ARAB AND NEAR EAST PLANT PROTECTION NEWSLETTER

Food and Agriculture Organization of the United Nations

The Arab Society for Plant Protection and the Near East Regional Office of the FAO jointly publishes the Arab and Near East Plant Protection Newsletter (ANEPPNEL), three times per year. All correspondence should be sent by email to the Editor (aneppnl@gmail.com).

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Food and Agriculture Organization of the United Nations

Number 80 August, 2020

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السنة الدوليّة للصحّة النباتيّة 2020

INTERNATIONAL YEAR OF PLANT HEALTH 2020

EDITORIAL

The Regional Sustainable Strategy to Manage Transboundary Plant Pests and Diseases in the Near East and North Africa Region

Plant pests and diseases threaten food security and nutritional status globally including the Near East and North Africa (NENE) region, with severe economic and environmental consequences. Most transboundary plant diseases can spread through propagation materials and have no curative measures. Plant pests and diseases cause annual losses in crop production estimated at 25-30% of the global production, which negatively affect the economy of many countries in which the agriculture sector represent the main source of income. Despite the fact that agriculture commodities represent the second most important non-oil exports in NENA region, the intraregional trade of agriculture goods represent less than 8% of total NENA exports.

The poor production of certified propagation materials and lacking harmonized production protocols and diagnostic methods in NENA countries led to higher risk of introduction and spread of transboundary plant pests and diseases. Furthermore, the inefficient control measures and applicable strategic tools in phytosanitary systems, in addition to weak surveillance and early warning systems, all together weakened the ability to properly control transboundary plant pests and diseases. Preventive measures remain the most effective strategy to manage transboundary plant pests and diseases. Few important examples will be addressed here:

In the case of plant insect pests, **fall armyworm *Spodoptera frugiperda*** attracted much attention during the past few years, as a pest that seriously threatens food security in the region, particularity because it can feed on more than 80 different plant species, and can lead to losses reaching 100% of the affected crops. This pest has spread quickly in central and South African countries, and was reported in Sudan in 2016, then in Yemen and Egypt. Recently, in 2020, the pest was reported in Mauritania and UAE. Red palm weevil Rhynchophorus *ferrugineus* continues to cause damage to palm trees in the region, and recently tens of thousands of palm trees has been reported to be damaged severely by red palm weevil, and losses in the NENA region reached around 483 million euros. Furthermore, fruit flies remained among the top harmful pests in the region, causing tremendous losses in fruit crops. For example, *Bactrocera dorsalis* has been reported to cause 320 million euro losses in the near east. Additionally, the phytosanitary measures applied by importing countries reduced trade opportunity and market accessibility of the region exports of fruit commodities.

In the case of transboundary plant diseases, the recent outbreak of *Xylella fastidiosa* in Italy has highlighted the risk of exotic pathogens and their ability to cause devastating epidemics. This bacterial pathogen was introduced from the Americas to Europe and has caused damage to more than 6.5 million olive trees (surface area of 650 Km^2) untill 2017. It was estimated that without taking effective control measures, the disease can cause up to 5.5 billion euro in Europe during the coming few years. In addition to Xylella fastidiosa, another bacterial disease known as “citrus greening” or “Huanglongbing" (the yellow dragon in Chinese) caused by *Candidatus* Liberibacter. This disease is another potential threat that can affect citrus production in the NENA region. The losses caused by citrus greening in 2007-2008 in the United States was estimated at 9.1 billion USD. Whereas, in case of fungal plant diseases, the pathogenic fungus *Fusarium oxysporum* f. sp. *cubense* which causes banana wilt is worth mentioning, which is the most serious disease of banana, and responsible for causing losses of two billion USD

worldwide. Another fungal disease is the "Bayoud" disease caused by *Fusarium oxysporum* f. sp. *albedinis*, which destroyed 3 million date palm trees in Algeria and 10 million date palm trees in Morocco.

The imminent threat of these plant pests and pathogens come certainly from the deficiency that appear in the region measures to prevent or manage these pests. It is essential to work hand-in-hand to establish the main pillar for efficient actions through regional programme to combat these pests, and the starting points should be:

- Strengthen the coordination and knowledge exchange between NENA countries
- Improve the surveillance and early warning system for transboundary plant pests and diseases
- Establishment of proper and effective phytosanitary measures
- Harmonization of production scheme of plant propagation materials

The transboundary plant pests and diseases continues to threaten the region food security, and there is no progress without joint preventive measures. The production of healthy plants and implementation of smart sustainable agriculture require special solutions. There is also a great need to adopt correct policies and legislations, smart investments, enhanced regional coordination, increased support to the National Plant Protection Originations (NPPOs) in all countries. Regional planning and coordination is essential requirement for more efficient early warning and proper response action.

The Near East and North Africa countries are not well prepared to respond effectively to challenges of transboundary plant pests and diseases, in addition to the present weakness in preventive, containment and eradication regional programmes. In general, the logistics and human capacity of NENA countries at present are not sufficient to manage major risks of plant health issues. Accordingly, we call for NENA countries support for the establishment of a regional programme to face transboundary plant pests and disease in the region, an action which is urgently needed.

Thaer Yaseen
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❖ Crop Protection News from Arab and Near East Countries

INVASIVE AND NEW PESTS

EGYPT

First Report of Tomato Brown Rugose Fruit Virus on Tomato in Egypt.

In June 2019, leaf samples from hybrid tomato (*Solanum lycopersicum* cv. Elquds E448) were collected from four regions in Fayoum and Ismailia Governorates, Egypt. Twenty samples were collected from plants with viral symptoms and nine from asymptomatic plants. The diseased samples had mosaics, deformation and necrosis on the leaves (Fig. 1), and discoloration and deformations on fruits (Fig. 2). Samples were tested by DAS-ELISA (LOEWE®, Germany) for the presence of viruses that induce similar symptoms on tomato plants. Of the diseased samples, four tested positive for *Tomato spotted wilt virus* (TSWV), three each for *Pepino mosaic virus* and *Tomato mosaic virus* (ToMV), two for *Tomato chlorosis virus*, six for *Tomato brown rugose fruit virus* (ToBRFV) antisera, and three samples had a mixed infection with TSWV and ToBRFV. The ToBRFV antisera gave a weak cross reaction with ToMV. Sap transmission using a ToBRFV-positive tomato isolate gave systemic mosaic symptoms on tomato, and chlorotic local lesions on the inoculated leaves of both *Nicotiana tabacum* and *Chenopodium amaranticolor*, indicating the presence of a tobamovirus. For confirmation, primers R-4718 / F-3666 (Luria *et al*., 2017), and TOBRFV-F2: 5′-GACCAACCAGAGTCTTCCTATACTCGGA-3′/ ToBRFV-R2: 5′- CGGGTCCTTTTACTGGTGTCGAGAGATATG-3′ (obtained from Prof. N. Salem, The University of Jordan) were used for molecular detection of tobamoviruses and ToBRFV, respectively. Six of the 20 samples yielded amplicons of the expected size for tobamoviruses (c. 1050 bp) and ToBRFV (c. 870 bp). *Tomato mottle mosaic virus* (ToMMV) was not detected in any of the samples using the specific primers (ToMMV-F and ToMMV-R) described by Sui *et al*., 201). RT-PCR products obtained from partial nucleotide sequence of the RNA-dependent RNA polymerase region from four ToBRFV isolates were purified and sequenced in both directions. The partial nucleotide sequence of these isolates was determined and submitted to GenBank (Accession Nos. MT227801-MT227802 for Ismailia isolates [Eg1 & Eg 2] and MT227803-MT227804 for Fayoum isolates [Eg 3 & Eg 4]). The nucleotide sequence for the Egyptian isolates shared 92.2-94.4% identity with tomato isolates from Palestine (MN013187 and MN013188), Germany (MK133093 and MK133095), United Kingdom (MN182533), Israel (KX619418), Jordan (KT383474), Italy (MN167466) and Mexico (MK319944), and a pepper isolate from Jordan (MK648157). A phylogenetic tree (Fig. 3) revealed genetic variability between Egyptian isolates and isolates from different countries. This is the first report of ToBRFV infecting tomato in Egypt and the ease with which it is mechanically transmitted may explain its rapid emergence around the world. [**M.A. Amer and S.Y. Mahmoud (Egypt), New Disease Reports, 41, 24, 2020].** http://dx.doi.org/10.5197/j.2044-0588.2020.041.024]

IRAQ

First Record of Root Rot of Rosemary (*Rosmarinus officinalis*) caused by *Rhizoctonia solani* in Iraq.

Rosmarinus officinalis, which commonly known as rosemary is one of the most economically important species of the family Lamiaceae. In October 2018, root rot symptoms were observed on rosemary in gardens of Horticulture Department, Collage of Agriculture & Forestry, Mosul University, Ninevah governorate, North Iraq specifically, the leaf tissues were blighted and white mycelial growth was seen on the stems. The fungus was isolated from diseased tissue and cultured on potato dextrose agar for identification. The young hyphae had acute angular branching near the distal septum of the multinucleate cells and mature hyphal branches formed at an approximately 90o angle. This is morphologically identical to *Rhizotonia solani*. Pathogenicity of the fungus in rosemary plants was also confirmed by Koch's postulates. Molecular identification of *R.solani* isolate was done by amplifying the internal transcribed spacer (ITS) region of the conserved ribosomal DNA using primers ITS1 and ITS4. All the ITS sequences were compared for gaps and similarity sequences of the fungus were homologous to those of

R.solani isolates in the GenBank database with a similarity percentage of 97%, thereby confirming the identity of the causative agent of the disease. The nucleotide sequence of ITS from the Iraqi isolate has been assigned GenBank Accession No MN 396663.1. Here, for the first time we report *R. solani* as the causal agent of root rot of rosemary in Iraq. **[Ali Kareem Al-Taae and Huda Hazim Wafi AL-Taae (Iraq), Plant Protection Department., College of Agriculture and Forestry, University of Mosul, Iraq, Plant Archives Volume 20(1): 1094-1098, 2020].** aaltaae@yahoo.co.uk

SYRIA

New Records of the Genus *Bryobia* (Acari: Tetranychidae) from Syria with Description of a New Species.

Three species of Tetranychidae belonging to the genus *Bryobia* were collected from Latakia governorate, Syria in 2019: *Bryobia* (*Allobia*) *syriensis* sp. Nov**.** Collected from *Salvia verbenaca* L., is described; *Bryobia* (*Allobia) nikitensis* and *Bryobia* (*Bryobia*) *gigas* collected from *S. verbenaca* and from soil litter, respectively, are reported. New observations of *Bryobia* specimens previously reported from the same governorate during 2014-2016 revealed that specimens of *B.* (*B.*) *watersi* were misidentified as *Bryobia* (*Bryobia*) *graminum* and *Bryobia* (*Bryobia*) *kissophila*. Among them, we found two aberrant females bearing three propodosomal lobes. By analogy, we discussed the cases of the trilobed species, *B. bakeri* and *Bryobia aegyptiacus*, and concluded that they could be teratological forms of quadrilobed *Bryobia* species rather than species with a particular pattern of propodosomal lobes. **[Ziad Barbar and Philippe Auger, (Syria), 60 (2): 268-288, 2020]**

First Record of Tarragon Rust *Puccinia dracunculina* Fahrendorff, 1941 on Tarragon *Artemisia dracunculus* L. in Syria.

Tarragon *Artemisia dracunculus* var. *sativa* L. (Anthemideae) is a common aromatic medicinal and perennial economically important plant. Tarragon rust *Puccinia dracunculina* Fahrendorff, 1941 (Basidiomycota: Pucciniomycetes: Pucciniales) is reported for the first time on tarragon during a periodic survey of diseases and insects infecting vegetables from Damascus and Damascus countryside including random samples collected from 12 central markets. Infection appeared in only two out of 12 centers. *P. dracunculina* is an autoecious rust with no aecia. Infected plants appeared shorter than healthy and accompanied by leaf chlorosis at density of the pustules. Sori are irregularly scattered mainly on leaves' lower surface and to a lesser extent on the upper surface of the leaves and stems. Uredinia were reddish brown and powdery, and the uredinias spores were light brown, globose, ellipsoidal to irregular, measuring 40–52 x 22–27 microns. Teliospores are typically two celled with uneven wall thickness larger and dark brown to chestnut and granular at apex measuring 32-70x18-36 microns, colorless permanent pedicels in length from 42-78 µm. Classification compared with taxonomic references. this is the first record of tarragon rust disease *P. dracunculina* in Syria. **[Houda Kawas, M. Fawaz Azmeh, Faculty of Agriculture, Damascus University, Syria 2020].**

First Record of the Beetle *Amara* subgenus *Acoris metallescens* (Zimmermann, 1831). (Coleoptera: Carabidae) in Syria 2020.

A large number of bronze beetles were observed in Damascus, Rural Damascus and Homs, Syria, from April to the end of May 2020. Bronze beetles were collected and brought to the laboratory. The different parts of body and female and male genitalia were dissected using small needles. Morphological and anatomical identification showed to be ***Amara subg. Acoris metallescens*** *metallescens* (Zimmermann 1831). (Coleoptera: Carabidae) (7-9 mm). This is the first record of this species in Syria. **[Alaa Turkey Saleh and Abdulnabi Mohamed Basheer (Syria), Biological control studies and Research Center, Faculty of Agriculture, Damascus University. 2020.]**

First Record of Two Species of Sawfly on Roses

By investigating the most important insect pests attacking roses in Syria, two species of sawfly were recorded, *Cladius difformis* (Panzer, 1799), and *Cladius pectinicornis* (Geoffroy, 1785), (Hymenoptera: Tenthredinidae). The larvae of the two insects are similar to each other, in terms along with three pairs of true legs, they have three pairs of abdominal legs which lack the hooked crochets on the prolegs of true caterpillars. The *Cladius difformis* larva is green, and its head is black. *Cladius pectinicornis* larva is lighter in yellowish-green color with brown head. The length of the fully developed larva is between 18-20 mm. Tha larva oh them have many hairlike bristles. The damage stag is the larva, that feed on the leaves, where they initially feed on the edges of the leaf, then they make holes in rose leaves. The adult sawflies are small, thick-waisted wasps, mostly black in color. **[Mahmoud Al Abdallah, Abdulnabi Bacheer, Muhammad Qanoua, (Syria), Damascus University, Faculty of Agriculture.]**

A new record of Cystiphora sonchi (Vallot, 1827), (Cecidomyiidae: Diptera) from Syria.

Several *Sonchus* sp. plant samples have been collected from three different localities of Latakia Governorate, Syria during investigation. The samples showed symptoms of *Cystiphora sonchi* infestation, placed in plastic containers to collect the emerged adults (males and females) in Lab. condition. Emerged adults were mounted in the Hoyer's medium and compared with available literatures. The mounted adults were identified and confirmed to be *Cystiphora sonchi*.**[Mahran Zeity (Syria),Latakia Center for Scientific Agricultural Research, GCSAR, Damascus, Syria, Acta Entomology and Zoology, 1(1): 54-57,2020]** mzma2009@gmail.com

A New Record of Parasitoid *Trechnites flavipes* (Mercet) (Hymenoptera: Encyrtidae) on the *Pauropsylla buxtoni* (Laing, 1924) that Infests Cultivated Fig in Syria.

The study was conducted to identify the parasitoid of the fig gall psyllid, *Pauropsylla buxtoni*, which was collected from Damascus, Syria. The parasitoid of the psyllid was collected from the infested leaves were kept at a laboratory condition for the emergence of the adult parasitoid. The parasitoid was identified as *Trechnites flavipes* (Mercet). This study provided a new collection data about two psyllid species that infests the cultivated fig in Syria, namely, fig gall psyllid, *Pauropsylla buxtoni* and the free living fig psyllid, *Homotoma ficus*.**[Mahran Zeity and Majeda Mofleh (Syria), Latakia Center for Scientific Agricultural Research, GCSAR, Damascus, Syria, at Syrian Journal of Agricultural Research – SJAR 7(2): 354-364 April 2020].** mzma2009@gmail.com

First Registration of Rosa Damascena Infestation by Capnodis tenebrionis (Linnaeus, 1758).

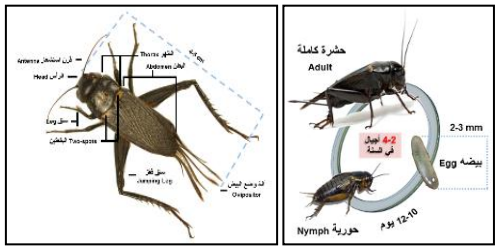
Where the infection was first observed in 2019 in the Al-Marah area (the village of the Levantine Rose), the only region that grows the Damask rose in Syria, and the infection was confirmed in April 2020. This insect poses a real danger threatening the cultivation of the Damascene rose, especially since this shrub is receiving global attention, as the United Nations Educational, Scientific and Cultural Organization "UNESCO" on 12-12-2019 announced the inclusion of the Damascene rose element and its associated traditional practices and crafts within List of intangible human heritage in the organization. The Capnodus insect has seriously degraded Damascene rose groves, forcing

farmers to use several types of pesticides, but to no avail. Currently, an integrated control program is directed to the use of biological control mainly and other means to eliminate this dangerous pest, which is one of the main pests on almond trees (apricot - cherry - peach - almond) and threatens its cultivation in Syria, and now it has begun to attack the Damascene rose bushes. **[Randa Abou Tara (Syria), Faculty of Sciences, University of Damascus-Syria, 2020].** randaaboutara@hotmail.com

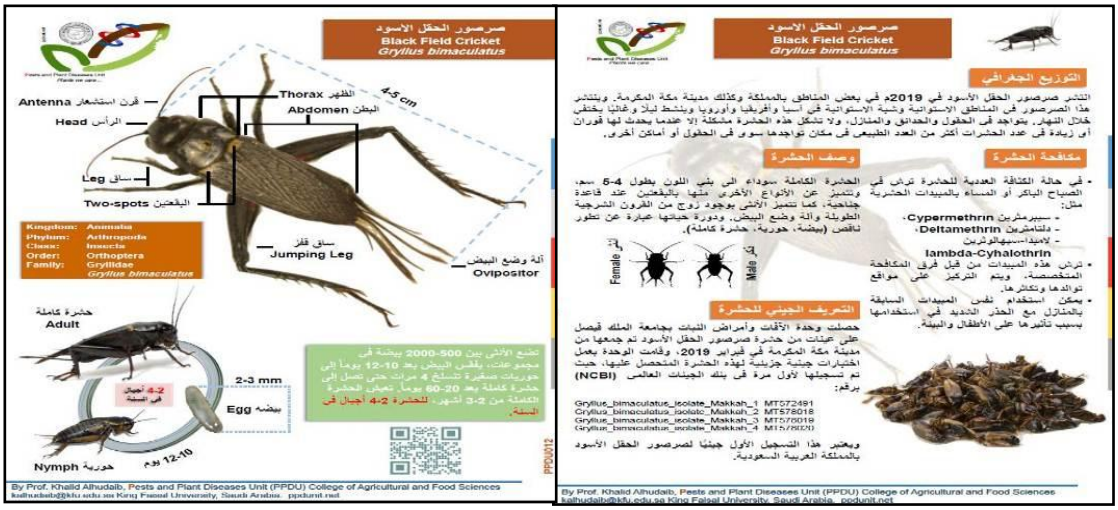
SAUDIA ARABIA

The First Genetic Identification of Black Field Cricket.

A number of samples of black filed cricket (adults) were obtained from Makkah Al-Mukarramah city, Saudi Arabia for testing at Pest and Plant Diseases Unit (PPDU) Laboratories, King Faisal University, for specific goal, which is to identify the insect genetically. Through this study, the cricket was described morphologically. However, it spreads in the tropical and subtropical regions of Asia, Africa and Europe, where it is active at night. The PPDU team has identified the cricket by genetic molecular methods to confirm the species of this black filed cricket; and how close to the species of neighboring countries. The cricket's DNA has been isolated and extracted to testing for genetic molecular identification. From the results of this study, it became clear that this cricket belongs to the family of Gryllidae of Orthoptera order and its scientific name is *Gryllus bimaculatus*. Because of the importance of this data, sequences have been registered at the National Center for Biotechnology Information NCBI, which considered as the first genetic registration in Saudi Arabia. Names and registration numbers were specified as follows:



Gryllus_bimaculatus_isolate_Makkah_1 MT572491
Gryllus_bimaculatus_isolate_Makkah_2 MT578018
Gryllus_bimaculatus_isolate_Makkah_3 MT578019
Gryllus_bimaculatus_isolate_Makkah_4 MT578020



As known, the outbreak of black field cricket is due to phenomenon as it occurs in the Desert Locust. The female lays from 500 to 2000 eggs in masses. After 10-12 days, the eggs hatch into small nymphs that reaching adults after 20-60 days. The cricket lives 2-3 months, and has 2-4 generations a year. One of the most important means of prevention and control of this cricket is the continuous monitoring and follow-up its occurrences, especially after rain. Easygoing to control the cricket before reaching its outbreak. Pesticides can be used in early morning and early evening, such as: Cypermethrin, Deltamethrin, lambda-Cyhalothrin. Currently, the PPDU team is working on mapping the similarity and differences between the species occurred in Makkah Al Mukarramah and the species in neighboring countries. This mapping helps to limit its spread in the future**.[Khalid A. Alhudaib, Aziz M. Ajlan and Sherif M. El Ganainy(Saudi Arabia), Pests and Plant Diseases Unit, King Faisal University, 28 July,2020].** kalhudaib@kfu.edu.sa

TUNIS

First Record of *Diaeretus leucopterus* (Haliday) (Hymenoptera, Braconidae, Aphidiinae), the Parasitoid of the Aphid Species, *Eulachnus agilis* (Kaltenbach) (Hemiptera, Aphididae) in North Africa.

A survey of pine-associated aphids and their parasitoidswas carried out in the arboretum of Pinus halepensis Miller in the Higher Agronomic Institute Chott Mariem (ISA CM, Tunisia) during 2010–2011 and 2018. The survey revealed the presence of the aphid parasitoid species, *Diaeretus leucopterus* (Haliday) (Hymenoptera, Braconidae, Aphidiinae). This is the first record of *D. leucopterus* from Tunisia and the African continent. The parasitoid emerged from the spotted green pine needle aphid, *Eulachnus agilis* (Kaltenbach) (Hemiptera, Aphididae, Lachninae), on *P. halepensis*. The generalist hyperparasitoid, *Asaphes suspensus* (Nees) (Hymenoptera, Pteromalidae), was also found attacking *D. leucopterus*. The diagnosis of the primary parasitoid, on the basis of relevant illustrations, was provided, and the possible routes of its transportation into North Africa were discussed. **[Monia Ben Halima Kamel, Nickolas G. Kavallieratos, Petr Starý and Ehsan Rakhshani (Tunisia), Egyptian Journal of Biological Pest Control, 30:53, Published on: 4 May 2020].** https://doi.org/10.1186/s41938-020-00249-6

First Report of Grapevine Virus L in Grapevine in Tunisia.

Grapevine virus L (GVL) has recently been identified as a new member of the family Betaflexiviridae (genus Vitivirus) that infects grapevine (Debat et al. 2019). GVL seems to have a worldwide distribution, having been reported in China, Croatia, New Zealand and the USA (Debat et al. 2019; Diaz-Lara et al., 2019). In July 2018, in an attempt to monitor the sanitary status of Tunisian vineyards, 4 grapevine samples of different varieties (grafted on R140 rootstock) showing virus-like symptoms, such as leafroll, yellow vein banding in leaves, shortened internodes and flattening in wood, were collected from an organic vineyard in Mornag (North-East of Tunisia) and further analyzed by high throughput sequencing (HTS). Total RNA was extracted from leaf tissue and sequenced, after ribo-depletion, using RNAseq TrueSeq Illumina methodology on a NextSeq 500 platform (Illumina Inc., San Diego, CA). HTS data analysis was performed by CLC Genomics Workbench 10.1.1 (QIAGEN, Hilden, Germany) and Geneious Prime 2020 software (Biomatters Ltd., Auckland, New Zealand). Raw data was subjected to quality control, trimming and host genome subtraction steps. The resulting reads were used to assemble de novo contigs using CLC. The contigs' similarity to viral sequences was analyzed by BLASTn and BLASTx with a cut-off e-value of 10-4. The analysis showed the presence of GVL related sequences in three of the four generated datasets, corresponding to one sample of cv. Red Globe (4 contigs of 5340, 1709, 375 and 213 nt) and two samples of local grapevine varieties, cv. Marsaoui (1 contig of 7532 nt) and cv. Razzegui (1 contig of 7409 nt). For recovery of full-length genomes, contigs were extended by mapping the reads against the recovered contigs and GVL genomic sequences available in the databases using Geneious software. One full-length GVL genome from isolate Red Globe (7580 nt, accession no. MT319081), and two near full-length GVL genomes from isolates Marsaoui (7557 nt, accession no. MT319082) and Razzegui (7563 nt, accession no. MT319083), were recovered. The nucleotide identity among all three isolates ranged between 98.4 and 99.2% whilst their similarity with respect to the closest GVL isolate available in the databases (isolate VL from Croatia, MH681991) was 96.8, 96.9 and 96.8%, respectively. Along with GVL, other sequences of grapevine viruses and viroids were found. A detailed information of the number of reads and contigs, the GVL genome coverage and the other detected viruses and viroids is shown in Supp. Table 1. In order to confirm the presence of GVL infecting grapevine in Tunisia, RT-PCR analysis was carried out on the HTS positive samples, using two specific sets of primers. Primers 5'-AGTTGAAGTCTAGGTGCACAC-3' (sense) and 5'-GTACTCAGACTTCCCCGATCTA-3' (antisense) target a 279-bp fragment of the CP/NAB region in the GVL genome (Debat et al. 2019). Newly designed primers based on the HTS recovered sequences GVL-repF 5'-TGCAAACAAGTTACCATGGAGA-3' (sense) and GVL-repR 5'-CATCGAGCACTTTTGGCCAG-3' (antisense) are anticipated to be specific for the amplification of a 273-bp fragment in the replicase region. Indeed, amplicons with the expected sizes were obtained for all three samples using both sets of primers. Sanger sequencing of the amplicons confirmed the identities of the amplicons. Together, these results demonstrated the presence of GVL in Tunisian grapevines. To our knowledge, this is the first report of the occurrence of GVL in Tunisia. Phylogenetic analysis of available full-length GVL sequences show that the

Tunisian isolates cluster together with the Croatian isolate VL, which is in agreement with their geographical origin (Supp. Fig. 1). Since other vitiviruses have been demonstrated to have an impact on grapevine (Minafra et al. 2017), the identification of GVL in a new geographical area represents potential risk for grapevine crop. Further studies will determine the biological significance of the presence of this recently identified vitivirus and its prevalence in Tunisian vineyards. **[Anis Ben Amar, Samia Daldoul, Hassen Zemni, Thierry Wetzel, Antonio Olmos, and Ana Belén Ruiz-García (Tunisia), Laboratory of Plant Molecular Physiology, Biotechnology Center of Borj Cedria, PB.901, 2050 Hammam-Lif, Tunisia, Instituto Valenciano de Investigaciones Agrarias, 46113 Moncada, Valencia, Spain, Plant disease, 7 Jul 2020]**. https://doi.org/10.1094/PDIS-04-20-0916-PDN

RESEARCH HIGHLIGHTS

ALGERIA

Diversity of Nematode Microbial Antagonists from Algeria Shows Occurrence of Nematotoxic *Trichoderma* spp. Fungi and bacteria associated to phytoparasitic nematodes *Globodera rostochiensis* and *Meloidogyne* spp. in Algeria were identified and characterized. *Trichoderma* spp. showed the highest prevalence in the cysts of *G. rostochiensis*. A number of isolates were identified through PCR amplification and the sequencing of the internal transcribed spacer (ITS) 1-2 and Rpb2 gene regions. The most represented species were *T. harzianum* and *T. afroharzianum*. The latter and *T. hirsutum* were reported for the first time in Algeria. *Fusarium* spp., including *F. oxysporum* and *F. solani*, comprised a second group of fungi found in cysts. Taxa associated to females of *Meloidogyne* spp. included *T. harzianum*, *Fusarium* spp. and other hyphomycetes. To assess the efficacy of *Trichoderma* spp., two assays were carried out *in vitro* with the culture filtrates of two *T. afroharzianum* and *T. harzianum* isolates, to check their toxicity versus the second stage juveniles of *M. incognita*. After 24– 48 hrs exposure, a mortality significantly higher than the control was observed for both filtrates at 1% dilutions. The TRI genes involved in the production of trichothecenes were also amplified with the PCR from some *Trichoderm*a spp. isolates and sequenced, supporting a putative role in nematode toxicity. Bacteria isolated from the cysts of *G. rostochiensis* included *Brucella*, *Rhizobium*, *Stenotrophomonas* and *Bacillus* spp., identified through 16S rRNA gene sequencing. The potential of the microbial isolates identified and their mechanisms of action are discussed, as part of a sustainable nematode management strategy. **[Nawal Benttoumi [1], Mariantonietta Colagiero [2], Samira Sellami [1], Houda Boureghda [1], Abdelaziz Keddad [1] and Aurelio Ciancio [2] (Algeria), [1]Laboratory of Phytopathology and Molecular Biology, Department of Botany, National Higher School of Agronomy (ENSA), El-Harrach, Algiers, Algeria. [2]Consiglio Nazionale delle Ricerche, Istituto per la Protezione Sostenibile delle Piante, Via G. Amendola 122/D, 70126 Bari, Italy, Plants, 9, 941, 2020].**
doi: 10.3390/plants9080941

Nematicidal activity of *Trichoderma* spp. and *Fusarium oxysporum* against the Potato cyst Nematode *Globodera rostochiensis* (Woll). Cyst nematodes of the genus *Globodera* are among the most dangerous bioagressors of potato crops in Algeria. The control of these quarantine organisms is mandatory. At present, among control approaches, biological methods alternative to chemical nematicides are also being actively investigated. Biocontrol of *G. rostochiensis* by isolates of fungi of genera *Trichoderma* and *Fusarium* was studied *in vitro* and *in vivo* on potato. An *in vitro* experiment with isolates of these two fungi showed a nematicidal effect on eggs of *G. rostochiensis*. The effect increased with the increase of spore concentrations and exposure time. An *in vivo* - assay with spore suspensions of the same isolates showed that the soil treatments significantly reduced the reproduction of *G. rostochiensis* and improved the growth of potato plants. Therefore, the use of these antagonistic microorganisms appears as a very promising alternative approach in the management of potato cyst nematodes. **[Nawal Benttoumi, Maissa Abba, Houda Boureghda and Samira Sellami (Algeria), The National Higher School of Agronomy (ENSA), Department of Botany, Laboratory of Phytopathology and Molecular Biology, El Harrach, Algiers, Algeria, Bioscience Research, 2020 17(1): 499-509.**

Induction of Growth and Osmoregulation in Salt Stressed Barley by the Endophytic Fungus *Chaetomium coarctatum*. Endophytic fungi have been shown to increase the growth and improve plants tolerance to stressful conditions, especially salinity. The intent of this study was to determine the salt tolerance of barley inoculated by

the fungus *Chaetomium coarctatum*, isolated from *Avena fatua* roots collected from saline soil (EC = 14 dS/m). A greenhouse experiment was conducted to test the effects of this selected fungus under increasing salinity levels (EC = 2.5, 8, and 14 dS/m) on seedling growth, leaf area and solute accumulation (proline and sugars) of barley seedlings. Results indicated a positive influence of *C. coarctatum* on barley salinity tolerance. Barley seedling emergence on heavily salted soil (14 dS/m) was improved by *C. coarctatum* (70%), compared to 60% recorded by control. Results showed that *C. coarctatum* increased soluble sugars (under moderate saline soil) and proline leaf contents (under unsalted soil, moderate and high saline soils). Inoculated barley has a higher leaf area (23 cm^2 under EC = 14 dS/m compared to 21.54 cm^2 recorded in the control) as well as sugar (29.1 mg/g FW under EC = 2.5 dS/m) and proline content (1.14, 1.99, and 2.21 mg/g FW under EC = 2.5, 8, and 14 dS/m, respectively). *C. coarctatum* fungus improves barley growth under salt stress conditions. [**Kouadria, R., Bouzouina, M., and Lotmani, B. (Algeria), Tunisian Journal of Plant Protection 15 (1): 19-27,2020].**

EGYPT

Cigar End Rot of Banana Caused by *Musicillium theobromae* and its Control in Egypt. Cigar end rot is a postharvest disease affecting the fruits quality of banana. Different fungal pathogens are involved but the main pathogen associated with the fruits is *Musicillium theobromae*. The adjectives of this study were (i) to isolate and identify the causal agent of cigar end rot of banana in Egypt, (ii) finding and evaluating the effectiveness of alternatives' means of control the causal agent using certain compounds including salts, hydrogen peroxide and nanomaterials *in vitro* and *in vivo*. Twelve salts; hydrogen peroxide with five concentrations (0.25, 0.5, 1.0, 2.0 and 4.0%) and five nanomaterials at two concentrations (0.2 and 0.4%) were tested *in vitro* against the mycelial growth of *M. theobromae*. The results demonstrated that natural incidence of cigar end rot disease was higher during 2018 as compared to 2017 season. *In vitro* results showed that, a complete inhibition of the pathogen was obtained by sodium metabisulphite at tested concentrations while a complete inhibition was detected for sodium silicate at 4%. Also, silica-copper nanoparticles (NPs) and silica-chitosan-copper NPs showed the best results as compared to other treatments reduced the colony diameter by 50.8 and 51.5% at 0.2%. On artificially inoculated banana fruit, sodium silicate, sodium metabisulphite, sodium carbonate, chitosan NPs, silica- copper NPs, silica-chitosan-copper NPs, copper NPs and silica NPs reduced the percentage of cigar end rot severity by 87, 85, 79, 69, 67, 53, 54 and 49%, respectively as compared to control. **[Youssef K., Mustafa Z.M.M., Kamel M.A.M., Mounir G.A., (Egypt-Brazil), Plant Pathology Research Institute, ARC, Egypt, Archives of Phytopathology and Plant Protection, 53(3–4), 162–177, 2020].**

Control of Gray Mold on Clamshell-Packaged 'Benitaka' Table Grapes Using Sulphur Dioxide Pads and Perforated Liners. The use of vented clamshells has become popular in the packaging of grapes for local and international markets. The aim of this study is to evaluate the postharvest preservation of 'Benitaka' table grapes individually packaged in vented clamshells using different types of SO2-generating pads and perforated plastic liners during cold storage. A completely randomized design with four replications in a two-factor arrangement with an additional treatment [(4x3) +1] was used. The trials were carried out under two situations: Artificial or natural infections with *Botrytis cinerea*, which is the causal agent of gray mold on table grapes. The incidence of gray mold, shattered berries, and stem browning were evaluated at 30 and 45 days of cold storage at 1±1 ºC and 3 days of shelf-life at 22 ±1 ºC after the period of cold storage. Mass loss and berry firmness were also examined at the end of the cold storage period. The use of dual-release SO_2-generating pads containing 5 or 8 g of a.i. and slow-release pads with 7 g of a.i. was effective in controlling the incidence of gray mold in grapes packaged in vented clamshells and kept under cold storage for up to 45 days. Under these storage conditions, perforated plastic liners with 0.3% ventilation area or micro-perforated liners with 1.0% ventilation area reduced the percentage of mass loss and shattered berries **[Osmar Jose Chaves Junior, Khamis Youssef (Egypt-Brazil), Renata Koyama, Saeed Ahmed, Allan Ricardo Dominguez, Débora Thaís Mühlbeier and Sergio Ruffo Roberto. Plant Pathology Research Institute, ARC, Egypt; Londrina State University, Parana, Brazil, Pathogens, 8, 271, 2019].** doi:10.3390/pathogens8040271

Nanomaterials as Alternative Control Means against Postharvest Diseases in Fruit Crops. Post-harvest diseases of fruit and vegetables have to be controlled because of the high added value of commodities and the great economic loss related to spoilage. Synthetic fungicides are the first choice worldwide to control post-harvest diseases of fruit and vegetables. However, several problems and constraints related to their use have forced

scientists to develop alternatives control means to prevent post-harvest diseases. Physical and biological means, resistance inducers, and GRAS (generally recognized as safe) compounds are the most important alternatives used during the last 20 years. Recently, nanomaterial treatments have demonstrated promising results and they are being investigated to reduce the utilization of synthetic fungicides to control post-harvest rot in fruit and vegetables. The collective information in this review article covers a wide range of nanomaterials used to control post-harvest decays related to each selected fruit crop including grape, citrus, banana, apple, mango, peach, and nectarine. Other examples also used are apricot, guava, avocado, papaya, dragon, pear, longan, loquat, jujubes, and pomegranate fruits **[Sergio Ruffo Roberto, Khamis Youssef (Egypt-Brazil), Ayat Farghily Hashim and Antonio Ippolito., Londrina State University, Parana, Brazil; Plant Pathology Research Institute, ARC, Egypt; Fats and Oils Department, National Research Centre, Egypt; Department of Soil, Plant and Food Science, University of Bari "Aldo Moro", Italy, Nanomaterials 9, 1752, 2019].** doi:10.3390/nano9121752

Pathogenicity of Three Entomopathogenic Fungi against the Mediterranean Fruit Fly, *Ceratitis capitata* (Wiedemann) (Diptera: Tephritidae). The use of pesticides against the Mediterranean fruit fly, *Ceratitis capitata* (Wiedemann) (Diptera: Tephritidae), as a tool to control the pest, has become an obstacle to the fresh agricultural products export to many countries that restrict pesticides residues. The effectiveness of three local strains of entomopathogenic fungi: *Metarhizium anisopliae*, *Beauveria bassiana*, and *Paecilomyces lilacinus* against the adult and immature stages of *C. capitata* was evaluated under laboratory conditions. Obtained results showed that *M. anisopliae* and *B. bassiana* were superior in its pathogenicity and potential to kill the pest than *P. lilacinus*. These results may be important to be used for the control of the pest in IPM program. **[N. A. Soliman, Sherihan M. Al-amin, Amira E. Mesbah, Ahmed M. A. Ibrahim and Ali M.A. Mahmoud(Egypt), Egyptian Journal of Biological Pest Control, 30:49, Published on: 1 May 2020].** https://doi.org/10.1186/s41938-020-00235-y

Optimizing Biological Control agents for Controlling Nematodes of Tomato in Egypt. Tomato is a major vegetable crop in Egypt and worldwide. Yet, many plant-parasitic nematodes (PPNs), especially *Meloidogyne* spp. and *Rotylenchulus reniformis* are a devastating threat to tomato cultivation in Egypt. This review addresses their biology, ecology, and economic importance from the standpoint of pest management. Soil treatment with synthetic nematicides has given some protection and enhanced tomato yields, but health hazards and environmental pollution are obstructing their intensive use. Moreover, some of such nematicides are being banned from the market. Therefore, safe biological control agents (BCAs) and their bioactive compounds should better be researched and developed to effectively replace hazardous nematicides. Abamectin, produced during the fermentation process of the actinomycete *Streptomyces avermitilis*, is recommended to manage PPNs of tomato in Egypt but further exploration should allocate where BCAs can reliably act with other agricultural inputs. Examples are given herein to streamline their development via synergistic interaction with compatible inputs such as chemicals and organic manure. Moreover, optimizing their delivery, interaction, and persistence under field conditions through novel ways such as the use of endophytic fungi and bacteria as well as bioactive molecules/ Nano-particles that have systemic activity in the nematode-infected plants should further be investigated and broadly disseminated. **[Mahfouz M. M. Abd-Elgawad (Egypt), Egyptian Journal of Biological Pest Control, 30:58, Published on 13 May 2020].** https://doi.org/10.1186/s41938-020-00252-x

Biological Control of Cucumber Powdery Mildew (*Podosphaera xanthii*) (Castagne) under Greenhouse Conditions. Cucumber powdery mildew disease caused by *Podosphaera xanthii* (Castagne) U. Braun & Shishkoff severe disease-causing yield losses worldwide. This research study was conducted to evaluate the efficacy of the tested bio-agents, *Trichoderma harzianum*, *T. viride*, *Bacillus subtilis*, *Paenibacillus polymyxa*, and *Serratia marcescens*, as well as the fungicide score (Difenoconazole), on cucumber infected with *P. xanthii*, *in vitro* and under greenhouse conditions. Results indicated that culture filtrate of the tested bio-agents and the fungicide (control) significantly reduced *P. xanthii* conidial germination *in vitro*; the reduction percentage ranged between 91.17 and 76.06%. Also, score recorded the highest reduction percentage (97.19%). All treatments significantly decreased the disease severity and area under disease progress curve (AUDPC) post spraying the bio-agents on cucumber plants under greenhouse conditions. Score followed by *B. subtilis* significantly decreased disease severity percentage (67.33 and 65.38%و respectively) and AUDPC (322.84 and 342.06) than the untreated control (988.13 AUDPC). Additionally, treated cucumber plants showed a significant increase in plant growth parameters (plant height, total chlorophyll, fresh, and dry weight) and yield parameters (fruit number/plant and fruit weight/plant) as well the activity of defense related enzymes, *i.e.*, peroxidase (PO) and polyphenol oxidase (PPO), and total phenols content (TPC) compared to the untreated plants. **[Ehab A. D. Sarhan, Michael H. F. Abd-**

Elsyed and Azza M. Y. Ebrahiem (Egypt), Egyptian Journal of Biological Pest Control, 30:65, Published on: 29 May 2020]. https://doi.org/10.1186/s41938-020-00267-4

IRAQ

Life Tables and Population Parameters of Sesame Webworm *Antigastra catalaunalis* (Dup.) [Lepidoptera: Pyralidae] on Sesame at Different Temperatures. The sesame webworm *Antigastra catalaunalis* (Dup.) is the most serious pest on sesame throughout the world. This study examined the relationships of individual development and population growth with temperature based on an age-specific life table of *A. catalaunalis* reared on sesame leaves in the laboratory at 15,20,25,30 and 35ºc. The life table of this insect was not completed at 35ºc because of the adults were not emerged from pupae at this temperature. The shortest values of adult pre-oviposition period and mean generation time were 2.6 days and 21.359 days, respectively at 30ºc, while the highest values were 5.8 days and 75.770 days, respectively at 15ºc. the fecundity, net reproductive rate (Ro) and intrinsic rate of increase (rm) were 78.05 eggs/female, 29.681 offspring and 0.159 days^{-1}, respectively at 30ºc that exceeded their values at other temperatures. The results of this study indicated that *A. catalaunalis* has strong reproductive potential within 25-30ºc, and that this temperature range could result in rapid population growth associated serious damage to sesame crop at an appropriate temperature.**[[1]Amer J. A. Al-Gerrawy and [2]Ahmed J. M. Al-Shammary (Iraq), [1] Plant Protection Dept., Faculty of Agriculture, University of Wasit, Iraq. [2] Directorate of Agricultural Research /Ministry of Science &Technology, Iraq, Journal of Entomological Research, 2020]**

Efficiency of Some Parasitoids on Eggs and Larvae of Tomato Borer *Tuta absoluta* in Laboratory. The tomato borer *Tuta absoluta* (Meyrick) is considered as a devastating pest of tomato crop in both fields and greenhouses, infesting all parts of plant except roots during all growth stages causing qualitative and quantitative looses in the yield. Results of laboratory studies showed that the egg parasitoid *Trichogramma pintoi* was superior being parasitism rate was 73.92%, while it was 60.12 and 55.46% for *T. principium* and *T. evanescens*, respectively. The results also showed that the larval parasitoid *Habrobracon concolorans* was very effective causing killing of 92.5 % of host, while percent of parasitism by *Bracon hebetor* and *B. brevicornis* were 17.5 and 10.0%, respectively. **[Amer J. A. Al-Gerrawy (Iraq), Faculty of Agriculture, University of Wasit, Iraq, 2020].**

Use of Plant Barriers, Yellow Traps and Squash Varieties in the Management of the Disease Watermelon Mosaic Virus 2 on Squash. We take Squash leaves showed the symptoms of mosaic and dwarfed, deformed and crushed the infected leaves with a 0.01 molar phosphate solution in a ceramic mortar, this extract of infected leaves inoculated the health Squash plant and some of indicator plant, after appearance symptom like these symptom in the field, we take it and inoculated anther Squash plant and Pigweed (Chenopodiumamaranticolor) plant, so after appearance Local lesion on Pigweed leaves, which is sensitive for WMV2, we adopted it with cereal transmitted to take it pure isolation of this virus in other Subsequent tests. ELISA test and symptoms showed on indicator plant is adopted. In Squash field, choose two varieties (Local, Tala c.v.) of seed Squash, depond on R.C.B.D. (Design) and planted Barriers (Sunflower, Eggplant) to protect the Squash field from Aphids insect to visit it. In other side, we use yellow traps to attract the Aphids insect. Insect Density indicate that the treatment of plant Barriers were less than control treatment, so percentages of infection in Virus WMV2 may be less than control treatment, too the yellow traps are reduce the ratio of Aphids insect, so it,s reduce the ratio of percentages too. We take Squash leaves showed the symptoms of mosaic and dwarfed, deformed and crushed the infected leaves with a 0.01 molar phosphate solution in a ceramic mortar , this extract of infected leaves inoculated the health Squash plant and some of indicator plant, after appearance symptom like these symptom in the field, we take it and inoculated anther Squash plant and Pigweed (*Chenopodium amaranticolor*) plant, so after appearance Local lesion on Pigweed leaves, which is sensitive for WMV2, we adopted it with cereal transmitted to take it pure isolation of this virus in other Subsequent tests. ELISA test and symptoms showed on indicator plant is adopted. In Squash field, choose two varieties (Local, Tala c.v.) of seed Squash, depond on R.C.B.D. (Design) and planted Barriers (Sunflower, Eggplant) to protect the Squash field from Aphids insect to visit it. In other side, we use yellow traps to attract the Aphids insect. Insect Density indicate that the treatment of plant Barriers were less than control treatment, so percentages of infection in Virus WMV2 may be less than control treatment, too the yellow traps are reduce the ratio of Aphids insect, so it is reduce the ratio of percentages too. **[Kareem A. H. Al Bayati and Q. K. Zewin (Iraq), Biochemical Cellular Archives, Vol. 20, No. 1, pp. 715-718, 2020].** DOI: 10.35124/bca.2020.20.1.715

Effectiveness of *Conocarpus lancifolius* Extract against Insects and Pathogenic Fungi. The study was carried out in the Faculty of Agriculture- University of Misan, to investigate the ability of the *Conocarpus lancifolius* extract to control some fungi and insects. Experiments were carried out in the laboratory (using the ethyl alcohol extract in concentrations 0.5, 1 and 1.5%) and the plastic house(using the butanol extract in the concentrations 1.5, 3 and 4.5%) to determine the ability of the extract to inhibit the growth of the fungi *Fusarium oxysporum*, *Fusarium solani*, *Rhizoctonia solani*, and laboratory study (using the butanol extract in the concentrations 1.5, 3 and 4.5%) to determine the efficiency of the extract to control the insects *Myzus persicae* and *Aphis nerii*. The effect of the conocarpus extract was high significant with 1.5% concentration on the three fungi in the laboratory. The results of the plastic house indicated that the effect of the extract was relatively better when used on eggplant. *Fusarium oxysporum* was unable to infect both eggplant and tomato when the extract was used in the three concentrations after 10 days of addition of fungi. *Rhizoctonia solani* was unable to infect both eggplant and tomato when the extract was used in the three concentrations when the fungi were added with extract together. The results showed that the extract of conocarpus was highly significant effect on the insects *M. persicae* and *A. nerii*, where the percentage of killing was increased with the increasing of concentrations, they were of 78% and 79% for the concentration (4.5%) on *M. persicae* for tomato and eggplant respectively, and about 99% to the concentration (4.5%) after 4 days on *A. nerii*. **[Alyaseri, Ismail Ibrahim, Fatimeh Qassem Hamdan, Ghasan Mahdi Dagher and Noreen Abdulzahra Hasan (Iraq), Indian Journal of Ecology. 47 (Special issue10): 204- 210, 2020].**

The Synergistic Effectiveness of *Saccharomyces cerevisiae* and Alcoholic Extracts of *Myrtus communis* and *Populus euphratica* against *Rhizoctonia solani* in *in vitro* Conditions. A laboratory study was conducted at a college of agriculture, university of Diyala during 2018 to assess the synergistic effectiveness of yeast *Saccharomyces cerevisiae* and plant extracts *Myrtus communis* and *Populus euphratica* in the inhibition of *Rhizoctonia solani* growth in vitro. Results showed that *S. cerevisiae* recorded increment in inhibition percentage of *R. solani* growth in the first and second methods 75.55 % and 46.66 % respectively as compared with control 0 %. The effective concentration (EC50) of *M. communis* extract in the yeast *S. cerevisiae* and *R. solani* reached 9120 ppm and 3311 ppm respectively, whereas the effective concentration (EC50) of *P. euphratica* extract in the yeast *S. cerevisiae* and *R. solani* reached 8709 ppm and 3019 ppm respectively. The inhibitory activity of *S. cerevisiae* with *M. communis* and *S. cerevisiae* with *P. euphratica* against *R. solani* growth reached 82.22% and 78.88% respectively compared with control 0%. **[Mohammed Nadeem Kasim Hantoosh, Hussein Ali Salim, and Abdul Jabbar S. Ahmed (Iraq), Plant Archives 20(2):768-773, 2020].**

SYRIA

Study the Effect of Some Microorganisms in Biocontrol of Fusarium Tomatoes Wilting (*Fusarium oxysporum* f.sp. *lycopersici*) under Laboratory Conditions. Tomato is one of the most important vegetable crops and it is infected with many pathogens, and the most important one is *F. oxysporum* f.sp. *lycopersici*. Biocontrol is one of the most important components of IPM. This research studied the effect of different bacterial isolates of *Bacillus*, *Pseudomonas* and different isolates of fungus *Trichoderma harzianum* to identify the most effective isolates in reducing the radial growth of vascular tomato wilt caused by the fungus *Fusarium oxysporum* f.sp. *lycopersici.* The experiment was carried out at Faculty of Agriculture Labs, Aleppo University, in 2012, according to complete randomized design CRD with 5 replicates for each isolate in addition to the control treatment. Measurements of the average diameter of the Fusarium colony was taken in each replication of the control area. The results showed significant differences between treatments when comparing the average colony diameter of different treatments with the control. The highest value was (8 cm) when using isolation PS3 while the lowest value when using isolation was (PS2 = 1.29 cm). T2, bas1 PS 3 and the control while there were no significant differences between PS, bas1, PS3, T2, T1, and bas1 and control treatment, which make it a promising method in controlling this pathogen**. [Bachar Aldakil (Syria), Syrian Journal of Agricultural Research – SJAR 7(3): 385-391 June 2020].**

Isolate and Identify of Storage Fungi in Two Varieties of Peanut (*Arachis hypogaea* L.) and Detection their Ability for the Toxins Secretion. In the present study, seeds of tow groundnut varieties viz. Landraces (local vs.) and Virginia were collected from different market places of El-Beida city, Libya, and seed mycoflora was isolated by standard blotter paper method and agar plate method, then identified and addition to be checked for toxin

production on PSA, CMA and YSA solid media. The identified fungal isolates included *Aspergillus flavus*, *A. niger*, *A. terreus*, *Cldosporium cladospoirides*, *Fusarium* sp. and *Penicillium italicum*. Data revealed that both varieties were affected by the fungal species however, 30 % of *A. niger* on agar plate method and 25 % on standard blotter paper, while *A. terreus* had the least percent incidence of up to 2% on agar plate method. Large seeds were more prone to fungal contamination than small seeds and higher numbers of fungi were isolated on agar plate method used as compared to standard blotter paper method. Results of the ability of fungal isolates for secretion toxins after exposure to liquid ammonia were recorded that color changed in pigment with different intensities, and PSA medium was suitable for toxin secretion by *A. flavus*, *A. niger and P. italicum.* **[Magida Younis El-Kadi and Zahra Ibrahim El-Gali (Syria), Syrian Journal of Agricultural Research – SJAR 7(3): 392-400 June 2020].**

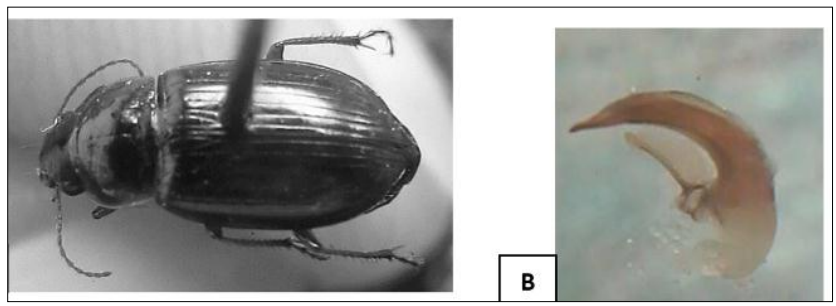
Effect of Carbendazim and Thiophanate Methyl Fungicides on the Conidia Spores Germination and Mycelial Growth of *Fusarium oxysporum* f.sp. *lycopersici* Causing Tomato Wilt in the Coastal Region of Syria. The objective of this research was to study the effect of Defazeem (carbendazim 50%) and Agrisin (thiophanate methyl 70%) on the mycelial growth and conidia spore's germination for five isolates of *Fusarium oxysporum* f.sp. *lycopersici* at Faculty of Agriculture, Tishreen University, during 2017 and 2018. The two fungicides were used in different concentrations ranged from 0.1 to 1000 parts per million (ppm) (active ingredient) on nutrient culture media (PDA). The results showed that carbendazim inhibited the fungus growth by 59.94% to 76.4% at 1 ppm and by 100% at 10 ppm for all isolates. Thiophanate methyl inhibited the growth by 71.73 to 81.47% at 100 ppm, and by 100% at 1000 ppm. The effect of carbendazim in conidia spore's germination was medium and ranged from 37.98 to 66.75% at 100 ppm and by 100% at 1000 ppm. While the effect of thiophanate methyl was low at all studied concentrations. **[Mais Alkbaily[(1)] Mohamed Tawil[(1)] and Sabah Al-Maghribi[(1)] (Syria), Syrian Journal of Agricultural Research – SJAR 7(3): 401-414 June 2020].**

Effect of Planting Date, Seed Rate and Location on the Incidence of Luteoviruses Affecting Chickpea under Natural Infection in Syria. Field experiments were carried out during 2017/2018 cropping season to study the effect of three planting dates (5 December, 25 December and 15 January) and five seed rates (80, 100, 120, 140 and 160 kg/ha) in two different sites/locations (Al Ghab Research Center and Jeb Ramleh Research Station/ Syria) on the chickpea infection with luteoviruses (aphid-born persistently transmitted viruses), which causing yellowing and stunting symptoms under natural infections. Tissue blot-immunoassay (TBIA) results showed that luteoviruses (family Luteoviridae) were the main causal of stunting and yellowing symptoms on randomly selected chickpea plants. High level of significant differences ($P < 0.001$) were recorded within the two experimental sites/locations. The early sowing date (5 December) reduced the percence of virus incidence by 75 and 85%, and grain yield were increased by 3.5 and 30.9% compared to other sowing dates (25 December and 15 January, respectively). Also, incidence of luteoviruses was reduced by 41% and remarkable enhancement of grain yield up to 28% was recorded on the second sowing date (25 December) compared to 3rd planting date (15 January). Disease incidence differed significantly ($P< 0.001$) at all levels of seeding rates, and it decreased gradually (2.7> 1.9> 1.5> 0.97> 0.63 %) in contrary to increased seeding rates (80< 100< 120< 140< 160 kg/ha, respectively). In addition, significant interactions were recorded between planting date and seed rate treatments, whereas the best treatment which was recorded when planting at the rates of 100 and 120 kg/h in early date (5 September), and the highest grain yield were 2,495 and 2,487 kg/ha, respectively, with low luteovirus incidence (0.5 and 0.45%, respectively). On the other hand, increasing of seed rates up to 140 and160 kg/ha played a positive role by decreasing the rate of virus infections by 64.3 and 76.7%, respectively, and enhancing the grain yield up to 25.7 and 30%, respectively when planting date was late on (15th January), to the contrary of early planting date where high seed rates resulted into negative effects on the grain yield. The highest parameters (except the disease severity levels) were significantly recorded ($P<0.001$) in Al Ghab Research Center in comparison to that of Jeb Ramleh Research Station with rates of 12, 40 and 39.5% for grain yield, infected plants per plot and disease incidence%, respectively; and in general, the performance of parameters were somehow similar in both locations with some differences. **[Nader Assad, Safaa Kumari, Amin Haj-Kassem, Salah Al-Chaabi and Attia Arab (Syria), Syrian Journal of Agricultural Research – SJAR 7(3): 415-433 June 2020].**

Impact of Certain Insecticides against Pink Bollworm *Pectinophora gossypiella*, Sucking Pests, and Their Associated Predators in Cotton Fields. Field experiments were conducted at ALZagazig Al-Sharkia Governorate during 2017 cotton season to test some chemical insecticides on the larvae of *Pectinophora gossypiella* cotton bolls. Three insecticides of Chlorpyrifos+Chlorfluazeron then Lambda-Cypermethrin and then Chlorpyrifos) on *P. gossypiella*, certain sucking pests, (*Aphis gossypii*, *Bemecia tabaci*, *Empoasca* spp., Nezara veridula and

Tetranychus spp.) and their associated predators, (*Coccinella* spp., Chrysoperla spp., Peaderus alferii, Scymnus spp., Orius spp. and true spiders). The resultes showed that 1st spray was moderately effective on P. gossypiella larvae and recorded 67.33 % reduction after 2 nd week while, the highest reduction was 85.71% after 2 nd week of 2nd spray. The seasonal mean of reduction was 73.89% after the three sprays. In case of studying the effect of pesticides used to control pink bollworm and its effect on sucking piercing pests. Also, data revealed that the 1st spray was the preferable spray on *Tetranychus*. spp. and Aphid gossypii attained (100 and 87.79 %), respectively. while in the case of the 2nd spray the effect were noticed on A. gossypii, Tetranychus. spp. and Empoasca spp., which attained (100, 53.40 and 56.20 %). While the 3rd spray recorded the high mean of reduction percentages on N. veredula and A. gossypii attained (92.15 and 84.16 %). The seasonal mean of reduction percentages after the three sprays can be arranged as follows: (90.65, 79.82, 71.52, 58.56 and 36.49 %) of A. gossypii, N. veredula, Tetranychus. spp., *B. tabaci* and Empoasca spp., respectively. On the other hand, the effect of the tested compounds on Chrysoperla spp. were 53.72, 8.23 and 9.39 % reduction recorded after the three sprays, respectively. The obtained results cleared that the tested predators affected on all sucking pests' population numbers and recorded the lowest seasonal mean 23.78 % which recorded on Chrysoperla spp. On the other side there was found a relationship ranged between positive & negative and insignificant between Coccinella spp. and the sucking pests, and the relationship was positive and significant with Empoasca spp. In the case of the Chrysoperla spp., the relationship was, and significant with Empoasca spp., N. veridula and Tetranychus spp. numbers. Whereas in the case of Scymnus spp., the relationship was positive or negative and significant in the case of B. tabaci, N. veridula and true spider mites. At the same time, the relationship between Orius spp. beetles and sucking piercing pests ranged between positive & negative, significant and insignificant, and that relationship was significant and negative true spiders and insignificant & positive with other insect piercing insects. Generally, multiple regressions between the sucking pests and predators were 65.19, 72.24, 55.75, 71.45 and 41.56 for (Coccinella spp., Chrysoperla spp., Peaderus alferii, Scymnus spp., Orius spp. and true spiders), respectively. It could be concluded that the treatment of pink bollo worm using the following pesticide program (Chlorperifos + Chlorfloiseron and then Lambadacyhalothrin alone and then Chlorperifos alone) led to a significant reduction in the number of pink bolloworm, pests associated with this effect were low on insect predators associated with perforating sucking insects in cotton fields. **[Mohammed E. M. A. Hegab, Ahmad A. T. Zaki, Ali A.A. El-Sayed and Adel A. Amer (Syria), Syrian Journal of Agricultural Research – SJAR 7(3): 467-479 June 2020]**

Outbreaks of the Ground Beetle Amara (Paracelia) simplex simplex in Syria. The ground beetle, *Amara* (*Paracelia*) *simplex simplex* Dejean, 1828. (Coleoptera: Carabidae) is very common in Syria. In April 2020, large populations of up to several hundred adults per m^2 were reported in open fields and in cities in south, central and northern regions of Syria. Adults readily fed on luncheon meat and on dead aphids; some adults also fed on bulgur wheat. This beetle was found in high number in the open area around the Homs city and also on the streets and at lights inside the city. This species occurs in moist areas of drier landscapes. The large populations of *A. simplex* observed in Syria could be influenced by climate conditions or the abundance of food sources during this period. We thank Dr. Hassan Khalil (Al Baath University in Homs) to providing us the samples and it is our pleasure to warmly thank Dr. Jiri Hejkal for his generous help in identification and providing date of species and Dr. Kevin Folate (Agriculture and Agri-Food Canada, Lethbridge Research Centre) for the valuable information. [**Ali Yaseen Ali (Syria), General Commission for Scientific Agricultural Research (GCSAR) Tartous Research Center, Tartous, Syria, 2020].** alialigermany80@gmail.com



TUNISIA

Temporal Distribution of Three Pepper Viruses and Molecular Characterization of Two *Cucumber mosaic virus* Isolates in Tunisia. Annual open-field pepper (*Capsicum annuum*) prospections were carried out in Cap Bon region in Tunisia from 2016 to 2018 at early, middle and end of the season, to study the disease spread of three viruses: *Cucumber mosaic virus* (CMV), *Potato virus Y* (PVY) and *Alfalfa mosaic virus* (AMV). Serological analysis revealed no infections at early cropping season. However, since mid-season, viral incidences appeared and increased until the end of the season with a predominance of CMV followed by PVY and AMV. Furthermore, CMV single infection was the most abundant in mid-season with a 42% average frequency, while at the end of season (CMV+PVY) mixed infection appeared with an average of 38.3% and CMV single infection rate was 33%. PVY occurrence was significantly increased once detected with CMV. AMV was detected only with CMV in double and in triple infections with PVY. Additionally, border weeds were also investigated in the same period. *Solanum nigrum*, the most abundant weed in the field, was also the most infected by the mentioned viruses. Furthermore, molecular analysis of two CMV isolates from pepper and *S. nigrum* revealed that they belong to the subgroup IA. **[Khaled-Gasmi, W., Souissi, R., and Boukhris-Bouhachem, S. (Tunisia), Tunisian Journal of Plant Protection 15 (1): 1-17, 2020].**

PLANT PROTECTION NEWS IN THE ARAB AND NEAR EAST COUNTRIES

❖ Graduate Students Thesis (Master and Doctorate)

Effect of Endophytic Fungal Isolates on Wheat Aphid *Rhopalosiphum padi* (L.) (Hemiptera: Aphididae) Under Favorable and Unfavorable Conditions.

The main objectives of the current study were to: (i) isolate and identify cultivable fungal wheat endophytes from healthy wheat plants grown in different regions in Jordan, (ii) verify the endophytic characteristics through conducting *in-vitro* test on seeds and testing the germination success of seeds with and without endophyte, (iii) investigate the isolation rate, relative frequency, species richness, dominance, species diversity and similarity of cultivable endophytic fungi living inside different wheat plants parts, wheat growing fields, districts and governorate of Jordan, and investigate the role of different field's soil types, climate zones, altitudes and annual rain fall on biodiversity of wheat fungal endophytes, (iv) assist the influence of wheat cultivable fungal endophytes on wheat plants growth traits, (v) screen the ability of cultivable fungal endophyte isolates from other plants in enhancing wheat growth at germination stage, (vi) test the effectiveness of fungal endophytic strains in protecting wheat against wheat aphid, and (xii) analyze the secondary bioactive metabolites of endophytes that had most effect on development of wheat aphid by GC-MS. Wheat plants were collected from different wheat growing regions in northern, middle, and southern of Jordan. Fungal endophytes were isolated from wheat roots and aerial parts, including leaves, stems, and spikes using the cultivable dependent approach. A total of 85 representatives of the most dominant cultivable endophytes were sequenced using the Transcribed Spacer (ITS) 4 and ITS5 gene region. All identified isolates were belonging to phylum Ascomyctoa, sub-phylum Pezizomycotina. In Pezizomycotina, six classes, nine orders, and 15 families were recognized. Sordariomycetes accounted for the highest frequency followed by Dothidiomycetes. Fungi were most abundant in roots as compared to the other plant parts from which they were isolated. A total of 23 genera and 45 species were identified (new recorded) from different wheat plant parts. *Chaetomium* sp. was the most recovered fungus **(**42.68%) followed by *Fusarium* sp. (19.64%) and *Alternaria* sp. (13.8%). Different genera were identified from some parts and some were identified from all plant parts. Some of the isolated fungi had been reported in previous studies as pathogenic to wheat but according to the pathogenicity *in vitro* experiment, all the tested isolates except one isolate (*Fusarium equiseti* strain 39) were non-pathogenic and were not significantly different in all the parameters from the control. Seven genera and two unknown fungal species are new reports as fungal endophytes in wheat. The distribution of the different fungal endophytes among the different governorates showed diversity and richness for some genera and in certain locations. For example, *Chaetomium* was found in all governorates suggesting the adaptability of this fungus to wheat regardless of the location. The Species richness (S) was 17 for roots and spikes, 16 for stems and 14 for leaves. The overall Camargo's index was 0.0156

reflected high species diversity. The Shannon's and Simpson's diversity results indicated that the highest biodiversity was in roots and stems followed by spikes and leaves. The average number of isolates in the fields was 14.66 isolates / field. Four genera were isolated from more than 60% of the studied fields. *Chaetomium* was isolated from 97.7% of the fields followed by *Fusarium* (84.1%), *Alternaria* (68.2%) and *Penicillium* (60.2%). *Chaetomium* was the dominant genus (84.1% of field) then *Fusarium* (43.2, *Alternaria* (29.5%), *Penicillium* (7.95 %) and *Bipolaris* (2.27%). Fields species richness average was 5.17 (1/S= 0.193). The highest species richness, Shannon and Simpson's diversity indexes of fields were: Huwwrah1 and An-Nuayyimah in Irbid governorate. Highest fields means of species richness and diversity indexes found in fields with Vertisols followed by Inceptisols soil type; located in semi-arid Mediterranean climate zone (BS); with annual rain average of 350-400ml per year and altitude of 350-700m. Variation in these four factors could be correlated with the differences of abundant and diversity of fungal endophytes communities in field and districts of Jordan. Out of the 85 tested isolates for growth trait enhancement, *F. equiseti* strain 13 had significantly higher means in all growth traits with average mean increase of 43.87% compared to the control followed by *C. globosum* strain (48) with 30.03%, *C. elatum* (18) with 29.22%. *A. alternata* (88) and *A. mouchaccae* (10) with 29.37 % and 23.00% respectively, *A. tellustris* (79) with 24.46%., *A. infectoria* (118) with 22.60%, *Nigrospora oryzae* (43) with 26.76%, *T. citrinoviride* (110) with 25.67%, Ascobolaceae sp. (5) with 30.05%, and *Paecilomyces variotii* (40) with 19.89%. Twenty endophyte isolates isolated from ten weed plants were collected from locations in which weeds live naturally and not disturbed by agricultural practices. These endophytes were tested for capability to enhance wheat plant tolerance to salinity stress (NaCl 0, 50, 100, 150, 200, 225 and 250 mM). Eight isolates had an increase in both the total of all extensions and the number of seminal roots (NSR) at the means of all concentrations. Isolate AnR29 had the highest increase of all extensions (25%) and in the NSR with 17.82% increase. The highest increase on the NSR was 24.11% for isolate AmR22 and had 21.58% in the total of all extensions. *Penicillium* sp. CaT40 had the highest increase in sum of the above parts of 37.70% and in coleoptiles length (39.89%), *Alternaria* sp. PrF43 had the highest increase in the sum of the down parts of 24.06% and in radicle length of 29.47%. Wheat aphid (*Rhopalosiphum padi*) distribution was reported. Infestation was seen on different wheat plant parts, leaves sheath base, leaves, stems, and spikes. Wheat aphid generation duration in control plants was 5.6 day ± 0.55, adult longevity was 17.3 day ± 0.55 and total adult progeny was 37.02± 6.98, mean number of offspring/reproduction day was 2.2 ± 0.99. A percent of 83.3% of wheat aphid adult females were settled and reproduced on control wheat plants. Overall, results showed that some endophyte inoculated wheats affected the development of the wheat aphid (*R. padi*). *Trichoderma citrinoviride* and *C. globosum* inoculated wheat plants were highly significant from other endophytes in many measurements: mortality of adults (settling and reproduction) with 70.8 and 61.47%, respectively less than control; winged morphs reproduced with 77.5 and 38.2%, respectively more than control; generation duration with 40.8 and 54.13% respectively more than control; adult longevity with 20.75 and 35.25% respectively more than control; adult progeny with 44.62 and 27.69% respectively less than control; adult progeny and 27.69%, respectively, less than control; adult progeny /female/day with 54.68 and 46.01% respectively less than control. These results demonstrated resistance against attack *by R. padi*. Gas Chromatography Mass Spectrometry (GC-MS) analysis of *T. citrinoviride, C. globosum* and *F. equiseti* hexane crude extract revealed the existence of compounds belonging to nine chemical groups and sixteen sub-groups. The chemical groups were: Alcohols, Akenes, Alkylglycerols, Amides, Acids, Hydrocarbons, Terpenes, Ketonees and Esters. The componds and its amount (IS; area %) of the three fungal entophytes differ at chemical groups and subgroups level. The highest number of compounds found in *F. equiseti* belongs to Esters group (61.80%) followed by Acids (16.24) then Amides (14.46%) and Alkanes (3.26%). For *C. globosum*, compounds were belonging to Esters (77.52%), followed by Ketones (80.35%), Amides (4.56) and Acids (3.80%). For *T. citrinoviride* compounds were belonging to Esters (39.78%) followed by Alcohols (33.89), Acids (18.31%) and Terpenes (4.03%). Nineteen bioactive compounds (fractions) were identified from *F. equiseti* strain 27, 21 bioactive compounds from *C. globosum* strain 46 and 17 bioactive compounds from *T. citrinoviride* strain 110. Long chain alcohols, fatty acids and fatty acids esters which were reported to have proved bioactive activity against the wheat aphid were extracted. The high percentage of LCOHs (33.89%) and fatty acids and fatty acids esters (23.0%) of *T. citrinoviride* strain 110 could explain the significant phagodeterrent and aphid development negative effectively of *T. citrinov*iride strain 110, on wheat aphid. In addition, other compounds that could have a bioactive effect on wheat aphid were identified and need more studies. *C. globosum* had 1.27% LCOHs and 4.24% of fatty acids and fatty acids esters. These are some of the compounds that are responsible of the bioactivity. More studies are needed to find the effect of those as bioactive compounds against wheat aphid. All identified compound work together to have bioactive

effect (anti-feedant, deterrent and aphicidal) against wheat aphid. Identification of wheat endophytes that are present in locally grown wheat is a necessary step in enhancing wheat growth and tolerance to biotic and biotic factors. Moreover, compatibility and ability of endophytes from other plants can be investigated in enhancing wheat tolerance to salinity stress, and other pests and diseases, and thus, enhancing the wheat production in Jordan. **[Mashhour M. H. Alkhawaldeh (Jordan), Plant Protection Department, The University of Jordan, Supervisor: Dr. Salah-Eddin A. Araj, Co-Supervisors: Dr. Kholoud M. Alananbeh, Dr. Musa H. Abu Zarga, (Doctorate, 2020)].**

Auchenorrhyncha (Hemiptera) of Jordan.

A survey of the Auchenorrhyncha fauna of Jordan (leafhoppers, planthoppers, treehoppers, spittle bugs and cicadas) was carried out from May 2018 to November 2019. Insects were collected mainly by a battery-operated vacuum device from different hosts, including grasses, fruit trees, vegetables, ornamentals and wild plants. The survey included more than 50 field trips to the main phyto-ecological zones of Jordan (the Jordan Valley, the highlands and desert areas). Insects collected previously from Jordan and preserved in the University of Jordan Insect Museum were also examined. Jordanian specimens kept at the Hungarian Natural History Museum (including original type material) were examined. A total of 2,219 specimens were collected belonging to 114 species in 82 genera in 14 families, 42 species were new recoreds. The number of collected species followed by number of new records in each family were as follow: Aphrophoridae (2, 0), Caliscelidae (1, 1), Cercopidae (2, 1), Cicadellidae (77, 33), Cicadidae (6, 1), Cixiidae (5, 1), Delphacidae (5, 2), Dictyopharidae (5, 1), Flatidae (2, 1), Issidae (1, 0), Membracidae (1, 0), Meenopliidae (2, 1), Tettigometridae (4, 0) and Tropiduchidae (1,0). Identification keys for Jordanian species were constructed and provided with color images of adults and male genitalia. Data on the world and local distribution, collecting dates, hosts, biology and ecology were given. **[Zaid Mohamad Omran Nabas (Jordan), Plant Protection, Department, The University of Jordan, Supervisor: Ahmad Katbeh-Bader, Professor (Doctorate, 2020)].**

Evaluating the Performance of Chickpea genetic Resources Germplasms towards *Chickpea chlorotic stunt* and *Beet western yellows viruses* and Determination their Resistance Characteristics

Aphid persistently-transmitted luteoviruses (family *Luteoviridae*) are among the most important viruses which cause economical losses and show yellowing and stunting symptoms on legume crops worldwide, including Syria. A survey of chickpea (*Cicer arietinum* L.) fields in Al Ghab region, Hama, Syria was conducted in 2006, 2007, 2017 and 2018; All collected samples were tested for the presence of *luteoviruses* using the tissue-blot immunoassay (TBIA) followed by Multiplex RT-PCR; Results showed the presence of the *Chickpea chlorotic stunt virus* (CpCSV), to prevail over the other viruses (BWYV, BLRV and SbDV) belonging to *Luteoviridae* in all past and present growing seasons. On the other hand, this study clearly showed that the McAbs for CpCSV and BWYV used in this study and those available worldwide, are not virus species specific, and there was about 95% agreement (positive correlation) between TBIA and molecular analysis for detecting BLRV and SbDV but not (≈66%) for detecting CpCSV and BWYV. Considerable variation was recorded among nucleotides and amino acids sequences related to a fragment (370 bp) of the coat protein for different Syrian isolates of the four viruses (CpCSV, BWYV, BLRV and SbDV), and it revealed that -for the first time in Syria- some BWYV isolates could be identified as *Turnip yellows virus* (TuYV). One of the main outcomes of this study was the developing of a simple and economical technique with high infection efficiency to screen chickpea genotypes for CpCSV resistance under open filed conditions, in which seeds were sown in seedling tray plates containing a mixture of peat moss, sand and soil (1:0.5: 0.5), then two weeks later, seedlings were inoculated with a Syrian isolate of CpCSV using the aphid virus vector *Aphis craccivora* Koch under greenhouse conditions. Twenty-five days after sowing, seedlings were transplanted into the field; Then, by that technique, a total of 75 chickpea genotypes originated from 16 countries (obtained from the Gene Bank of ICARDA) were screened against

Syrian isolate of CpCSV, and six resistant and 16 tolerant genotypes from different origins were identified for the first time in Syria. Field experiments were carried out at Al-Ghab Scientific Agricultural Research Center, during the 2016/2017 and 2017/2018 cropping seasons to study the interaction of planting dates (10 December, 30 December and 20 January), chickpea cultivars (Ghab 3, Ghab 4, Ghab 5, FLIP95-67 and JG62) and plant densities (20, 25, 30, 35 and 40 plant/m^2) on chickpea infection with luteoviruses under natural infection conditions. Disease incidence was reduced, and grain yield was enhanced considerably (even for JG62, the susceptible variety) when planting early (up to mid-December) with plant density of 20-30 plant/m^2 and when proper variety (such as Ghab4 or FLIP95-67) were used. It is worth mentioning that the results of this study which evaluated the role of interaction between three treatments may provide the basics for better understanding of luteoviruses epidemiology in chickpea. The study provided sustainable practices options for the control of such viruses**. [Nader Yousef Asaad, (Syria), Faculty of Agriculture, Aleppo University, Syria, under supervision of: Dr. Amin Haj Kassem (Aleppo Uni.) and Dr. Safaa Kumari (ICARDA). (Doctorate, 2020)].**

Contribution to the Development of a Biocontrol Strategy against Fire Blight (Erwinia amylovora Burrill, 1883) in Morocco

The objective of this research is to contribute to the development of a biological fire blight control strategy for the pathogenic bacterium *Erwinia amylovora* on pome fruit rosaceae (pear [*Pyrus communis*], apple [*Malus domestica*] and quince [*Cydonia oblonga*]). The study was based on 4 experiments conducted in the laboratory and / or in the field. (1) The identification and characterization of Moroccan strains of *E. amylovora* by the random amplified polymorphic DNA fragment (RAPD) method was carried out. Strains of *E amylovora* were isolated from plant samples (shoots, leaves, flowers and fruits) of apple, pear, quince and an ornamental rosacea (*Pyracantha spp.*) affected by fire blight and harvested in various Moroccan geographies regions. High polymorphism of bacterial isolates with no correlation between the genetic diversity of these isolates and their geographical origin or plant host has been demonstrated. (2) The study of new potential bacterial antagonists for biocontrol of fire blight disease was carried out. Twenty bacterial soil and rosaceae flowers isolates show antagonistic activity against *E. amylovora* during (i) the agar diffusion test, (ii) the attached blossoms test and (iii) the immature pear test. The identification and characterization of the twenty bacterial isolates was done via conventional bacteriological and biochemical tests and sequencing of the 16S rRNA genes. These isolates were grouped into the following genera: Alcaligenes (ACBC1), Pantoea (ACBC2, ACBP1, and ACBP2), Serratia (HC4), Brevibacterium (SF3, SF4, SF7, and SF15),Pseudomonas (SP9), and Bacillus (CPa12, CPa2, HF6, JB2, LMR2, SF14, SF16, SP10, SP13, and SP18). In field trials, the most effective were *P. agglomerans* ACBP2, *B. amyloliquefaciens* LMR2, *B. halotolerans* (SF3 and SF4), and *B. mojarvensis* SF16. (3) The evaluation of the commercial biological control agent *Pantoea agglomerans* P10c against fire blight in Morocco was carried out. In the laboratory, tests were carried out on detached pear blossoms that undergone - at the open flower stage - either (a) an inoculation of *E. amylovora* alone (E0, control); (b) a pre-inoculation of *Pantoea agglomerans* P10c and a post-inoculation of *E. amylovora* (PE, preventive application); (c) a pre-inoculation of *E. amylovora* followed by post-inoculation of *Pantoea agglomerans* P10c (EP, curative application); (d) either an inoculation of *Pantoea agglomerans* P10c alone (P). The PE treatment showed a significant (96%) reduction in fire blight symptoms compared to E0 versus only a 32% reduction in the EP test. (4) The development of a fire blight control strategy integrating biocontrol agents and activators of natural plant defenses has been developed. Commercial preparations of bacterial antagonists (*Bacillus subtilis* GB03, *B. subtilis* QST713, *B. subtilis* Y1336 and *Pantoea agglomerans* P10c) and activators of natural plant defenses [acibenzolar-S-methyl (ASM), fosetyl aluminum (F-Al) , potassium phosphites (PH) and Prohexadione-Ca (ProCa)] have been evaluated individually or in combination for their effectiveness in controlling fire blight. Two individual applications of ProCa have been identified as the most effective treatment for reducing the incidence of shoot blight. The integration of plant defenses activators and biological control agents has achieved the highest rate of protection against blight of flowers and shoots, ranging from 76 to 98.2. **[Smail Ait Bahadou (Morocco), Plant Biotechnology and Molecular Biology, Moulay Ismail University, Faculty of Sciences, (Doctorate, 2019)].**

Evaluation of some Plant Extracts to Control Root Rot and Damping off on Okra Plant Caused by *Fusarium solani* and *Rhizoctonia solani.*

This study was conducted to evaluate the efficacy of hot and cold aqueous extracts of leaves and alcoholic of six species of desert plants (*Citrullus colocynthis* L., *Opuntia* spp. L., *Alhagi maurorum*.L., *Malva parviflorea* L. , *Suaeda vermiculata* forssk.es J and *Tamarix aucheriana* L.) to reduce root rot disease and the death of seedlings of okra caused by *Rhizoctonia solani* and *Fusarium solani*. Preliminary pathological test results showed that *R.solani* and *F.solani* significantly reduced the germination rate of okra seeds. The germination rates ranged between 40-46.67% compared to 100% without pathogenicity. As for the laboratory, the plants were effective in inhibiting the growth of the fungus *Rhizoctonia solani* and *Fusarium solani*, where the results of the study showed that there were no significant differences at the probability level of 0.05 between all concentrations of the studied plants (10, 15, 20, 25)% where all concentrations had an inhibitory effect and when studying the effect Interference The hot aqueous extract was given at a concentration of 10% and 25% inhibition rate of 81.6% and 80.0%, respectively, for the fungus, *R. solani* The hot aqueous extract at a concentration of 10% and 25% was given a rate of inhibition of the fungus *F. solani* was 78.0% and 82.1%. % Respectively. The results of the green house proved that the treatment of seeds with hot and cold alcoholic and aqueous extracts had a positive effect in controlling the disease and differed significantly from the comparison treatment (seeds not treated with the extract) and gave plant extracts at a concentration of 10 and 25% when they overlapped with the fungi *Rhizoctonia solani* and *Fusarium solani* increased in All studied traits of plant length, dry and wet weight of the vegetative and root groups, and lowering the incidence ratio compared to the comparison treatment. The treatment of seeds with aqueous hot extract of bitter melon reduced the infection rate to 0% and gave the highest lengths of the vegetable total to 13.53 cm, the root length of 5.42 cm, the wet weight of the vegetable total reached 0.86 g, the dry weight of the vegetable total reached 0.30 g, the wet weight of the root total was 0.24 g and the dry weight of the total The root was 0.12 g. The results indicated that the alcoholic extracts preserved in commercial corn oil also had a positive effect on the inhibition of the fungi. The alcoholic extract preserved in the oil at a concentration of 10% for bitter melon and 25% for the baker gave an inhibition rate of 84.6% and 85.7%, respectively, for the fungus, *R. solani* gave the alcoholic extract preserved in oil also at a concentration of 10% and 25% for bitter melon and baking plants. The inhibition rate for the fungus *F. solani* was 83.6% and 83.9%, respectively. The infection rate has also been reduced to 0%. **[Asmaa Abdul Munem Talib Al-Araji (Iraq), Plant Protection - Plant disease, Faculty of Agriculture, University of Kufa-Iraq, Supervised by Prof. Dr. Fadhal Abdul Hussein Al-Fadhal (Master,2020)].**

❖ Some Plant Protection Activities of FAO and Other Organizations

ACTIVITIES OF THE REGIONAL OFFICE OF FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS – NEAR EAST AND NORTH AFRICA

FAO Regional Office for Near East and North Africa

First Steering Committee meeting (virtually) of the Red Palm Weevil Management Programme in the Near East and North Africa.

The Regional office for Near East and North Africa (RNE) of the Food and Agriculture Organization of the United Nation (FAO) organized its first Zoom meeting on the status and implementation of the Red Palm Weevil Management Programme on 08th June 2020. The Red Palm Weevil (RPW) is a serious transboundary pest of date, coconut and ornamental palms and is among the world's major invasive pests that attacks around 40 palm species worldwide causing widespread damage to date palms and other plantations and impacts production, farmer livelihoods and the environment.
Participants in the teleconference included some members of the RPW Trust Fund Steering Committee including FAO, AOAD, ICARDA, IPPC, NEPPO, CIHEAM-Bari, ICBA, RPW programme Trust Fund pledging countries (Kingdom of Saudi Arabia, United Arab Emirates, Sultanate of

Oman) and international RPW Experts, in addition to technical officers and specialists from FAO Headquarter and the Regional office for the NENA Region. Various cities, 8 June 2020: The FAO first international conference on RPW held in Rome (29 to 31 March 2017 had developed a Framework Strategy for Eradication of RPW. The first RPW Steering Committee Meeting convened in Cairo (22 to 24 May 2017) finalized the report of the Rome Meeting and a proposed a matrix to follow-up actions. Another important meeting was held at the margin of the sixth International Date Palm Conference, UAE (19 March 2018). It focused on the importance of a multidisciplinary programme and an integrated approach to manage the RPW. Later on, FAO organized a scientific international meeting on "Innovative and Sustainable Approaches for the Control of RPW in Bari, Italy (23 to 25 October 2018). Bari meeting focused the attention on the gaps in the control of RPW. This was followed by a donor meeting in Abu Dhabi on 9 March 2019 which endorsed the FW strategy for eradication of RPW and endorsed the creation of a Trust Fund to finance its implementation. Five Technical Working Groups (TWGs) were formed to address the gaps in RPW management in areas of technology transfer, research and capacity building. Membership in the TWGs comprised FAO, international and regional R&D organizations, National Agricultural Research Systems (NARS) in the NENA region, private sector and International RPW experts.

The current meeting reviewed the status of the RPW Management Programme and the work of the TWGs. Partners reviewed the financial aspects including donor pledges. They assessed the status of the TWGs priorities, project development, budget allocations and partnerships issues. The meeting addressed pending actions needed towards completion of the TWGs projects' workplans, targets, detailed activity budgets, nomination of country focal points, collection of baseline data, designation of a leading institution/partner for each TWG and a monitoring plan. Participants evaluated the work of the TWGs projects based on relevance, feasibility, sustainability and projects alignment and strategic fit to the RPW Framework Strategy among other criteria. The meeting decided on TWG project priorities, activity programming (priorities, timelines etc.) and level of funding to be approved. Participants emphasised on fostering partnerships for effective implementation of planned activities. The meeting noted the remarks, suggestions and expectations of partners organizations and countries and agreed on follow-up actions and deadlines towards the work of the TWGs, launch of TWGs activities and strengthening partnerships.http://www.fao.org/neareast/news/view/en/c/1280399/

FAO Efforts Toward Concrete Impact in the Way of Controlling FAW in Yemen

Photo Caption: Beneficial insect in the field feeding on the Larva of FAW as a bio-control in Yemen ©FAO

In June 2018, the fall armyworm, appeared for the first time in Yemen and farmers appeals raised from the field to identify this new threat. In response to the request from the national authorities, FAO sent technical team to affected areas to explore the situation and conduct an initial survey including collected samples of FAW.

FAO built the capacity of Ministry of agriculture and irrigation (MAI) staff through regular training workshops targeted over 125 agro-engineers representing all governorates throughout the country on identifying the pest and the damage, monitoring mechanisms and control by introducing new technologies such as utilization of smart phones and pheromones traps through establishing the Farmer Fields Schools (FFS) training programs.

The primary concern of FAO intervention was to help farmers and preserving their agroecosystem form the devastating consequences of FAW or the un-rational use of pesticides. Therefore, FAO control strategy focuses on how to preserve the Yemeni agroecosystem, as well as, the livelihoods of small-scale farmers

Seventy percent of the Yemeni population lives in rural areas, depending on agricultural livelihoods to survive. However, since the tragic war stricken the country in mid-March 2015, farmers' situation has been deteriorating at all levels. For instance, from time to time, some pests and diseases appear, threatening the life of crops and causing them severe damage. The lack of awareness and knowledge on how to manage or control such a problem exacerbate farmers' struggle. Therefore, raising awareness of farmers in the areas of biological control by rearing beneficial insects and allow them to use environmental-friendly plant protection techniques will positively impact their food security and income status together with protecting their ecosystem.

In addition to given technical support, FAO provided MAI with FAW monitoring and management equipment including pheromone traps, smart phones and Neem-based bio-insecticide.
Although the limited financial resources, the obtained results are promising and encouraging for more investment to continue FAW monitoring and management during coming seasons especially in coastal and warm areas.

Photo Caption: FAO International experts during conducts FAW training program in Yemen. ©FAO

Photos Caption: Mohammed conducts FAW survey process in the field on crops (Maize and Sorghum). ©FAO
Technical Knowledge and Raising Awareness Make a difference in plant Protection

Photo Caption: Eng. Mohammed during conducting awareness session for farmers in the field. ©FAO

The Regional Efforts against Fall Armyworm in Near East and North Africa

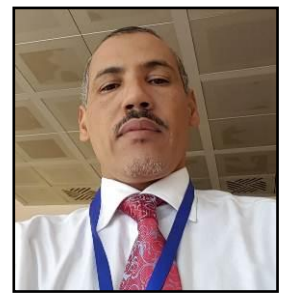
The NENA region has continued the efforts to face the risks of Fall Armyworm (FAW), and series of tele meetings were held by FAO with the participation of the Arab Association of Plant Protection and Near East Plant Protection Organization, and representatives of 16 different countries of the region. The meetings were held with the aim of exchanging information on pest status, provide updates on geographic distribution, economic losses and countries' efforts against the pest. Also, the tele meetings were used as capacity development tool to improve the knowledge on Integrated Pest Management of the FAW, FAO smart phone application (FAMEWS) that help countries to collect and manage data of field scouting ad trap inspection as part of the national surveillance system During the meeting, the activities performed jointly by FAO and Ministry of Agriculture in Yemen against FAW were presented. Notably, the activities of identification of natural enemies, trap management and surveillance system. Also, the national focal point of Mauritania presented general information on the pest presence in Mauritania, the affected areas and level of damage. In addition, he highlighted the partnership with FAO and the FAO assistance in identifying the suspected specimens using molecular tool. Government of Mauritania has established national task force, developed national action plan and performed some training and awareness raining activities before the lockdown measures due to COVID-19. Also, FAO has supported the Mauritanian government by 100 traps and 300 lures.
The national focal point of Egypt highlighted the national efforts in Egypt that were launched 2 years before the arrival of the pest. He also stressed that FAO has supported the Egyptian government efforts since then by providing technical guidance, knowledge exchange, pest monitoring tools and identification of specimen. A year ago, new emergency TCP project was launched. The Egyptian specialists has received training on pest identification, field scouting, trap management and FAMEWS. He stated that the pest was first reported in three governorates; Aswan, Luxor and Qena. Recently, the pest was detected northward in Sohag. The pest prevalence has increased in Qena and decreases in Aswan compared to the last season. Currently, the Ministry of Agriculture has announced temporary recommendations for managing FAW in Egypt, and the next year, more recommendation will come after finalizing the pesticides evaluation experiments. The Ministry of Agriculture in Egypt is conducting national wide study to identify natural enemies and potential biocontrol agenda. In addition, FAO will support natural enemy's production facilities in Sohag.

The president of the Arab Association of Plant Protection delivered a lecture on available approaches and tools within the Integrated Pest Management (IPM) against FAW. The lecture included overview on pest biology, behaviour and host damage, in addition, historical prospective on the different control strategies used against FAW. The lectures discussed thorough the pros and cons of control methods, their effectiveness and lesson

learnt from other countries experience. The lectures emphasized the importance of selecting the proper pesticides depending on their efficiency and adverse effect on health and environment, and also the importance of alternative cultural methods like push and pull.

Congratulation

Regional Plant Protection Office, FAO-RNE, Cairo, Egypt and the Arab Society for Plant Protection (ASPP) Congratulate Dr. Mohamed El Hady for his new position as a Plant Production and Protection officer in the sub-regional office of the Food and Agriculture Organization of the North African region in Tunisia since December 2019. Mr. Mohamed El-Hady is currently leading plant production and protection activities in the Food and Agriculture Organization of North Africa to support crop production and pest and plant diseases control. Mr. Mohamed El Hady obtained his PhD in Desert Locust Bioecology from the University of Paris XI Orsay in 1996. Prior to that, Mr. Mohamed El Hady obtained a certificate of Agricultural Engineer specializing in plant protection from the National Institute of Agriculture in Algeria. He began his career as an official in charge of scientific research on desert locust control at the National Center for Locust Control in Mauritania. He also worked for three years as an expert in the FAO project on locust control techniques and provided numerous consultations to FAO in the field of plant protection and then was appointed head of the Agricultural Production service from 2004 until 2007. Then, he was appointed as a regional director of agriculture and veterinary in Adrar, Mauritania, until late 2009. He also worked from 2000 to 2009 as a national expert representing Mauritania on the Sahelian Pesticides Committee, the regional pesticide registration authority in nine countries from the Sahel. In December 2009, Mr. Mohamed El Hady joined the United Nations Food and Agriculture Organization in Rome as an agricultural officer at the secretariat of the Rotterdam Convention, where he trained national authorities in several Arab and African countries on implementing the Rotterdam Convention at the national level, as well as implementing several programs on monitoring and evaluating the effects of pesticides on the Human health and the environment. **[Dr. Mohamed El Hady Sidatt (Mauritania), 2020]** MohamedelHady.Sidatt@fao.org



Activities of the Commission for Controlling the Desert Locust in the Central Region (CRC) Food and Agriculture Organization of the United Nation

Desert Locust Situation

Warning level: THREAT

General Situation of the Desert Locust during July 2020 and Forecast until mid-September 2020 provided by the FAO Emergency Centre for Desert Locust (ECLO).

General Situation

Focus shifts to summer breeding area

Second-generation spring swarms declined in northwest Kenya by mid-July. A few swarms crossed into northeast Uganda while other swarms migrated northwards to Ethiopia to join existing swarms, some of which moved into the northern Ethiopian highlands and northwest Somalia where hopper bands and swarms were already present. Some of the swarms that continued east across northern Somalia could still reach India and Pakistan in early August. Two swarms from Yemen invaded northeast Ethiopia. A few swarms may appear in Sudan and Eritrea where conditions became favourable for summer breeding. Unusually heavy rains fell again in Yemen where hopper bands and swarms continued to form, which is likely to continue. Widespread breeding is also expected in northern and eastern Ethiopia. Consequently Ethiopia and Yemen are likely to be the epicentre of summer infestations. In southwest Asia, the situation has nearly returned to normal in Iran but remains serious along the Indo-Pakistan border where monsoon breeding commenced by spring-bred swarms, including those returning from northern India, and substantial hatching and band formation are expected in August. A second generation of summer breeding will start in September. At least one swarm reached Nepal and dispersed. Control operations were in progress in all affected countries. Although the threat to West Africa

has nearly subsided for now, summer breeding will cause locust numbers to increase between Mauritania and Chad.

Western Region: CALM

SITUATION. Isolated adults in Mauritania, Niger, Chad, and Algeria. FORECAST. Small-scale breeding in the northern Sahel from Mauritania to Chad.

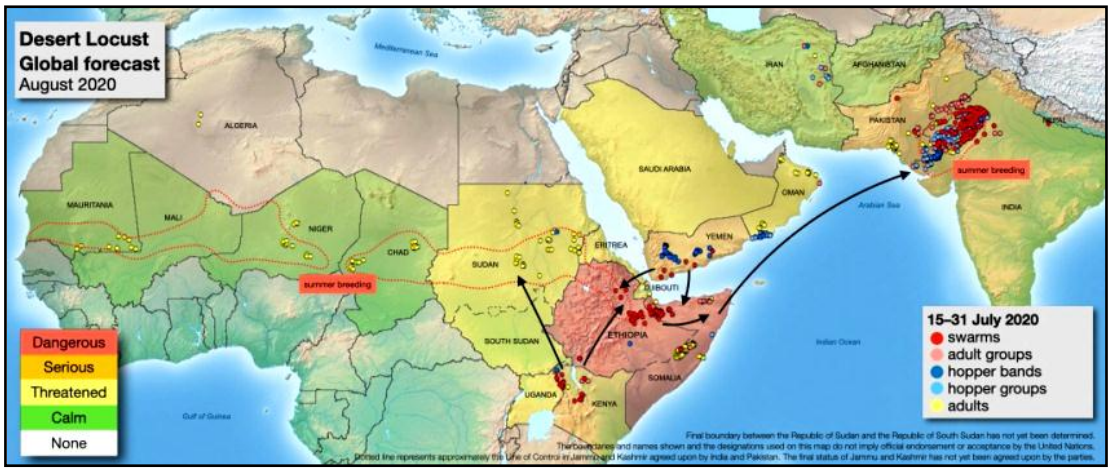
Central Region: THREA

SITUATION. Swarms decline after mid-July in northwest Kenya (12 080 ha treated), some move north to Ethiopia (44 883 ha) where swarms persist in north and east; hopper bands and swarms in northern Somalia (12 569 ha), some swarms move east. Few swarms in northeast Uganda (3 080 ha). Hopper bands and swarms in the interior and south coast of Yemen (10 718 ha); hopper bands on south coast of Oman (443 ha); adults and a mature adult group and swarm in southwest Saudi Arabia (440 ha). Scattered adults in Sudan (235 ha). FORECAST. Few residual swarms likely to remain in northwest Kenya but some may migrate to Ethiopia and Sudan via South Sudan in August. Swarm breeding will cause hopper bands to form in northern and eastern Ethiopia, coastal and interior Yemen, and perhaps northern Somalia. Widespread local breeding in Sudan. Other swarms likely to arrive in northeast Ethiopia from Yemen and a few swarms may arrive in Eritrea and breed.

Easter Region: THREAT

SITUATION. Situation calms down in Iran (1 450 ha treated). Swarm breeding along Indo-Pakistan border with hatching and band formation in Pakistan (33 599 ha) and India (102 645 ha); swarms in northern states returned to Rajasthan, and one swarm reached Nepal. Limited breeding in eastern Afghanistan (304 ha). FORECAST. Substantial increase in locust numbers in India and Pakistan during August with more hatching and band formation; a second generation of egg-laying to start from early September onwards.

For more up to date information about the Desert Locust situation and forecasts, visit the FAO's Desert Locust website: http://www.fao.org/ag/locusts/en/info/info/index.html and FAO Commission for Controlling the Desert Locust in the Central Region http://desertlocust-crc.org. Source: The FAO Desert Locust Bulletin issued monthly in English and French by the Desert Locust Information Service, AGP Division (Rome, Italy; and Arabic version by the Commission for Controlling the Desert Locust in the Central Region (FAO Regional Office for Near East, Cairo, Egypt http://desertlocust-crc.org).



ARAB SOCIETY FOR PLANT PROTECTION NEWS

Postponement of the 13th Arab Congress of Plant Protection

After considerable discussion between the Executive Committee of ASPP and the Congress Organizing Committee in Tunisia, and after considering all the parameters associated with Covid 19 pandemic and its potential effect on the congress participants and their families, it was decided to postpone the congress until 31 October-5 November, 2021. We would like to bring to the attention of participants the following points:

1. The new congress date is October 31-November 5, 2021.
2. The congress venue will remain Hotel Le Royal, Hammamat, Tunisia.
3. All submitted abstracts will be transferred to the new date, unless participants send an apology letter to the Organizing Committee indicating that they will not be able to attend the new date, or they prefer to send a new or revised abstract. New submissions will also be accepted.
4. The email address for the congress will continue to be: info@acpp-aspp.com.

The Congress Organizing Committee will soon announce new dates for new abstracts submission, or registration through the congress website. Participants are encouraged to follow all congress news on the congress website.
We apologize for any inconvenience caused by this postponement which was imposed on us by conditions beyond our control, and very much appreciate your kind understanding. Looking forward to meet you all in the fall of 2021 in Tunisia.

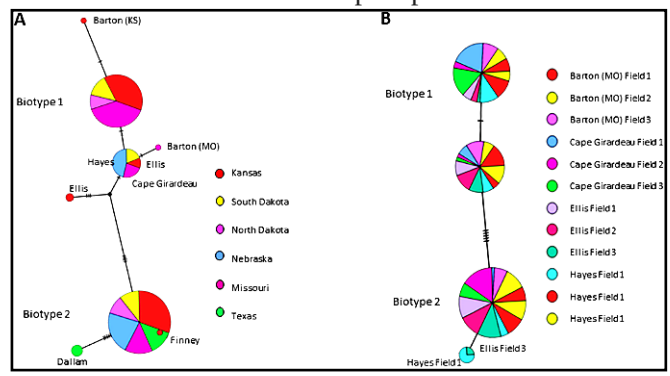
The Arab Society for Plant Protection
The Organizing Committee of the 13th Arab Congress of Plant Protection in Tunisia

ASPP MEMBERS NEWS ABROAD

Identification of Brassicadiene, a Diterpene Hydrocarbon Attractive to the Invasive Stink Bug *Bagrada hilaris*, from Volatiles of Cauliflower Seedlings, *Brassica oleracea* var. *botrytis*.

Brassicadiene, a novel tricyclic diterpene hydrocarbon, was identified by a combination of mass spectrometry, microchemical tests, and analysis of NMR spectra. The compound constitutes >90% of the volatile organic compounds produced by cauliflower seedlings, *Brassica oleracea* var. *botrytis*. The invasive stink bug *Bagrada hilaris* is strongly attracted to brassicadiene, providing a mechanism for this herbivore, which specializes on cruciferous plants, to locate its hosts in a nutrient-rich and vulnerable stage. [**Kyle Arriola, Salvatore Guarino, Christian Schlawis, Mokhtar Abdulsattar Arif (Iraq-Italy), Stefano Colazza, Ezio Peri, Stefan Schulz, Jocelyn G. Millar.**
doi.org/10.1021/acs.orglett.0c00707 , https://pubs.acs.org/doi/10.1021/acs.orglett.0c00707

Modeling *Aceria tosichella* Biotype Distribution over Geographic Space and Time.



The wheat curl mite, *Aceria tosichella* Keifer, one of the most destructive arthropod pests of bread wheat worldwide, inflicts significant annual reductions in grain yields. Moreover, *A. tosichella* is the only vector for several economically important wheat viruses in the Americas, Australia and Europe. To date, mite-resistant wheat genotypes have proven to be one of the most effective methods of controlling the *A. tosichella*—virus complex. Thus, it is important to elucidate *A. tosichella* population genetic structure, in order to better predict improved mite and virus management. Two genetically distinct *A. tosichella* lineages occur as pests of wheat in Australia, Europe, North America, South America and the Middle East. These lineages are known as type 1 and type 2 in Australia and North America and in Europe and South America as MT-8 and MT-1, respectively. Type 1 and type 2 mites in Australia and North America are delineated by internal transcribed spacer 1 region (ITS1) and cytochrome oxidase I region (COI) sequence differences. In North America, two *A. tosichella* genotypes known as biotypes are recognized by their response to the *Cmc3* mite resistance gene in wheat. *Aceria tosichella* biotype 1 is susceptible to *Cmc3* and biotype 2 is virulent to *Cmc3*. In this study, ITS1 and COI sequence differences in 25 different populations of *A. tosichella* of known biotype 1 or biotype 2 composition were characterized for ITS1 and COI sequence differences and used to model spatio-temporal dynamics based on biotype prevalence. Results showed that the proportion of biotype 1 and 2 varies both spatially and temporally. Greater ranges of cropland and grassland within 5000m of the sample site, as well as higher mean monthly precipitation during the month prior to sampling appear to reduce the probability of occurrence of biotype 1 and increase the probability of occurrence of biotype 2. The results suggest that spatio-temporal modeling can effectively improve *A. tosichella* management. Continual integration of additional current and future precipitation and ground cover data into the existing model will further improve the accuracy of predicting the occurrence of *A. tosichella* in annual wheat crops, allowing producers to make informed decisions about the selection of varieties with different *A. tosichella* resistance genes. **[Luaay Khalaf (Iraq-USA), Alicia Timm, Wen-Po Chuang, Laramy Enders, T. J. Hefley, C. Michael Smith, Published: May 29, 2020].** https://doi.org/10.1371/journal.pone.0233507

Characterization of Type VI Secretion System in *Xanthomonas oryzae* pv. *oryzae* and its Role in Virulence to Rice.

Type VI secretion system (T6SS) is a contact-dependent secretion system, employed by most gram-negative bacteria for translocating effector proteins to target cells. The present study was conducted to investigate T6SS in *Xanthomonas oryzae* pv. *oryzae* (*Xoo*), which causes bacterial blight in rice, and to unveil its functions. Two T6SS clusters were found in the genome of *Xoo* PXO99^{A}. The deletion mutants, Δ*hcp*1, Δ*hcp*2, and Δ*hcp*12, targeting the *hcp* gene in each cluster, and a double-deletion mutant targeting both genes were constructed and tested for growth rate, pathogenicity to rice, and inter-bacterial competition ability. The results indicated that *hcp* in T6SS-2, but not T6SS-1, was involved in bacterial virulence to rice plants. However, neither T6SS-1 nor T6SS-2 had any effect on the ability to compete with *E. coli* cells. In conclusion, T6SS gene clusters in *Xoo* have been characterized, and its role in virulence to rice was confirmed. **[Yeoun-ju Choi, Namgyu Kim, Mohamed Mannaa (Egypt-Koria), Jungwook Park, Hyejung Jung, Gil Han, Hyun-Hee Lee, and Young-Su Seo (Koria), The Plant Pathology Journal, 36, pp.289-296, 2020]**

Influence of Resistance-Inducing Chemical Elicitors against Pine Wilt Disease on the Rhizosphere Microbiome.

Pine wilt disease (PWD) caused by *Bursaphelenchus xylophilus* is a major threat to pine forests worldwide. Induction of resistance is a promising and safe management option that should be investigated in relation to its possible influence on the pine tree ecosystem, including the surrounding microbial communities. In this study, two main resistance-inducing chemical elicitors, methyl salicylic acid (MeSA) and acibenzolar-s-methyl

(ASM), were tested for their control efficiency against PWD and their influence on the rhizosphere microbial composition. Foliar treatment of pine seedlings with the chemical elicitors resulted in a reduction in PWD severity, with ASM showing better control efficacy, reaching up to 73% compared to the untreated control. Moreover, bacterial community analysis of the rhizosphere revealed significant changes in several microbial taxa that were present at low relative abundance. In particular, ASM treatment resulted in a significant increase in specific microbial taxa, including members of the *Rhodanobacter*, *Devosia*, *Bradyrhizobium*, *Acidibacter*, *Mesorhizobium*, and *Hyphomicrobium* genera, which are known to play ecological and plant growth-promoting roles. Furthermore, chitinolytic bacteria were shown to be reduced in response to treatment with both MeSA and ASM. Altogether, the present findings demonstrate the occurrence of significant alterations in several ecologically important microbial taxa after treatment with resistance-inducing chemicals. As compared to MeSA treatment, ASM treatment was more effective at suppressing PWD and resulted in more beneficial changes in rhizosphere microbial composition. **[Mohamed Mannaa (Egypt-Koria), Gil Han, Hee Won Jeon, Junheon Kim, Namgyu Kim, Ae Ran Park, Jin-Cheol Kim and Young-Su Seo. Microorganisms, 8(6), p.884,2020]**

Smart Palm: An IoT (Internet of Things) Framework for Red Palm Weevil Early Detection.

Smart agriculture is an evolving trend in agriculture industry, where sensors are embedded into plants to collect vital data and help in decision making to ensure higher quality of crops and prevent pests, disease, and other possible threats. In Saudi Arabia, growing palms is the most important agricultural activity, and there is an increasing need to leverage smart agriculture technology to improve the production of dates and prevent diseases. One of the most critical diseases of palms if the red palm weevil, which is an insect that causes a lot of damage to palm trees and can devast large areas of palm trees. The most challenging problem is that the effect of the weevil is not visible by humans until the palm reaches an advanced infestation state. For this reason, there is a need to use advanced technology for early detection and prevention of infestation propagation. In this project, we have developed am IoT based smart palm monitoring prototype as a proof-of-concept that (1) allows to monitor palms remotely using smart agriculture sensors, (2) contribute to the early detection of red palm weevil. Users can use web/mobile application to interact with their palm farms and help them in getting early detection of possible infestations. We used Elm Company IoT platform to interface between the sensor layer and the user layer. In addition, we have collected data using accelerometer sensors and we applied signal processing and statistical techniques to analyze collected data and determine a fingerprint of the infestation. **[Anis Koubaa, Abdulrahman Saad Aldawood, Bassel Saeed, Abdullatif Hadid, Mohanned Ahmed, Abdulrahman Saad, Hesham Alkhouja, Adel Ammar and Mohamed Alkanhal, (Oman-Suadia Arabia), Agronomy, 10, 987, 2020].** doi:10.3390/agronomy10070987

A New Species of *Cenopalpus* Pritchard & Baker (Acari: Tenuipalpidae) from Japan, with Ontogeny of Chaetotaxy and a Key to the World Species.

A new species of flat mite, *Cenopalpus umbellatus* sp. November. (Acari: Trombidiformes :Tenuipalpidae) is described and illustrated based on females, males, deutonymphs, protonymphs and larvae. The morphological ontogeny in idiosomal and leg chaetotaxy is briefly described for all stages. Mite specimens were collected from the leaves of *Rhaphiolepis indica* var. *umbellata* Makino (Rosaceae), an evergreen shrub native to Japan. An identification key to the world species of *Cenopalpus* is also provided**. [Mohamed W. Negm, (Egypt-Japan), Edward A. Ueckermann and Tetsuo Gotoh, (Japan). Peer J. 8: e9081**
doi:10.7717/peerj.9081 [2020]

Soil-inhabiting Mites of the Family Laelapidae (Acari: Mesostigmata) from Assiut Governorate, Egypt.

This paper reports on ten species, in six genera, of soil-inhabiting mites of the family Laelapidae from Assiut Governorate, Egypt. The species *Androlaelaps projecta* Furman, 1972, *Gaeolaelaps mirzakhaniae* Kazemi & Khalesi, 2018, *G. nolli* (Karg, 1962), *Hypoaspisella asperatus* (Berlese, 1904a) comb. nov., *Laelaspis calidus* Berlese, 1924 and *Ololaelaps tasmanicus* (Womersely, 1956) are recorded for the first time from Egypt. Supplementary descriptions of some species are presented to facilitate species delimitation. The males of *Cosmolaelaps longus* (Hafez, Elbadry & Nasr, 1982) and *O. tasmanicus* are described for the first time. **[Omid Joharchi and Mohamed W. Negm (Egypt-Japan). Zootaxa 4759(4): 488–510, 2020]**

Population Dynamics of *Oligonychus mangiferus* and *Aceria mangiferae* (Acari: Tetranychidae, Eriophyidae) on Two Mango Cultivars in Assiut Governorate, with an Annotated Checklist of Mango Mites in Egypt.

The mango spider mite, *Oligonychus mangiferus* (Rahman and Sapra) (Tetranychidae) and the mango bud mite, *Aceria mangiferae* Sayed (Eriophyidae) are serious pests of mango orchards in Egypt. The population dynamics of both species were studied on two mango cultivars (Zebda and Taimoor) under the natural climatic conditions of Assiut Governorate. Also, an annotated list was provided for the mite fauna inhabiting mango orchards during the present study and in previous Egyptian literature. The results showed that the population dynamics of both mite pests were affected by the ambient climatic conditions (temperature and relative humidity) and mango cultivar. The peak population of *O. mangiferus* was reported in October-November on leaves of both cultivars, while *A. mangiferae* was found regularly at almost all examined buds throughout the year. The checklist reported on 67 species belonging to 30 families and 52 genera. The predatory mites, *Eucheyletia* sp., *Lepidocheyla gracilis* Volgin (Cheyletidae) and *Hemisarcoptes coccophagus* Meyer (Hemisarcoptidae) were recorded for the first time in Egypt. Interestingly, the family Phytoseiidae represented the largest diversity of mites reported herein, with 10 species records. We anticipate that the results reported in the current study may encourage the establishment of control programs for these pests using phytoseiid mites. [**Fatma A. Marei, Mohamed W. Negm (Egypt-Japan), Mohamed A. Nasser, Sayed A. Eraky. International Journal of Entomology and Nematology 6(1): 149–155,2020]**

A New Species of *Amblyseius* Berlese (Acari: Phytoseiidae) from Japan.

A new phytoseiid mite species, *Amblyseius marunumus* sp. n., is described and illustrated based on female and male specimens collected from Gunma, Japan. The new species belongs to the *americanus* species-group, due to the presence of setae *J2* and *Z1*, and having setae *z4* longer than *z2*. *Amblyseius marunumus* sp. n. is morphologically close to *A. yadongensis* Wu, but differs conspicuously in the length of the dorsal idiosomal setae *z4*, *r3*, *S2*, *S5* and the shape of spermatheca**. [Mohamed W. Negm (Egypt-Japan) and Tetsuo Gotoh (Japan). Biologia,** https://doi.org/10.2478/s11756-020-00519-6, 2020]

Interplay between ABA Signaling and RNA Silencing in Plant Viral Resistance.

Abscisic acid (ABA) regulates plant responses to different stimuli including viral infections through two different defense mechanisms; the antiviral RNA silencing pathway and callose accumulation. In some pathosystems, induction of these defense mechanisms is stronger in plants with resistance (R)-genes than in more susceptible plants. Mutants in several RNA silencing genes are hypersensitive to ABA, which suggests that these genes exert a regulatory feedback loop on ABA signaling. This scenario suggests that the RNA silencing pathway can target genes involved in the ABA pathway to control ABA production/signaling since prolonged production of this stress hormone arrests plant growth and development. Mutations in the ABA or salicylic acid pathways do not completely repress RNA silencing genes, indicating that RNA silencing represents a regulatory hub through which different pathways exert some of their functions, and thus the regulation of RNA silencing could be subject to hormone balancing in plants. **[Mazen Alazem[1](Syria-Koria) and Na-Sheng Lin[2]" [1]Department of Agricultural Biotechnology, College of Agriculture and Life Sciences, Seoul National University, Seoul 08826, Republic of Korea; Plant Genomics and Breeding Institute, College of Agriculture and Life Sciences, Seoul National University, Seoul 08826, Republic of Korea, [2]Institute of Plant and Microbial Biology, Academia Sinica, Taipei 11529, Taiwan, Current Opinion in Virology, Volume 42, Pages 1-7, June 2020].** m.alazem@gmail.com

Coding-Complete Genome Sequence of a *Black Queen Cell Virus* Isolate from Honey Bees (*Apis mellifera*) in Italy.

Black queen cell virus (BQCV) is one of the most common and widespread viral pathogens causing mortality in queen bee pupae. During a nationwide monitoring network event conducted in Italy in 2009 to 2010, 749 adult honey bee samples were analyzed by TaqMan-based real-time reverse transcription-PCR, of which 75% were infected with BQCV. The infected queen bee larvae turn yellow and then brown-black. The blackened

areas on honeycomb cell walls that contain infected pupae give the name to this virus. BQCV was first isolated from queen prepupae and pupae found dead in their cells. It can be transmitted horizontally through social movements between adults within and between colonies, as well as vertically from the queen to offspring and from adults to larvae through glandular secretions, e.g., royal jelly. BQCV belongs to the recently established genus **Triatovirus** within the **Dicistroviridae** family and the order **Picornavirales**. The viral genome consists of a single-stranded RNA molecule approximately 8,550 nucleotides (nt) long, possessing two open reading frames (ORFs), ORF1 and ORF2, which encode polyproteins containing nonstructural and structural (capsid-forming) subunits, respectively. Here, we report the complete coding nucleotide sequence of an Italian BQCV isolate from infected Apis mellifera workers collected in the spring of 2018 in Puglia, South Italy. The viral RNA was extracted from a pool of five adult honey bees collected from an apiary located in the Puglia region, all showing suspected symptoms of BQCV infection, such as dark color. The infected bees were homogenized in liquid nitrogen using a mortar and pestle, and the TRIzol (Thermo Fisher) extraction protocol and isopropanol precipitation were applied. The water-resuspended total RNAs were further purified using an RNeasy plant minikit (Qiagen, Valencia, CA, USA) and DNase (Promega, USA) digested following the manufacturer's instructions. Poly(A) enrichment of the total RNAs and Illumina TruSeq RNA library construction, followed by 2 × 100-bp NovaSeq sequencing, were outsourced to Macrogen, Inc. (Seoul, South Korea). The total number of obtained reads was 36,919,326. The raw reads were quality checked using FastQC. Paired reads of 101 bp were assembled using metaSPAdes version 3.9.0 with the "only-assembler" parameter and multiple kmers (-k, 71, 81, and 91). The coding-complete genome sequence of the BQCV isolate was assembled with an average coverage of 13.4× (3.5 reads per kilobase per million reads [RPKM]). This genome consisted of 8,458 nucleotides (nt) with a GC content of 40.30%, including 2 untranscribed regions (UTRs) at the 5′ and 3′ locations consisting of 647 nt and 154 nt, respectively. The 5′-proximal open reading frame 1 (ORF1) initiated at nucleotide position 648 and terminated at nucleotide position 5534, and the 3′-proximal ORF2 was located between nucleotide positions 5851 and 8304. The Italian BQCV isolate shared 95.93% nucleotide identity with a BQCV isolate from Vespa velutina **nigrithorax** in France (NCBI GenBank accession number MN565034) and also clustered together in the phylogenetic tree with isolates from China and Hungary (NCBI accession numbers KP119603, KY741959, and EF517515). This is the complete coding genome sequence of BQCV-IT1, isolated from A. mellifera in Italy. It provides additional insights and a better understanding about BQCV genome phylogeny and divergence. The complete coding genome sequence of *Black queen cell virus* isolate (BQCV-IT1) from Italy has been deposited in the GenBank database under the accession number MT416539. Sequencing reads are available in the SRA database under BioProject accession number PRJNA637229. **[Raied Abou Kubaa[a], Annalisa Giampetruzzi[b], Rocco Addante[b], Maria Saponari[a, a] Institute for Sustainable Plant Protection, National Research Council (CNR), Bari, Italy, [b] Department of Soil, Plant and Food Sciences, University of Bari Aldo Moro, Bari, Italy.American Society for Microbiology Journals, July 2020]. Correspondence: Raied Abou Kubaa,** raied.aboukubaa@ipsp.cnr.it
DOI: https://doi.org/10.1128/MRA.00552-20

XYLELLA NEWS

A New Laboratory for Bacterial Diseases Rapid Examination in Egypt

Dr. Ashraf Al-Saeed Khalil, Director of the Plant Pathology Research Institute, Agricultural Research Center, Giza, Egypt, announced the opening of a new laboratory in the Bacterial Diseases Research Department, noting that the new laboratory is concerned with the rapid examination and diagnosis of *Xylella fastidiosa*, one of the most dangerous types of bacteria that are subject to agricultural quarantine and which affect more than 500 plant hosts. He continued: The opening of

the new laboratory comes within the plan for the continuous development of the laboratories of the Plant Pathology Research Institute, noting that the department sent 4 researchers to Italy to train in the latest technologies in the process of examination and diagnosis of *Xylella fastidiosa*, through the CURE-XF project.

General News

Fitness Costs of Reflex Bleeding in the Ladybird beetle *Harmonia axyridis*: The Role of Parental Effects.

Reflex bleeding is an important antipredator defense mechanism in Coccinellidae. We examined the costs of reflex bleeding in larval and adult stages of the ladybird beetle *Harmonia axyridis* on offspring fitness and reproductive performance through the comparisons between bled and control larvae, reciprocal crosses of bled/control beetles, and early and late clutch phenotypes. Beetles bled during their larval stage spent a longer time in development and weighed less than controls. Egg fertility was reduced for crosses where either one or both parents had been bled during the larval or adult stage. Offspring crosses that included a parent bled during the larval stage suffered fitness costs in development and female body mass, while those bled during the adult stage suffered no transgenerational costs. Males that suffered bleeding during their larval stage accelerated progeny development of non-bled females in early clutches, suggesting a positive transgenerational effect of larval bleeding, while males that did not suffer bleeding accelerated progeny development of bled females in later clutches. As the underlying effects of bleeding on females' offspring in the early clutches were diminished in the late ones, suggesting another transgenerational effect. The strength of maternal and paternal effects on progeny development of parents bled at the larval stage were higher in earlier clutches. This study suggests that *H. axyridis* adults are less affected than larvae by the frequent use of the defensive secretions in their stressful habitats. [**Mohamed H. Bayoumy (Egypt), Naoya Osawa, Séverin Hatt ,[1]Economic Entomology Department, Faculty of Agriculture, Mansoura University, Mansoura 35516, Egypt; [2]Laboratory of Forest Ecology, Graduate School of Agriculture, Kyoto University, Kyoto 606-8502, Japan.**mhmohamed@mans.edu.eg **(The information was presented in a Webinar on June 2020 orgaized by the University of Muthana, College of Agriculture and Mansoura University].**

Bug Vacuum Captures Unidentified Flying Insects—and Valuable Data

The third week of May, Agricultural Research Service (ARS) scientists Doris Lagos-Kutz and Glen Hartman venture to a nearby field to set a timer on a smokestack-like device that rises 20 feet into the air and serves a single purpose: to capture winged insects such as aphids (notably, soybean aphids), thrips and other potential soybean pests. Known as a "suction trap," the fan-driven device is one of about 30 that are whirring away in 10 states as part of a network to gather yearly seasonal data on the migratory flight patterns and geographic distribution of the soybean aphid, *Aphis glycines*. Ultimately, such information can help improve the timing and use of counter measures to mitigate the harm caused by the sap-sucking insect, an invasive species from Asia that's become a major pest of America's $40.9 billion soy crop since its discovery in 2000. If insecticides, resistant cultivars and biological control are analogous to the weapons of war on the soybean aphid, then the traps might be likened to a chief means of collecting valuable "intel" on the pests, noted Lagos-Kutz, a research associate, and Hartman, a plant pathologist with the ARS Soybean/Maize Germplasm, Pathology and Genetics Research Unit in Urbana, Illinois. In that state and others, the traps run from 7 a.m. to 8 p.m. each day from mid-May to mid-October, drawing in air at the rate 60 cubic meters per second—a force that plucks small, airborne insects straight from the skies and directs them into a plastic jar filled with a specimen-preserving solution of water and anti-freeze. A mesh screen over the traps' top prevents larger winged critters like bats and birds from meeting a similar fate. Upon receiving suction trap samples collected by research

station collaborators, Lagos-Kutz and Hartman sort and otherwise process the contents of the jar once a week in their laboratory. They refer to the slurry of wings, legs, bug bits and unseen microorganisms that live on or in the hapless insects as an "aerobiological soup." The term also reflects the richness of data that can be gleaned from the traps about where insects move around, mainly in the summer and fall season. David Voegtlin of the Illinois Natural History Survey originally conceptualized the data collection and analysis effort in 2001. Known as the "Suction Trap Network" (STN) its success today is a testament to the collaboration of participants in multiple states noted Lagos-Kutz. These include Illinois, Indiana, Iowa, Kansas, Louisiana, Michigan, Minnesota, Missouri, Nebraska and Wisconsin. Support for the STN over the years has been in part provided by the North Central Soybean Research Program and the ARS project, "Integrated Management of Soybean Pathogens and Pests." Some findings to emerge from the effort include:

- Soybean aphid outbreaks vary in size by year and location. In fall 2009, for example, soybean aphids had taken to the air in such high numbers that people in Illinois mistook the flying pests for gnats.
- An analysis of 9,167 trap samples from 2001 to 2018 showed that Illinois, Indiana, Iowa, Michigan, Minnesota and Wisconsin had the highest aphid counts, ranging between 146,114 (Minnesota) and 167,893 (Illinois). Kansas and Kentucky had the lowest counts, with 13,509 and 14,329, respectively.
- A total of 152 aphid species were identified, not counting captured specimens that scientists have yet to identify. The most abundant identified species besides soybean aphids were *Rhopalosiphum padi, R. maidis, Pemphigus spp., Tetraneura spp., Therioaphis trifolii, Capitophorus elaeagni, R. rufiabdominale* and *Sitobion avenae.*
- Aphids typically migrate between winter host plants (buckthorn) on which the pest survives as eggs during the cold months and then to soybeans, their summer host plants (spring migration). They'll also move within and out of their summer host plant fields (summer migration) and back to the winter host plant (fall migration).

Suction trap data is also yielding valuable information about other insect species, including thrips and mosquitoes. Studies of nine mosquito species, for example, have revealed symbiotic bacteria that influence the biology, reproduction and ability of their blood-feeding hosts to transmit parasites and pathogens, opening the door to new ways of controlling those that cause human disease. Other applications for suction trap data include tracking pest populations with traits for insecticide resistance, studying the effects of changing climate or habitat areas on pest populations, and detecting expansions of pests into new areas, like the sugarcane aphid, which moved into Kansas (Manhattan), Missouri (Columbia and Portageville), Louisiana (Chase) and northern Wisconsin. Details of the project were published in the March 2020 issue of *American Entomologist* by Lagos-Kutz, Hartman, Voegtlin and their co-authors. Expansion of the suction traps into new states could also help paint a fuller picture of the "air microbiome," namely, the community of microbes in transit within flying insects. Similar studies are underway of microbiomes in soil, water and even the human body, noted Hartman. *The Agricultural Research Service is the U.S. Department of Agriculture's chief scientific in-house research agency. Daily, ARS focuses on solutions to agricultural problems affecting America. Each dollar invested in agricultural research results in $20 of economic impact.*

https://www.ars.usda.gov/news-events/news/research-news/2020/bug-vacuum-captures-unidentified-flying-insects-and-valuable-data/

Science diplomacy for plant health: moving towards global phytosanitary research coordination to empower countries against regulated and emerging pests.

International research coordination and collaboration are increasingly perceived as essential to help both local and international authorities fight plant health threats, and to find common solutions to emerging global challenges. Research is key to build synergies between national and international communities and to overcome some of the limitations phytosanitary systems are currently experiencing. Global phytosanitary research coordination is one of the objectives of the International Plant Protection Convention (IPPC) 2020-2030 Strategic Framework, which will be presented for adoption at the fifteenth session of the Commission on Phytosanitary Measures (CPM-15) in 2021. In order to launch the work, a group of experts from leading plant health organizations and initiatives worldwide, has published an article in the August issue of the scientific journal Nature Plants. The article 'Science diplomacy for plant health' should be seen as a call to arms to federate national and international plant health research stakeholders around the topic. Dr Baldissera Giovani, lead author of the article, explains that the Arab Society for Plant Protection, that has played an essential role

to promote research and education in plant health, will be pivotal for channelling knowledge and expertise in and from Arab speaking countries in order to increase the contribution and impact of Arab scientists to international plant health research activities. A press release and a link to the article are available from the IPPC website https://www.ippc.int/en/news/nature-plants-publishes-a-new-paper-on-science-diplomacy-for-plant-health/

SELECTED RESEARCH PAPERS

- **Agricultural-Grade Apple Cider Vinegar Is Remarkably Attractive to *Drosophila suzukii* (Diptera: Drosophiliadae) in Mexico.** Rodrigo Lasa, Saide Aguas-Lanzagorta and Trevor Williams, Insects **2020**, 11(7), 448; https://doi.org/10.3390/insects11070448

- **Efficiency of Biological and Chemical Inducers for Controlling Septoria Tritici Leaf Blotch (STB) on Wheat (*Triticum aestivum* L.).** Fares Bellameche, Chiara Pedrazzini, Brigitte Mauch-Mani & Fabio Mascher, Eur J Plant Pathol (2020). https://doi.org/10.1007/s10658-020-02057-y

- **Identification and Characterization of *Pseudomonas Syringae* pv. *mori* affecting White Mulberry (*Morus alba*) in Poland.** Krzysztof Krawczyk & Małgorzata Łochyńska, European Journal of Plant Pathology, 2020. https://doi.org/10.1007/s10658-020-02074-x

- **Comparison of the Performance of the main real-time and Conventional PCR detection tests for '*Candidatus* Liberibacter' spp., Plant Pathogenic Bacteria causing the Huanglongbing disease in *Citrus* spp.** Gilles Cellier, Cristina Redondo, Jaime Cubero, Montserrat Roselló, Eugénia de Andrade, Leonor Cruz, Elen Ince, H. Nilüfer Yildiz, Pakize Gök Güler, Anna Maria D'Onghia, Thaer Yaseen, Khaled Djelouah, Eveline Metz-Verschure, Francesca Gaffuri, Richard A. Gottsberger & Baldissera Giovani. European Journal of Plant Pathology, Volume 157, pages919–941, 2020.

- **Distribution, Phenology, and Overwintering Survival of Asian Citrus Psyllid (Hemiptera: Liviidae), in Urban and Grove Habitats in North Florida.** Xavier Martini, Kathi Malfa, Lukasz L Stelinski, Fanny B Iriarte, Mathews L Paret, Journal of Economic Entomology, Volume 113, Issue 3, Pages 1080–1087, June 2020. https://doi.org/10.1093/jee/toaa011

- **Mass Rearing, Quality Parameters, and Bioconversion in *Drosophila suzukii* (Diptera: Drosophilidae) for Sterile Insect Technique Purposes.** Marysol Aceituno-Medina, Alicia Ordoñez, Morfa Carrasco, Pablo Montoya, Emilio Hernández, Journal of Economic Entomology, Volume 113, Issue 3, Pages 1097–1104, June 2020. https://doi.org/10.1093/jee/toaa022

- **Radiation on Medfly Larvae of *tsl* Vienna-8 Genetic Sexing Strain Displays Reduced Parasitoid Encapsulation in Mass-Reared *Diachasmimorpha longicaudata* (Hymenoptera: Braconidae).** Lorena Suárez, María Josefina Buonocore Biancheri, Guillermo Sánchez, Jorge Cancino, Fernando Murúa, Mariana Bilbao, Diego Molina, Osvaldo Laria, Sergio M Ovruski, Journal of Economic Entomology, Volume 113, Issue 3,Pages 1134–1144, ,June 2020. https://doi.org/10.1093/jee/toaa062

- ***Artemisia frigida* (Asterales: Asteraceae) Improves the Growth of Grasshopper *Calliptamus abbreviatus* and Increases the Risk of Damaging Populations.** Xunbing Huang, Hidayat Ullah, Zehua Zhang, Shenjin Lv, Journal of Economic Entomology, Volume 113, Issue 3, Pages 1195–1201, June 2020. https://doi.org/10.1093/jee/toaa003

PAPERS PUBLISHED IN THE ARAB JOURNAL OF PLANT PROTECTION (AJPP) VOLUME 38, ISSUE 2, JUNE 2020

HOST RESISTANCE

Developing an artificial inoculation technique for screening chickpea genotypes against a Syrian isolate of *Chickpea chlorotic stunt virus*
N. Asaad, S.G. Kumari, A.A. Haj-Kassem, S. Al-Chaabi and A. Arab (SYRIA & LEBANON)
Pages 103-114
https://dx.doi.org/10.22268/AJPP-38.2.103114

Role of organic acids in chickpea plant resistance to leaf miner, *Liriomyza cicerina* Rondani
L. Ali, A.N. Trissi, N. Kaaki, K. El-Shamaa and M. El-Bouhssini (SYRIA & MOROCCO)
Pages 115-121
https://dx.doi.org/10.22268/AJPP-38.2.115121

BIOLOGICAL CONTROL

Comparison of three cultivars of climbing bean as host of *Tetranychus urticae* Koch and its predator mite *Phytoseiulus persimilis* Athias-Henroit
M. Ahmad, R. Zidan and A. Shaabow (SYRIA)
Pages 122-129
https://dx.doi.org/10.22268/AJPP-38.2.122129

Effect of the bacterial strain *Bacillus subtilis* FZB27 in controlling cucumber mosaic virus (CMV) in pepper plants grown under greenhouse conditions
M. Moalla, A. Ahmed, O. Hammoudi and I.D. Ismail (SYRIA)
Pages 130-136
https://dx.doi.org/10.22268/AJPP-38.2.130136

Molecular diagnosis of a Cucumber mosaic virus and its biological control using the algae *Spirolina platensis*, bacterium *Pseudomonas fluorescens* and some herbal extracts under field conditions
M.A. Al-Fahd, M.G. Abdelmagid and O.N. Abboud (IRAQ)
Pages 137-148
https://dx.doi.org/10.22268/AJPP-38.2.137148

Isolation and identification of local isolates of *Lactobacillus plantarum* and evaluation of their efficacy in controlling tomato Fusarium wilt disease
A.A. Hassan, A.R. Mahmoud and L.Q. Mohammed (IRAQ)
Pages 149-161
https://dx.doi.org/10.22268/AJPP-38.2.149161

PESTICIDES

Effect of insecticides used in the control of insect pests in tomato fields in Quneitra governorate in Syria on some insect predators
R. Hussein, H.K. El-Saydeh and A. Bachir (SYRIA)
Pages 162-171
https://dx.doi.org/10.22268/AJPP-38.2.162171

FIRST REPORT

Red gum lerp psyllid, *Glycaspis brimblecombei* Moore, 1964 and its natural enemies in the province of Lattakia, Syria
N. Abo Kaf and E. Mohamed (SYRIA)
Pages 172-179
https://dx.doi.org/10.22268/AJPP-38.2.172179

First report of *Taphrina deformans* Tulasne (Berk.) on apricot trees in Syria
H.A. Khalil, N. Bdour, R. Nawfal Yousef and S. Lawand (SYRIA)
Pages 180-185
https://dx.doi.org/10.22268/AJPP-38.2.180185

EVENTS OF INTEREST 2020-2021

1-3 /9/ 2020	International Agricultural, Biological and Life Science Confrence Edirne (E-AGBIOL), Edirne-Turkey. https://agbiol.org/
22-29/11/ 2020	3RD World Conference on Sustainable Life Sciences, Hilton Garden Inn, Mardin, Turkey. https://www.wocols.com
15-18/3/ 2021	The 10th International Integrated Pest Management (IPM) Symposium in Denver, Colorado, USA. https://ipmsymposium.org/2021/call_for_proposals.html
20-22/4/2021	The 16th Congress of the Mediterranean Phytopathological Union in Limasol, Cyprus. Info@easyconferences.org
12-16 /7/ 2021	IX EURAAC Symposium of the European Association of Acarologists in Bari- Italy, https://euraac2020.com/
18-23 /7/2021	XXXVI International Congress of Entomology, Helsinki, Finland. www.ice2020helsinki.fi
31/10-4/11/2021	The 13th Arab Congress of Plant Protection in Tunis (2020), Hammamat, Le Royal Hotel, Tunisia. www.acpp-aspp.com

Mexican Black Scale, Saissetia Miranda (Hemiptera: Coccoidea: Coccidae

Photos sent by Dr. Mohamed Z. Khalaf (Iraq)

Pomegranate butterfly *Virachola livia* Klug. (Lepidoptera: Lycaenidae)

[Eman Zentane, Plant Protection Department, College of Agriculture, University of Tripoli, Libya, 2020].

The Editorial Board of The Arab And Near East Plant Protection Newsletter Highly Appreciates the Contribution Of Several Arab Scientists In This Issue, Namely:

Amer Al-Gerrawy (Iraq), Ziad Barbar (Syria), Smail Ait Bahadou (Morocco), Abdulnabi Basheer (Syria), Houda Kawas (Syria), Kareem Al Bayati (Iraq), Khamis Youssef (Egypt-Brazil), Mokhtar Abdulsattar Arif (Iraq-Italy), Mahmoud A. Amer (Egypt) , Ismail Ibrahim Alyaseri (Iraq), Abdulrahman Saad Aldawood (Saudia Arabia), Mohamed Waleed Negm (Egypt-Japan), Luaay Kahtan Khalaf (Iraq- USA), Hussein Ali Salim(Iraq), Ali Kareem Al-Taae (Iraq), Mohamed Mannaa (Egypt-Koria), Mazen Alazem(Syria-Koria), Mohammed Ziadan Khalaf (Iraq), Mashhour Alkhawaldeh (Jordan), Zaid Nabas (Jordan), Nader Asaad (Syria), Mohamed El Hady Sidatt (FAO Mauritania), Khalid Abdullah Alhudaib (Saudia Arabia), Aziz Ajlan (Saudia Arabia), Asmaa Abdul Munem Talib Al-Araji (Iraq), Mejda Daami (Tunisia), Anne-Sophie Roy(EPPO,France), Ali Yaseen Ali (Syria), Mahran Zeity(Syria), Eman Zentane(Libya), Mostafa Al-Juboory(Iraq), Mohamed H. Bayoumy (Egypt), Tareq Almantheri(Oman-UK), Mamoon Alalawi (FAORNE), Lidia AbdelShahid, (FAORNE), Heba Tokali (FAORNE) Ahmed Elsayed (FAORNE), Ashraf Al-Saeed Khalil(Egypt), Ashraf Fathy Abd El-Rahman(Egypt).

News and announcements from all, on any aspect of plant protection in the Arab world, are invited for the Newsletter. Contributions from the Executive Committee of the Arab Society for Plant Protection and from the four Subject Matter Committees, as well as from national societies in the Arab region dealing with any aspect of plant protection, are kindly requested and highly appreciated.

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