA, PC14 and PC9 cells.

PP-544

Showing the Environmental Effects of Heavy Traffic Pollution SourcesAli AYDIN¹, Nedim KARAGENÇ²¹ Pamukkale University, Engineering Faculty, Department of Geophysics Engineering, Denizli, Turkey² Pamukkale University, Medicine Faculty, Denizli, Turkeyaaydin@pau.edu.tr

Aim of the study: In this study, we did a first and primary magnetic study near the high heavy traffic pollution in two parts which are Bağbaşı district and Gökpınar water sources area of Denizli city, Türkiye which was said the most polluted city in Aegean Region of Turkey.

Material and Methods: The samples of the tree leaves and soil under the tree were sampled and collected near of the heavy traffic roads and in the urban and residential area, for the purpose of a magnetic susceptibility study on pollution in Bağbaşı district and Gökpınar water sources area, Denizli City, Türkiye.

Results: Measurements of volume-specific magnetic susceptibility (κ) show a significant variation range both of soil and tree leaves samples. The magnetic susceptibility measurements increase from the garden area to residential area and reached the high levels near the traffic road of two study regions. Magnetic particle concentration and grain size sourced exhaust gasses and other pollution sources increase with the increasing distance from residential area, indicating the high traffic road area.

Keywords: traffic pollution, magnetic susceptibility, environmental effects.

PP-545

Introducing Some East-Asia Flora Elements in Azerbaijan Climate Condition

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Aim of study: The aim of this research is to study of bio-ecological features and modern condition of Eastern Asia Flora (EA) trees and shrubs species, in terms of dry-subtropical condition of Azerbaijan. There researched East Asian flora (EA) trees and shrubs are related to third group of prospects: to I group (more perspective) – *Photinia serrulata*, *Berberis thunbergii*, *Hibiscus syriacus*, *Juniperus chinensis*, *Sophora japonica*; to II group (medium perspective) – *Ginkgo biloba*, *Paulownia tomentosa*, *Broussonetia papyrifera*, to III group (less perspective) – *Cunninghamia lanceolata*, *Cycas revoluta*. Studying the bio-ecological features of East Asian flora (EA) species in local condition gives possibilities to find more innovative ways of introductions of new species of trees and shrubs from ecofloristic sphere in dry subtropical Azerbaijan zone.

Material and Methods: During last year we have carried out

The phenological observation on 200 introduced trees and shrubs species was carried out last year noticing the start and the end of vegetations, flowering and fruiting phases and growing of shoots. Observation of EA flora species are distributed in terms of the beginning and the end of the growing seasons on 4 phenological groups: starting early and ending early of vegetation phases (EE), starting early and ending late of vegetation phases (EL), starting late and ending early (LE), starting late and ending late of vegetation phases (LL). To clarify further pathways of plants in dry subtropical conditions of Azerbaijan, we have established the natural habitat of each species, then detected botanical areas, territory where these areas located. We Identified perspective species for general use.

Results: Flora of Eastern Asia is rich of species possessing more decorative, medicinal and technical features. Dendroflora of Eastern Asia has been represented primary interest for testing some of its species in humid subtropicals. Institute of Dendrology are introduced more than 600 trees and shrubs species – from them 220 species are from EA flora. Most of EA flora representatives are found in Azerbaijan flora in solitary forms. According to climatic condition, EA floristic area is heterogeneous, successfully introduced species are following: *Lonicera japonica*, *Ligustrum japonicum*, *Lycium chinense*, *Broussonetia papyrifera*, *Berberis julianae*, *Berberis thunbergii*, *Buddleia davidii*, *Eriobotrya japonica*, *Firmiana platanifolia*, *Abelia chinensis*, *Cryptomeria japonica*, *Chaenomeles japonica*, *Eriobotrya japonica*, *Pittosporum heterophyllum*, *Chamaecyparispisifera*, *Euonymus japonicus*, *Securinega suffruticosa*, *Juniperus chinensis* etc. The researched trees and shrubs from EA flora are grouped into 3 sections: I group (more perspective) - *Cryptomeria japonica*, *Sophora japonica*, *Berberis japonica*, *Hibiscus syriacus*, *Magnolia kobus*, *Cercis siliquastrum*; II group (medium perspective) - *Ginkgo biloba*, *Magnolia soulangeana*, *Paulownia tomentosa*, *Aleurites cordata*; III group (less perspective) - *Hovenia dulcis*, *Camelia japonica*.

Keywords: Eco-biological features, landscape architecture, introduction, acclimatization.

PP-546

Idioadaptation of *Allium* L. Genus Species Propagated in Azerbaijan

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Aim of the study: The present study are given information about adaptation genus of *Allium* L. species in different ecological conditions. There occurred the idioadaptation changes in vegetative and generative living organs according to ecological conditions. Researches observed by evolution of *Allium* L. species in rhizosome well development of adapted plants. *Allium* species are propagated in dry places areas on direct well sunlight. Some species are located in shadow forest places, other species in humid places and others partly in swamp. They are used in feeding. Natural hybrids of *Allium* species have high living ability and they are possess wide area in suitable ecological condition. Formation of rhizosomes in plants the progress (aromorfoz) are intensified the living activities, take them to entire high in structure. *Allium* species are occurred in mountain slopes, pebbles, mountain pavements, in fields, in permanent humid spaces, in different associations. *A.atroviolaceum* Boiss. is propagated in Azerbaijan plain places to mountain ridges as weeds in fields and in humid places. Ecological researches have shown that in Azerbaijan propagated some *Allium* species are mesophytes, some are heliophytes.

Material and Methods: By propagation in ecological condition *Allium* species are divided into 4 groups: 1. Distributed in sandy, stony, gravelly, lime environmental conditions; 2. Species distributed in deserts, they are almost appeared in dry grass gravelly slope spaces; 3. Species distributed in forests. They are appeared in forests, in forest sides; 4. Species distributed in Alpine and Subalpine meadow spaces. There are included group of species distributed in high mountain spaces. This species are distributed above 2600-3100 m sea level. Results of ecological analysis are shown that species distributed in steppe spaces have high ecological amplitude as species distributed in desert, Alpine and Subalpine meadows. This species are distributed in different associations. By study of *Allium* species are identified to 4 evolution stages of different section. At first level are existed identified by primitiv mark. There are included sylidric, conus shape solid rhizosomes *Anguinum* and *Rhiziridium* sections. At second level are existed *Haplestomon* section. There are included rhizosome plant species. To third level are included *Porum* and *Ophioscordon* sections. There are characterized zhizosome. *Porum* section is more progressive. In this section are existed oval, ballon-oval shaped, specialized nutrient zhizosome, flat leaved, clear colored flowers sides, seeds in conered shaped. Species of *Ophioscordon* section rhizosomes are thin long shaped, leaves are remembered cherry leaves, leave sides are white colors, seeds are ballon shape. To fourth level is included progressive species of *Molium* section. In this level are characterized the big and nutrient rhizosomes.

Results: As above mentioned evolution prosesses in *Allium* L. genus of *Porum*, *Molium* section are well developed.

Keywords: Idioadaptation, filogenetics, *Allium*.

PP-547

Growing of Henna in Azerbaijan Indoor Conditions, Obtaining at the First Time Monoflor Honey from Them and Its Medicinal Profit

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Aim of the study: This study aims to grow Henna indoor conditions in Azerbaijan. The temperature in the ground of the shelves must be 18-20 °C and the air in 30-35 °C. In indoor condition it should be kept 500-600 henna seedlings for each square meter. Henna seedling grows rapidly in the indoor condition 2 months after their shooting. In the first half of the April (to 1 m² -2 gr. nitrogen, 4 gr. phosphorus, 3 gr. potassium is given as fertilizer) seedling should be watered with the mixture of mineral fertilizers with water, then pure water.

Material and Methods: The abundance in humidity of the ground causes the rotting of cuttings, increasing of fungous diseases. That's why the cutting area should be irrigated by watering pot. For its biological peculiarities henna is a light-loving and heat-loving plant. During planting cuttings in autumn-winter period if the weather is unpleasant and they root late in cause of light isn't enough for cuttings in the shelves, some parts are getting rot in ground grown bushes. In indoor condition the 10 cm trunk cutting of henna plant have been planted in different ways, in soil and sand substratum. According to experiments 600 cuttings can be planted in 1 square meter area in vertically and horizontally positions. Sprouts have been obtained from cuttings planted vertically and they give better results than cuttings planted horizontally, 80-88% sprouts have been obtained from these cuttings. It is determined that the root of henna cuttings have been planted in sand can be much more. Proceeding from biological situation of cuttings taken from roots of one year duration had been planted in various conditions; the ability of rooting is more than cuttings taken from green branches.

Results: Based on the results of 30 year researches carried out in our experimental area, we have selected of a new type of *Lawsonia inermis* L. "Sarkhan henna species" to obtain monoflor honey from them. From new species of "Sarkhan henna" cultivated in indoor greenhouse conditions have been produced "monoflor" honey. From the long-term researches of "Sarkhan" henna species has been appeared flowering throughout of the year, also giving up to 35 - 40% of henna products. This is an economically valuable for the henna producing and obtaining Monoflor honey from them. From 1 ha henna plants area inhabited 5 bee families we can obtain 100 kg of Monoflor honey per year. Based on the results of many years of researches conducted almost exclusively in indoor conditions we can obtain a high-quality seeds of henna products as high-quality product to the other side we plant henna in indoor greenhouse condition in Azerbaijan for the first time, maintaining the bee family producing Monoflor honey from 1 ha of henna plants in this area, which profits are in a score of 100.000-500.000 Azerbaijani manat.

Keywords: Henna plant, growth of henna, henna seeds, Monoflor honey, economical profit.

PP-548

The Comparative Study Between Absheron Peninsula and Antalya (Turkey) Region's DendrofloraT.S. MAMMADOV, Sh.R. ALIYEVA*Institute of Dendrology of Azerbaijan National Academy of Sciences, Azerbaijan
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Aim of the study: The observations on dendroflora of both regions Baku and Antalya were carried out regarding the similarity of the soil-climate conditions features in research. In this study the appearance of decorative plant species not only in natural flora also distribution in cultural flora condition and using in greening, gardening of hotels, housing estates, in greening of road sides of these both regions are determined. It is noticed that increasing of biodiversity in researched species are influenced to development of ecotourisms and they are also the source of esthetic effects. This sorts of greenings are used in protection of environmental pollutants, also in consolidation of sandy soil, it plays a major role in the prevention of soil erosion in Caspian Sea and Black Sea sides slopes landslides.

Material and Methods: Researches carried out have shown that there are some trees and shrubs belonging to 87 families, 230 genera, 662 species of cultivated in Absheron in natural and cultural condition. Using in greening of researched species are grouped into some species: to decorative features, by height, by deciduous species, by evergreen species. In research work of high taxa compositions of introduced species are divided to gymnosperms 71 species, to angiosperms 589 species. Also by analysis of "Trees and shrubs vital forms introduced" are determined that 313 species of introduced are consisted (47,4%) from trees, 313 species (47,4%) from shrubs, 34 species (5,2%) from *Convolvulus* plant species. In research works are determined that the grouping of introduced to floristic zones consisted in 192 species (27,2%) are from Europe, 350 species (49,6%) are from Asia, 116 species (16,4%) are from America, 23 species (3,2%) are from Africa, 25 species (3,5%) are from Australia.

Results: The researched species are inherent for Antalya dendroflora. But the influence of environmental factors, the difference in relative humidity, in temperature have impacts on plants life processes. Plants are studied according to researches results by height, flowering, fruit bearing biologies, vegetation times. There are scientific studies in despite of having different features of Absheron and Antalya regions using in greening of parks and gardens in Antalya regions of 269 species of trees and shrubs cultivated in natural and cultural conditions of Absheron.

Keywords: Biodiversity, dendroflora, climate conditions, plant species.

PP-549

Variety Trial on Tomato Hybrids in Greenhouse Conditions of the PreAral Area in Kazakhstan
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Aim of the study: Growing demand for vegetable product and food security are a driving force for improvement of technology for cultivation of vegetables in the greenhouse. And one of the most important factors in the intensification of greenhouse tomato production is the introduction of new high-yielding hybrids which have complex resistance to diseases and pests adapted to new technologies and unfavorable climatic conditions. The correct choice of a hybrid for implementing the appropriate production is critical to success. The present investigation was undertaken to study the performance of different tomato hybrids in terms of growth, yield and quality inside greenhouse in conditions of the PreAral area in Kazakhstan.

Material and Methods: Research was carried out in the greenhouse of the Korkyt Ata Kyzylorda State University in 2010-2015. Seventeen hybrids of tomatoes like Lilos, Sample, Favorita, Grace, Clarabella, Abellus, Klepton, Maxitos, Esmira, Gravitet, Panekra (Dutch selection), Sharlotta, Garem (Israeli selection), Kalash, Azov, Beysuzhok, Salakhutdin (Russian selections) and standard check Franchesca (Israeli selection), were evaluated in the experiment. Hybrids are grown on a substrate of sawdust in the conditions of the extended culture. Crops of seeds on July 15, landing of seedling on September 10, density of standing of plants of 2,3 p/m², formation of tomato plants was done in one stem, composition of nutritious solution N -200, P -55, K -300, Ca -200, Mg -55, Fe-3,00, Cu -0,50, Mo -0,12, Zn -0,20, B -0,90 and concentration - 1,7-3,0 mS/sm. The experiment was laid out in randomized complete block design with three replications. Observation recorded as taken days to the first flowering and fructification, number of leaves before the first blossom, average amount of fruit on 1-3 inflorescence, fruit weight, yield of fruits in kg/m², dry matter, total sugar, ascorbic acid, titratable acidity and content of nitrates. Economics of tomato production was worked out by considering the present price of input and produce.

Results: The test results showed that the best results of yield and fruit quality were obtained at hybrids of the Dutch selection. The most productive was a hybrid Panekra, its yield - 27.30 kg/m², yield of standard products - 97.9% and its fruit has a very good taste. This is the only hybrid exceeded the standard sample Franchesca on all indicators. High yield and fruit quality at the level of the standard sample had hybrids Lilos, Maxitos, Gravitet, Klepton, Esmira and Clarabella, their yield was 23.86 - 26.13m kg/m² that is 91,2-100% with respect to the standard sample. These hybrids had a high yield of standard products of 95,6-97,8% and fruits with excellent taste. The largest profit was made under growing hybrids Panekra and Clarabella. The break-even level made up 29.6 and 25.4% that is 4.9 and 0.7% higher than that of the standard sample. Besides, the relatively high profit was obtained when cultivation of hybrids Lilos, Maxitos, Gravitet, Klepton, Esmira and Clarabella and in this case the break-even level amounted to 10,8-16,3%. These hybrids are recommended for greenhouse soilless culture in the conditions of the PreAral area.

Acknowledgements: This work was performed within the framework of the program of the Ministry of Education and Science of the Republic of Kazakhstan "Grant financing for research" on priority "Life Science".

Keywords: food security, variety of tomato hybrids, greenhouse, soilless culture, productivity and quality, economic efficiency.

PP-550

Studies on the Distribution of *Encarsia formosa* to Control the Greenhouse Whitefly *Trialeurodes vaporariorum* on Tomato Crops in Greenhouse of the PreAral area in KazakhstanElina DYAMURSHAYEVA, Rakhym KUDIYAROV, Gulsym SAUYTBAYEVA, Galina DYAMURSHAYEVA,
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Aim of the study: To date, the exclusively toxic chemicals are used for destruction of the greenhouse whitefly *Trialeurodes vaporariorum* in greenhouses of the PreAral area. However, at present the biological control of the *T.vaporariorum* through release of the parasitoid *Encarsia formosa* is used in most countries with an important greenhouse industry. The use of *E.formosa* provides a control of the number of greenhouse whitefly and a reduce or even completely elimination of the insecticides use. Therefore, studies on the use of *E.formosa* to control greenhouse whitefly *T.vaporariorum* on tomato crops were carried out and recommendations for the greenhouse facilities in the PreAral area of Kazakhstan were developed.

Material and Methods: The research was conducted in the greenhouse of the Korkyt Ata Kyzylorda State University in 2014-2015. The method of saturated colonization was used for control of *T.vaporariorum* on tomato crops in the adult stage at various ratio of parasite: host. The yellow traps were used for detection of the pest in the greenhouse. Release of *E. formosa* was started under occurrence of the first foci of the pest evolution and held once a week for a month. The parasite *E. formosa* was propagated on tobacco plants and were placed in the areas of the foci evolution. The introduction material consisted of 95 % pupae in parasitized whitefly larvae and 5 % living 4th instar whitefly larvae. Whitefly adults and parasitism were counted weekly on the 10 upper leaves of ten consecutive plants within a every row and one plant was selected at random. Sampling was done on those leaves where most of the non-parasitized pupae had already hatched. Percent parasitism was calculated as the sum of the parasitized pupae found on all plants on an sampling date divided by the total number of pupae.

Results: Results: The research result shows that the parasitic effect of *E.formosa* occurred at the third release of entomophage and was minimal 8.2% and 5.3% respectively for the ratio parasite: host 1:10 and 1:15. At a ratio of 1:5, the effect of the third release was significantly higher - 43.7%, but not sufficient for a complete pest control. It was found out that for full control over *T.vaporariorum* it is necessary to produce *E.formosa* in a ratio of parasite: host 1:5 and 1:10. The effect when the subsequent release of *E.formosa* is not required and it has the ability to control the pest population at a ratio of 1:5 occurred at the third release of entomophage and was 87.9% and finally amounted 98.1%. When the ratio of parasite: host made up 1:10 the threshold effect occurred at the fourth release of *E.formosa* and amounted to 91.6%. *E.formosa* release in the ratio parasite: host 1:15 also gave a positive effect (72.3%), but it is not sufficient for complete control of *T.vaporariorum* and the entomophage release needed to be continued.

Acknowledgements: This work was performed within the framework of the program of the Ministry of Education and Science of the Republic of Kazakhstan "Grant financing for research" on priority "Life Science".

Keywords: biological control, greenhouse whitefly, *Trialeurodes vaporariorum*, entomophage, *Encarsia formosa*.

PP-551

Flora of Tripolis Ancient City (Yenicekent-Denizli)Gürkan SEMİZ^{1,3}, Bahadır DUMAN²¹ Pamukkale University, Department of Biology, TURKIYE² Pamukkale University, Department of Archeology, TURKIYE³ FAGUMER - Flora and Fauna Research, Development and Application Center of Pamukkale University
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Aim of the study: Turkey has a unique combination of diverse geographical, edaphic and climatic conditions that have given rise to a large number of rare or endemic species. According to the Flora of Turkey, 9222 native, alien and cultivated species grow in Turkey. The number of taxa is 12006 while the endemic taxa is 3708 and the percentage endemism is 34.5%. In this study, flora of Tripolis ancient city located in Yenicekent-Denizli was studied.

Material and Methods: Three hundred and fifty plant specimens were collected from the study area during field trips arranged between 2012 and 2014. The relevant floras and monographs were used for identifications of those specimens. The recorded taxa were listed alphabetically. All specimens were deposited in the Pamukkale University, Chemical Ecology Laboratory.

Results: Out of 350 plant samples, a total of 122 taxa (belonging to 40 families) were identified. Of the 137 taxa, 58 are elements of the Mediterranean Phytogeographical Region, 4 are of the European-Siberian Phytogeographical Region and 70 are of Multi-Region or of an unknown region. Of the 122 taxa determined during this research period, 5 belong to phylum Pteridophyta and 117 belong to phylum Magnoliophyta. There are 4 taxa in the subphylum Pinophyta (Gymnosperms) and 118 in the subphylum Magnoliophyta (Angiosperms). Of the 121 taxa in the subphylum Magnoliophytina (Angiosperms), 106 belong to the class Magnoliopsida (Dicotyles) and 15 to the class Liliopsida (Monocotyles).

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Keywords: Flora, Tripolis Ancient City, Denizli, Turkey.

PP-552

The endemics of the Lichen Flora of AzerbaijanSevda ALVERDIYEVA*Institute of Botany, National Academy of Sciences, Azerbaijan*
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Aim of the study: The endemic species represent a specific component of each flora and serve as their absolute distinctions from all other floras. The endemics are of great value as a genepool of the vegetable world and also important for settling a series of questions of the flora genesis. Generic endemism is not available, specific endemism prevails in the flora of Azerbaijan. These features are a criterion of a relative youth of the flora. The aim of the present study is to investigate the endemics of the lichen flora of Azerbaijan.

Material and Methods: On the territory of Azerbaijan there are 6 endemics discovered. All these species grow in the Greater Caucasus. From them *Lecanora oxneri* Novruz species collected from the mountainous silicate substratum in Zagatala State Preserve at 3210 meters is of interest. Possible formation of this species in Pleistocene under unfavorable conditions in highland. In the end of Tertiary period, according to A.N. Oksner (1946), *Lecanora* species intensively speciated. Since *Lecanora* has no alliance with plain species, the species of this genus could only appear on a basis formatting highland species. Incidentally, *Lecania saviczii* Novruz was also collected in Zagatala State Preserve on silicate rocks at Akkmal mount (2300). Endemic species *Dimirella barchalovii* Novruz was also collected in Zagatala State Preserve in mountain forest (1800) on *Fagus* L. cortex. *Dimirella barchalovii* was probably formed with mesophilous forest flora at the end of Cretaceous. *Physcia subnuda* Novruz species was found in Guba region (750) in a fruit garden, on *Prunus donestika* L. cortex. *Graphis albinata* Novruz found in Gusar region (1235) on *Fagus* L. cortex is relatively young. This species could probably appear in late Holocene when the Caucasus was under subatlantic climate. *Aspicilia grossheimii* Oxn. lichen is of interest being scarce (collected on limestone in Absheron village).

Results: So, in the lichen flora of Azerbaijan endemics constitute only 0.72% whereas endemism of land plants comes up to 2.5 %. The reason probably lies in the specifics of the speciation process.

Keywords: Endemic, lichen flora, Azerbaijan, Greater Caucasus.

PP-553

Geophytes of Trabzon (Turkey)Ali ÇELİK¹, Güven GÖRK², Ahmet ERMiŞ¹¹*Pamukkale University, Faculty of Science and Arts, Department of Biology, Denizli - TURKEY*²*Muğla Sıtkı Koçman University, Faculty of Science, Department of Biology, Muğla - TURKEY*acelik@pau.edu.tr

Aim of the study: Geophyte is the general name given to the plants with tuber, bulbous and creeping parts that win the ability to store food under the ground after their body transforming by metamorphosis. Geophyte plants is of economic importance due to these features of them. For example; orchid tubers is used in sahlelep making. Thus, it is important to identify the Geophyte diversity of a region. In this study, Geophyte plants naturally grown in Trabzon region have been identified.

Material and Methods: A field work was done in Trabzon province in the years of 2014-2015. Geophyte plant samples were taken and herbarium specimens was performed. The land registry information of the plant samples were recorded by using GPS. Plant diagnostics were applied by benefiting from the various flora resources that are Flora of Turkey and the East Aegean Island primarily. Endemic and rare taxa hazard categories are defined according to the IUCN (1994) criteria.

Results: According to the grid system, Trabzon is located in A7-A8 and Europe-Siberian phytogeographic area. Geophyte of totally 10 families were identified in the region of Trabzon occupancy. 5 Family are Dicotyledones (Ranunculaceae, Primulaceae, Geraniaceae Papaveraceae, Paeoniaceae), 5 Family are Monocotyledones (Liliaceae, Amaryllidaceae, Iridaceae, Orchidaceae Araceae). 9 taxa are endemic, 3 taxa are rare. 1 taxa is in EN, 6 taxa are in VU and 5 taxa are in LR categories.

Keywords: Trabzon, Turkey, Biodiversity Geophytes

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