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The impact of the armed conflict on the forest cover in Syria

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1- Abstract:

Armed conflicts and other types of violence that cause human displacement are key drivers of human-induced landscape change. They also contribute to increase the wildlife poaching and environmental degradation, especially in developing countries. In March 2011 the devastating armed conflict erupted in Syria causing the migration of more than 5 million people outside the country and the displacement of 6 million people in the country (internal displacement). About 1,4 million of refugees fled to the coastal area of Syria that contains most of the forest cover of the country, causing an additional pressure on the natural resources and especially forests. The main aim of this research is to study vegetation cover area changes in Syria, concretely on forest cover area and species conservation, since the beginning of the Syrian armed conflict. To study the effect of the armed conflict on the Syrian forests, Landsat TM and OLI satellite imagery were used from the pre-conflict (2011) and the conflict (2019) periods. The change detection method was the NDVI differencing using different NDVI threshold values to classify the vegetation in Syria into four classes: Forest, Agriculture, Grassland and No-vegetation. Another objective of the study is identifying the important areas for conservation in Syria using the data downloaded from the IUCN red list for threatened species to build the maps of important species areas for conservation. Results showed a significant forest cover loss of -9.26% from 2011 to 2019, most of the area loss (35.5%) was a result of forest conversion into agriculture lands, 34.1% was converted into a no vegetation (urban expansion mainly) and 29.3% were lost due the forest cover conversion into grasslands. Two hotspots maps were produced marking the most important species biodiversity areas for conservation like the coastal mountain range, Anti-Lebanon mountain range, Jabal al -Arab, Julan heights that presented the highest number of threatened species. The results indicate the negative impact of the armed conflict on the Syrian forests and the urgency of the conservation and the restoration efforts by applying policy interventions designed to reduce the elimination of the forests, especially in biodiversity hotspots.

Keywords: Armed conflict, Conservation, Forest change, Biodiversity, Violence.

2- Introduction:

Most of the Syrian forests are located in the Mediterranean area which is characterized with variety of geographical areas and different soil types, rainfall averages and temperatures, resulting in a great number of biodiversity hotspots (Al berni ,2010; Merlo and Croituru, 2005). Historically the proportion of forest-covered land area accounted for 15 percent of the Syrian landscape, but this proportion declined dramatically during the twentieth century and especially during the second half as a result of excessive deforestations (UNDP,2010). In 2007 forests covered 3% of the land area. The government set a target of rising the forest land area to 3.86 percent by 2015 (UNDP,2010).

The forest sector in Syria doesn´t satisfy the wood market demand and only produces a modest amount of wood that only can satisfy the local industries (UNDP,2009). The national demand on wood is mainly dependent on the imports of timber (30,000 tonnes/year of softwood timber, 3,000 tonnes/year of hardwood (beech), 2500 tonnes of fuel wood and 100 tonnes of charcoal), in addition to paper pulp (Al berni ,2010; Abido, 2005) and the imports are mainly from Russia and Romania (Woodstat,2018). Despite the scarce production of wood by the Syrian forests represent an important source of rural people´s livelihood as they have a good potential of non woody forest products and ecosystem services that defined by the Millennium Ecosystem Assessment as "the ecosystem benefits that people derive." In addition to the provision of services or products like grazing, eco-tourism and recreation and they play an important role in water filtration and regulation, prevention of soil erosion, biodiversity conservation, carbon sequestration, enhancing the landscape beauty and quality and desertification control (Al berni ,2010; Abido, 2005).

According to UNEP-WCMC, there are 19 protected areas in Syria that cover only 0.69% of the total area of the country including: 1 nature reserve, 13 protected areas, 2 game management areas, 1 not reported, 1 UNESCO-MAB biosphere area and 1 Ramsar site. The marine protected area covers 0.25%. In March 2011 the devastating armed conflict erupted in Syria causing the migration of more than 5 million people outside the country, displacement of 6 million people in the country (internal displacement) and more than 13 million people in a need of assistance (UN reports 2020). About 1.4 million of refugees fled to the coastal area of Syria (OCHA,2017). The coastal area contains 90% of the vegetation of Syria (Barakat et al. 2014; abdo,2018) and its forest ecosystems are highly important in terms of carbon storage, timber, biodiversity, in addition to recreational uses.

The role of forest deforestation during conflicts is still not clear, for example armed conflicts provoke notable economic and social costs, and a significant environmental impact (Collier et al., 2003). Although the war impact almost always has a devastating effect on people, it might have negative and positive impacts on forests (McNeely, 2003), for example the armies burn the forests to clear the space and have better vision to spot the enemies, soldiers hunt wildlife for food (Hart and Mwinyihali, 2001; SAMFU, 2002; FAO, 2005). At the same time the war discourages the investment of wood and transforming the woodlands to pastures, ranchers can be concerned about being kidnapped or have their cattle stolen, timber companies don´t risk their valuable machinery. The decrease of forest exploitation has a negative effect on the economy and in a long term on the forest management but in a short term it protects this resource. Modern wars, particularly intranational conflicts, often play out in remote areas, where armed factions seek the cover afforded by deep forests, mountains, and other rugged landscapes (Nietschmann 1990a; McNeely 2003). Protected-area boundaries lose effectiveness in this context, usually resulting in the evacuation of field staff and suspension of conservation activities (Hart et al. 1997). Local proliferation of small arms leads to increased hunting for bushmeat, wildlife products, and sport, often by the soldiers themselves. Examples include the decimation of Uganda's elephant (*Loxodonta africana*) and

hippopotamus (*Hippopotamus amphibius*) populations during the 1970s (Eltringham & Malpas 1980) and the more recent war-related poaching in neighbouring Democratic Republic of (DR) Congo, where hippopotamus herds in Virunga National Park have been reduced by more than 95% (Muir 2006). The big numbers of concentrated refugees and displaced people put a huge pressure on the local environment (Hart and Mwinyihali, 2001; Plumptre, 2003), as they move to new areas to hunt, fish, remove trees for building their houses and firewood and in result can rapidly deplete those resources. The impacts appear to be shaped by the use of natural resources near settlements, following large displacements of residents who had previously dispersed across the landscape during the war (Ordway, 2015). On the other hand, the restricted access to the areas under war conditions makes it difficult and frustrating to study the impact of armed conflict on ecosystems during the event of crisis. Hence the need to use remote sensing by satellite as an appropriate instrument for analysing the impact of conflict on the landscape (Gorsevski et al., 2012). Humans have had negative impacts on conservation of Syrian forests through history. For example, it has been reported a large-scale human-made deforestation of the oak forests as early as 9000 years before present, during the Mesopotamian era, in Alghab valley, in north west Syria. It was followed by the late glacial climatic amelioration which caused the expansion of deciduous oak forests on coastal mountains, but this forest was cleared by pre-pottery Neolithic people in which is considered to be the oldest anthropological deforestation in history (Yasuda, 2000 et al). The clearance of cedar trees began in the 7700 BP by the pre-pottery people in the beginning of the bronze age, almost causing the disappearance of the cedar forests and the deciduous forest of the Syrian coastal mountains, and replacing them by olive groves as described in the epic Gilgamesh (Yasuda, 2000 et al). Nahal 1996 mentions important historical periods in which the Syrian forests suffered from notable deforestation from different civilizations and wars, mainly to build navies in the Phoenician times and then the Greek and Roman empires, followed by the Arabic and ottoman campaigns, and finally World War one and two. During the armed conflict there have been different causes of forest massive destruction like acute need for fuel for heating in the winter so that the locals contribute to deforestation of the area, the residential expansion of urban areas and the intended and repeated wildfires to produce charcoals in order of the economic benefit for the locals (Abdo,2018).

Satellite remote sensing plays an essential role in monitoring changes in land use (Hostert et al 2011, Witmer 2008, Witmer 2015), especially in unsafe areas. The classification of land used with a detailed satellite imaging time series has been shown to be appropriate for mapping agricultural dynamics and land use transition, including agricultural abandonment, which is one of the possible effects of population displacement (Estel et al 2015, Estel et al 2016, Alcantara et al 2012, Alcantara et al 2013). Since 2011 till now the armed conflict is still going on, a very small number of refugees came back to Syria and to their areas since the number of battles and violence has been reduced since 2015 (UNHR,2017) .Therefore, in this study we have compared forests in 2011, before the armed conflict started, until 2019, to see the changes of Syrian forests from the beginning of the armed conflict until now.

3- Research aim and objectives:

Aim:

The main aim of this research is to study vegetation cover area changes in Syria, specifically changes in forest cover area and species conservation, since the beginning of the Syrian armed conflict

Objectives and hypothesis:

Objective 1 – To quantify the changes of forest cover area in Syria, by comparing and analysing the forest cover area from the beginning of the armed conflict (2011) until 2019. The hypothesis states that on average, in Syria, there has been a notable forest loss due to different pressures of massive migrations to the coastal Mediterranean areas and because of over exploitation and dependency on forest resources during the times of the armed conflict.

Objective 2- To obtain and analyse the information about the main groups of Syrian plant and animal species especially the endemic and threatened ones, and to produce different updated checklists of these groups of species.

Objective 3- To identify the priority areas for conservation in Syria by building conservation biodiversity hotspots, that is, showing the spots with different levels of threatened species richness.

4- Materials and Methods:

4.1. Study area:

4.1.1. Location:

Syria is located in southwest Asia at the eastern part of the Mediterranean bordering, with Jordan in the South, Iraq in the East, Turkey in the North and Palestine and Lebanon in the West.

The study area includes the total area of the Syria that extends on 185,180 square kilometres laying between 32˚19 to 37˚20 North latitudes and 35˚43 to 42˚25 East longitude with a coast line that extends to 183 kilometres along the Mediterranean Sea **(Fig 1)**.

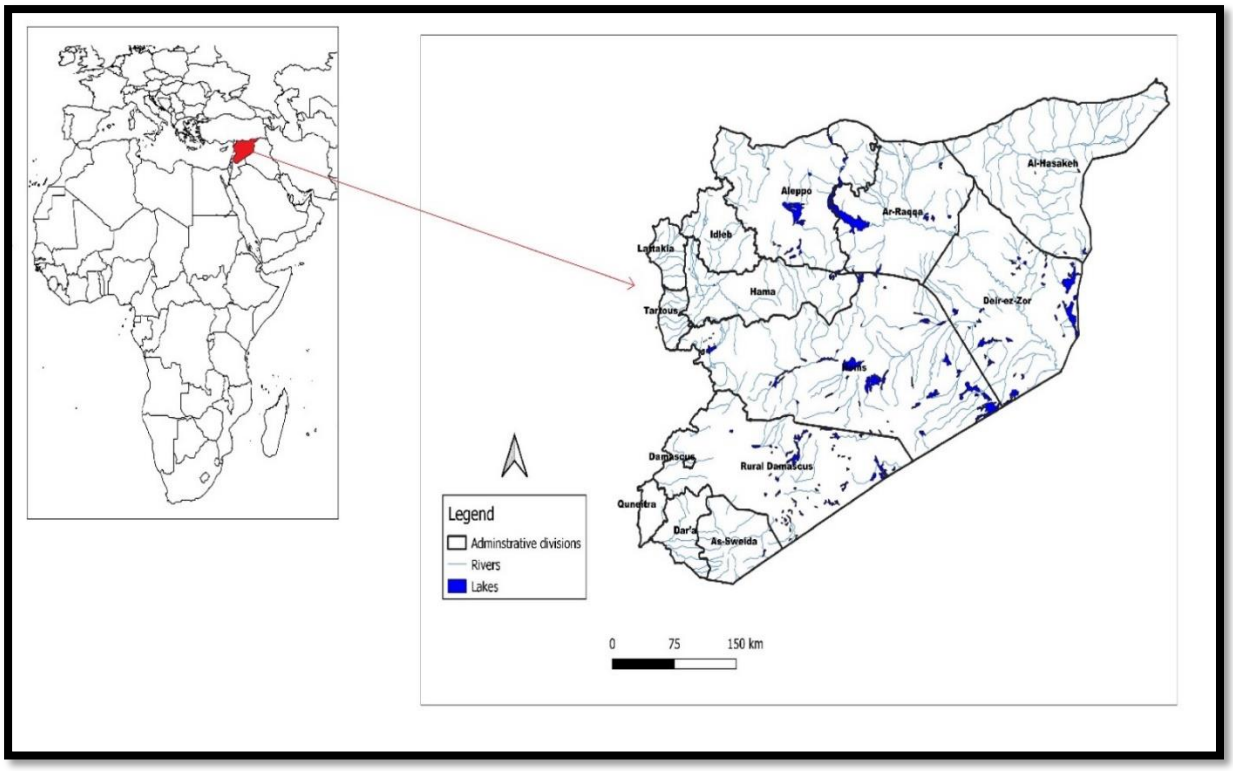

Fig 1. The geographical location of the study area (Angham Daiyoub, 2020).

4.2.1. Vegetation and wildlife:

Despite the relatively small area of Syria, it is considered as a rich country in flora and fauna biodiversity. This richness is a result of the topographic, climatic, geological and soils diversity (CBD, 2009). The national study on biodiversity of Syria registered 55 species of bacteria, 754 species of algae, 641 species of fungi, 10 species of gymnosperms, 3,100 of angiosperms, 1,439 insects, 452 fish, 16 amphibians (3 of them are endangered), 127 reptiles (31 of them are endangered), 360 birds and 125 mammals. Some animal and plant species have become extinct in the last few decades due to several reasons like heavy hunting and habitat loss, those species include large mammals like (*Gazella gazella, Gazella subgutturosa, Capra aegagrus, Ursus arctos syriacus, Equus hemionus hemippus*, etc.) (Ministry of State for Environmental Affairs, 2000).

4.3.1. Climate:

The climate in Syria is considered as a Mediterranean climate characterized with dry hot summers cold winters, and rainy spring and autumn **(Fig 2&3).**

Average temperatures in winter are moderate to cold with precipitation between 100 and 1400 mm/year; in summer the temperatures can rise up to 30 °C in most regions and in some places can go above 40 °C depends on the bioclimatic range (Ghazal, 2008).

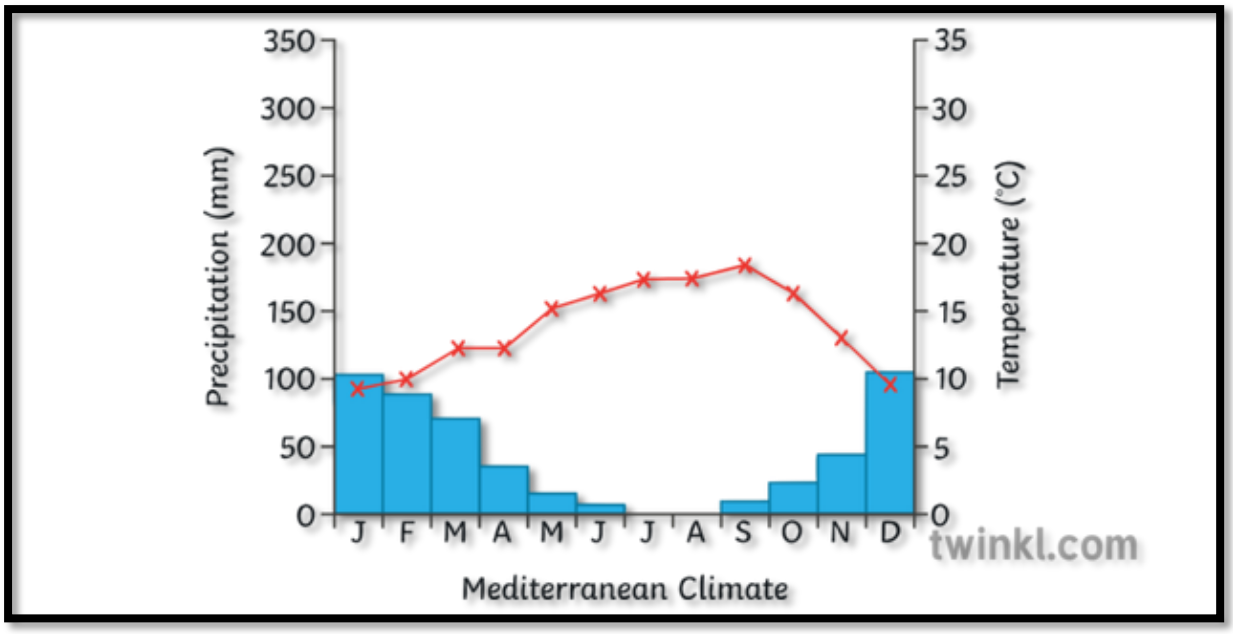

Fig 2. Climate diagram of the Mediterranean (Source: https://www.twinkl.es).

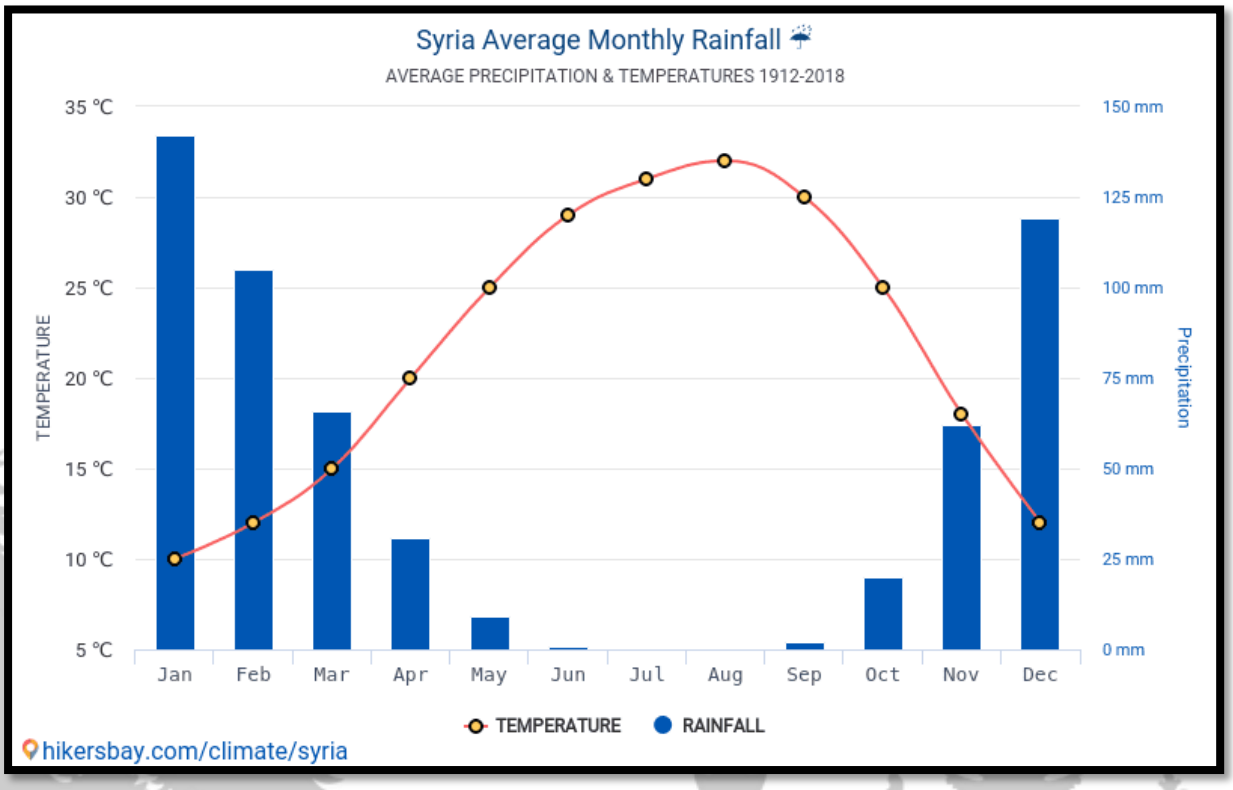

Fig 3. Climate diagram of Syria (Source: http://hikersbay.com).

According to UNEP 1998 Syria is divided into different bioclimatic ranges:

1-Humid Mediterranean: where the precipitation is more than 800mm, this area includes coastal mountains and some peaks of the eastern mountain range.

This sub-division comprises of two vegetation stages, Lower stage where the dominant vegetation is evergreen forest (*Pinus brutia, Quercus infectora, Quercus calliprinos, Pistacia lentiscus*) and the upper stage (1400-2000 m) that consist of species like (*Cedrus libani, Abies cilicica, Juniperus drupacea*). Sub-alpine forest and meadow (above 2000m) consists of Juniperus excelsa.

2-Sub-humid Mediterranean: receives precipitation between 600-800 mm in the coastal plains, Golan hights, middle and hight altitude eastern mountains range and the high peak of Jabal al Arab.

The vegetation consists of degraded oak forests (*Quercus ithaburensis, Quercus calliprinos*).

3-Semi-arid Mediterranean: receives precipitation between 350-600 mm and includes the areas of (Hama, Homs, Jabal al Arab, upper Jazira area, high peaks of the inner mountains, Eastern slopes of the Eastern mountain range and the adjacent plains of Aleppo, the fertile crescent.

The vegetation consists of grasses and legumes and degraded steppic woodlands (*Pistacia atlantica, Crataegus sp).*

4-Arid Mediterranean: receives precipitation between 200-350 mm and includes the areas of western and the northern limits of the eastern plateau with a vegetation of grasses and shrubs.

5-Saharan Mediterranean: receives precipitation below 200 mm and includes arid areas of eastern plateau with a vegetation of perennial dwarf shrubs (*Achillea sp, Anabasis sp, Haloxylon sp*.).

4.4.1. Topography:

The topographic divisions of Syria (Fig 4):

1- Coastal plains: They are located between the Mediterranean Sea and the coastal mountains range; they are narrow plains and extend from the Turkish borders in the north to the Lebanese southern borders

2- Coastal Mountains: a mountain range parallel to the Mediterranean Sea with abrupt eastern slopes and gradual slopes in the west, the highest peak in this range is Nabi matta (1562) with the highest precipitation of the country.

3- Orontes valley: A Low valley between the coastal mountains range and the eastern mountains range, the Orontes river flows in this valley and forms al Ghab plain.

4- Eastern mountains range: parallel mountains to the coastal range in the north to Lebanese mountains in the south. The southern parts of the range are formed by the Anit-Lebanon mountains where is the mount Hermon which are the highest mountains (2814).

5- Eastern Plateau and plains: contain**s** a large area from the country surface from the eastern mountain range to the borders of Iraq and Jordan in the east and the south, this area is intersected with some isolated mountains and the Euphrates river.

6- Isolated inner mountains: they are separated mountains in the wide eastern plateau, in the south stands the volcanic mountain of jabal al Arab which receives good precipitation through the gap of galilee-golan.

In the north stands the range of Palmyrene which are very arid extension of the Anti-Lebanon. The north palmyrene mountains locate in the middle of the eastern plateau. In Homs gap they receive some humid Mediterranean air.

Two mountains are found in the north east Jabal Bishri and Jabal abdl Aziz

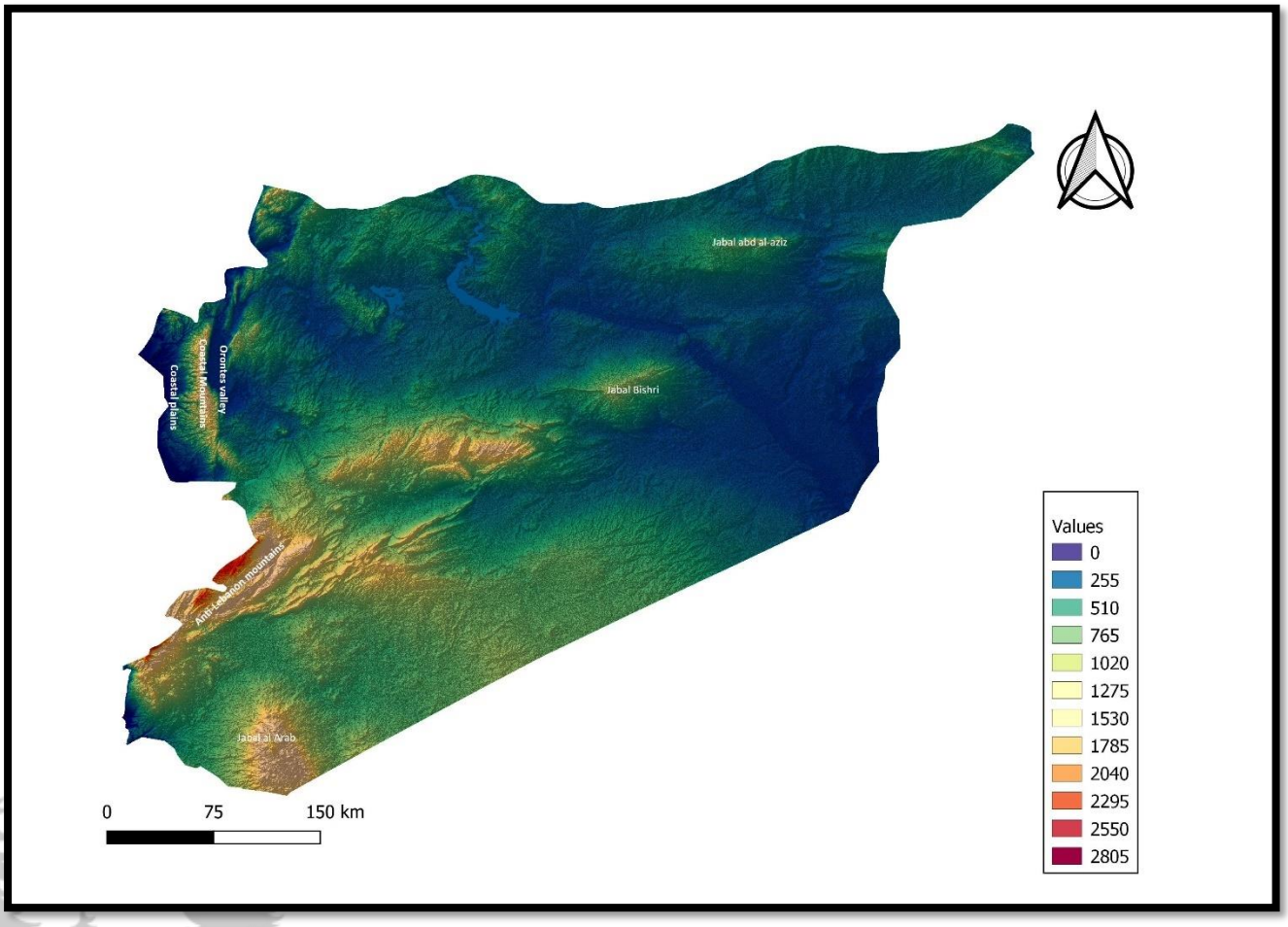

Fig 4. Topographic map of Syria (Angham Daiyoub, 2020).

4.5.1. Forests in Syria:

Nahal (1981) classified the Syrian forests to the 5 following parts according to the different geoclimatic zones:

1. The coastal mountains which are divided into two parts due to the variation of precipitation that they receive annually:
    a. The western part which ranges between [0-1570] m above sea level with dominant species like (*Quercus calliprinos, Pistacia palaestina, Abies cilicia, Ceratonia siliqua, Pistacia lentiscus, Quercus infectoria*).
    b. The eastern part which ranges between [300-1570] m above sea level with dominant species like (*Quercus calliprinos*, *Pistacia palaestina, Cedrus libani, Quercus cerris).*

2. The Baer and Basit Mountains: Ranging from [0-900] m above sea level with main species of (*Ceratonia siliqua*, *Pistacia lentiscus, Quercus cerris, Pinus brutia*).

3. Aleppo Mountain Ranging from [400-1200] m above sea level and its dominant species are composed of (*Quercus infectoria, Quercus cerris, Quercus calliprinos*).

4. Hermon Mountain: The vegetation of Hermon mountain is considered to be degraded in result of the over grazing and desertification. It ranges between [>800- 2500] m above sea level and the dominant species are:

   (*Crataegus azorolus, Poterium spinosum, Quercus calliprinos, Quercus Infectoria, Pyrus syrica, Amygdalus orientalis, Juniperus excelsa*)

5. Al-Arab Mountain: ranges between [850- 1700] m above sea level with main species of (*Quercus calliprinos, Quercus infectoria, Quercus cerris, Pistacia atlantica)*.

Oak forests in Syria occupy the largest area of forest vegetation with 59% of total forest area when the coniferous forests occupy about 27,5 % and the rest of the species are considered as associated species (Ministry of Agriculture, 2005).

4.2. Remote sensing data (Table 1):

Satellite imageries were downloaded from the US geographic survey (USGS) of Landsat 8 Operational Land Imager/Thermal Infrared Sensor (OLI/TIRS) Surface Reflectance on demand data through Earth Explorer (Surface Reflectance Level-2 Data Products at a 30-meter spatial resolution) for the year of 2019.

For the year 2011, the imageries were downloaded from Landsat 5 TM Surface Reflectance through Earth Explorer . Surface Reflectance Higher-Level Data Products at a 30-meter spatial resolution (on demand data).

No Landsat imageries were downloaded from Landsat 7 because the images that collected after May 31, 2003 have data gaps when the Scan Line Corrector (SLC) failed and most the images of the forest areas in Syria has data gaps so it has been replaced by Landsat 5 data. Both L8 and L5 imageries were downloaded in the month of July to avoid seasonal changes effects and to obtain the minimum cloud cover < %5, the images were extracted by a shape file of the country downloaded from the open source website www.diva-gis.org.

Table 1. Landsat 5 and 8 TM&OLI bands and their specifications.

Study Area	Satellite ID	Date	Sensor ID	Path/Row	Spatial Resolution	Image Quality
Syria	Landsat 5	31/07/2011	TM	170/34	30m	8 bit
Syria	Landsat 5	31/07/2011	TM	170/35	30m	8 bit
Syria	Landsat 5	31/07/2011	TM	171/34	30m	8 bit
Syria	Landsat 5	31/07/2011	TM	171/35	30m	8 bit
Syria	Landsat 5	31/07/2011	TM	171/36	30m	8 bit
Syria	Landsat 5	31/07/2011	TM	171/37	30m	8 bit
Syria	Landsat 5	31/07/2011	TM	172/34	30m	8 bit

Syria	Landsat 5	31/07/2011	TM	172/35	30m	8 bit
Syria	Landsat 5	31/07/2011	TM	172/34	30m	8 bit
Syria	Landsat 5	31/07/2011	TM	173/35	30m	8 bit
Syria	Landsat 5	31/07/2011	TM	173/34	30m	8 bit
Syria	Landsat 5	31/07/2011	TM	173/35	30m	8 bit
Syria	Landsat 5	31/07/2011	TM	173/36	30m	8 bit
Syria	Landsat 5	31/07/2011	TM	173/36	30m	8 bit
Syria	Landsat 8	31/07/2019	OLI & TIRS	170/34	30m	16 bit
Syria	Landsat 8	31/07/2019	OLI & TIRS	170/35	30m	16 bit
Syria	Landsat 8	31/07/2019	OLI & TIRS	171/34	30m	16 bit
Syria	Landsat 8	31/07/2019	OLI & TIRS	171/35	30m	16 bit
Syria	Landsat 8	31/07/2019	OLI & TIRS	171/36	30m	16 bit
Syria	Landsat 8	31/07/2019	OLI & TIRS	171/37	30m	16 bit
Syria	Landsat 8	31/07/2019	OLI & TIRS	172/34	30m	16 bit
Syria	Landsat 8	31/07/2019	OLI & TIRS	172/35	30m	16 bit
Syria	Landsat 8	31/07/2019	OLI & TIRS	172/34	30m	16 bit
Syria	Landsat 8	31/07/2019	OLI & TIRS	173/35	30m	16 bit
Syria	Landsat 8	31/07/2019	OLI & TIRS	173/34	30m	16 bit
Syria	Landsat 8	31/07/2019	OLI & TIRS	173/35	30m	16 bit
Syria	Landsat 8	31/07/2019	OLI & TIRS	173/36	30m	16 bit
Syria	Landsat 8	31/07/2019	OLI & TIRS	173/36	30m	16 bit

4.3. Spatial analysis:

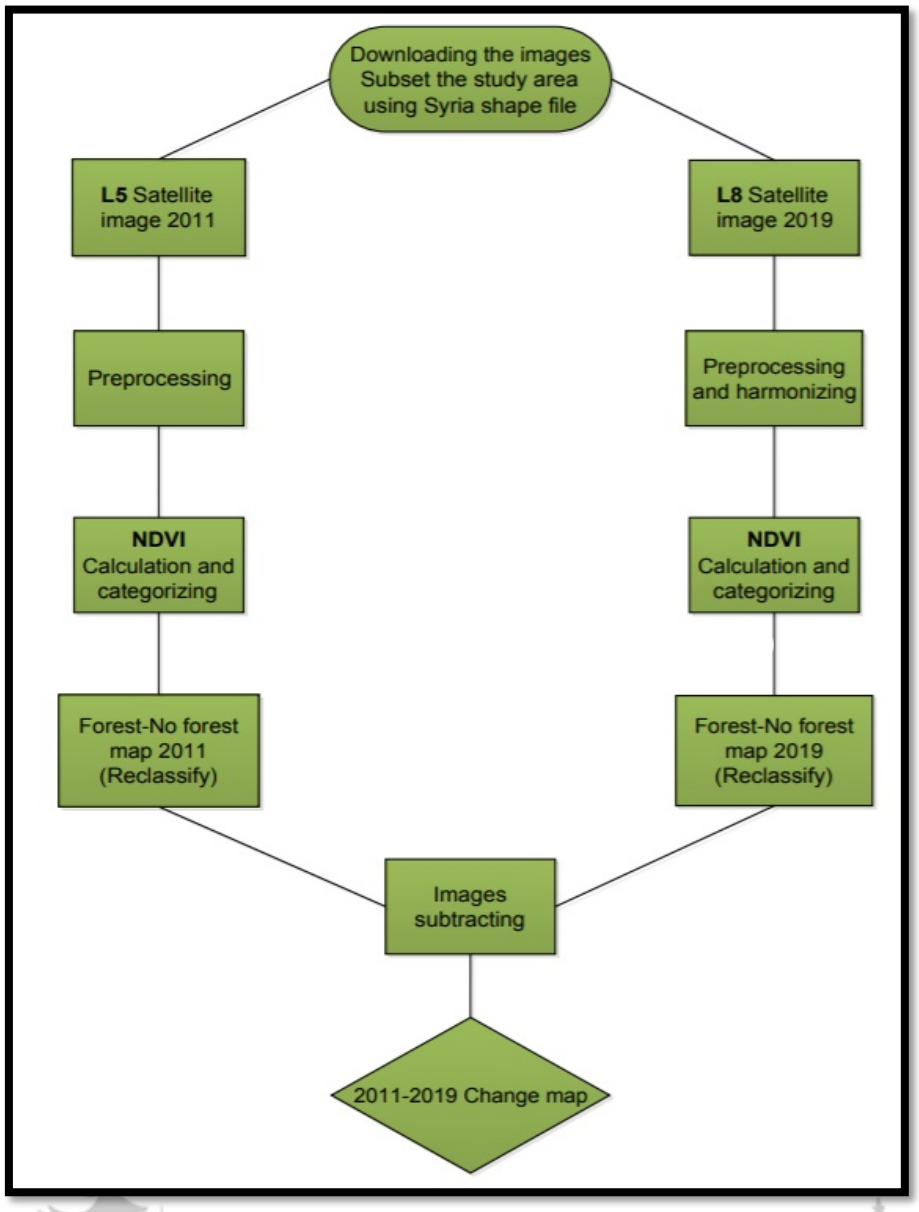

Fig 5. Methodological flow chart.

Pre-processing the Satellite images:

The images were downloaded from the Landsat level 2 products which are already corrected with substantial improvements in the absolute geographic accuracy, validated and calibrated with updated global digital elevation models and atmospherically corrected to surface reflectance.

Roy et al (2016) indicated that depending on the application, there are minor but potentially important variations between the spectral characteristics of Landsat ETM+ and OLI. For this reason, the two data sets should be harmonized to obtain more accurate results.

According to Roy et al. (2016), the wavelength differences can be harmonized using a series of equations and regression coefficients mentioned in the table two of the paper Characterization of Landsat-7 to Landsat-8 reflective wavelength and normalized difference vegetation index continuity.

By applying those codes using R studio software to apply the linear transformation of TM spectral space to OLI spectral space using the coefficients mentioned by Roy et al.2016, the band-respective coefficients are defined with slope and intercepts as image constants.

All the Y-intercepts were multiplied by 10,000 to match the USGS Landsat reflectance data.

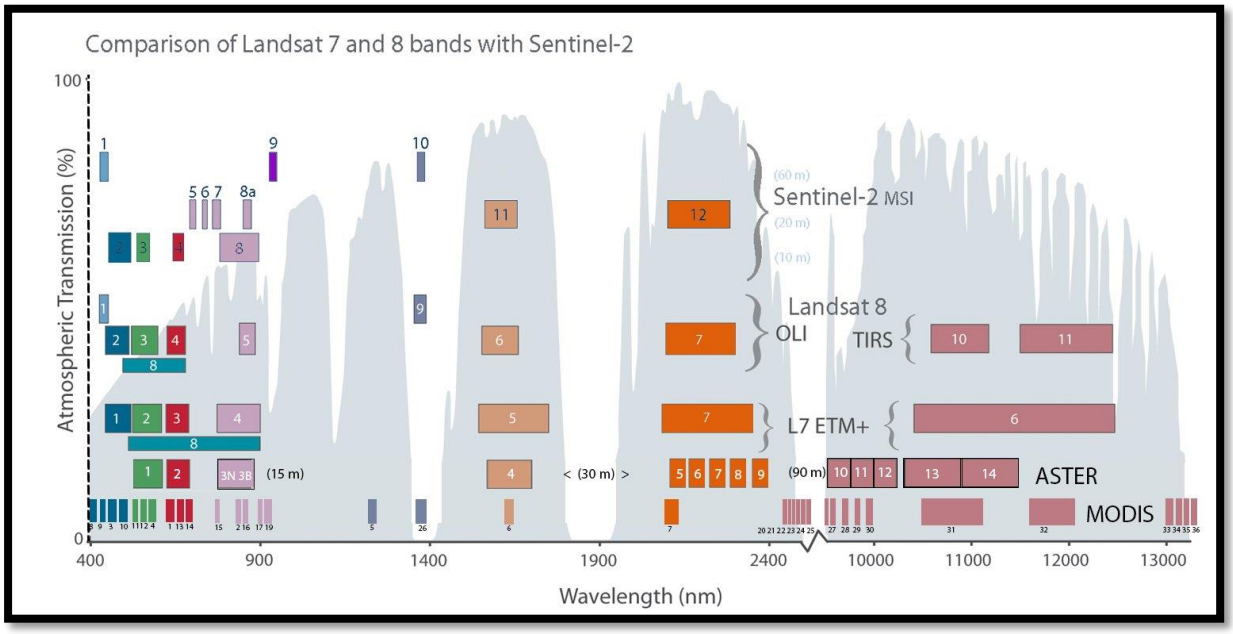

Fig 6. Approximate spectral bands chart for Landsat, MODIS, ASTER and sentinel2 (Source: USGS).

Creation of vegetation cover maps and classification:

NDVI is a common and widely used remote sensing index (Bhandari, Kumar, & Singh, 2012) that gives a quantitative estimation of vegetation growth and biomass (Wu, Li, Wang, & Yan, 2016) Healthy vegetation absorbs more red and blue light and reflects more Near-infrared (NIR) and green light compared to other wavelengths and that´s explains the green colour of the vegetation that we are able to see and the near-infrared which is not in the visible range but the Landsat and Sentinel are provided with sensors that can detect the necessary bands with NIR and red.

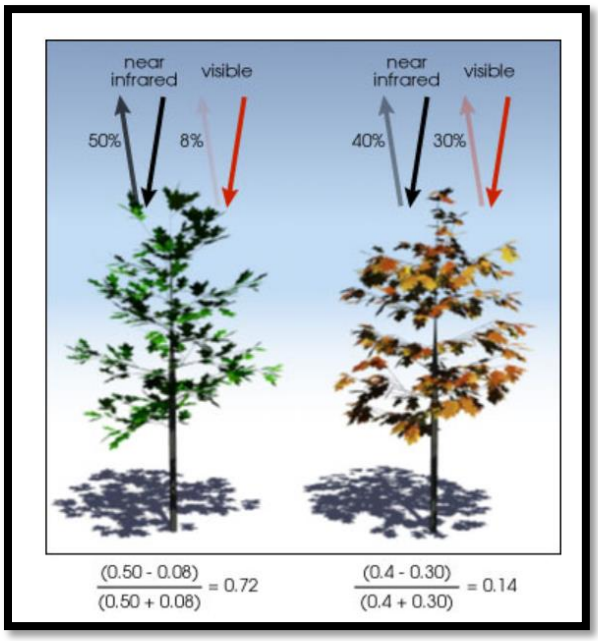

Fig 7. Normalized Difference Vegetation Index (NDVI), (Source: NASA)

The NDVI is calculated as the difference between near-infrared (NIR) and red (RED) reflectance divided by their sum.

NDVI index was introduced by Tucker (1979) and its values range between -1 and 1 when the values below zero during the growing season refer to no plant cover (It can be a desert, barren, water body and snow….) and values above the zero describe the vegetation cover and their status (Bahram coubin et al, 2019).

In order to create pre-conflict (2011) and conflict (2019) vegetation cover maps, we calculated the NDVI (Normalized Difference Vegetation Index) for the whole country area of Syria in the two years, 2011 and 2019. This index allowed us to compare the changes on the vegetation of Syria that had happened during this period

By transforming the satellite images into maps with NDVI values, a vegetation cover map was created and categorized into 4 classes depending on NDVI values and using the following equation (Tucker, 1979):

NDVI= (NIR-RED) /(NIR+RED)

In Landsat 5, NDVI= (Band 4 – Band 3)/ (Band 4 + Band 3)

In Landsat 8, NDVI= (Band 5 – Band 4)/ (Band 5 + Band 4)

The NDVI values range between -1 - +1 when:
≤0.1 (No-vegetation).

>0.1 to ≤0.3 (Sparse Vegetation).

0.3 to ≤0.5 (Moderate Vegetation).

>0.5 to ≤1 (Dense Vegetation). (Weier and Hoque 2000; Nath 2015).

Table 2. NDVI values for different features.

NDVI Range	Corresponds to	Classified as	Reference
≤0.1	No-vegetation	No-vegetation	Weier and Hoque 2000; Nath 2015
>0.1 to ≤0.3	Sparse Vegetation	Grassland	Weier and Hoque 2000; Nath 2016
0.3 to ≤0.5	Moderate Vegetation	Agriculture	Weier and Hoque 2000; Nath 2017
>0.5 to ≤1	Dense Vegetation	Forest	Weier and Hoque 2000; Nath 2018

Table3. Descriptions of the vegetation cover categories used.

Class Number	Class name	Description
1	No-vegetation	Transportation, mining areas, water bodies, clouds shade, bare constructions sites, rock, sand, fallow agriculture lands, residential and commercial buildings.
2	Grassland	Natural and cultivated pastures, Scrublands.
3	Agriculture	Crops, olive groves, orchards, other agriculture areas.
4	Forest	Natural and planted forests, Riparian forests, evergreen and deciduous dense forests.

As the objective of the study is detecting the change of forest area the maps were reclassified using ArcGIS reclassification tool considering only two classes with two different pixel values:

Forest class was given the value of 1, No forest class was assigned to the value 0.

2011 and 2019 classified maps were subtracted to obtain the forest loss map resulting with 3 following pixel values:

0 to No change, 1 to Forest gain, -1 to Forest loss

4.4. The obtention and analysis of Endemic and threatened species information and species groups checklists:

Different sources were used to obtain the species data, for threatened species the source was the international union of conservation of nature (IUCN red list) which contains a comprehensive data source of the world´s conservation. The data was downloaded for the main species groups like Vascular Plants, Amphibians, Birds, Reptiles, Mammals, Insects and fresh water Fish.

The threatened species data contained a detailed information about the taxonomy, evaluation, the evaluation level, the habitat, the threats, the locality of species and their spatial distribution for each species group and two different spatial data were downloaded, for the plants the spatial data was

represented by spatial points as the plants have a static locations but the animals spatial information was represented by spatial polygons distributed on different areas of the country.

The endemic plant species information was extracted manually from the Syrian flora (Mouterde flora 1966-1983) containing the species taxonomy, habitat, location and the evaluation by the IUCN red list was added for each plant species to the endemic plants checklist (Appendix 2).

To obtain the information of the endemic animal species a number of 19 research papers was reviewed as well as global databases of species and the information included the taxonomy, habitat, location and the IUCN red list evaluation (Appendix 1).

The checklists of the different groups of species were taken from different resources as well, either from one source like Birds checklist which was taken from the international BirdLife organization (Appendix number) and Mammals from the national report of biodiversity 1998 (UNEP), Or from different resources like Reptiles and Amphibians (Appendix 7 & 8).

To visualize the obtained data Microsoft Excel was used to build different pie and column charts for the different species groups in different habitats and the spatial data was used to build the biodiversity hotspots maps that will be explained more specifically in the next passage of the methodology.

Table 4. Categories of the variables assessed to analyse and map the biodiversity of endemic and threatened species in the study area.

Category	Variable	Data type	Data source
Plant species	Endemic Species	List of species, spatial distribution	Mouterde flora 1966-1983
Plant species	Threatened Plants	List of species, spatial data (points)	IUCN red list
Animals	Endemic animals	List of species, spatial distribution	19 research papers and 2 databases
Birds	Threatened Birds	List of species, spatial data (polygons)	IUCN red list
Mammals	Threatened Mammals	List of species, spatial data (polygons)	IUCN red list
Amphibians	Threatened Amphibians	List of species, spatial data (polygons)	IUCN red list
Reptiles	Threatened Reptiles	List of species, spatial data (polygons)	IUCN red list
Insects	Threatened Insects	List of species, spatial data (polygons)	IUCN red list
Fresh water Fish	Threatened Fish	List of species	IUCN red list

4.5. Building the hotspots maps:

Threatened plants hotspots map:

A list of 91 threatened species was used including 7301 spatial points from the data base of the **IUCN red list** (Appendix 9). The least concern category (LC) was excluded from the plant species list while Near threatened, Vulnerable, Endangered, Critically Endangered and Extinct categories were used in the hotspots map) using **QGIS** 3.14 software.

The obtained map was composed by 530 rectangle grids covering the entire area of Syria with 18,8 X 15.5 km scale, this size of the grid resulted to be the best representative size due to the geomorphological diversity, the small number of species and the big area of the country. Each rectangle contains a sum of extant plant species made using Microsoft office Excel and **QGIS** software by joining the number of plant species to each rectangle in the grid map.

The species richness is represented by a gradual colour map from the lowest to highest number of plant species (clear colours indicate lower values and the colour gets darker as the number of species increases).

Threatened biodiversity hotspots map:

A grid map combining different major species groups (Plants, Mammals, Amphibians, Birds, Reptiles, Insects) was made using a list of 148 species and their spatial data from the threatened IUCN red list category.

The plants' spatial data was represented by spatial points, while the animal's spatial data contained a number of distribution polygons explained by the constant movement of animals in the habitats.

The data included 91 plant species, 2 insect species (resident species), 1 Amphibian (resident), 10 mammals (resident) including one extinct species, 28 bird species including (breeding, non-breeding, passage) and 8 resident reptiles (Appendix 9).

The spatial data of all species groups was used to build a data base and to be joined to a 530 grid map composed by 18,8 X 15.5 km rectangles which considered to be the most appropriate scale. The data visualization on the grid map used a gradual colour scale from the symbology option in QGIS and each colour is an indicator to the species richness in each grid of the map.

5.RESULTS:

5.1. Changes of forest cover from 2011 to 2019:

2011 map:

The results of images classification on the vegetation cover of 2011 showed that the majority of the country lacked vegetation in 10,72 million ha or 57,06% of the total area, with the no-vegetation class located in the eastern and the middle parts of the country. Agriculture accounted for 4,14% of the total, with 775,77 thousand ha distributed along the Euphrates and Tigris rivers in addition to the humid western parts. Grasslands represented 36,45% of the area with 6,86 million ha mainly in the southern and the western areas. Finally, the forest area occupied 2,26% of the total area of Syria with 426,2 thousand ha mainly concentrated in the western coastal area (Fig 8 & 9).

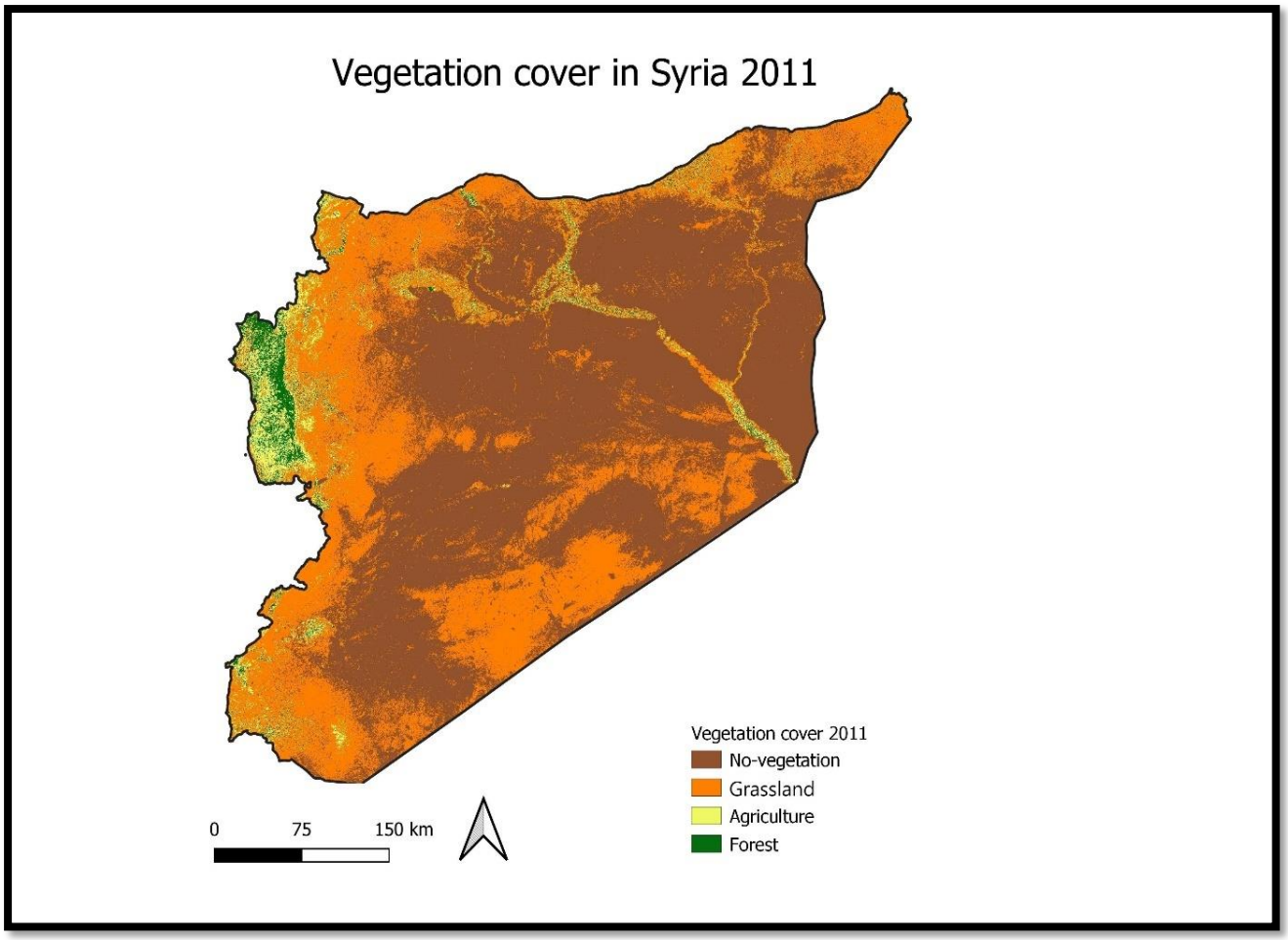

Fig 8. Vegetation cover of Syria 2011.

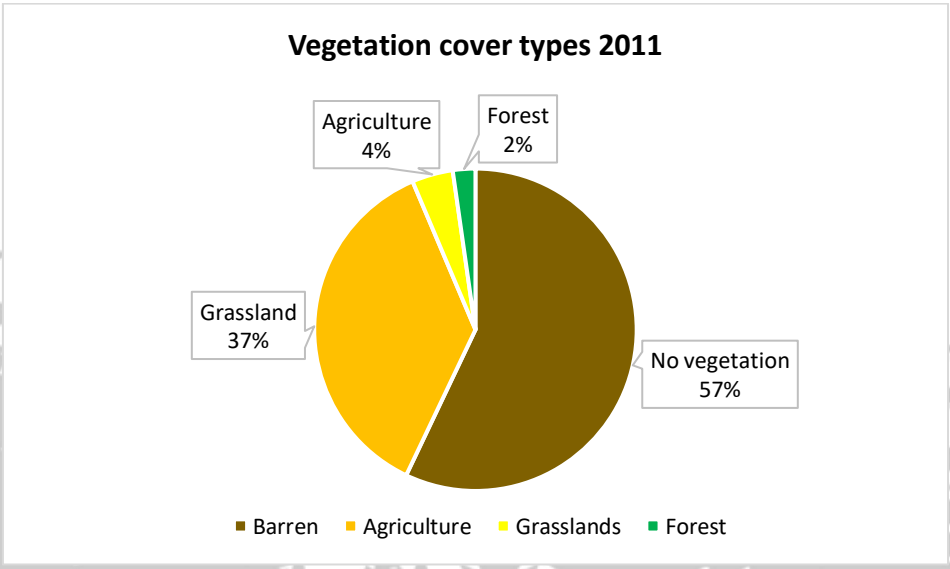

Fig 9. Proportions of vegetation classes 2011.

2019 map:

The dominant landcover class in 2019 is the no-vegetation class which represents the 73.29% of the total area of the country with 13,77 million ha mainly located in the eastern and the middle parts where the Syrian steppe lays, the agriculture lands dominated the rivers basins in addition to the western part with 680 thousand ha or 3.61% of the vegetation cover, grassland occupied mainly the western side along with the agriculture class forming the 21.02% of the area with 3,95 million ha, and the forest formed 2% of the total area with 386,72 thousand ha (Fig 10 &11).

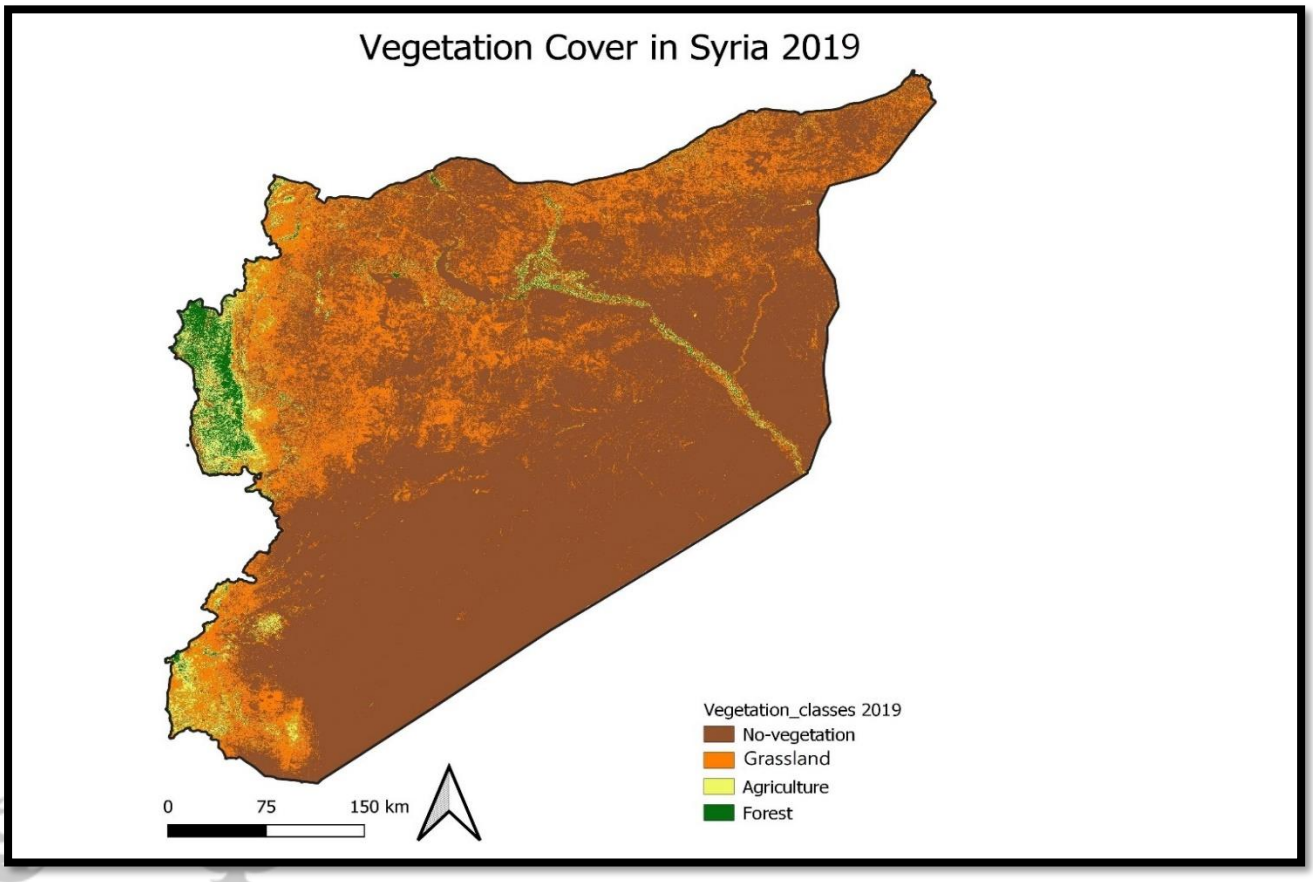

Fig 10. Vegetation cover of Syria 2019.

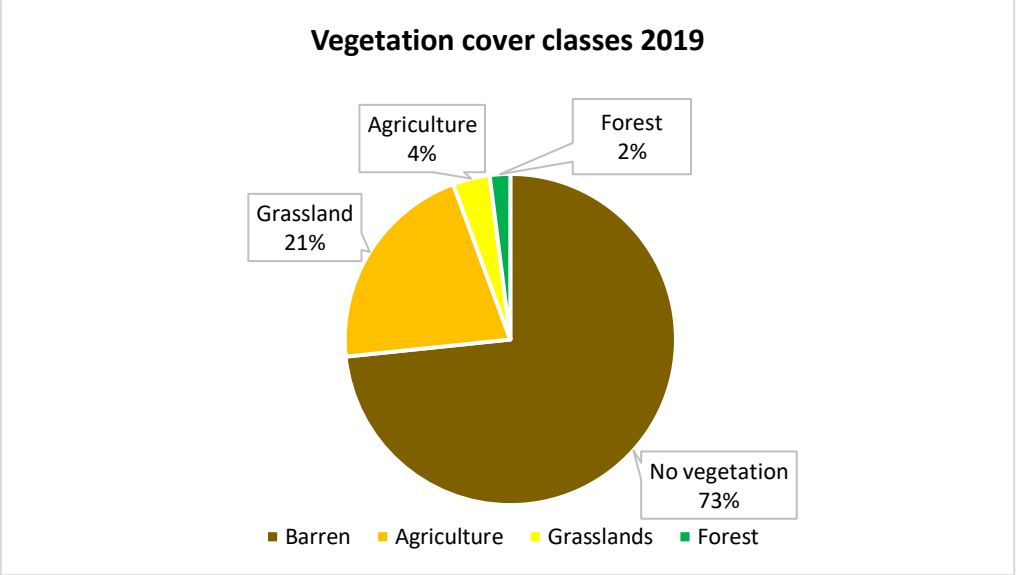

Fig 11. Proportions of vegetation classes 2019.

Land cover change 2011 – 2019:

The results of change detection of the four different landcover classes during the eight years of conflict showed different magnitudes of change as shown in table (5) and Chart (3).

The highest percentage of change (2011 Area-2019 Area /2011 area) *100) occurred in the Grassland class with a drop of 2,91 million ha in 2019 (42.45%), followed by the increment of the no-vegetation class with 3 million ha (28.45%). Agriculture dropped also 95,74 thousand ha (12.34%). And finally, the forest class dropped 39,47 thousand ha with a percentage of change of 9.26%.

Table 5. Change of area for different vegetation classes.

Types of Vegetation	Area (Hectare) 2011	Area (Hectare) 2019	Area change (Hectare)	Change (%) (2011-2019)
No-vegetation	10726383.96	13777856.15	+3051472.19	+28.45
Grasslands	6869088.767	3952839.9	-2916248.867	-42.45
Agriculture	775773.9587	680027.278	-95746.6807	-12.34
Forest	426200.6735	386721.4847	-39479.1888	-9.26

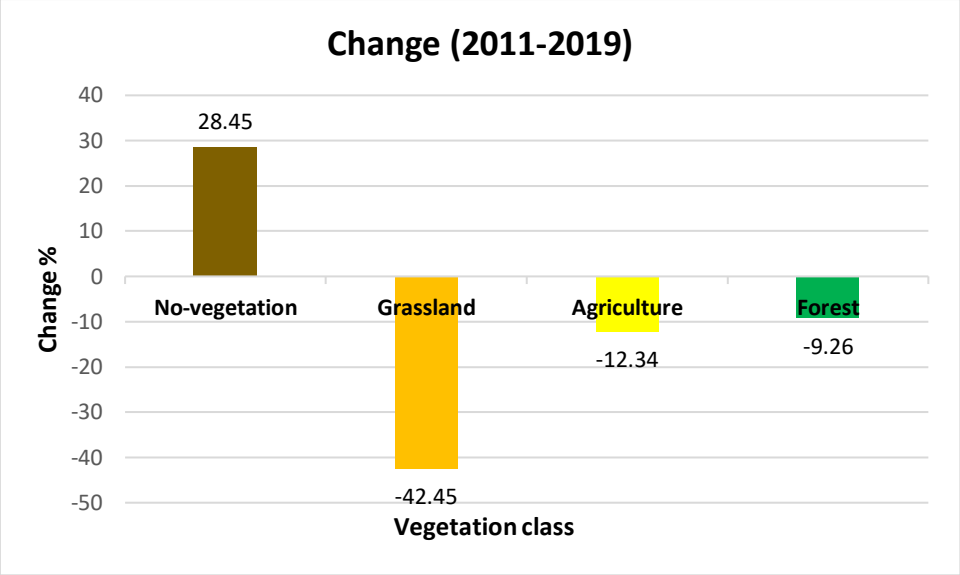

Fig 12. The change % of each vegetation cover class between 2011-2019.

The change between the years 2011 and 2019 showed that in general **64,44%** of the total landscape remined the same while **33.22%** experienced a change. Most of the unchanged area belongs to the no vegetation class forming 50% of the total area and locating in the eastern and middle steppic area of Syria.

About 9.5 million ha of no-vegetation class was stable during the eight years of conflict forming **50.5%** of the total area. An extent of 375.99 thousand ha of agriculture class or **2%** remained the same. **12.6%** or 2.4 million ha of grassland class stayed without any change and 245.38 thousand ha of forests did not experience any change forming **1.3%** of the total area of the landscape.

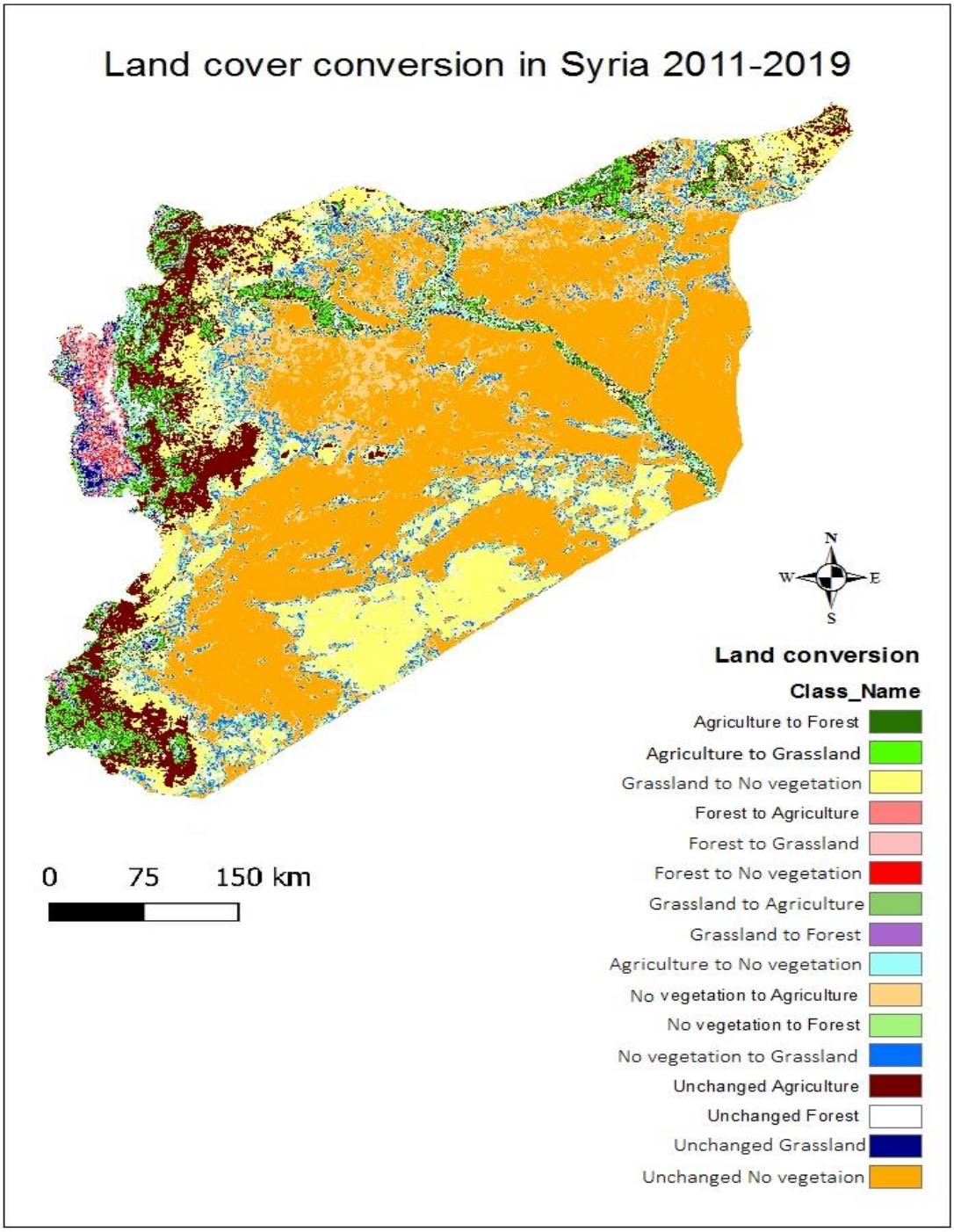

Fig 13. 2011-2019 conversion classes of Syrian vegetation cover.

Table 6. Area of different trajectory vegetation cover classes of the study area.

Conversion	Area (ha)
Unchanged no vegetation	9500646
No vegetation to Agriculture	1221936
No vegetation to Grassland	12024.9
No vegetation to Forest	5257.184
Agriculture to no vegetation	90712
Unchanged Agriculture	2430390
Agriculture to Grassland	208031.7
Agriculture to Forest	51680.88
Grassland to No vegetation	421290
Grassland to Agriculture	186715.9
Unchanged Grassland	375991.1
Grassland to Forest	77836.13
Forest to no vegetation	60550.81
Forest to Agriculture	64706.71
Forest to Grassland	51924.08
Unchanged Forest	245389.7

Forest cover dynamics:

This pre-conflict and conflict period analysis was focused on forest dynamics and different factors that derived the changes in this area (Fig 14).

245.38 thousand ha of the forest area of the country did not experience any change during the years of the conflict while 311.95 thousand ha had a significant change of the area.

29.3% of the changed forest area degraded to grassland, 36.5% of the forest area was transformed into agriculture lands and 34.1% was converted into a no-vegetation class. On the other hand, 57.7% of the grassland class developed to the forest class, 38.3% of agriculture lands were converted into a forest area and 3.9% of no-vegetation class was reforested.

Table 7. Forest cover area change.

Forest change	Conflict period (2011-2019)	
	Area (ha)	**Area %**
Forest loss	177181.6	32%
Forest gain	134774.2	24%
No change	245389.7	44%

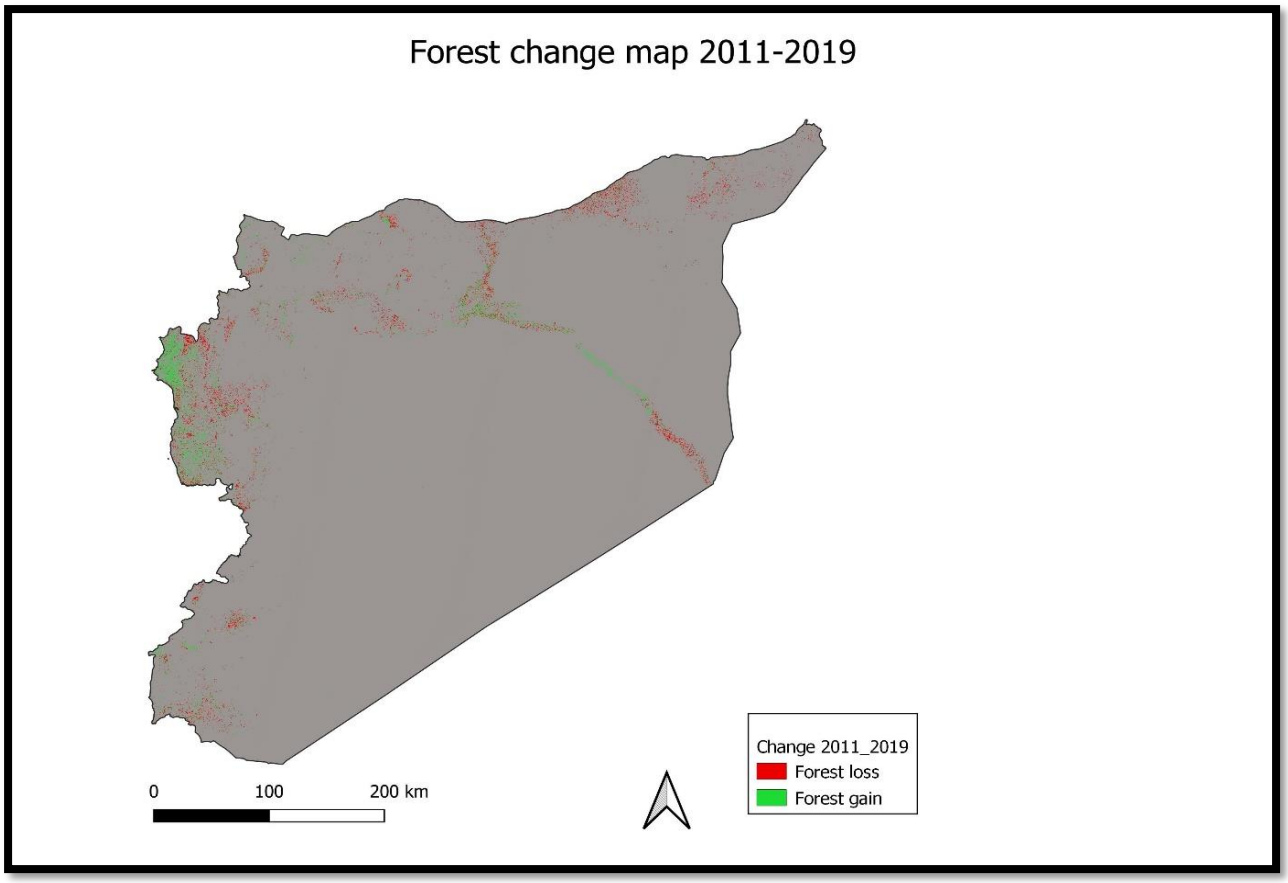

Fig 14. Forest cover change.

5.2 .The accuracy assessment:

The random points were generated depending on land cover classes and their geographical distribution (Fig 15). In this study, using Google Earth Pro we selected 20 reference points as the base map in each of the feature classes (80 points in total). Google Earth provides high-resolution satellite imagery for many places in different dates and times. Overall precision was measured using error matrices and kappa indices (NASA, 2018).

The error matrix describes the level of accuracy of the same image between the training sample and the classified values. This method is the most commonly used and essential for assessing the overall classification using user accuracy, producer accuracy and kappa coefficient (Foody, 2002).

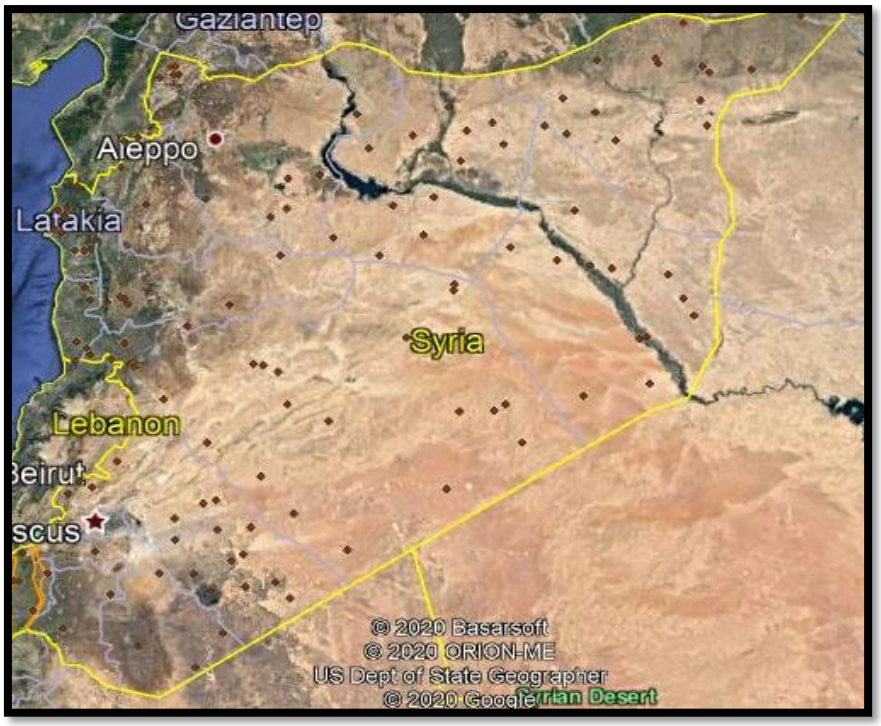

Fig 15. The distribution of the reference validation points on the study area using Google earth pro.

The overall accuracy measured in the final classified maps was 87% in (2011), and 83 % in (2019). The user accuracies were 95%, 75%, 100%, 80% respectively for the classes No-vegetation, shrubs and grassland, agriculture and forest for the year of 2011 when the producer accuracies measured 83%,100%,83%,89% and the kappa measured 0.83. For the year of 2019 accuracies were 95%, 75%, 80%, 85% respectively for the classes No-vegetation, shrubs and grassland, agriculture and forest when the producer accuracies measured 86%,88%,76%,85% and the kappa measured 0.78.

Table 8. 2011 Vegetation cover confusion matrix.

2011 Vegetation cover confusion matrix							
Class name	Class number	1	2	3	4	validation points	User accuracy
No-vegetation	1	19	0	0	1	20	95%
Grassland	2	3	15	1	1	20	75%
Agriculture	3	0	0	20	0	20	100%
Forest	4	1	0	3	16	20	80%
Grand total (producer)		23	15	24	18	80	
Producer accuracy		83%	100%	83%	89%		
Overall accuracy	87%						
Kappa coefficient	83%						

Table 9. 2019 vegetation cover confusion matrix.

2019 Vegetation cover confusion matrix							
Class name	Class number	1	2	3	4	validation points	User accuracy
No-vegetation	1	19	1	0		20	95%
Shrubs and grasslands	2	2	15	3	0	20	75%
Agriculture	3	0	1	16	3	20	80%
Forest	4	1	0	2	17	20	85%
grand total (producer)		22	17	21	20	68	
Producer accuracy		86%	88%	76%	85%		
Overall accuracy	83%						
Kappa coefficient	78%						

5.2. Endemic and threatened species information and evaluation:

Endemic Fauna:

The literature analysis on endemic animal species of Syria, highlighted 19 research papers and2 databases (IUCN, Species 2000). 39 endemic species were mentioned in the papers including 6 fresh water fish (4 critically endangered species, 1 endangered and 1 extinct), 1 mammal (data deficient), 2 arthropods (not evaluated by IUCN), 1 reptile (not evaluated by IUCN), 1 Mollusc (not evaluated by IUCN), 25 insect species (1 near threatened species and the rest of the species are not evaluated by IUCN) and 0 Birds and amphibians endemic to Syria. (Fig 16)

84% of endemic fauna is not evaluated by the IUCN red list when the majority of evaluated species are endangered (15% of total endemic fauna with 1 extinct species and 1 data deficient).

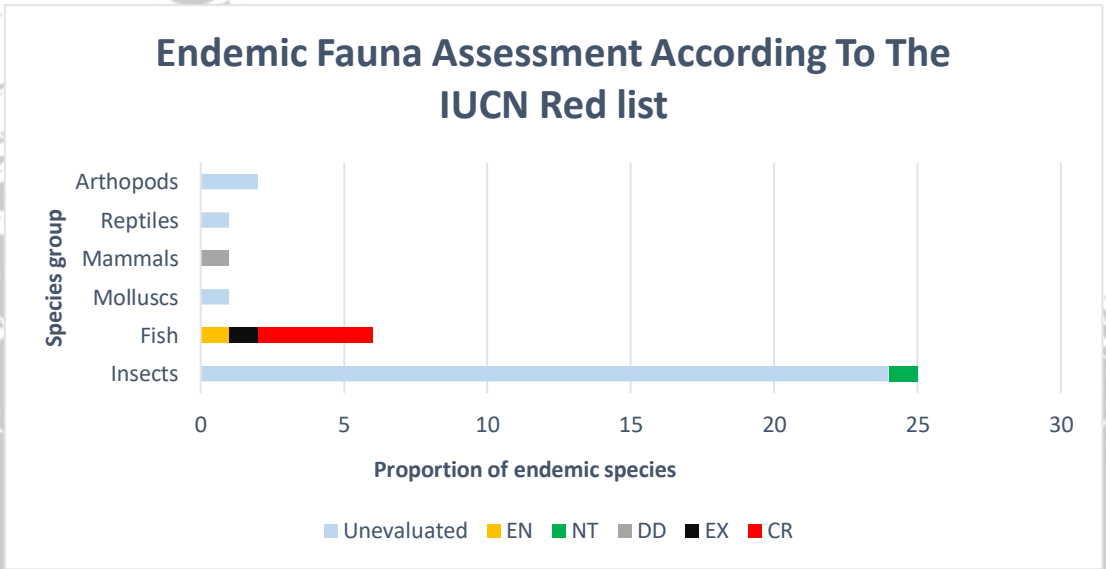

Fig 16. Endemic Fauna Evaluation According to The IUCN Red list.

Endemic Flora:

Endemic plant information was extracted manually from the flora of Syria and Lebanon (***Nouvelle flore*** du Liban et de la Syrie, 1966, 1970 et 1983, Paul ***Mouterde),***

249 endemic plant species were mentioned in the flora belonging to 39 families (Annex 2). Fabacea

Contained the highest number of endemic species with 32 species (*Astragalus* sp) and forming the 14% of total endemic species, Asteraceae contained also a big number of endemic species with 23 species (11 species belongs to the genus Centaurea) and thus formed about 10% of the endemic flora. Lamiaceae contained 22 plant species (6 species from the genus Teucrium) and forming 10% of total endemic flora, Iridaceae contained 18 species represented mostly by Iris species (18 species) and forming 8% of total endemic species, Caryophyllaceae contained 5% of the total endemic flora with 10 species as well as *Scrophulariaceae* family represented by 10 endemic species of Verbascum sp.

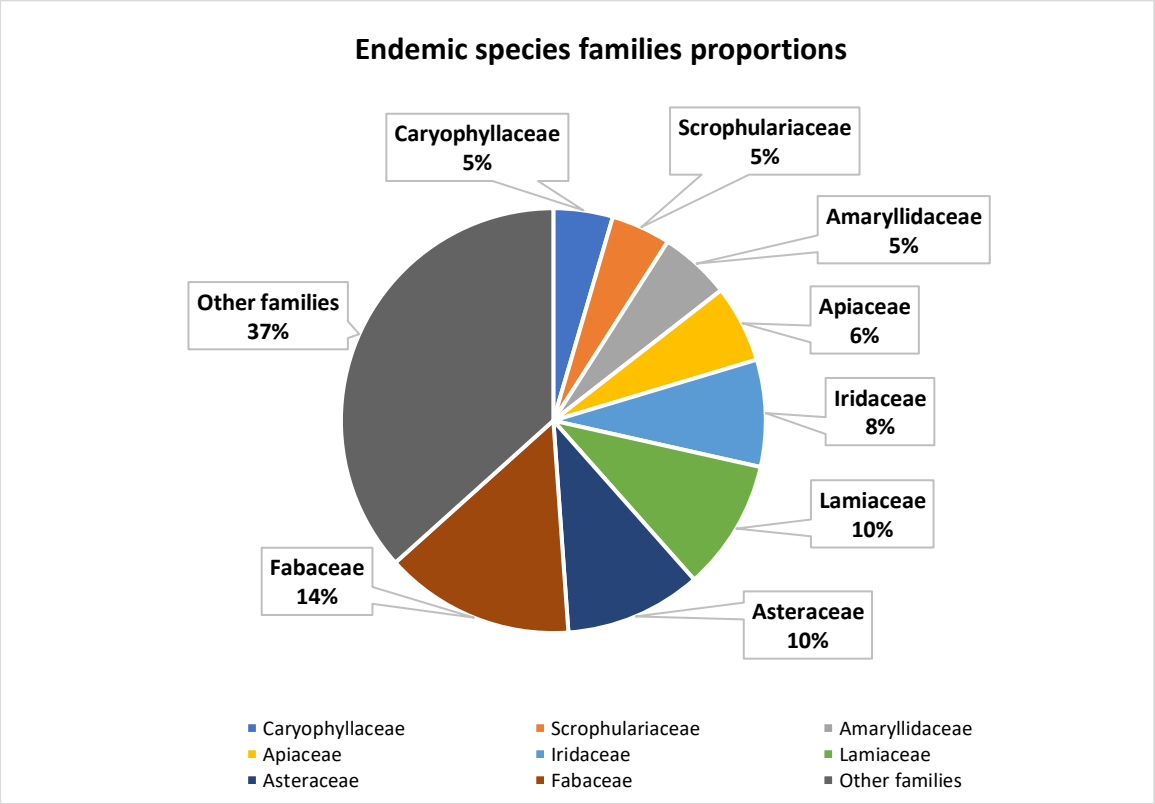

Fig 17. Endemic species families proportions.

Endemic plant species evaluation by the IUCN red list:

The majority of endemic plants are not evaluated by the IUCN red list (only 7%) and among the evaluated species there are 4 critically endangered species, 1 vulnerable ,3 endangered, 1 near threatened, 4 least concern, 4 data deficient.

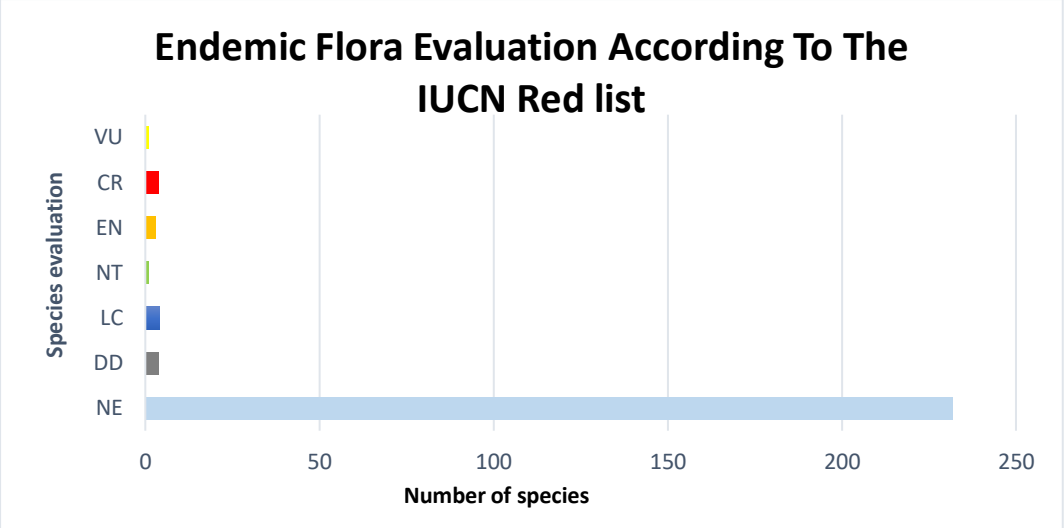

Fig 18. Endemic species families proportions.

Endemic plants to the forest ecosystem:

25 endemic species were described in the flora of Syria to belong to the forest ecosystem and they represent 10% of the Syrian endemic flora, 10 species of them belong to Fabaceae family which contained the highest number of endemics, Lamiaceae and Liliaceae contained 2 species each and the rest of the families contained 1 species only as showed in the (Fig 19).

The endemic plant species to the forest ecosystem are represented by herbal plants either annual or perennial herbs.

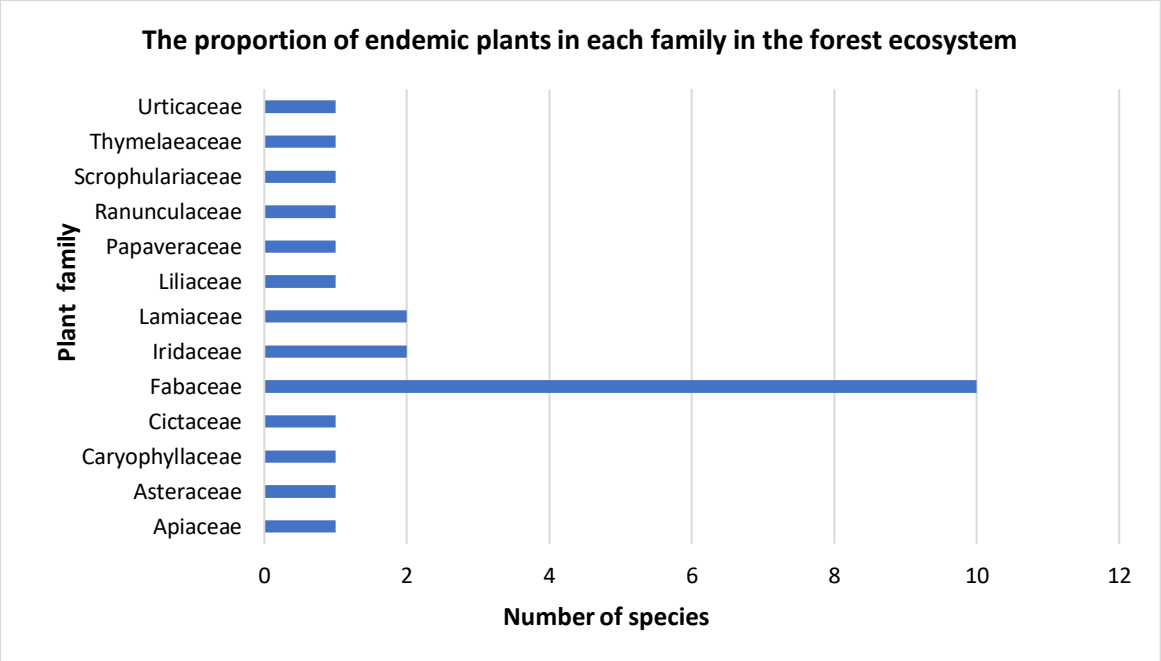

Fig 19. The proportion of endemic plants in each family in the forest ecosystem.

Rare plant species:

Rare species are defined to be the species that have small population sizes, limited geographical ranges and narrow habitats (Leitão, 2016; Rabinowitz D. ,1981).

17 plant species are considered as rare species according to Nahal 2016 and different others in this following table (10).

Table 10. Rare species in Syria.

Species	Family	Location	Reference
Alnus orientalis	Betulaceae	Fronlouk forests-Latakia	Aswad,1991
Asplenium bourgai	Aspleniaceae	Wadi alnasara-west Homs	Krzon,1998
Cornus mas	Cornaceae	Fronlouk forests-Latakia	Aswad,1991
Corylus avellana	Betulaceae	Fronlouk forests-Latakia	Aswad,1991
Cytisus syriacus	Fabaceae	Wadi alnasara-west Homs	Krzon,1998
Dryopteris aculeata	Dryopteridaceae	Wadi alnasara-west Homs	Krzon, 1998
Fragaria vesca	Rosaceae	Coastal mountains	Nahal,UNEP
Lycopodium denticulata	Lycopodiaceae	Coastal mountains	Shalabi, 1991
Malus trilobata var oxyloba	Rosaceae	Wadi alnasara-west Homs	Krzon, 1998
Mespilus germanica	Rosaceae	Fronlouk forests-Latakia	Aswad, 1991
Paeonia mascula	Paeoniaceae	Fronlouk forests-Latakia	Aswad, 1991
Polypodium aculeatum	Polypodiaceae	Coastal mountains	Shalabi, 1991
Prangos hermonis	Apiaceae	Jabal al arab-al swayda	Post, 1886
Solenanthus circinatus	Boraginaceae	Jabal al arab-al swayda	Post, 1886
Vicia articulata	Fabaceae	Jabal halab- Aleppo	Ehrman et al, 1990
Vicia noeana	Fabaceae	Jabal halab- Aleppo	Ehrman et al, 1990
Pteris longifolia	Pteridaceae	Coastal mountains	Shalabi, 1991

Threatened species:

27% of the world´s species are evaluated by the IUCN red list and yet 32,000 species of them are considered to be threatened with extinction. The evaluation of Syrian species varies according to species groups on a global level. Birds and Mammals are the most evaluated species with 100% of birds and 71% of mammals while Fungi, Fish and Insects have the lowest number of evaluated species 0.2%, 8.4%,and 9.5% repectively (Fig 20).

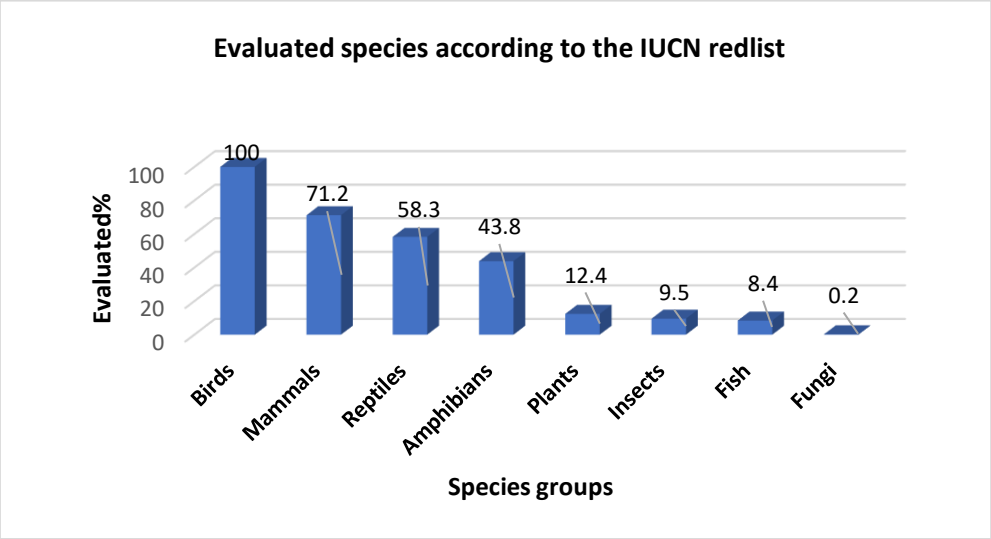

Fig 20. Endemic Flora Evaluation According to The IUCN Red list

Table 9. Species groups with their total number and evaluated number.

Species	Reptiles	Plants	Amphibians	Fungi	Fish	Insects	Birds	Mammals	Reference
Total Number:	127	3100	16	641	452	1500	394	125	**CBD**
Evaluated Number:	74	383	7	1	38	142	394	89	**IUCN**
Evaluated%	58.3	12.4	43.8	0.2	8.4	9.5	100	71.2	

Evaluated species groups:

Plants:

Total number of evaluated species:

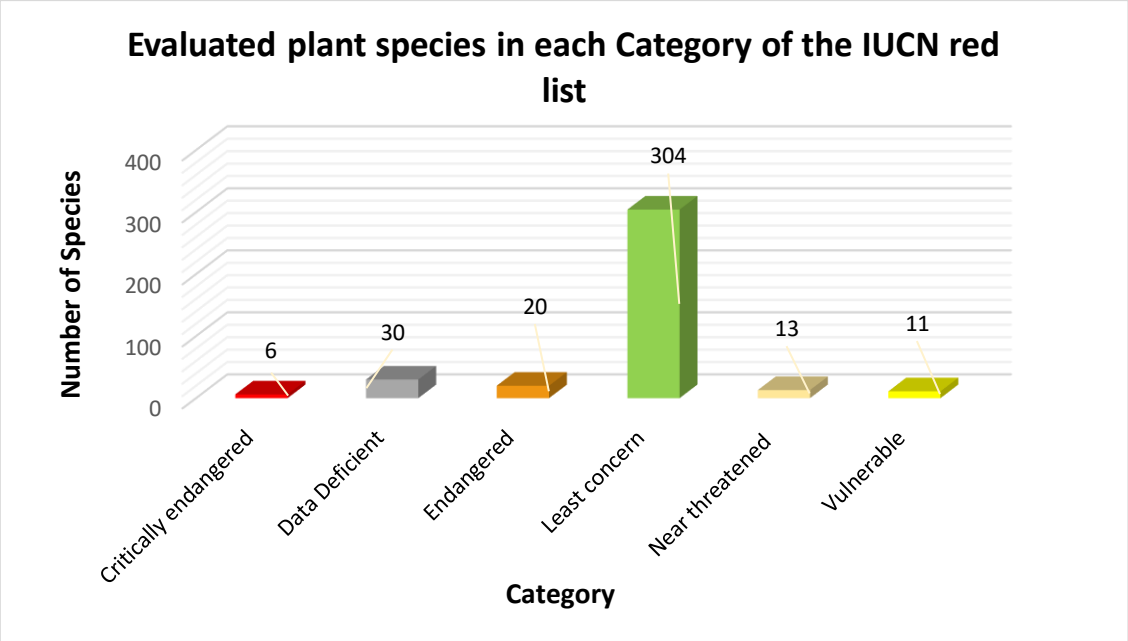

Fig 21. Evaluated species according to the IUCN red list.

383 plants in total were evaluated by the IUCN and distributed on 6 categories when (79%) of species were in the **LC** category, 3% **NT**, 2% **VU**, 5%**EN**, 7%**DD** and 1% in **CR**.

Plant families in each category:

Critically endangered category **(CR):**

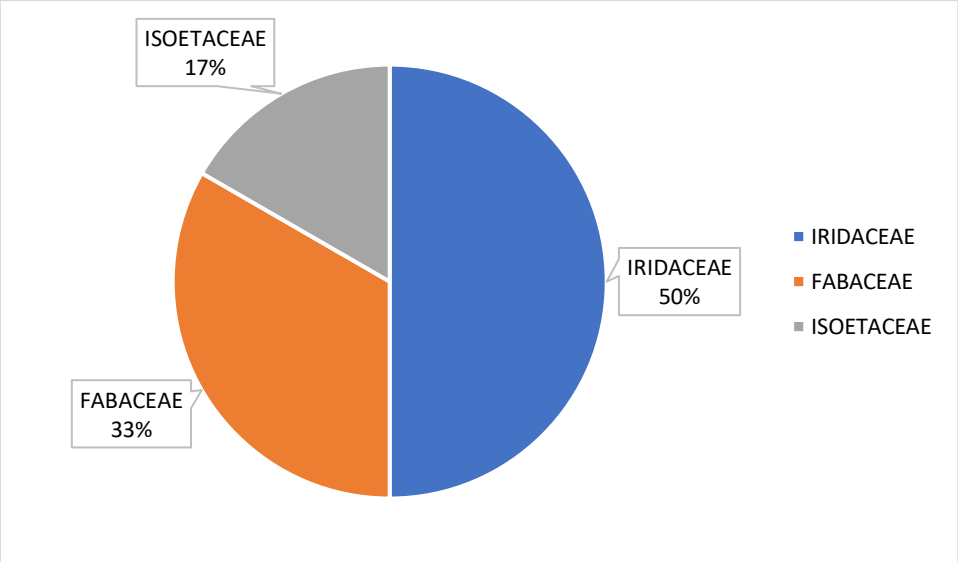

Fig 22. Critically endangered plant species.

6 plant species are evaluated as critically endangered when half of Critically endangered plants belongs to Iridaceae family (3 species), 2 species or 33% belong to Fabaceae and 1 species belong to Isoetaceae.

Data Deficient category **(DD):**

30 plant species belong to Data deficient category, Fabaceae, Iridacaea and Amaryllidaeae contained the higher number of plant species in this category with 17% of total number of species, with 5 plant species each.

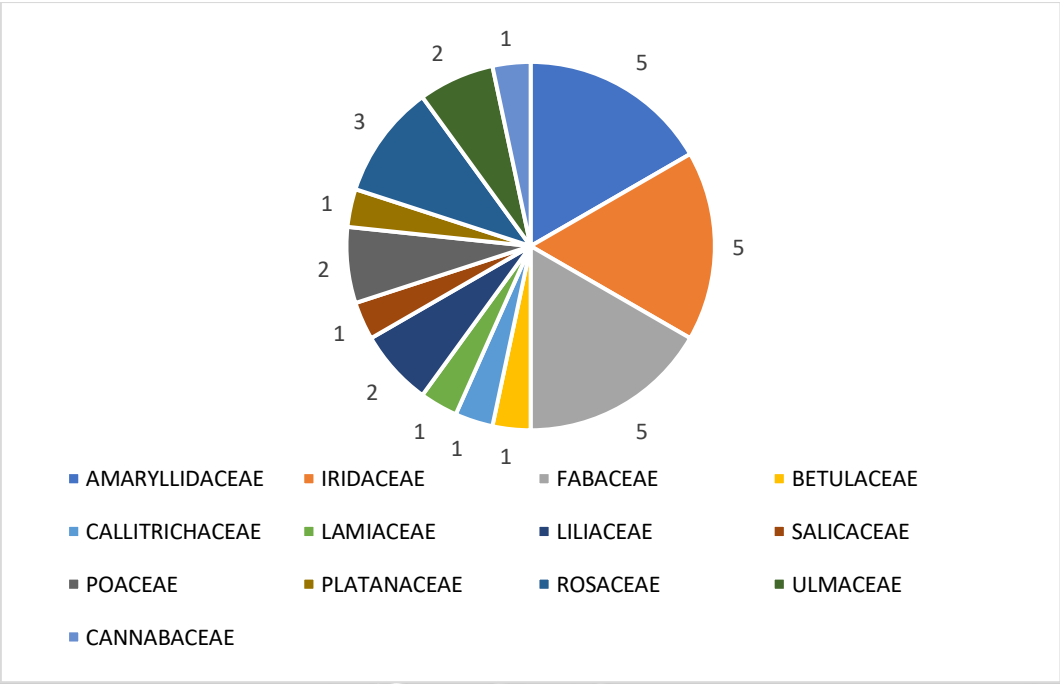

Fig 23. Data Deficient plant species.

Endangered plant species category (EN):

20 plant species are considered by the IUCN to be endangered, 7 plant species of the family Fabaceae (35%), 5 species of Amaryllidacae family (25%), and 4 species from Iridaceae family (20%).

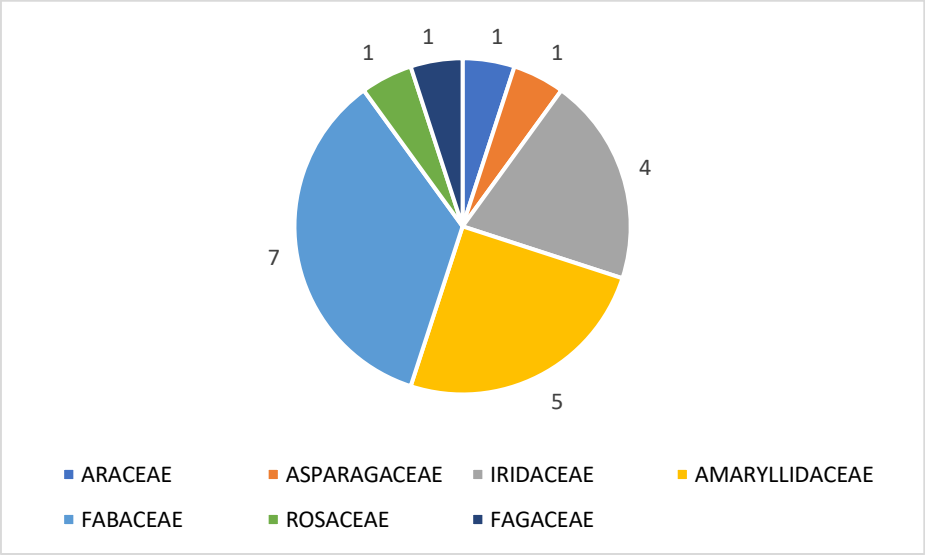

Fig 24. Endangered plant species.

Near Threatened plant species category (NT):

13 species are near threatened, 4 species of Fabaceae family (31%), 3 species of Amaryllidaceae (23%) and the rest of the families are represented with 1 species.

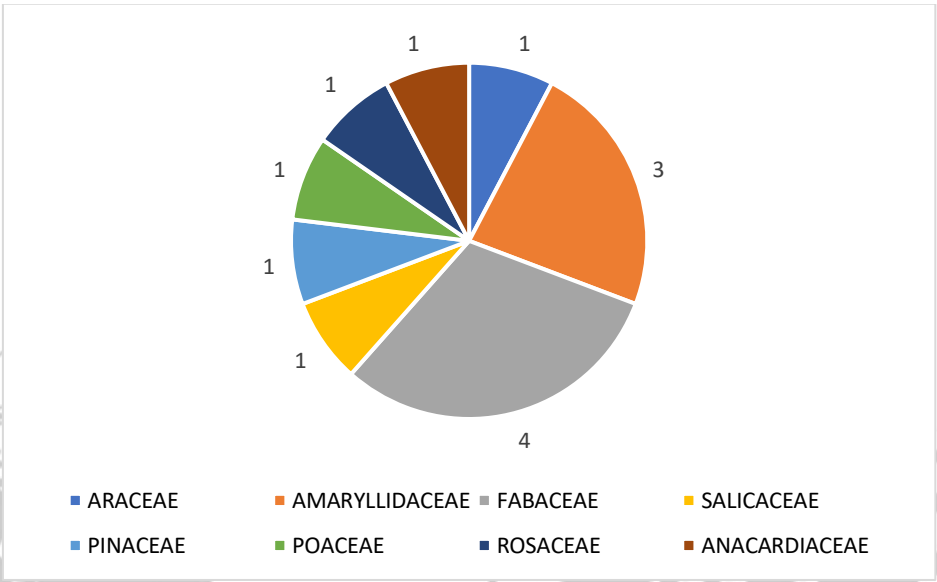

Fig 25. Near Threatened plant species.

Vulnerable plant species category **(VU):**

9 of the evaluated plant species are vulnerable, 2 of them belong to Iridaceae ,3 to Fabaceae and the other families are represented by 1 species.

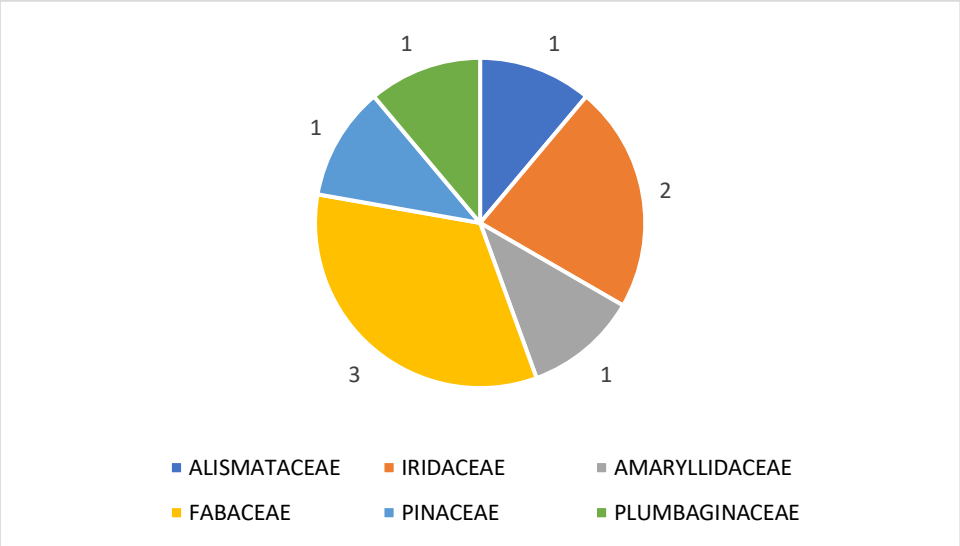

Fig 26. Vulnerable plant species.

Plants in the forest ecosystems

83 plant species were evaluated in the forest ecosystems in 6 categories ,70% of the plants are in the **least concern** category with 58 species, other species distributed on the other 5 categories with 1 species in the **Critically endangered** category, 2 **Vulnerable** plant species, 7 **endangered** species and 7 **near threatened**.

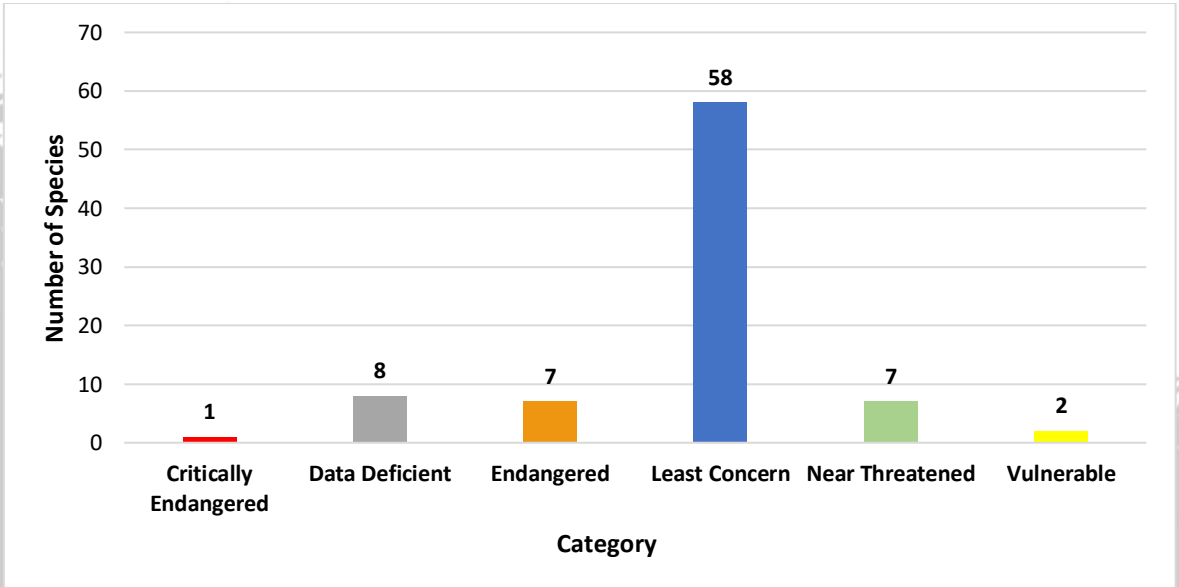

Fig 27. Number of plant species in each IUCN category in the forest ecosystem.

Plant families in each category:

Most of evaluated families contain species that belong to the least concern category, Fabaceae contains the highest number of evaluated species with 4 endangered species, 2 near threatened, 1 data deficient and 8 least concern species. Iridaceae contained 1 vulnerable species, 1 endangered species and 1 least concern species. Araceae represented only with 1 near threatened species.

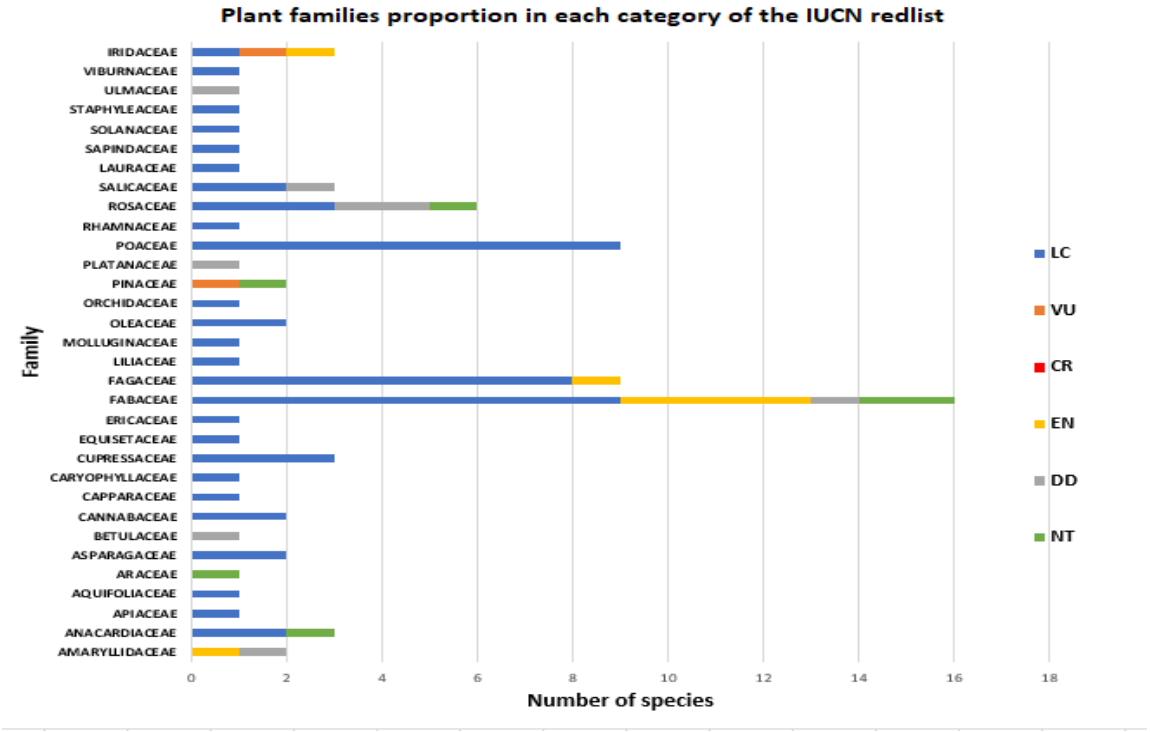

Fig 28. Plant families proportion in each category of the IUCN red list.

Threatened Fauna:

Reptiles:

Among the 72 evaluated reptiles 59 or 80% are in the least concern category, 5 species (7%) are endangered, 6 species (8%) are vulnerable, 3 species (4%) are in the data deficient category, 1 near threatened species (1%).

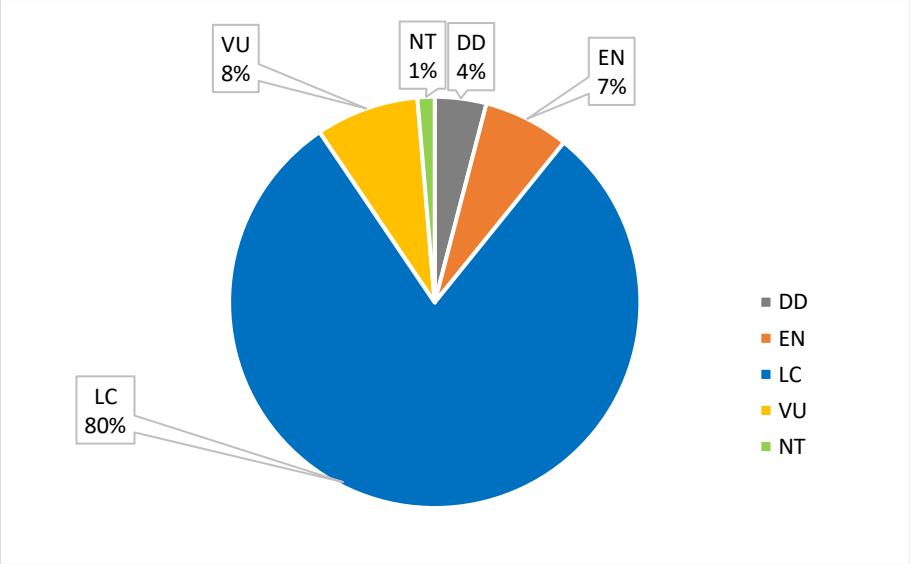

Fig 29. Proportion of evaluated reptiles by the IUCN.

Evaluated reptiles in the forest ecosystems:

59 species of reptiles are considered by the IUCN to belong to the forest habitats, 53 of the total number of species is classified as a least concern species or (90%) of the evaluated reptiles, 3 in the data deficient category, 2 vulnerable species and 1 only one endangered species.

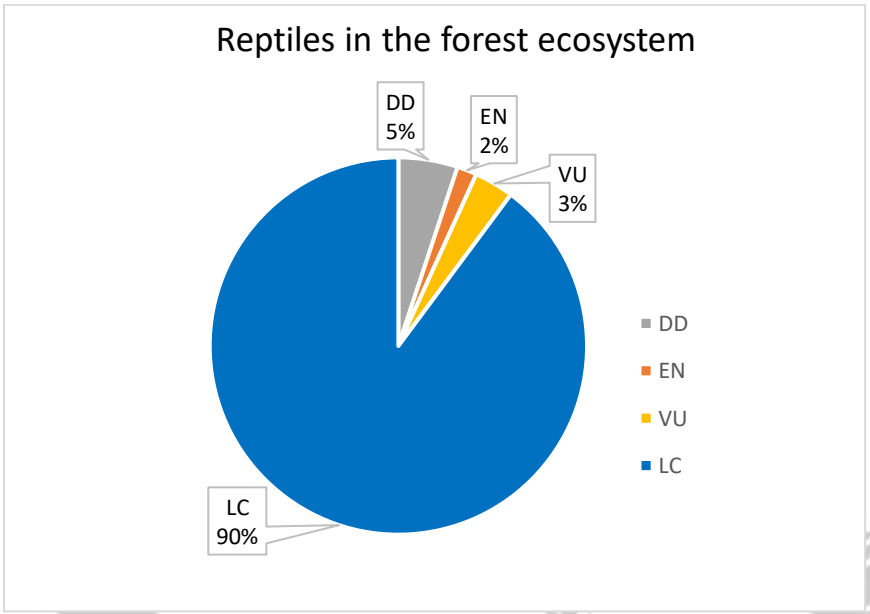

Fig 30. Reptiles in the forest ecosystem.

Mammals:

110 species of mammals are evaluated by the IUCN on a global level including 81 least concern species or 74% of the total species, 11 vulnerable species 10%, 6 near threatened species (5%), 5 belong to data deficient category (5%), 3 endangered and extinct species (3%).

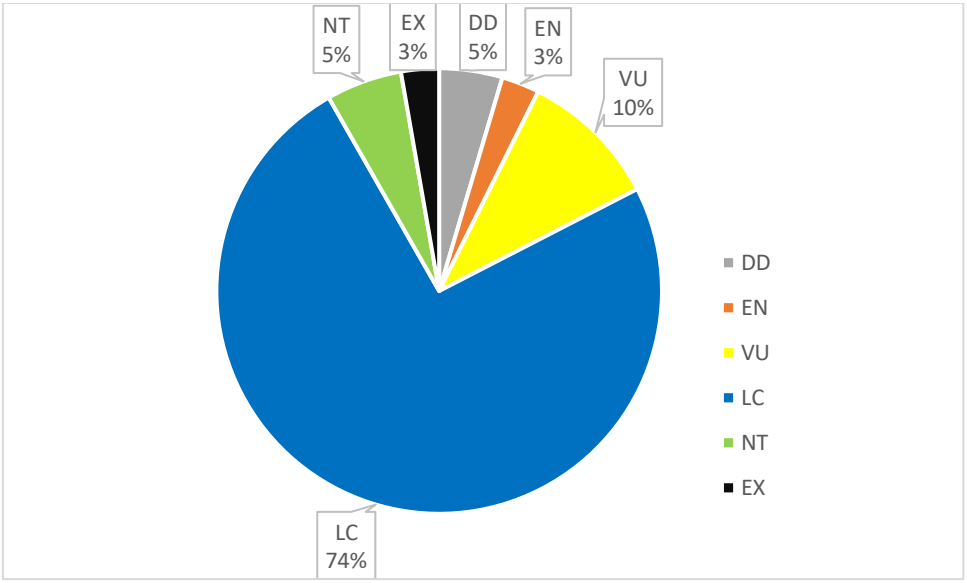

Fig 31. Evaluated mammals by the IUCN.

In the forest ecosystems:

Among the 110 evaluated mammals 86 of them are considered to live in the forest habitats, 69 species belong to the least concern category forming 80% of total evaluated species, 6 vulnerable species (7%), 5 near threatened species, 3 extinct species (4%), 2 data deficient species (2%) and 1 endangered species (1%).

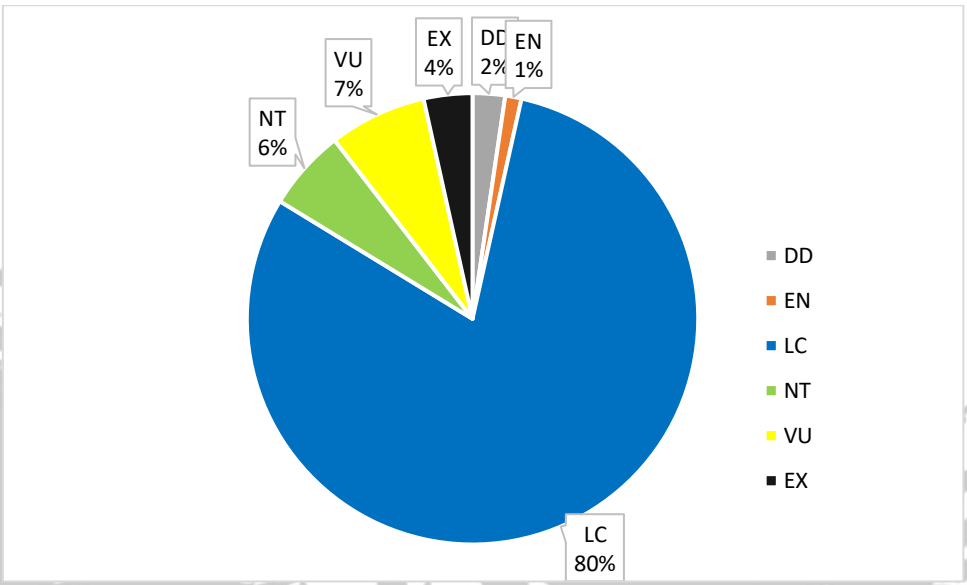

Fig 32. Mammals in the forest ecosystem.

Birds:

351 bird species are evaluated by the IUCN on a global level including 351 least concern species or 89% of the total species, 15 vulnerable species 4%, 20 near threatened species (5%), 7 belong to endangered category (2%), 2 critically endangered (0.5%).

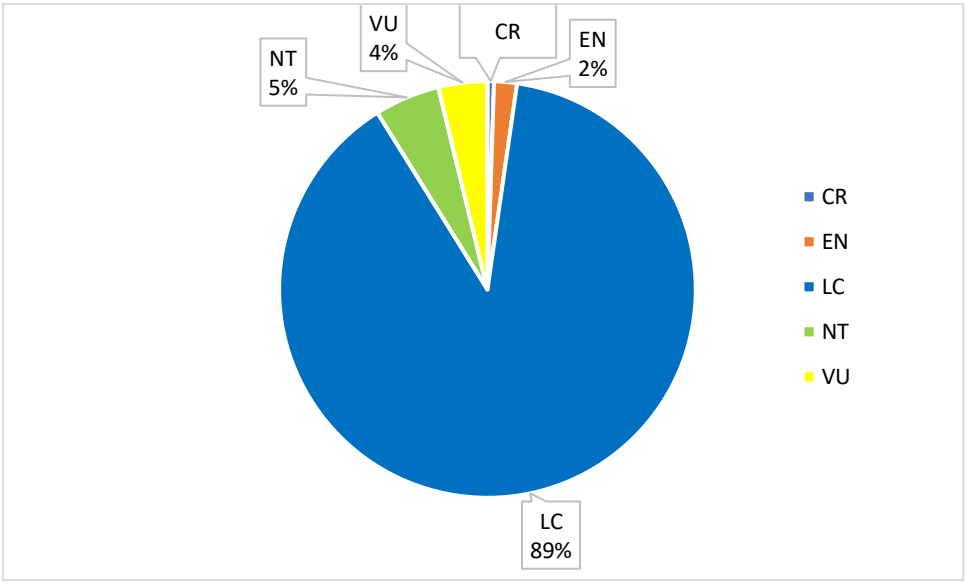

Fig 33. Evaluated birds by the IUCN.

Birds in the forest ecosystems:

Among the 395 evaluated birds 258 of them are considered to belong to the forest habitats, 235 species belong to the least concern category forming 91% of total evaluated species, 7 vulnerable species (3%), 10 near threatened species (4%), 5 endangered species (2%) and 1 critically endangered species (0.3%).

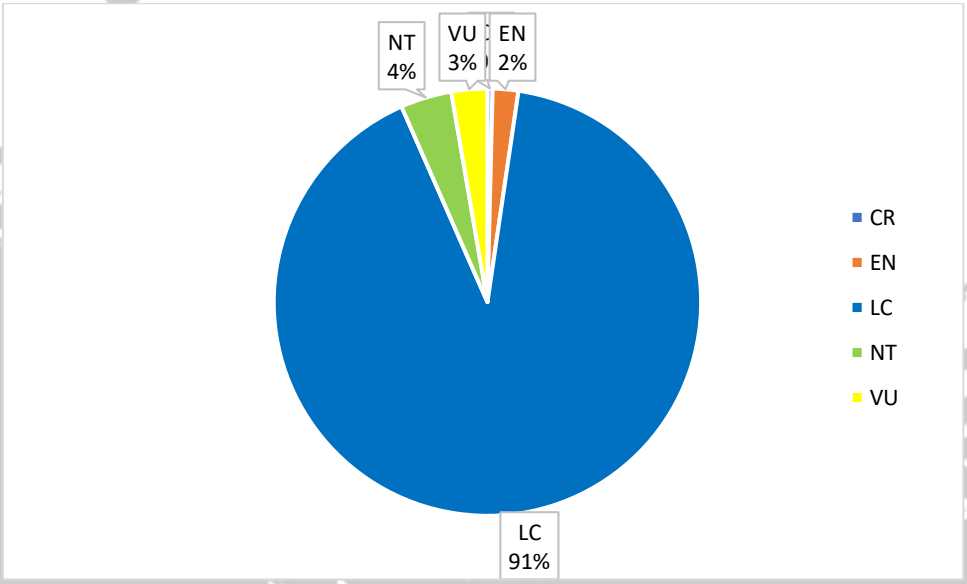

Fig 34. Birds in the forest ecosystems.

Amphibians:

7 amphibian species are evaluated by the IUCN red list with 5 belonging to the least concern category forming 72% of total evaluated species, 1 near threatened species and 1 data deficient species.

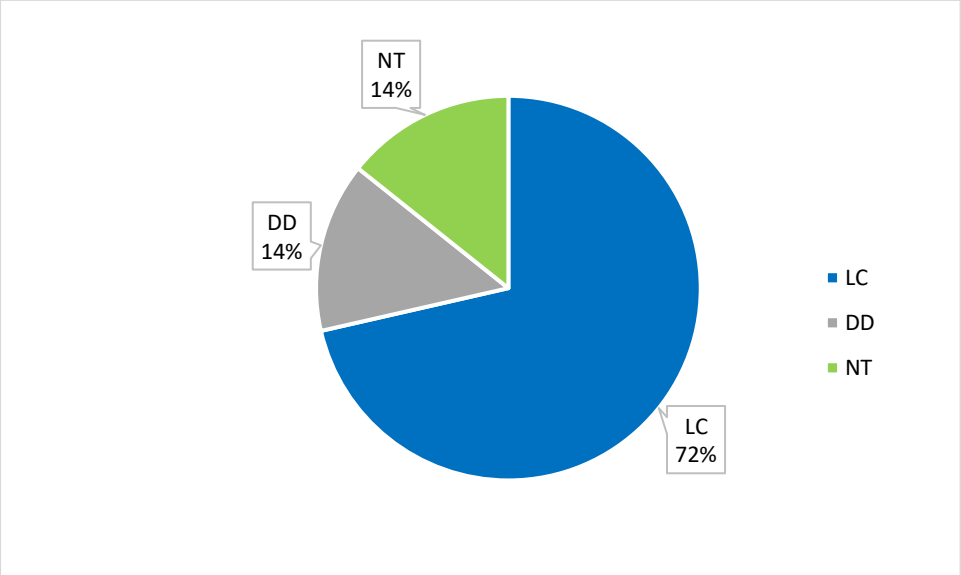

Fig 35. Evaluated amphibians by the IUCN.

Insects:

142 insect species are evaluated by the IUCN red list with 84 belonging to the least concern category forming 59% of total evaluated species, 8 vulnerable species (6%), 7 near threatened species (5%), 44 data deficient species (29%) and 2 endangered species (1%).

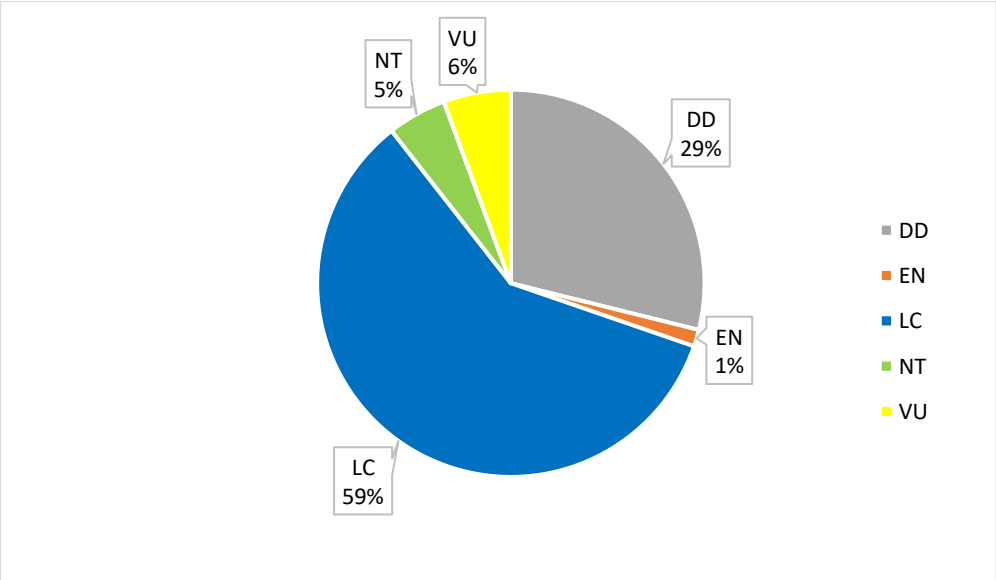

Fig 36. Evaluated insects by the IUCN.

Insects in the forest ecosystems:

Among the 142 evaluated insects 50 of them are considered to belong to the forest habitats, 28 species belong to the least concern category forming 57% of total evaluated species, 2 vulnerable species (4%), 3 near threatened species (6%) and 16 species belong to data deficient category (33%).

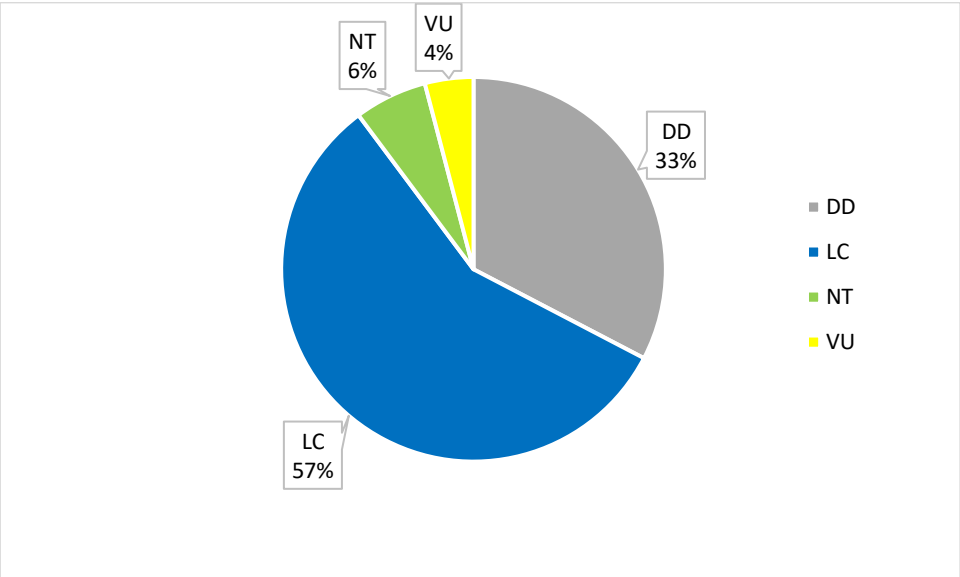

Fig 37. Insects in the forest ecosystems.

Freshwater fish:

81 fresh water fish species are evaluated by the IUCN on a global level including 15 least concern species or 30% of the total species, 8 vulnerable species 16%, 6 near threatened species (12%), 10 belong to endangered category (20%), 7 critically endangered (14%).

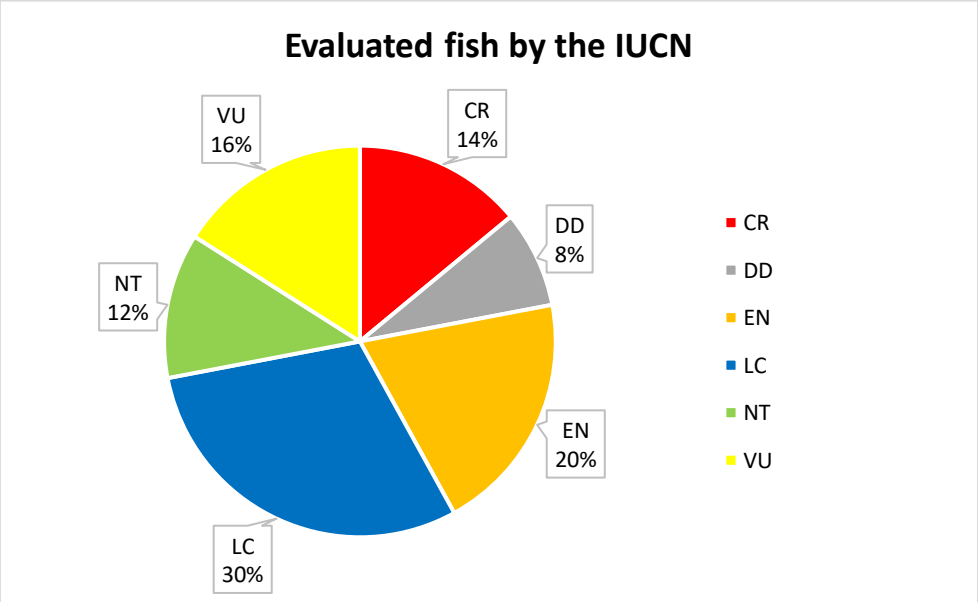

Fig 38. Evaluated fish by the IUCN

5.4. Threatened Species hotspots:

Threatened plants hotspots map (Fig 39)**:**

About 7301 of threatened plant species spatial observations were taken from the data base of the IUCN red list including 91 plant species to build the map of threatened species richness hotspots and identify the most important plant areas in terms of richness and priority for conservation.

The results show a high number of threatened plant species in the western and the south western parts of the country and the richest areas in plant species are:

The coastal Mediterranean area where the forests are concentrated represents an important area in species richness. The Anti-Lebanon high mountains contain a high number of species as well, The isolated Jabal al-Arab mountain in the south, Julan heights, north west Aleppo and north west Idlib.

Very scarce spatial information about the plants of the Syrian steppe was found in the database and most of the steppic area was represented by zero plant species information located in the centre and the eastern parts of Syria.

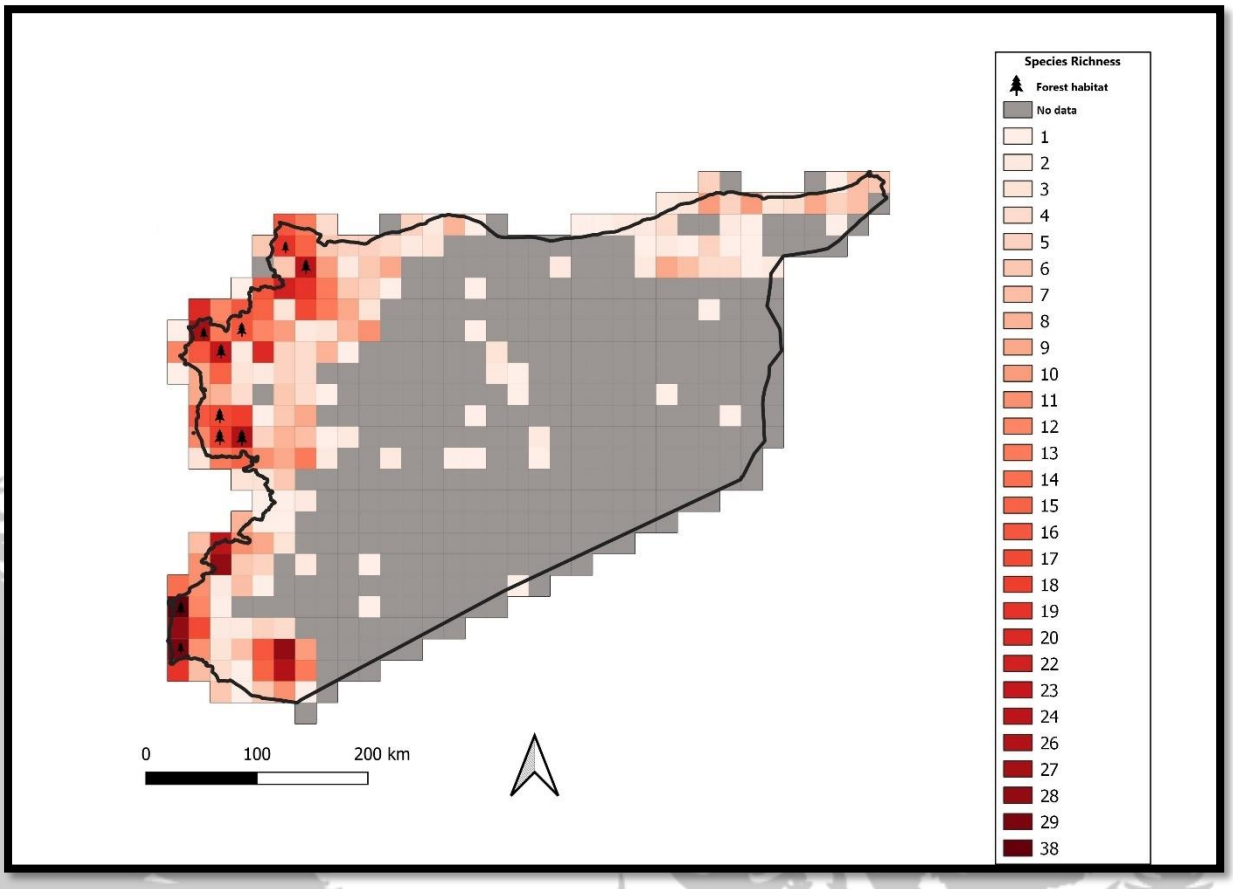

Fig 39. Plants biodiversity hotspots map in Syria.

Threatened species hotspots map (Fig 40):

This map contains the spatial data of different groups of threatened species in Syria on a global level, with the distribution of threatened (Birds, Mammals, Reptiles, Insects, Amphibians and plant species) at the time.

The map shows that most of the area of the country represents a habitat for one or more threatened species, when the steppe area of the country ranges between 17-21 species in each grid the northern area represent richer habitats ranging from 21-44 species.

The highest number of species richness is found in the Julan heights area ranging from 44-68 species in each grid as well as the coastal mountains area 25-56 species per grid.

The Jabal al Arab isolated mountain also showed a high number of species with a arrange of 31-56 species per grid in addition to the Anti-Lebanon mountain range in the south west parts of the country 36-56 species.

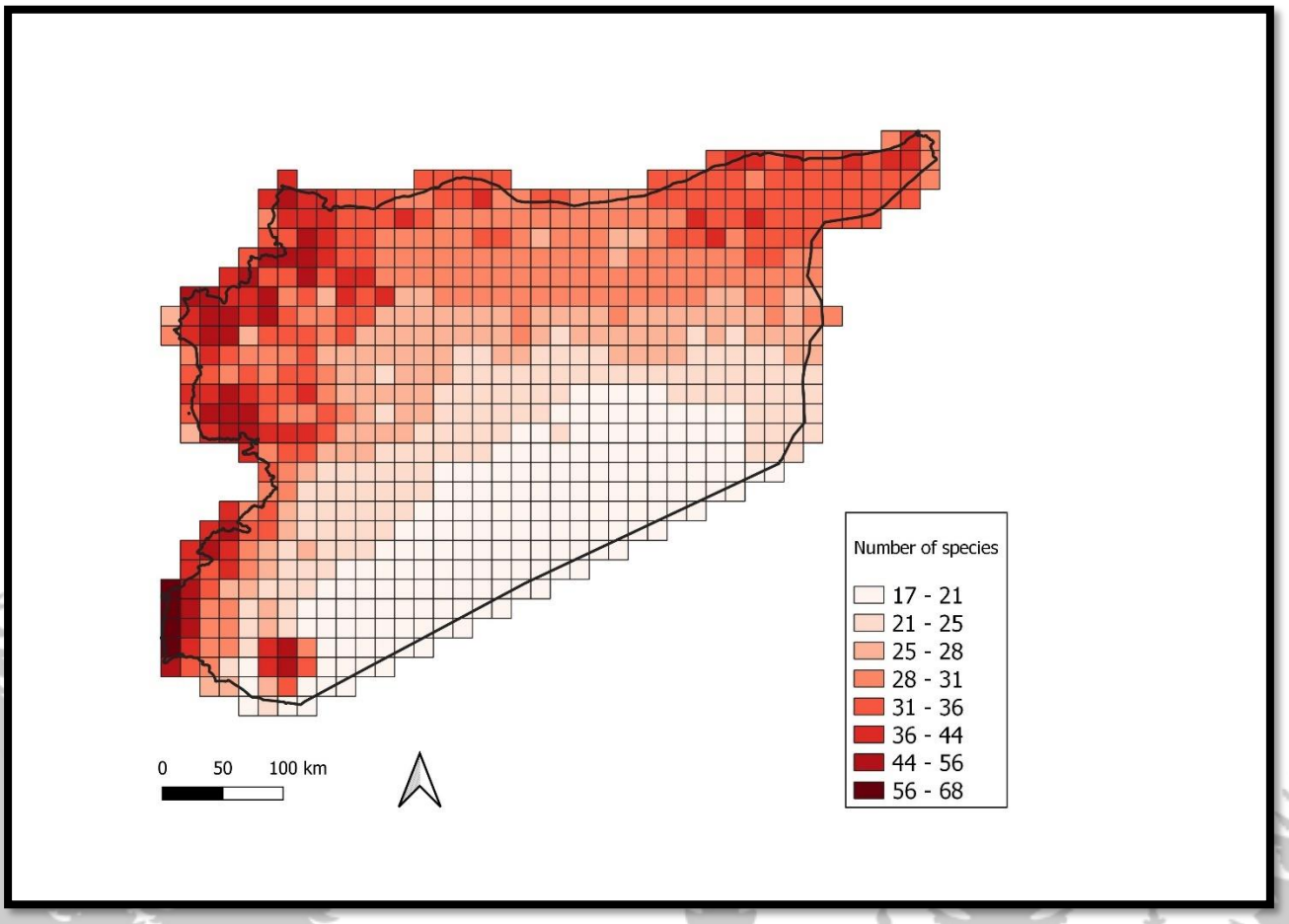

Fig 40. Biodiversity hotspots map.

6. Discussion:

Armed conflict induced land cover changes (2011-2019):

Forests:

The spatial analysis of the study area revealed a total loss of forest cover of 9.29% between (2011-2019) which can be explained mainly by human activities rather than the natural causes.

177.18 thousand ha of the forests were transformed into other land use classes while the major transformation (36.5%) of forest cover was into agriculture lands. This can be explained by the increasing pressure on the natural resources by the local inhabitants and the additional refugee's pressure as the forest cover change mainly occurred in the coastal area which happened to be the safest area of the country and hosted more than 1.4 million people since the beginning of the conflict (Abdo,2018). Thus, this area requires a cultivated areas expansion to have some additional source of income to withstand the prices rise due to the sanctions and to fulfil the increasing population needs at the expense of the forest cover and especially with the absence of forest rangers and government control during the years of the conflict.

34.1% of transformed forest cover was converted into a No-vegetation cover class which includes bare soil, urban areas and a small percentage due to the slight clouds cover. The NDVI visual interpretation doesn´t differentiate the 3 of them as they have similar NDVI values. Google Earth Pro was used to compare the vegetation cover maps with the high-resolution satellite imageries, results showed a significant urban expansion in the adjacent areas to forests including rural houses, roads, military installations, touristic facilities especially in Kassab zone in the north of Lattakia.

No-vegetation class seems to be a result of illegal logging, low agriculture density (especially on olives terraces as the farmers tend to clean the surrounding vegetation) and quarries.

Illegal logging was and still practised by locals due to the fuel shortages caused mainly by the dominance of extreme armed groups on the oil resources in the eastern parts of the country and also by cutting the main roads that connect the major cities which leaves a big portion of the population with no fuel to fight the cold winters, especially in the mountain areas.

A few local articles have been published about the commercial cutting for the charcoal industry (a report from ARIJ by Ahmed 2018 in Edlib governorate, BBC 2013 report, Kamal Shaheen article in 2019 on logging in coastal area forests). These articles, in addition to some local resources and field observations evidenced an intense illegal cutting in the coastal governorates and Edlib governorate mainly for charcoaling which represents a good income for locals in the absence of jobs and the increase of poverty. Forest guards' role is very limited and they have no possibilities to prevent the illegal logging as some loggers are armed and could threaten them with their lives.

In 2018, according to agriculture ministry and forestry department in Tartous (SyriaUntold, 2019), more than 669 forestry law violations were reported including cutting, charcoaling and selling the wood and only 20 violations in Lattakia were sent to the courts.

Forest fires also can explain the deforestation, according to global forest watch, Syria experienced 125,982 fire alerts from 2012-2020 with the highest peak in 2019 (Fig 41 & 42).

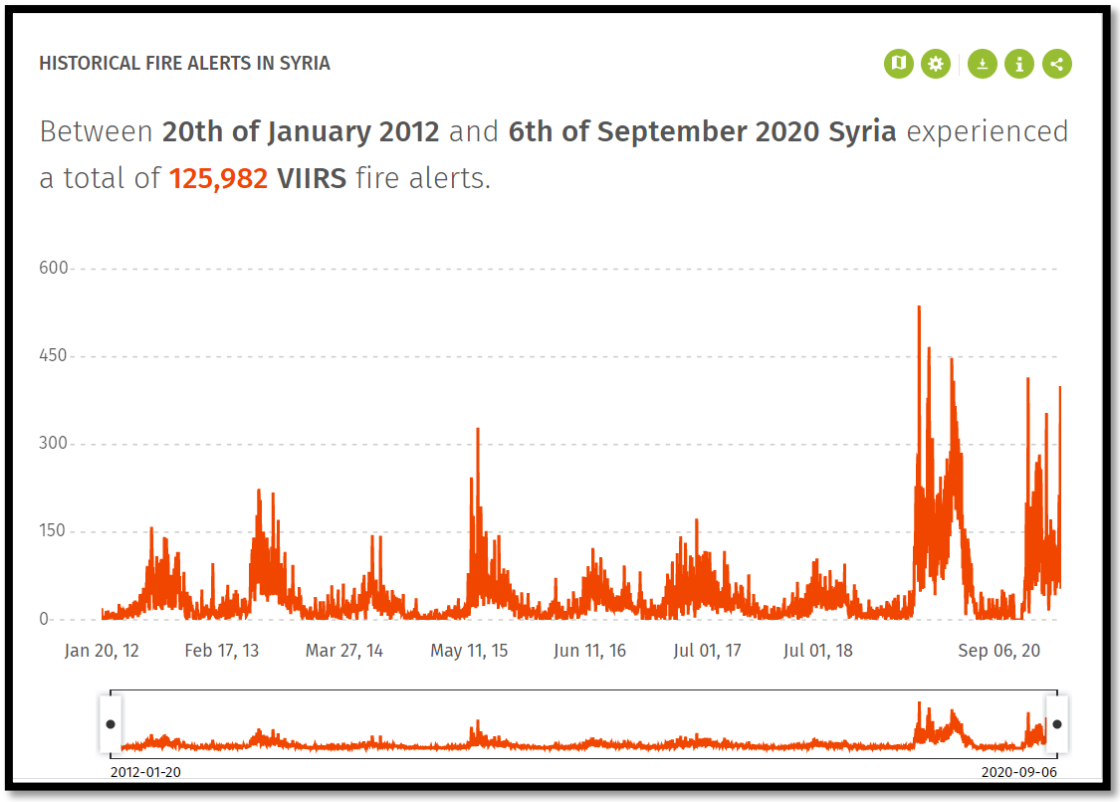

Fig 41. Historical fire alerts in Syria (2012-2020).

Globally, only about 4 percent of all forest fires have natural causes such as lightning, as a general rule. Like all other cases, humans are responsible for the fires — whether consciously or unintentionally, intentionally or due to carelessness (WWF,2017). Climate change further exacerbates the risk of Mediterranean area forest fires. Expected consequences include longer periods of drought during summer, and droughts at other times of the year (WWF,2017).

Forest fires in Syria were triggered by the war either directly by the falling missiles on the forest areas and mutual bombardment between the conflict parties (Mohammad,2020; Hammad,2019; SDC,2014), or indirectly, by the absence of a functioning forestry guards system and government control on the forest sector which permitted the illegal logging and different other violations like charcoaling and illegal hunting.

Many forest fires started from the adjacent agriculture areas as the farmers normally clear their lands using fires during the dry seasons, some fires started from the charcoaling kilns according to local resources.

Forest fires might be one of the most important drivers of deforestation of the Syrian forests and can be associated with the climate change consequences mainly represented by the dry hot seasons that are promised to be elongated with the climate change risk.

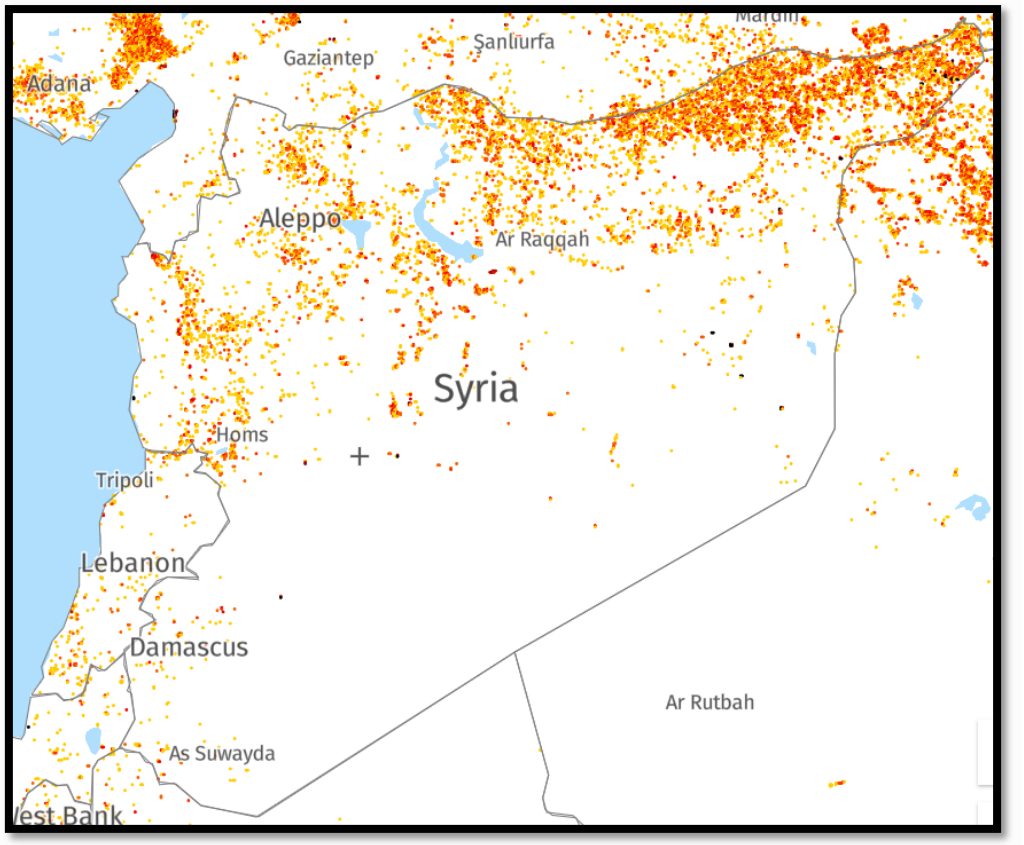

Fig 42. The distribution of VIIRS fire alerts in Syria in 2019.

Some 29.3% of the forest area was converted into shrubs and grasslands, mainly in Latakia and Tartous governorates and that can be explained also by fires, as local communities tend to transform the forest areas into grasslands in order to have new pastures for their grazing livestock. the degradation of forest trees by logging also might explain the low-density shrubs cover in the area.

In the other hand, the forest cover had a substantial increase of 134.77 thousand ha, mainly distributed in the coastal region and the Euphrates basin. A 57.7% of this increase was attributed to the transformation of grasslands and shrubs into forest cover in the coastal governorates, which could be explained by the inaccessibility to some forested areas due to various reasons. For example, in the Ras-Albassit coastal area, a large land area was transformed into a military base which was not accessible by people during the times of the conflict and far from the hot zones. This area suffered in the past from wildfires and had the chance to develop and recover away from humans interference.

Another reason that might have helped in the development of the forest cover is also explained by the inaccessibility by people in the hot conflict zones for the fear of being killed or kidnapped and this could be the case of the development of the forests in the Afrin area in the north of Syria.

I also found that 38.3% of the gained forest area was converted from agriculture, and this could be better explained mainly by misclassification which could be due to the spectral confusion between the extensive irrigated agriculture and forest cover.

The 3.9% of the forest gain was from the non-vegetation class which is believed to be a noise value made by the cloud cover in the study area.

Fig 43. The deforestation caused by the agriculture expansion on the forest areas Tartous governorate (Google earth).

Fig 44. The deforestation caused by the urban expansion on the forest areas in Kassab north Syria (Google earth).

Agriculture:

The most important concern in the scenarios of conflicts is the suffering and the human loss, but also the impact of conflicts on agriculture might cause a medium to long-term suffering for people as a result of the increase of the food insecurity at the individual level and this insecurity can lead to repetitive further conflicts (Mitchell,2019). For example, in Ethiopia during the conflict was found that there was a significant relationship between the violence caused by the conflict and decrease of agriculture production. Angola is considered as an extreme case due to the significant loss of agriculture production caused by a long-term conflict and resulted with a decrease of agriculture output estimated to be well below half what could have been the actual production in the scenario of the absence of the war. In the Sub-Saharan countries, the economic losses caused by conflicts estimated to reach almost 30% of agriculture output (FAO,2000).

Armed conflicts can impact the agriculture production in many different ways. For example, depending on the location of the fighting groups in the country the agriculture production decreases dramatically as the crops cannot be planted, weeded or collected. In conflict situations, food-producing regions experience food stocks, livestock and other properties being confiscated or lost, interrupting the selling of food supplies not only in these regions but also in neighboring regions.

Agricultural populations tend to migrate, decline or cease agriculture. Farmers who manage to remain will reduce agriculture to subsistence and survival production, since there is no incentive to invest extensively in production. Recruiting young male men into militias and thousands of battle-related deaths would not only decrease family income but also take away farm labor. Another aspect in which wars contribute to food shortages is through landmines. Agricultural land would be inaccessible for years because of landmines, harvests are damaged and fields cannot be cultivated (Messer et al. 2000).

In the case of Syrian conflict, results showed that the agriculture production experienced a significant loss with a total drop of (12.34%) from 2011 to 2019 and that can be explained mainly by population displacements and land abandonment according to FAO reports.

Vast areas of agricultural land with orchards or crops have been damaged and farmers are either facing or unable to afford agricultural input shortages (seeds, fertilizers, fuel for irrigation pumps, etc.) due to rising prices. In addition, irrigation systems and processing and storage facilities, farming equipment and agro-sector buildings were damaged, about 30 per cent of the resident households interviewed by the FAO in 2017 had absolutely stopped crop production due to high input prices and insecurity. This number was nearer to 40 per cent for IDP households. The key constraint for those households still in the agricultural sector was poor access to production inputs and specifically fertilizers, followed by irrigation issues (with no fuel pump access) and drought. Nearly 60 per cent of households are involved in production of perennial crops. Significant damage has been reported to tree plantations in Dara'a, Rural Damascus, Aleppo and Ar-Raqqa because of the destruction caused by the crisis (FAO,2017).

In 2017 FAO reported an Overall of 60 percent of households in Syria suffered from severe infrastructure damage, up to 70–90 percent in some governorates concentrated in the most irrigated areas (i.e. Al-Hassakeh, Aleppo, Ar-Raqqa). Overall, 20 % of households have completely lost access to irrigation, while 40 % of households still have access to irrigation but are facing higher costs as a result of higher prices and smaller fuel supplies, leading to less water use.

Another study by (Jaafar et al,2015) on the irrigated agriculture in the Orontes basin indicated to a drop of agriculture production between 15% and 30% in the years 2000-2013 explained mainly by the conflict as the main driver rather than the drought that detected for 2000-2009.

Mohammed et al,2019 found that the conflict triggered the reduction of the production of wheat by 47.53% ,olives by 64.18% and the cotton was the most affected crop with total loss of more than 93%.The results explained by the escalation of the Syrian conflict especially in the year 2014, the migration of agriculture communities to the safer zones, the failure of the implement of the agriculture plans and the drought. According to the World Bank study in 2018, as a result of the consequences of the conflict, the agricultural sector 's GDP in Syria dropped by 41 per cent in 2014 compared to 2010.

The wheat production forecast for 2019 was 2.2 million tonnes, but it is still below the before conflict level of 4.1 million tonnes (2002-2011) (FAO,2019).

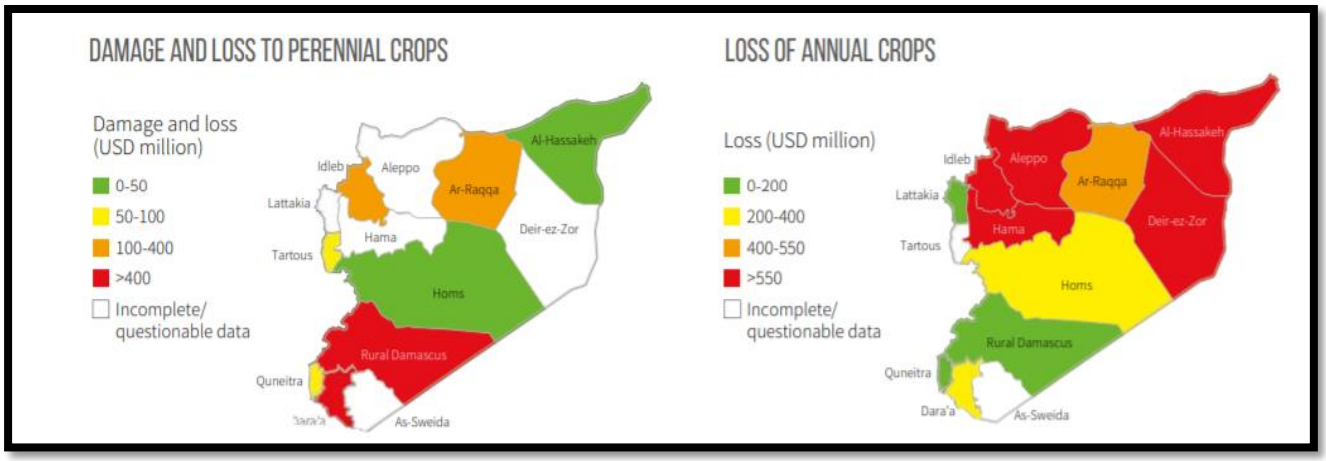

Fig 45. The damage to annual and perennial crops of Syria caused by the conflict (FAO, 2017).

Fig 46. The cropland difference along the Syrian-Turkish borders in 2013 (CEOBS, 2019)

Grassland:

Grasslands is the largest category of land-use within the country. The Syrian steppe occupies nearly 10.5 million ha, more than half the land mass of the country (Louhaichi & Tastad, 2010; Al-Khatib, 2008).

Most of the Grasslands areas fall within arid and semi-arid zones marked by high rainfall and temperature variations. There are no well-established boundaries, as they change according to climatic conditions. Rainfall is low, irregular and poorly distributed, with significant geographical, seasonal and annual fluctuations due to the occurrence of drought years. The vegetation is mainly composed of dwarf shrubs, with a few annual forbs and grasses. The most common species are *Poa bulbosa*, *Anabasis syriaca*, and *Artemisia herba-alba*.

Some shrubby species dominate the landscape like (*Noaea macronata and Anabasis syriaca*), these species are not palatable by sheep and used mainly as fuel wood. These areas of ecological fragility can be degraded and decertified easily if overgrazed and badly managed, and can ultimately become biologically sterile in the worst-case scenario. One of the main contributors to overgrazing is the pressure from population growth, which in turn leads to degradation. Yet war, political upheaval and poverty are also resulting in resource mismanagement. At the same time, the implications of climate change lead to the difficulty of sustaining efficient and stable rangelands (IFAD,2012).

This study indicates to a major shift in grassland area from 2011 to 2019 by 42.45%. The grass lands mainly degraded to bare soil by 61% and this finding can be explained mainly by overgrazing and drought in addition to the conflict effect caused by the battles that took place in the Syrian steppe areas.

The main decrease of the grasslands area occurred in the Syrian steppe which is located in the centre of the country (mainly in Homs and rural Damascus governorates). This finding can be explained by the intensification of the post-2014 war in particular regions and the extension of military operations; the opposing parties have deliberately eliminated large areas of rangelands to reveal fronts, encourage surveillance, secure trade routes or facilities and ensure the arrival of military and oil supplies (Mohammad,2020; Winter,2017).

No vegetation:

The no-vegetation class includes bare soils, urban areas, water reservoirs and streams, clouds shadows and the increase of the area of this class associates with the increase of all its components. The results showed an increase of the no-vegetation area by **28.45%** in 2019 when all the other classes had a significant decrease of the area.

The highest value of change occurred in the steppe area and resulted from the degradation of the rangeland cover (in the central governorates of the country) which mentioned to be related to the drought periods and the military activities during the escalating battles in the steppe that started in 2014 (mohammad,2020).The urban expansion and the deforestation also explain are one of the most important causes of this increase in addition to the abandonment of the agriculture irrigated lands and the massive displacement of the rural inhabitants as a consequence of the elevated violence in these areas.

Also, a small area was under a cloud cover which blocks the vegetation reflectance and can be misinterpreted as a bare land

Hotspots maps and distribution:

Plants hotspots map:

In this analysis, a number of plant hotspots areas were observed based on the species richness of each hotspot map grid, and the most important plant areas are:

North Lattakia: Kassab and Ras al-bassit, East Lattakia: Salma and alhaffa areas, alghab, north west

Aleppo, al drekeish area in the east of Tartous, anti-Lebanon mountains, Jabal al Arab in Alswaida governorate, occupied Julan heights, the west of Idleb governorate.

These areas are home to more than 12 threatened species of plants per 290 squared kms (one grid), since they provide a unique habitat with their particular geological or climatic characteristics. The Syrian country report on the Identification of Important Plant Areas (IPAs) in Syria in 2010 detected a 5 conservation priority sites which are:

1-Kurd dagh, 2- Salma-Haffeh, 3- Ghab, 4- Anti-Lebanon, 5- Jabal al Arab

These results are combatable with the findings of this study and the importance of these areas comes from the high degree of endemism with the most threatened habitats due to the absence of any legal or national protection in these areas

Most of previously mentioned conservation hotspots are concentrated in forest areas and that requires the protection of these areas in order to recover the threatened species and their habitats and avoid the threat of their extinction if not applied the right measures in the forest areas.

Biodiversity hotspots map:

As a big part of the country falls in the Mediterranean zone thus, Syria is considered as a hotspot area for the species biodiversity. The biodiversity map included the main groups of plant and animal species either they are resident or migrant species. The map also included the bird's migration pathways over the country.

Some species has large distribution areas like mammals and birds (birds polygons occupy the entire area of the country), large mammals also need a big area territory. Amphibians areas were limited only to the relatively wet areas (the coastal areas) when insects and plants occupied the least of the category.

The western side of the country was the richest in biodiversity and that can be explained by the Mediterranean influence (which considered to be more humid than the rest of the country).

The isolated mountains (Jabal abd-alazia, Jabal Al arab) are rich with endemic species as well as the high mountains like Hermon mountain in the Anti-Lebanon range, those mountains represent an exclusive habitat for these species which are fragile to changes and different threats and that´s why they should be considered as protected areas.

The steppe area represented a poor content of biodiversity hotspots as the steppe area contained from 17-21 per grid (290 km2) species due to the drought and the scarce vegetation, and this number of species is mainly resulted from the birds' migration pathways.

The protection of these hotspots is necessary in order to conserve the species and that should be done starting from the highest concentration of species' areas, as they are and should be considered to be priority areas for conservation, to the lowest concentration. And as most of these hotspots are located in the forest areas, forest policy and laws should be reviewed considering the protection of the hotspot areas.

7. Conclusion:

Overall, the results demonstrated a significant effect of the Syrian armed conflict on the forests and provided a theoretical framework for future studies through analysing the change between the forest cover in pre-conflict and conflict periods. The study indicated a significant forest loss during conflict years mainly for the benefit of agriculture lands and urban areas, and this is an important finding in the understanding of the dynamics of the forest cover under conflict conditions. Changes were explained by the increasing demand of forest resources by the nearby inhabitants and the refugees rather than direct violent events as the forest areas mainly happened to be in a relatively safe zone. This research also highlighted flora and fauna species richness in Syria, especially the endemic plant species, and a low percentage of species evaluation for most of groups by the IUCN redlist. Understanding the anthropological effect on the forests during the conflict is highly relevant for post-conflict forest management and restoration. As most of the forest area is owned by the Syrian government, the responsibility falls on them in the post-conflict period to recover the damage occurred on the forests, and that can be achieved with an effective management plan by firstly estimating the damage on forest area and species habitats and evaluating their status following the IUCN red list criteria. It is important to take into account the inclusion of people who live in the forest areas in the process of restoration by providing them with their basic life needs and, most importantly, rising their awareness on the countless benefits of the forest ecosystems, as well as teaching them how to use the forest in a sustainable way. Forest conservation goals should be widely applied by increasing the area of protected areas especially in the biodiversity hotspots indicated by this study, and following the international criteria of protected areas.

8. Acknowledgment:

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10. Appendices:

Appendix number 1:

List of endemic animal species to Syria

Species	Family	IUCN Evaluation	Type	Habitat	Location	Reference
Acanthobrama tricolor	Cyprinidae	CR	Fish	Fresh water	Barada river Damascus	IUCN
Adela alurgis	Adelidae	NE	Insect		Near Aleppo	Mikhail V Koslov 2005
Altonomus rahmei	Curculionidae	NE	Insect		Damascus NE bloudan	Borovec 2007
Birulatus astartiae	Buthidae	NE	Arthropod	Arid areas	Syrian steppe	Iasmi Stathi & Wilson R. Lourenço (2003)
Calomyscus tsolovi	Calomyscidae	DD	mammal	Shrubland, Rocky areas (eg. inland cliffs, mountain peaks), Desert	Tafas, Southern Syria	IUCN
Camponotus palmyrensis	Formicidae	NE	Insect		Palmyra 34.55311 °,38.26728°	Tohmé & Tohmé, 2000
Clavipanurgus gusenleitneri	Andrenidae	NE	Insect		Palmyra	Patiny, Sèbastien (2004)
Clytus kabateki	Cerambycidae	NT	Insect		Abal an Nusayrtah mountains north Syria	Sama, 1997
Cymus syrianensis A.Hamid	Cymidae	NE	Insect	Terrestrial	south syria	www.catalogueoflife.org/col. Species 2000
Dasypoda syriensis	Melittidae	NE	Insect		Syria Cen., Horms, al-Muharram env. [WGS: 34°49'N/37°04'E]	Michez_Terzo_Rasmont_2004.
Dicronychus involucer	Elateridae	NE	Insect		Jabal al Ansariyah Mts., Hişn Sulayman env. (50 km E of Tartus), m 800, 1.V:2000, S. Benedikt (CMHK). 7 Paratypi %% - 6 stessi dati dell'Ht. (CMHK; CPG). 1 Banyas env. (50 km E of Tartus), 1.V.2000, F. & L. Kantner (CCW)	Platia & Gudenzi de 2004
Elathous lizleri	Elateridae	NE	Insect		Coastal regoin	Mertlik, 2005
Euchondrus adwani	Enidae	NE	Molluscs		Syria , surrounding of the monastery of Deir Moussa , 34.0219°N36.8423°E , 1300 m a.s.l. , 11.iii. 2010 , leg. Adwan Shehab	Eike Neubert, Zuhair Amr (2016)
Eupithecia weigti	Geomertidae	NE	Insect		Syria, 25 km W v. Damaskus	VLADIMIR MIRONOV 1 & ULRICH RATZEL 2012

Glossocratus syriacus Horváth	Cicadellidae	NE	Insect			www.catalogueoflife.org/col. Species 2004
Hemidactylus lavadeserticus MORAVEC & BÖHME, 1997	Gekkonidae	NE	Reptile	Terrestrial.	Ar'Raqiyeh, 32°48'N, 37°05'E, Muhafazat of Sweida, Syria	Moravec, Jiri & Böhme, Wolfgang 1997. reptile-database.org
Hoplia bezdeki	Melolonthidae	NE	Insect		Slinfeh, 1300m,Jabal an Nusayriyah	Keith, 2002
Hypera kayali	Curculionidae	NE	Insect		Western Syria (province Tartus).	Skuhrovec 2006a
Laemostenus nusayriyahensis	Carabidae	NE	Insect		NW Syria, cave between Mashtal Helu and Uyun al Vadi (ca. 60 km W of Homs), southern part of the mountain range Jabal an Nusayriyah,	Lohaj & Mlejnek 2007
Leptobium korgei	Staphylinidae	NE	Insect		Qadmous [= Al Qadmus, 35°05N, 36°10E], 700–1000 m.	Assing, 2005
Lerpa beraudi Navás	Perlidae	NE	Insect	Freshwater,terrestrial	west of Syria	www.catalogueoflife.org/col. Species 2000
Lygus israelensis Linnavuor	Miridae	NE	Insect	Terrestrial	Banias , Hama, Damascus	www.catalogueoflife.org/col. Species 2000
Monomorium syriacum	Formicidae	NE	Insect		Markab, south of Banias, 10 m, 10.iv.1974 (Tohme &- Tohme)	Tohmé, H.; Tohmé, G. 1980
Ochthebius (Ochthebius) pallidulus Kuwert	Hydraenidae	NE	Insect	Fresh water	mesopotamia	www.catalogueoflife.org/col. Species 2000
Oxynoemacheilus galilaeus	Balitoridae	CR	Fish	Wetlands	Lake Muzairib	IUCN
Oxynoemacheilus panthera	Balitoridae	EN	Fish	Wetlands	Nahr Baradá and Nahr al-A'waj in the Damascus basin.	IUCN
Phytoecia kabateki	Cerambycidae	NE	insect		(Antilebanon Mts., Rif Dimashq Governorate, Syria).	Gianfranco Sama 1997
Psallus skylla Linnavuori	Miridae	NE	Insect		Mt. Hermon	www.catalogueoflife.org/col. Species 2000
Pseudophoxinus hasani	Cyprinidae	CR	Fish	Fresh water	Nahr Marqīyah, Syria, flowing to the Mediterranean.	IUCN
Pseudophoxinus syriacus	Cyprinidae	CR	Fish	Fresh water	at the source of Barada stream in the Damascus basin.	IUCN
Pygopleurus keithi	Glaphyridae	NE	insect	Grasslands	North Syria near Aleppo	Sabatinelli, G.; Uliana, M. 2009
Raglius alboacuminatus bicolor	Rhyparochromidae	NE	Insect	Terrestrial		www.catalogueoflife.org/col. Species 2000
Thamnotettix loratus Horváth	Cicadellidae	NE	Insect			www.catalogueoflife.org/col. Species 2000
Tipula (Lunatipula) kinzelbachi Theischinger,	Tipulidae	NE	Insect		Orontes, N Homs-Damm 1.4.1979	www.catalogueoflife.org/col. Species 2000
Tipula (Lunatipula) leeuweni Theischinger, 1982	Tipulidae	NE	Insect		7 km north Banyas , south Syria	www.catalogueoflife.org/col. Species 2000
Tristramella magdelainae	Clichlidae	EX	Fish	Fresh water	Known only from Damascus.	IUCN

Zaitunia halepensis	Filistatidae	NE	Arthropod		Aleppo	Zonstein, Sergei L. & Yuri M. Marusik. 2016

Appendix number 2:

List of endemic plant species to Syria (Nouvelle flore du Liban et de la Syrie, 1966, 1970 et 1983, Paul Mouterde):

Species	Family	IUCN Evaluation	Habitat	Location
Acantholimon antilibanoticum Moût	Plumbaginaceae	NE		Banias, aux sources du Jourdain, 30 mai 1955
Acantholimon damassanum Mobayen	Plumbaginaceae	NE		Â.L. Entre Zebdani et Tékiyé (Sam, typus), Zebdani (Wall), Bloudane (Sam), embranchement de la route de Zebdani au-dessus de Tekiyé (Mt).
Agropyron libanoticum Hack	Poaceae	NE	Pastures of high regions	S. A.L. Au-dessus de Bloudane (P sous elongatum, Pb), Ouadi-el-Qarn (Sam, Hafstr, Wall), Jabal Abou-1-Haoua (Mt), Jabal Halimé, Col de Zemrani, Ma'arat-el-Bach, Yabroud, Qprnetel-Massa'di (Pb). St. Deir 'Atiyé (Pb).
Ajuga chasmophila Davis	Lamiaceae	NE		A.L. Au-dessus de Bloudane (P sous elongatum, Pb), Ouadi-el-Qarn (Sam, Hafstr, Wall), Jabal Abou-1-Haoua (Mt), Jabal Halimé, Col de Zemrani, Ma'arat-el-Bach, Yabroud, Qprnetel-Massa'di (Pb). St. Deir 'Atiyé (Pb).
Ajuga rechingeri Bilik	Lamiaceae	NE		Sy. Jab. Sema'ane (Har) (typus, G).
Alcea damascena Moût.	Malvaceae	NE	Dry lands, in a sub-arid Syrian climate, quite often near inhabited places. Edges of the steppes towards Damascus	Sy. Entre Homs et Hama (Bl), Ma'aret-en-No'mane, Teftenaz, Chaizar, NE de Massiai (Pb), 30 km. N. de Hama (Mt). A.L. Ouadi el-Qarn, Ouadi-Houreiré (Pb). Dam. Jab. Qasyoun (Bl), 'Adra (Pb).
Alcea dissecta (Baker) Zoh	Malvaceae	NE	Rocks.	Bords du lac de Tibériade, à Tibériade (Mme Octavie Lagrange, 1866), Galilée (Lowne), Tell Houm (Post), Ouadi Hammam (Aar).
Alcea rufescens Var. assyriaca Boiss	Malvaceae	NE		S. H.J. A mi-chemin entre Hassetché et Derbassiyé, W. de Qamechliyé, 20 km. S. de Tell 'Alo (Pb).
Allium azaurenum Gombault	Amaryllidaceae	NE	Steppes	St. Deir-ez-Zor (latin: Azaura) à Bessiré (Gombault, typus). Jabal Dmeir, Palmyre (Pb, Mt).
Allium drusorum Feinbr	Amaryllidaceae	DD		J.D. Tell Chihane (Eig, Zoh, Mt).
Allium emarginatum Rech	Amaryllidaceae	NE	Limestones	S. NLatt. Kizil Dagh (Pb). A.L. N. de Yabroud (Pb). St. Jabal Dmeir, Jab. Dibsi (Pb).
Allium karyateini Post	Amaryllidaceae	NE	Arid areas	S. Dam. Base du Jabal Qasyoun (Mt). H.J. Jab. 'Abd-el-'Aziz (Hd-Mz, Gb sous dictyoprasum). St. Mountains au sud de Qaryatein (P, typus), entre Damas et Qaryatein sur les collines de «Makoun Nimr» (Eig, Zh), Palmyre (Mt).
Allium libani Boiss.	Amaryllidaceae	NT	Mountains	S. A.L. Au-dessus de Bloudane (Mt, Pb), Tala'at Moussa, Jabal Halimé (Pb
Allium makmelianum Post	Amaryllidaceae	NE	Rocks	A.L. Yabroud (Pb), Jabal Ma'loula (Pb, Mt).
Allium opacuxn Rech	Amaryllidaceae	NE		S. Sy. Qasr-el-Banât, à la frontière syro-turque, sur la route d'Alep à Antioche (Sam, Wall).
Allium phanerantherum Boiss. et Hkn	Amaryllidaceae	NE	Limestone slopes	Herm. Au-dessus de 'Arné (Pb).
Allium qasyunense Moût	Amaryllidaceae	NE		S. Dam. Jabal Qasyoun,
Allium schergianum Boiss	Amaryllidaceae	NE	Dry mountains and steppes.	S. A.L. Jabal Gharki, au-dessus de Bloudane, récolte originale (Ky). St. Deir 'Atiyé (P), Jabal Abou Qpsh (Gb), Qaryatein (Mt), Jabal Tias (Gb), Arak, 15 km. nord de Deir-ez-Zor (Pb).
Allium zebdanense Boiss. et Noë	Amaryllidaceae	NE	Humid, non-calcareous places, at altitude	S. A.L. Au-dessus de Zebdani (Ky, typus).

Anchonium billardieri D.C.	Brassicaceae	NE	Mountains	S. A.L. Au-dessus de Zebdani (Ky, Mt).
Anchusa tiberiadis Post	Boraginaceae	NE		S. Sy. sud de Homs, près de l'embranchement de la route de Baalbeck (Pb).
Androcymbium palaestinum (Boiss.) Baker	Colchicaceae	NE		Endémique de la dépression jordanienne.
Anisosciadium isosciadium Bornm.	Apiaceae	NE	Steppes	St. 'Aïn Khnaifes, au S.E. de Palmyre (P), Qaryatein (Mt), Jabal Abou Qpsh (Gb), Khan Abou Chamate (Gb, Pb), 10 km. E. de Dmeir (Pb).
Ankyropetalum coelesyriacum Boiss	Caryophyllaceae	NE		S. A.L. Yabroud (Mt, Pb), Qaldoun (Bl, sous Paracaryum myosotoides (Labili.) Boiss.; P, sous P. reuteri Boiss. et Hausskn., puis P. velutinum Post!). St. E. de Deir 'Atiyé, Jab. ed-Daoua (Pb).
Anthémis lyonnetioides Boiss	Asteraceae	NE	Anti-Lebanon	A.L. Col de Rankouss, dans' le Jab. Qalamoun, 1800 m (P), Jab. Ma'loula, sur roches en décomposition, vers 1800 m. (Pb).
Aristolochia scabridula Boiss	Aristolochiaceae	NE	Stony places	A.L. Zebdani (Boiss.), Bloudane, Houreiré (Pb), Jab. Gharbi (Ky), Ouadi-el-Qarn (Mt, Sam). WHoms. Qala'at-el-Hosn (Pb). Mm. Slenfé (Sam, Wall).
Asperula breviflora Boiss	Rubiaceae	NE	Above 2000 m altitude	A.L. Dolines du Jabal Halimé (Pb), vers le sommet du Tàla'at Moussa (Pb).
Asperula libanotica Boiss.	Rubiaceae	NE	Afforestations, dry lands, desert.	A.L. Zebdani (Ky), Mnine à Ma'arrah (Gb), Jab. Abou 'Ata (Eig et Zoh), au-dessus de Madaya (Pb). Dam. Dimas (Bl, Pr, Eig et Zoh), Doumar (G), vallée du Barada (Ky), Sahl-es-Sahra (Wall, Pb), Mayssaloun (P). Herm. 'Aïn-ech-Cha'ra (P), Aïha-Rakhlé (P). J.D. Tell Chihane (Eig), Soueida (Zoh, Mt), Ormane, Arisé, Chaaf (Mt), Est de Chahba (Pb).
Asphodeline damascena Boiss	Asphodeloideae	NE	Stony grounds	S. A.L. Ouadi-el-Qarn (Mt), Ouadi Barada (Boiss.),Bloudane (Pr), Madaya, Ma'arret-el-Bach (Pb), Zebdani (Gb), Jdeidé (Np). Dam. Mayssaloune (Bl), Doummar (Gaill), Sahl-es-Sahra (Gaill).
Astragalus antilibani Bge	Fabaceae	NE		Manchoura au-dessus de Bloudane, près des neiges (Ky), vers Bloudane (Reese, Sam, Pb). St. Jab. Bilas (Pb).
Astragalus argyrothamnos Boiss	Fabaceae	NE	Rocks.	S. A.L. «Entre Zebdani et Zahlé» (Boiss, Ky), Zebdani (Gb), Bloudane (Mt).
Astragalus baalbekensis Bornm	Fabaceae	NE	Mountains	A.L. Jab. Ma'loula, Tala'at Moussa (Pb). Herm. 'Aïssem-el-Foqa à Qatana (Wall). Dam. Sahl-es-Sahra (Sam), Dimas, Jab. Krim (Pb), Jab. Qasyoun (Mt) ?
Astragalus bhamrensis Sirj. et Rech	Fabaceae	NE		Mi. Bhamra (Har, typus).
Astragalus bombycinus Var. palmyrensis (Post)	Fabaceae	NE		S. Sy. Alep, Meskène (Wall), Bazzouriyé (P), Jab. Tias (Gb), Palmyre, Qaryatein (Mt), SW. de Qasr-el-Haïr, N. d'Abou Kémal, T 2 (Pb).
Astragalus chlorostegius Boiss. et Hausskn	Fabaceae	NE	Subarid and arid regions	H.J. Entre Ras-el-'Aïn et le Jab. 'Abd-el-'Aziz (Hkn), Hassetché à Deir-ez-Zor (Gb). St. Zebed à 'Aïn Maragha (P, type de A. butleri), Qaryatein (Mt), Forqlos à T 4 (Talion), SW. de Qaryatein, W. d'Iraq, SW. de Qasr-el-Haïr, base du Jab. ed-Daoua (Pb), 'Aïn Beida, Palmyre (P), Jab. Tias (Gb sous bracteosus Boiss et Noë).
Astragalus coluteoides Will	Fabaceae	NE	Mountainous regions, especially slightly wooded.	Herm. SE. de l'Hermon (Pb), Qala'at Jendel (Sam). A.L. Ma'aret-el-Bach à Tala'at Moussa, Jab. Halimé (Pb).
Astragalus cruentiflorus Var. supranubius (Bornm.)	Fabaceae	NE	Mountains.	S. A.L. Jerijir (Eig, Zh), Jab. Zemrani, Jab. Halimé, Birket Foukhté (Pb).
Astragalus dictyocarpus Boiss.	Fabaceae	NE	Mountain slopes	S. A.L. Anti-Liban (Pestalozza, Ky), Birket Foukhté (Pb).
Astragalus dorcoceras Bunge	Fabaceae	NE		S. Sy. Alep et environs immédiats (Ky, Hkn, JL, Gb, Mt). H.J. Vers Ras-el-'Aïn (Hkn).
Astragalus duplostrigosus Post et Beauv	Fabaceae	NE	Steppes.	St. Palmyre (Gb, Mt), Bazzouriyé vers Palmyre (P), Palmyre à 'Aïn-el-Beida (P), 'Aïn Faouarez (Gb), entre le Jab. Abiad et le Jab. Bilas (Bl), Qaryatein (Mt), E. de Palmyre, Tell Daba (Pb).
Astragalus ehrenbergii Bunge	Fabaceae	NE		A.L. Anti-Liban (Unger), Ouadi Zemrani (Eig, Zh).
Astragalus emarginatus Labili.	Fabaceae	NE	Mountains.	A.L. Tala'at Moussa (Pb).
Astragalus exiguus Post	Fabaceae	NE	Summits	A.L. Sudr Cheikh 'Ali (P), Tala'at Moussa, Birket Foukhté (Pb).
Astragalus gaillardotii Beiss-.	Fabaceae	NE	Vines and grass lands	Herm. Qala'at Jendel (Gaill, typus
Astragalus griseo-sericeus Eig	Fabaceae	NE		. Sy. Jab. 'Arbaïn près Eriha (Eig, Zh).
Astragalus hasbeyanus Boiss.	Fabaceae	NE		A.L. Madaya (Pb). J.D. Soueida (Mt), Tell Qpuleib (P, sous aintabicus, Mt).
Astragalus heliopolitanus Moût	Fabaceae	NE	Subarid regions under Syrian climate or on the edge of the steppe	A.L. Bloudane (Sam). St. 110 km. S. de Homs, Deir 'Atiyé (P, Pb), Qastal (P). Dam. Jab. Qebli, Ouadi Barada (Pb), entre Damas et l'Anti-Liban (Boiss). J.D. Qastal près Cha'af (Mt).
Astragalus hermoneus Boiss	Fabaceae	NE	Preference for non-calcareous or	A.L. Au-dessus de Zebdani (Ky), Jab. Chekif, Tala'at Moussa, Birket Foukhté (Pb). J.D. Soueida-Sâlé (Sam), Tell Qpuleib (P), Fontaine des Bédouins, au-dessus de Soueida (Pb), Soueida, etc. (Mt).

			decalcified soils	
Astragalus lepidanthus Boiss Var. major	Fabaceae	NE	Semi-arid lands	Sy. Qatma, route d'Afrine près de Qatma (Pb).
Astragalus louisii Thiébaut	Fabaceae	NE		S. Sy. Qatma (JL).
Astragalus megaloceras Sam. et Eig	Fabaceae	NE	Dry regions	A.L. Entre Mnine et Saïdnaya (Wall, typus, Sam). Dam. Vers Dimas (Sam). Sy. Alep (Auch). H.J. Jab. 'Abd-el-'Aziz (Gb). St. W. de 'Aïn-el-Beida (Dinsm), Ouadi au N. de Qasrel-Hair (Pb).
Astragalus mitchellii Post	Fabaceae	NE	The most lenient region of the Syrian steppe, bordering the region of the Syrian climate.	Sy. El-Ghandur, Es-Saït à Abou Dali, El-Jbaa (Jabah) (P). Entie Hama et Sélémiyé (Pb), Forqlos-T 4 (Gb), Qaryatein (Mt), Sait à Jerbou'a (Sam).
Astragalus pabotii Moût.	Fabaceae	NE	Steppes.	S. AL. Qtaifé (Pb). Dam. Kissoué (Pb, Mt).
Astragalus psilodontius Boiss	Fabaceae	NE	Dry regions	A.L. Entre Jdeidé et Ouadi el-Joz (Gaill), région inférieure de l'Anti-Liban (Boiss), Ma'loula (Mt), Jab. Ma'loula, Yabroud, Qtaifé, Mnine, Madaya à Houreiré (Pb), Mnine-Saïdnaya, Ma'araba (Sam). Dam. Doummar (Pb).
Astragalus qatmensis Thiéb	Fabaceae	NE		S. Sy. Qatma (JL).
Astragalus spicaeiformis Eig	Fabaceae	NE	Steppes	St. Entre Qaryatein et Haouarine (Eig, Zoh), Deir 'Atiyé à Qaryatein (P), vers Forqlos (Mt), Homs-Qaryatein, Qaryatein, Palmyre, en spécimens non fleuris (Mt).
Astragalus stramineus Boiss. et Ky	Fabaceae	NE	Fertile lands, crop lands	A.L. Zebdani et Bloudane (Ky), Bloudane (Pb, Mt), au-dessus de Ma'loula (Mt).
Astragalus tadmorensis Eig et Sam	Fabaceae	NE	Steppes	St. Palmyre (Post, sous var. brachylobus, Sam, Mt, Gb, Pb), Jabal Abiad (Sam), T 4 (Mt), Palmyre à Homs (Har), 15 km. N.W. de 'Aïn Beida (Sam).
Astragalus transjordanicus Sam. ex Rech	Fabaceae	NE	Dry areas	Haur. Ghabagheb-Sanamein (Sam), Sanamein (Pr), Bosra (P). J.D. Bosra-Qrayé (P), Bosra à Salkhad (Gb), Soueida, Tell Hadid (Mt).
Astragalus trichopterus Boiss	Fabaceae	NE	Rocks des Mountains	A.L. Manchoura (Ky), Harf Ram-el-Kebsch (P).
Astragalus zachlensis Ssp. zebedaniensis (Freyn et Bornm.)	Fabaceae	NE	Mountain slopes, pastures, vineyards	S. A.L. De Zebdani à Rachaya (Bnm), Bloudane (Mt). J.D. Cratère de Maf aie (Herbette), Chahba, Tell Ahmar (Mt), au-dessus de Soueida, E. de Rouchaidiyé (Pb).
Ballota antilibanotica Post	Lamiaceae	NE	Rocky lands	A.L. Ouadi-el-Qarn (Gaill), Ouadi Zemrani (Eig et Zoh), Jdeidet Yabous (Gaill), Yabroud (P), Jab.-el-Qprn (Dinsm), Qprnet Mas'adi (P), Bloudane (Davis), Sahel au-dessus de Nebk (Davis), Flita (Davis), Jab.-ech-Chekif (Bertschinger), Serghaya à Baalbeck (Letourneux), Serghaya (JL), Menine à Ma'arra (Gb), Saïdnaya, Ma'loula (Pb), 'Akbet-et-Tine (Gb) au-dessus de Madaya (Pb). Dam. Dimas (G), entre Doummar et Ouadi-ej-Joz (G), Damas (Thiéb), Jab. Qasyoun (Bnm, Mt, Pb), Sahl-es-Sahra (Sam, Gaill), Ouest de Mayssaloun (Pb). Sy. Plaine d'Alep (Boiss), entre Alep et (El-Bab (Bertschinger, Pb), Idlib (Pb).
Ballota semaanica Rech. fil	Lamiaceae	NE	Fields	S. A.L. Halimat Qabou, Ouadi Sahrij, Ouadi-el-Ayyoun (P), Jebel Halimé (Pb), Signal de Zemrani (Pb)
Bellevalia densiflora Boiss.	Scilloideae	NE	on basalts	NLatt. 'Aïn Haramiyé (Gb), Kessab (Bksh). Sy. Hailane près Alep (Hkn). Sy ou St. Palmyre-Homs (Har). Dam. Mayssaloun (Pr.). WHoms. Homs-Hadidi (Pb), Khirbet-et-Tine (Mt) Haur. Sanamein (Pb). J.D. El-Krès près Salkhad (Mt).
Bellevalia hermonis sp. nova	Scilloideae	LC	Rocky places at altitude.	S. A.L. Jabal Abou-1-Haoua, mai 1953 vers 2000 m. (Mt. et Pb).
Bellevalia palmyrensis Feinbrun	Scilloideae	NE		S. St. Palmyre (Zohary, typus. Autre récolte par M. Joseph BITTAR, alors élève à l'Université Saint-Joseph, 3 avril 1934), 10 km. N. de Palmyre (Davis, Herbier de Kew). Dam. Damas (Pr, dans Herbier Delessert à Genève, selon Feinbrun).
Biarum aleppicum Thiébaut	Araceae	NE	Fields.	S. Sy. Environs d'Alep (JL, Th, Mt). Syrie Nord (Gb), Khirbet Farès vers Ma'aret-en-No'man (Mt). K.D. Kurd Dagh (Dbt). Dam. Jab. Qasyoun (Pb), Kissoué (Pb, Mt). St. Tromba (Pb).
Biarum russellianum Schott	Araceae	NE	Fields	S. Sy. Alep (Hkn, JL, Mt), Kafr Seghir près d'Alep (Sam), entre Alep et Mossoul (Olivier), Syrie (Auch), Tana (Gb). St. Khan Abou Chamate (Pb).
Bupleurum postii Wolff	Apiaceae	NE	Rocky slopes	Endémique de l'Anti-Liban.
Callitriche sp. nova.	Plantaginaceae	NE	humid soils	S. Haur. 1 km. N. de Qneitra (Pb), Er-Raha (Mt, Herbier de Paris), Qanaouat, Tell Jina (Mt). Entre Soueida et Salé (Sam, sous C. pedunculata D.C.).
Camelina lasiocarpa Boiss. et Hausskn	Brassicaceae	NE	Dry lands	Sy. Homs (Mt). A.L. Qastal (Pb), Yabroud (Mt, Pb), Ma'loula (Mt). J.D. Qastal près Chaaf (Mt). St. 'Aqareb, Snou Fadel (Bl).
Campanula damascena Labili	Campanulaceae	NE	Fields, Rocks	H.J. Jab. 'Abd-el-'Aziz (Hand-Maz, Mt, Pb), lac Khatouniyé (Hand-Maz), est de Rasel-'Aîn (Pb).
Campanula euclasta Boiss	Campanulaceae	NE	Fields, stony lands	A.L. Zebdani (Boiss, Gb), au-dessus de Madaya (Pb), Jab. Gharbi (Ky), Ouadi-el-Qarn (Pr, Sam, Mt, Pb). Herm. Ouadi Benka entre Yantha et Doummar (Gaill). K.D. Kutschuk Darmik (Pb). Mm. Nebi Younès près Slenfé (Sam).

Campanula trichopoda Boiss.	Campanulaceae	NE	Paths, Fields, Limestone Rocks	Ct. Entre le Nahr-el-Kebir et Amrith (Gaill), Qala'at Marqab (P), 'Arab-el-Mulk (Gb), Tartous (Wall, Pb). WHoms. Vers Tell Kalakh (Thiéb, Gb, JL, Mt), Qala'at-el-Hosn (Dinsm).
Centaurea ainetensis Boiss	Asteraceae	NE	Sandy hills and alpine region of Antilebanon, up to 2350 m.	S. A.L. Harf Ram-el-Qebch (P!, récolte originale), 'Ayyoun Berdi (Mt!), 'Ayyoun Berdi à Maareboun (Mt!, Gb!), Jab. Chekif, Bloudane (Pb!), Aisur Neir 6 km. au nord-ouest d'Aïn Berdi (Gb!).
Centaurea arifolia Boiss	Asteraceae	NE	Rocks	A.L. Flita près de Nebq (Davis), Yabroud (Pb), Jab. Ma'loula près de Yabroud (Pb; feuilles un peu moins amples).
Centaurea blancheana Mouterde	Asteraceae	NE	woods of northern Syria.	. NLatt. région boisée du Cassius (Boiss, P), Bassit (Pb), 'Ain Haramiyé (Mt, Sam, Dlb, Pb), route de Kessab (Pb).
Centaurea cyanoides Berg et Wahlenb	Asteraceae	NE	Fields	Ct. Nahr Abrache (Mt). Mi. Haffé (Wall). Sy. Chinnchar-Qpsseir (Sam). Dam. Sahl-esSahra (Sam), Jab. Qasyoun (Hafst). A.L. Yabroud (Pb), est du Jab. Halimé (Pb).
Centaurea damascena Boiss	Asteraceae	NE	Fallows, pastures, etc.	S. Sy. Maharada à Rafer-Baum (P). St. Palmyre (Mt).
Centaurea dumulosa Boiss	Asteraceae	NE	Lebanon and Anti-Lebanon raised	S. A.L. est du Jab. Halimé (Pb), signal de Zemrani (Pb).
Centaurea hololeuca Boiss	Asteraceae	NE	Wooded or grassy places.	NLatt. Bassit (Pb, peut-être l'espèce suivante?).
Centaurea longispina (Post) Wagenitz	Asteraceae	NE	Places heavily watered in spring, including beds of small torrents.	S. J.D. Qanaouat (P, sous V. parviflorum), El-Krès près Salkhad, de Soueida à Fontaine des Bédouins, Fontaine des Bédouins (Mt), entre Kafer et Salkhad, sud de Kafer (Pb), Es-Safa (P).
Centaurea onopordifolia Boiss	Asteraceae	NE	Rocky places	St. Jabal Abiad (Bl, Pb).
Centaurea reducta Wagenitz	Asteraceae	NE	Rocky places	St. Jabal Abiad (Bl, Pb).
Centaurea simulans Wagenitz	Asteraceae	NE	Rocky places	Qasr-el-Barrat (Sam, Hafst), Jab. Sema'ane (Har).
Ceratocapnos palaestina Boiss	Papaveraceae	NE	Hedges and grass places	S. Sud. Hammé, Mass'adé, Heite (Pb), Banias (P). Sy. Qala'at Sema'ane (Dinsm).
Cicer bijugum Rech. fil.	Fabaceae	EN		Sy. 'Azaz (Har, typus), Qatma (JL).
Cirsium lappaceum (Bieb.) Fischer var. hermonis Boiss	Asteraceae	NE	Mountains	A.L. Au-dessus de Bloudane (P, Pb), Jab. Ma'loula (Pb), Yabroud (Mt), S. de Qastal (Pb), Jab. Abou'Ata (Pb).
Consolida coelesyriaca nomen novum	Ranunculaceae	NE	Uncultivated lands	Sy. Tell Bouada (Bl). J.D. Tell Chihane (Mt).
Consolida gombaultii (Thiéb.)	Ranunculaceae	NE	Vines and places herbus	J.D. Djebel Druze (Gb), Soueida, Chahba (Mt).
Consolida pusilla (Lab.) Schrôd	Ranunculaceae	NE	especially Anti-Lebanon and desert.	S. A.L. Souq Ouadi Barada (Boiss), Ma'arra (Ky), Ma'loula (Mt), Yabroud, Jabal Ma'loula (Pb), Nebk-Fallita (Davis), sud de Qastal (Pb). St. Deir 'Atiyé, à Qaryatein, Izriyé (P), Joubb ej-Jarra au Jabàl Bilas (Dlb), Base E. du Jabal Abiad (Bl, sous D. oliganthurri
Convolvulus libanoticus Boiss	Convolvulaceae	NE		Sy. N. de Menbij, l'ancienne Hierapolis (Pb, deux récoltes).
Corydalis solida (L.) Swartz, var. brachyloba Boiss	Papaveraceae	NE	Rich soils, generally above 1000 m.	NLatt. Kessab (P). A.L. Bloudane (P), Souq Ouadi Barada (Mt), au-dessus de la source du Barada (Pb), Ouadi-el-Qarn (Wall, Pb). Mm. Slenfé (Pb).
Corynephorus desioides Bornm	Poaceae	NE	Sandstone and sandy soils	S. A.L. Jab. Gharbi (Ky).
Cousinia pestalozzae Boiss	Asteraceae	NE	Mountains and hights	.L. Anti-Liban à l'est de Bloudane (Mt), Tala'at Moussa (Pb), hauts plateaux de l'AntiLiban (Pb), nord de Bloudane (Pb).
Crépis pterothecoides	Asteraceae	NE	Mountain pastures.	A.L. Au-dessus de Zebdani et Bloudane (Ky, Pb).
Crépis robertioides Boiss	Asteraceae	NE	Arid slopes	Dam. Damas (Boiss, Gaill, Pb!), Dimas (Pb!), Sahl es-Sahra (Pb!), Doummar (Mt!), Imtale (Eig et Zoh). Haur. Bosra (Dinsm, Gb), Dera'a (Mt!). JD. Tell Chihane (P), Chaba (Mt!).
Crocus dispathaceus Bowles	Iridaceae	NE		S. Premier exemplaire, fourni par EGGER à BOWLES, de provenance non indiquée, vraisemblablement Alep. Sy. Environs d'Alep (JL, Chapman: «American College grounds»). St. Jab. Bilas, un pied venu en la possession de M. PABOT, qui m'en a cédé une fleur.
Crocus macrobolbos Jovet et Gombault	Iridaceae	NE	Very dry regions.	S. H.J. Entre Hassetché et Cheddadé, récolte originale (Gb), Cheddadé (Pb). Dam. Sahles-Sahra, vers Damas (Th, Gb, Mt), Jab. Qasyoun (Pb). St. Palmyre (Mt).
Crocus thiebauti Moût	Iridaceae	NE	Mountain slopes	S. Herm. Pentes syriennes de PHermon, au-dessus de Qatana (Dbt). Sjy. 10 km. E de Homs (Bksh), Rastane (Pb).
Crocus vitellinus Wahlenberg	Iridaceae	NE	Various terrains.	S. Mi. Safita (Pb). Sy. Homs (Pb).

Cyclotaxis palaestina Boiss. Diagn	Convolvulaceae	NE	Fertile land, more or less flooded in spring.	S. Haur. Sanamein (Sam), Ezra'a (Mt), J.D. Vers Soueida (Zh), Oualgha (Mt).
Cytisus cassius Boiss.	Fabaceae	NE	Wooded places	S. NLatt. Cassius (Boiss), 4 h. S. of Kessab (P), 'Aïn Haramiyé (JL, Sam), Froulok (Pb, Mt),
Daphne libanotica Moût	Thymelaeaceae	NE	Degraded wood.	S. Mi. Jaoubat Bourghal (Mt/Nahal). Mm. Slenfé (JL).
Delphinium virgatum Poir	Ranunculaceae	NE	Rocky lands. Sub-arid areas especially on the Syrian slopes of Hermon and Anti-Lebanon.	S. Sy. Entre Antioche et Alep (Boiss.)). Dam. Damas (Gaill.). A.L. Qaldoun (P), Ma'loula, Hile (Mt), Yabroud (Pb). Herm. Qala'at Jendel (Gaill). Haut. -Exxï* (Pb), N. de Cheikh Meskine (Sam). St. Jab. Dmeir (Pb)
Dianthus pendulus Boiss. et Bl	Caryophyllaceae	NE		Dana (P), Jab. Sema'ane (Dinsm). Haut.? Lac de Tibériade (Armitage).
Draba oxycarpa Boiss Var. brevistyla Bornm	Brassicaceae	NE	Rocks and stones in HautrLanban, Hermon and Anti-Lebanon	A.L. Jabal Halimé (Pb).
Draba vesicaria Desv	Brassicaceae	NE	Mountains, especially in rocky places.	S. A.L. Au-dessus de Zebdani (Ky, Pr).
Echinops descendent Hand.-Mazz	Asteraceae	NE	Anti -Lebanon slopes	A.L. Jab. Gharbi (Ky, Pr), Zebdani (Gb), Souq Ouadi Barada- Yahfoufa (Fox), ouest du Ouadi-el-Qarn (Pb).
Echium pabotii Mout.	Boraginaceae	NE		S. H.J. Deirik (Pb
Erodium gaillardotii Boiss.	Geraniaceae	NE	Rocks, steppes.	S. A.L. Jab. Ma'loula, Jab. Halimé, Tala'at Moussa (Pb), Yabroud (Mt, Pb), Deir 'Atiyé (P). Dam. Jab. Qasyoun (Gaill, holotypus, Mt, Pb). St. Nebk à El-Mahin (P), SW. de Hassiyé (Dinsm), Qaryatein (Mt).
Erodium trichomanifolium L'Hér Var. albiflorum Boiss	Geraniaceae	NE	Rocks at high altitude	Herm. Au-dessus de 'Arné (Ky, d'après Boiss.), 'Arné à Mazra'a (Aar).
Eryngium desertorum Zohary	Apiaceae	NE	Desert and dry regions	S. A.L. 'Aïn-et-Tiné au pied dujabal 'Antar (Eig, Zh). Sy. N. de Menbij (Pb). Dam. Jab. Dmeir, Jab. Qasyoun, 'Adra, Ouadi-el-'Arad (Pb). St. Entre Damas et Qaryatein (Eig, Zh), Qaryatein (Mt), jab. el-Hass (Pb).
Erysimum tenellum D.C	Apiaceae	NE		S. H.J. Entre Alep et Mossoul (Olivier), désert du Khabour (Hkn), entre Hassetché et Q_amechliyé (Gb), Qp ubour-el-Bid (Pb) ? Dam. Kharaba (Socin dans Boiss)
Euphorbia antilibanotica sp. nova	Euphorbiaceae	NE	Rocky slopes.	A.L. Jabal Charki (mons Schergi) dans l'Anti-Liban (Ky, sous E. chesneyi dans Boiss.), Dor Abu-1-Hin (P), Jab. Abou-1-Hassen (Mt), Jab. Abou-1-Haoua (Mt, Pb), Madaya (Pb).
Euphorbia physocaulos Moût.	Euphorbiaceae	NE	Roadside.	Haur. Ezra'a (Mt). J.D. Soueida, Sleim, Mourdouk, Chahba (Mt).
Euphorbia postii Boiss.	Euphorbiaceae	NE		S. Sy. Entre Hama et Mahardé. (P), vers Zeidal (Mt).
Euphorbia promecocarpa P.H. Davis	Euphorbiaceae	NE	Rocks.	S. A.L. Flita, près de Nebk, sur Rocks verticaux, vers 1800 m. (typus: Herbier de Kew), Yabroud vers 1500 in. (Davis), Tala'at Moussa (Pb).
Ferula hermonis Boiss	Apiaceae	NE	Mountain slopes	S. A.L. Jab. Chekif (Mt), au-dessus de Bloudane, en abondance (P, Gb, Mt, Pb).
Ferulago frigida Boiss	Apiaceae	NE	Rocks	S. A.L. Au-dessus de Bloudane (Mt, Pb), Jab. Halimé (Pb).
Fritillaria alfredae Post	Liliaceae	NE	Wooded areas.	S. NLatt. 'Aïn-Haramiyé (Thiéb, Sam, Mt), Froulok (Pb), Cassius (Wall).
Fumana oligosperma Boiss. et Ky.	Cictaceae	NE	Wooded areas.	S. NLatt. Bois au sud du Cassius (Boiss), vers 'Aïp Haramiyé (Mt).
Gagea micrantha (Boiss.) Pascher	Liliaceae	DD	Slightly humid places in the mountains.	S. A.L. Au-dessus de Bloudane (Pr), Jabal Abou-1-Haoua (Mt, Pb), Tala'at Moussa (Pb). J.D. Fontaine des Bédouins (Mt).
Genista libanotica Boiss.	Fabaceae	NE	Mountains.	A.L. Au-dessus de Zebdani (Ky), N. de Bloudane (Pb).
Gladiolus imbricatus Var. libanoticus Boiss.	Iridaceae	NE	Soggy soils at altitude	S. A.L. Ouadi Marj au-dessus de Bloudane (Ky). NLatt. Bassit, marais près de Kessab (Bksh
Gypsophila filicaulis (Boiss.) Bornm.	Caryophyllaceae	NE	Arid areas	Dam. Damas (Boiss), Jab. Qasyoun (PbBarkoudah), Doummar (Gaill), Dimas (Bl). A.L. Ma'loula (Mt, Barkoudah), Jab. Abou 'Ata (Pb). Saïdnaya J.D. Oum-ez-Zeitoun (Mt). St. Qaryatein (Mt), Palmyre (P, Mt, Pb), entre Damas et Palmyre (Ky), Jab. Abou Qpsh (Gb), Jab. Abiad (Bl, Pb), Ouest d'Arak (Pb
Gypsophila polygonoides (Willd.) Halacsy Ssp. Ansariensis	Caryophyllaceae	NE	Rocks, especially in the mountains.	Mi. 'Ain Halaqim (Har)
Gypsophila polygonoides (Willd.) Halacsy Ssp. barradensis	Caryophyllaceae	NE	Rocks, especially in	A.L.,Dam. Souq Ouadi Barada (Boiss, P), Jab. Qasyoun (Mt)

			the mountains.	
Haplophyllum chaborasium Boiss. et Hausskn.	Rutaceae	NE	Fields, crops.	H.J. Bords du Khabour (Hkn), Tell Kaukab (Hd-Mz), E. de Qamechlié (Pb), Guir Cafek (Mt).
Haplophyllum fruticulosum (Labili.) Boiss	Rutaceae	NE	Dry land, steppes	Dam. Damas (Labili, Ky, Boiss, Pb), Jab. Qasyoun (Mt, Pb), Mayssaloun (P), Ouadi
Haplophyllum haussknechtii Boiss	Rutaceae	NE		H.J. Bords du Khabour (Hkn), Khan Serri, 30 km. au N. du Lac Khatouniyé, feuilles en grande partie indivises (Pb), N. de Deir-ez-Zor (Pb).
Haplophyllum suaveolens (D.C.) Var. glabrum	Rutaceae	NE		NLatt. Sommet du Dj. Akra (Cassius) (Boiss, Har, Mt).
Hedysarum atomarium Boiss	Fabaceae	NE		Endémique du sud de la Turquie
Hedysarum coelesyriacum Sam.	Fabaceae	NE	Dry places	A.L. Jab. Halimé (Pb), Ma'loula (Mt). Dam. 'Aïn Figé (Pb), Doummar (Pr, dans Herbier Général de Paris), entre Doummar et Damas (Letourneux, d'après Ark. for Bot. I, 5, pp. 310-312, R.S.I.).
Heleochloa acutiglumis Boiss	Poaceae	NE	Non-limestone flooded land in spring	S. Haur. N. de Qneitra (Pb). JD. Chahba (Mt). WHoms. Liftaya (Mt).
Helichrysum pygmaeum Post	Asteraceae	NE	Mountain slopes.	A.L. Bloudane (Gb, Mt, Pr, Dubertret, Pb), Jab. Halimé, Tala'at Moussa (Pb). Herm. Au-dessus de 'Arné (Gaill), sous PHermon (Pb).
Heliotropium schweinfurthii Boiss.	Boraginaceae	NE		Sy. Entre Alep et Terek (Hkn), vers le Nahr Deheb (Hand-Mazz).
Hypericum libanoticum N. Robson, sp. nov.	Hypericaceae	NE	Rocky lands, mostly wooded.	S. A.L. Vers Zebdani, à Ouadi Abou-el-Hom (Ky), Ouadi-el-Qarn (Gaill, Pb), Madaya,Houreiré (Pb), Nebi Habil (Barkoudah), Bloudane (Davis). Dam. Vallée du Barada (Harding, Hardy & Whitehorn), Doummar (Letourneux). Herm. 'Arné (Pb).
Iris antilibanotica Dinsm	Iridaceae	CR		S. A.L. Au-dessus de Bloudane, vers 2300 m. (West, Werckmeister), Jabal Abou-1-Haoua, au-dessus du même Bloudane (Pb, Mt).
Iris auranitica Dinsmore	Iridaceae	DD	On lava and volcanic ash	S. JD. Tell Qpuleib (Dinsm), Tell Qpuleib, Kafer, Mayamas, Tell Jeffiia (Mt). Var. unicolor vers le Tell Jeffna (Mt).
Iris basaltica Dinsmore	Iridaceae	DD		S. W. de Homs. Entre Tell Kalakh et Qala'at-el-Hosn (KrakMes-Chevaliers) (West, Thiébaut, Gombault, Highwood).
Iris bostrensis Moût, Bull. Soc. Bot.	Iridaceae	EN		Hauran et Djebel Druze. S. Haw. 10 km. N. de Dera'a (Highwood, typus), Bosra (Dinsm), Jebab (Mt), Sanamein (Pb). JD. Salkhad (Pb), vers le Tell Hadid (Mt).
Iris caeruleo-violacea (Gombault) comb, nova	Iridaceae	NE	Dry land	Sy. Deir Jemal (JL, typus), Lac Jabboul, Qatma, Sfiré, Jabal Sema'ane (JL). 30 km. N. d'Alep, collecteur inconnu (Herbier Delessert à Genève), Homs-Hama (Har). HJ. Abondant. Entre 'Aïn Divar et le Tigre, et au Karatchok Dagh vers Toramiche (Mt), N. de Tell Kotchek (Pb).
Iris damascena sp. nova	Iridaceae	CR		S. Dam. Pentes du Jabal Qasyoun au-dessus de Damas. Trouvée par M. PABOT. Risque, vu la proximité de Damas et la vente des fleurs dans les rues de la ville, d'être vite éliminée.
Iris fumosa Bois, et Hkn	Iridaceae	NE	Subarid and arid regions	S. Sy. Alep (Ky, Hkn, JL), Ouroum-es-Soughra (Dlb, Pb), SW d'Alep (Pb), Tourmanine (Hkn), Jabal Muhassan (JL), Qpumhané (Gb), Qasr-el-Banât (JL). St. 30km. au sud d'Ezriyé (Mt).
Iris jordana Dinsm	Iridaceae	NE		S. Sud. El-Hammé, entre Fiq et Hammé (Pb), Fiq à Kafer Harib (Séguy dans Herbier Gombault).
Iris melanosticta Bornm	Iridaceae	NE	Dry basaltic terrains.	Hatir. Hauran vers Ezra'a et Dera'a (Dinsm), Ezra'a, ce. (Mt), Hauran au nord de Dera'a (Highwood, Bksh), Jilline, Khisfine (Pb). JD. Ta'alé (Mt).
Iris nusairiensis sp. nova	Iridaceae	CR	Rocky soils.	S. Mm. Slenfé (Pb, Mt). Col de Chatha (Pb). Typus: Slenfé, 24 avril 1953, leg. PABOT (Herbier Mouterde, P 186).
Iris postii sp. nova	Iridaceae	NE	Syrian desert	St. Deir 'Atiyyé à Mehin (P), Qasr-el-Haïr (Pb), désert dans la même région (Highwood, Bksh), Palmyre, Forkhlos-Palmyre (Gb).
Iris sindjarensis Boiss. et Hausskn	Iridaceae	NE	Subarid and arid regions	S. Sy. Alep (Ky, Hkn, JL), Ouroum-es-Soughra (Dlb, Pb), SW d'Alep (Pb), Tourmanine (Hkn), Jabal Muhassan (JL), Qpumhané (Gb), Qasr-el-Banât (JL). St. 30km. au sud d'Ezriyé (Mt).
Lamium adoxifolium Handel-Mazzetti.	Lamiaceae	NE	Mountain slopes	S. A.L. Madaya-Houreiré (Pb), entre Damas et Zebdani (Boiss), Ouadi-el-Qarn (Boiss), vers Bloudane (Dlb). Haut. Ezra'a (Zoh), Ghaba'a (Mt, Pb), Tell Chihane (Mt), Mouchaidiyé (Pb), 'Atil (Mt). Hem. 'Arné (Ky), Qala'at Jendel (Gaill). Dam. vers Damas (Auch), Sahl-es-Sahra (Pb), Mayssaloun-Barada (P), plateau de Dimas (Bl, Pb), Jab. Qasyoun (Pb). Sud. Mayssaloun
Lamium ehrenbergii Boiss. et Reut	Lamiaceae	NE	Mountain slopes, Rocks.	A.L. Ouadi-el-Qarn (Sam), Jab. Chekif (Mt). LABILLARDIÈRE avait, selon son usage, étiqueté sa récolte à PHermon : « In monte Gebel Scheikh Antilibani circa Damascum » et nommé ainsi l'espèce d'après une géographie de faible précision
Lathyras basalticus Rech. fil	Fabaceae	NE	Basalt	WHoms. Tell Kalakh (Pb), 'Akkari à Tell Kalakh (Sam, typus).
Lathyrus ciliolata Sam	Fabaceae	LC	Rocky lands	S. Ct. Lattaquié-Banias (Wall). W. de Homs. 'Akkari-Tell Kalakh (Sam). Sy. Tell 'Aqibrin (Sam), Homs (Pb). Dam. Jab. Krim (Pb). Haut. Ghabagheb (Pb). J.D. Tell Ahmar, Qanaouat (Mt, tiges souterraines présentes), Saouet-el-Khodor, Tell Qpuleib (Mt, sans tiges souterraines).
Lathyrus gleosperma Warb. et Eig	Fabaceae	CR	Strong lands.	S. Hour. Ezra'a (Mt). J.D. Mezra'a, Chahba (Mt). Aire géogr. — Endémique de la Palestine N. et du Djebel Druze.

Lathyrus stenolobus Boiss	Fabaceae	EN	Afforestation.	NLatt. «In sylvaticis montis Cassii» (Boiss), 'Aïn Haramiyé (Sam, Mt), Ouadi Qandil, Askorane (Sam).
Linaria aucheri Boiss	Plantaginaceae	NE	Rocky slopes	S. A.L. Halimat Qabou, Ouadi Sahrij, Ouadi-el-Ayyoun (P), Jebel Halimé (Pb), Signal de Zemrani (Pb).
Linaria damascena Boiss. et Gaill.	Plantaginaceae	NE	Rocky slopes	. A.L. Halimat Qabou, Ouadi Sahrij, Ouadi-el-Ayyoun (P), Jebel Halimé (Pb), Signal de Zemrani (Pb).
Linum toxicum Boiss	Linaceae	NE	Rocks	Sommet de l'Hermon
Lotus gebelia Var. libanoticus Boiss	Fabaceae	NE	Rocky lands, Pastures	Dam. Doummar (Pb), vers Damas (Sam). A.L. Zebdani, vers Ma'arra (Ky), MnineSaïdnaya (Sam), Houreiré (Pb). Haur. Sanamein (Sam, var. haussknechtii).
Malcolmia exacoides (D.C.) Spreng.	Brassicaceae	NE	Stony terrain, Mountains	S. A.L. Anti-Liban (Gaill), Manchoura (Ky), Bloudane (Pr, P, Sam), Ouadi-el-Qarn (Sam, Mt), Souq-Ouadi-Barada (Mt), Zebdani, Source du Barada (Pb). Herm. W. de Qatana (Pb). H.J. S. de Deirik (Pb).
Malva oxyloba Boiss	Malvaceae	NE	Herbus places, roadsides, gardens	Sy. Homs (Har).
Marrubium hierapolitanum Moût.	Lamiaceae	NE	Rocky slopes	J.D. Chahba (Pb), Jab. Druze (Gb), Soueida (Dinsm, Mt).
Matthiola damascena Boiss	Brassicaceae	NE	Rocks in Dry areas.	L. St. Sources de l'Oronte (Mt, Np). S. A.L. Yabroud (Mt, Pb). Dam. Vers Damas (Boiss, Gaill), Jab. Qasyoun (P, Pb), entre Hamé et Dimas (Pb), Doummar (Sam, Mt). St. Deir 'Atiyé à Mahin (P), Qaryatein (Pb), Jab. Abou Rejmein (P).
Melica pannosa Boiss	Poaceae	NE	Mountains and arid regions	A.L. Zebdani (Ky), Jab. Halimé (Pb), Souq Ouadi Barada (Boiss., P). Dam. Bessima (Gaill), Jab. Qasyoun (Sam), Jab. 'Antar (Gaill). St. Jab. Abou Qpsh (Gb).
Minuartia innominata McNeill	Caryophyllaceae	NE	Anti-Lebanon hights	A.L. Jabal Halimé, 11 juillet 1952 (Pb).
Minuartia parvulorum Moût, et Sam	Caryophyllaceae	NE	Very poor and very shallow soils in the Rocks of Anti-Lebanon	A.L. Ma'loula (Mt, récolte originale), Ma'ara (P), Yabroud (Mt, Pb), Tala'at Moussa (Pb), Sahel près de Nebq (Davis).
Monocaryum fasciculare Roem. et Sch	Colchicaceae	NE		Sy. Alep et environs immédiats (Hkn, JL, Gb, Mme Marsh), Deir-al-Jamal (Gb), Homs (Pb), Soueida (Bksh).
Onobrychis aurantiaca Boiss.	Fabaceae	NE		Sy. Darkouche à Antioche (Boiss), Mouslimiyé (Pb), Selkine (Dlb).
Onobrychis gaillardotii Boiss	Fabaceae	NE	Subarid lands.	S. Dam. Jab. Kahalé près de Saknaya (Bl), vers Damas (Gaill), Douma (Mt), Kissoué (Pr), Ouadi Barada (P), entre Doummar et Hamé (Pb).
Onobrychis hemicycla Blanche et Boiss.	Fabaceae	NE	Dry, sub-arid and arid regions.	A.L. Bloudane (Pr). Sy. Abou Dali-'Afir (Sam), Abou Douhour (Har). St. Snou Fadel (Bl, typus), Mawrayda-Palmyre (P), Forqlos (Reese), Jab. Chbeit (P).
Onobrychis pinnata (Bertol.)	Fabaceae	NE	Dry regions	S. H.J. Jab. 'Abd-el-'Aziz (Pb), 10 km. N. de Deir-ez-Zor (Dlb). St. Palmyre (Mt), Reddé (Mt), abords de Soukhné (Pb), Palmyre-Homs (Har), Palmyre à 'Aïn-el-Beida (P), W. d'Arak, NE. de Zélaf, Qasr-el-Hair à Qaryatein (Pb), Palmyre à Abou Kemal (Gb).
Onopordum syriacum Holmboe	Asteraceae	NE	Rocky slopes	A.L. Ma'loula (Socin, Mt, Pb), Jab. Ma'loula (Pb), Yabroud (P, sous T. yebrudi, Mt, Pb), Jab. Halimé (Pb).
Origanum bargyli Moût	Lamiaceae	NE	Rocky slopes	S. A.L. Ma'loula (Socin, Mt, Pb), Jab. Ma'loula (Pb), Yabroud (P, sous T. yebrudi, Mt, Pb), Jab. Halimé (Pb).
Ornithogalum fucescens Boiss. et Gaill	Asparagaceae	NE	Fields et cultures	Sy. Ma'aret-en-No'man (Gb), Qala'at-el-Moudiq (Mt). Haur. N. de Dera'a, N. de Qneitra (Pb). J.D. Soueida (Zh, Mt).
Papaver libanoticum Boiss.	Papaveraceae	NE	High mountains	S. A.L. Soudr Cheikh 'Ali (P).
Phlomis brachyodon (Boiss.) Zohary Subsp. damascena (Bornm.)Sam.	Lamiaceae	NE	Rocky slopes.	A.L. Ma'loula (Socin, Mt, Pb), Jab. Ma'loula (Pb), Yabroud (P, sous T. yebrudi, Mt, Pb), Jab. Halimé (Pb)
Phlomis brevilabris Ehrenb	Lamiaceae	NE	Sandy slopes, fertile terrain.	S. Mm. Slenfé (Pb). K.D. Kutchuk Darmik (Pb).
Pilgerochloa blanchei(Boiss.)	Poaceae	NE	Pastures. Lebanon mountain and dry interior regions	S. Sy. Homs(Mt), K.D. Kutchuk Darmik (Pb). Haw. Mass'adé (Pb), N. de Qneitra (Pb). JD. Qrayé-Kafer (P), Kafer, Soueidâ-Sâlé (Sam), au-dessus de Soueida (Pb), Tell Qpuleib, Soueida (Mt), NW. de Salkhad (Pb). Qanaouat (Sam, Mt). St. Jab. Dibsi (Pb).
Polygonum corrigioloides Jaub. et Spach	Polygonaceae	NE		St. De Meyyadine à Babylone, dans la boue de l'Euphrate (Handel-Mazzetti).
Polygonum libani Boiss	Polygonaceae	NE	High peaks on Rocks or very thin soils.	. S. A.L. Jabal Chekif (Mt).
Postia lanuginosa (DC.) Boiss	Asteraceae	NE	Preference for volcanic terrains.	S. Dam. Jab. Assouad, Saknaya (Gaill), S. de Qtaifé (Pb), vallée du Zebdani (Pb). ffaur. Hauran (Pb), Khabab (Mt), Sanamein (Pb), Bosra à Samad (Gb), Samad à Ghariyé (Gb). J.D. Djebel Druze (Gb), Tell Hadid, Ezraa, Soueida (Mt), Bosra à Qrayyé (P), Tell Qpuleib (Pb).

Postia tnicrocephala Boiss	Asteraceae	NE	Elevated regions of Anti-Lebanon and Lebanon.	S. A.L. Au-dessus de Bloudane, Halimat Kabou, Bloudane à Chtaura (P). Embranchement de la route de Zebdani sur celle de Damas, Madaya, Talaat Moussa, Jabal Ma'aloula (Pb).
Potentilla geranioides Willd Var. syriaca Boiss.	Rosaceae	NE	Mountains, often sheltered from rocky outcrops.	A.L. Au-dessus de Bloudane (Ky, Pb), Birket Foukhté (Pb).
Poterium compactum Boiss	Rosaceae	NE	Wet sandstone and decalcified soils, at altitude	A.L. Jab. Chekif (Mt), au-dessus de Bloudane (P, Pb).
Prangos asperula Boiss	Apiaceae	NE	Mountain slopes.	A.L. Bloudane (Mt, Pb), Ouadi-el-Qarn (Sam).
Prangos deserti Post et Beauv.	Apiaceae	NE	Desert.	Jab. Zebed-(P),'Aqerbat (Bl).
Prangos hermonis Boiss.	Apiaceae	NE	Preference for volcanic terrains	S. Herm. 'Arné (Ky). Haur. Khabab (Mt). J.D. Tell Chihane (P, Mt), Saouet-el-Khodor, Chahba (Mt), Bosra-Salkhad (Pb).
Psoralea jaubertiana Fenzl	Fabaceae	NE	Clay soils	Sy. D'Antioche à Alep (Boiss), Qatma (JL). N. de Deirik (Pb).
Pyrus syriaca Boiss Var. bovei (Steud.)	Rosaceae	LC	More or less rocky terrain	A.L. Jab. Ma'loula (Dlb). Spécimen en fleurs. Ma'aret-el-Bach, Qprnet Mass'adi (Pb).
Ranunculus chionophilus Boiss Ssp. sericeus (Peyron) Moût	Ranunculaceae	NE	Near fresh water on sandstone or basalt	A.L. Bloudane (Pb). J.D. Tell Qpuleib, Tell Jinah (Mt), entre le Tell Ahmar et Soueida, „vers 1200 m.
Ranunculus myosuroides Boiss	Ranunculaceae	NE	High Mountains.	A.L. Manchoura (Ky, récolte originale), Jabal Abou-1-Haoua (Mt, Pb), au-dessus de Bloudane (Gaill, Pr).
Rindera schlumbergeri (Boiss.) Gùrke	Boraginaceae	NE	on rocky soils	A.L. Yabroud (Mt, Pb), Qaldoun (Bl, sous Paracaryum myosotoides (Labili.) Boiss.; P, sous P. reuteri Boiss. et Hausskn., puis P. velutinum Post!). St. E. de Deir 'Atiyé, Jab. ed-Daoua (Pb).
Romulea nivalis (Boiss. et Ky) Klatt	Iridaceae	VU	Near melting snow	de PHermon et de l'Anti-Liban Ouadi Marj (Martsch) (Ky). Jabal Abou-1-Haoua
Rosa dumetorum Thuill Var. schergiana (Boiss.) Christ	Rosaceae	NE	Rocks	S. A.L. Au-dessus de Zebdani (Ky). Lieu dit Khardour-el-Khorj à l'est de Bloudane dans le Haut Anti-Liban (Mt). Herm. Hermon (Aar).
Salsola autrani Post	Amaranthaceae	NE	Steppes	St. Mar Lian près de Qaryatein (P), Haouarine (Mt), Sud de T 4, entre T 4 et Qasr-elHaïr (Pb).
Salsola postii Eig	Amaranthaceae	NE	Steppes	St. Entre El-Jeba'a et Aïn Beida, 18 juill. 1890
Salvia pinardii Boiss	Lamiaceae	NE	Elevated areas, Fields and pastures	S. A.L. au-dessus de Bloudane (Mt, Pb).
Salvia rubifolia Boiss	Lamiaceae	NE	Elevated regions, on Rocky lands	Mm. Slenfé (JL).
Saponaria bargyliana Gombault	Caryophyllaceae	NE		Mm. Slenfé (JL, typus, Muséum de Paris), Jabal Mattai au-dessus de Slenfé (Pb).
Scaligeria hermonis Post	Apiaceae	NE	Dry lands	Herm. 'Aïn-ech-Cha'ara (P, typus). J.D. Tell Ahmar (Mt).
Scandix damascena Bornm.	Apiaceae	NE		Dam. Jabal Qasyoun (Bnm, Pb).
Scorzonera libanotica Boiss	Asteraceae	NE	Dry regions	Dam. Damas (Boiss), Jab. Qasyoun (PbBarkoudah), Doummar (Gaill), Dimas (Bl). A.L. Ma'loula (Mt, Barkoudah), Jab. Abou 'Ata (Pb). Saïdnaya J.D. Oum-ez-Zeitoun (Mt). St. Qaryatein (Mt), Palmyre (P, Mt, Pb), entre Damas et Palmyre (Ky), Jab. Abou Qpsh (Gb), Jab. Abiad (Bl, Pb), Ouest d'Arak (Pb).
Scutellaria cretacea Boiss. et Hausskn	Lamiaceae	NE	Subarid regions east of Homs and Damascus	Dam. est de la Ghouta (Pb), Marj-el-Akhdar (P). St. Deir 'Atiyé (Pb), Tell-Bouada (Bl), Khanaser (P), Zebed (P), Jab. Abiad (Bl).
Sedum assyriacum Boiss Var. minus Boiss.	Crassulaceae	NE	Winter flooded land, more or less rocky	S. Flaques basaltiques du Hauran et du Djebel Druze. Haur. Vers Qneitra (Pb). J.D. Salé, Tell Jeffna, Hébrane, etc. C. (Mt).
Sedum louisii Frôd	Crassulaceae	NE		S. Dam. Damas-Salihiyé, très rare (Gb). St. Jab. 'Amiri (JL, Gb), Palmyre (Mt).
Senecio delbesianus Arènes	Asteraceae	NE	Subarid regions	.L. Ouadi Zemrani (Eig et Zoh), Jabal Halimé (Pb), Tala'at Moussa (Davis), Birket Foukhté (Pb), entre 'Assal-el-Ouard et Deir-'Atiyé (P), entre Deir 'Atiyé et Jerijir (Eig et Zoh), Qara au N. de Nebk (Pb), Yabroud (Pb), Ouadi Houreiré E. de Bloudane (Mt). St. Meskène à Karakol Hammam (JL), piste de Qaryatein à Forqlos, Armilé (Mt).

Silène makmeliana Boiss	Caryophyllaceae	NE	Rocky places	A.L. Jab. Gharbi (Ky), au-dessus de Zebdani (Boiss, Gb), Jab. Halimé, Houreiré, Jab. Ma'loula (Pb). Dam. Entre Salihiyé et Barzé (Aar). J.D. Chahba (Pb), Tell Ahmar, Tell Chihane, Tell Qpuleib (Mt).
Smyrniopsis syriaca Boiss. Diagn	Apiaceae	NE	Rocky places, especially wooded.	J.D. Chahba (P, Mt, Pb), Tell Qpuleib (Mt).
Stachys nivea Labili	Lamiaceae	NE	Rocks	Sy. Jab. Sema'ane (Har), Qasr-el-Banât, Tell 'Aqibrin (Sam), Harim à Sarmada (Pb
Stachys paneiana Moût	Lamiaceae	NE	Rocks	Mi. Bhamra (Har). Non contrôlé
Sternbergia pulchella Boiss	Amaryllidaceae	NE		S. Sy. Alep (Pb), entre Alep et Mossoul (Olivier et Bruguière), entre Alexandrette et Alep (Hkn).
Teucrium antilibanoticum Moût	Lamiaceae	NE	Rocks	S. Sy. Entre Darkouch et Idlib (Boiss), El-Barra (Mt), Qasr-el-Banât (Hafst), E. de Harim (Pb). NLatt. Pieds du Cassius (Montbret).
Teucrium coniortodes Boiss. et Bl	Lamiaceae	NE	Rocks	St. Jabal Abiad (Bl, Pb).
Teucrium haradjianii Briq. ex Rech	Lamiaceae	NE	Stony soils, in subarid regions.	H.J. Entre Ras-el-'Aïn et Tell Abiad (Gb), vers Cheddadé (Pb), Jab. 'Abd-el-'Aziz (Mt, Pb). Aire géogr. — Endémique du Jabal Sinjar et de la Haute Jéziré.
Teucrium heterotrichum Briq. ex Rech. fil	Lamiaceae	NE	clay soils	A.L. Jab. Gharbi au-dessus de Zebdani (Pr, Ky), Jab. Qebli (Sam), Ouadi-el-Qarn (Sam), Jab. Halimé (Sam, Pb), Jab. Ma'loula (Pb), Yabroud (Pb), Tala'at Moussa (Pb), Jab. ed-Daoua (Pb). J.D. Jab. Druze (Werckm), Kafer Salkhad (Sam), Kafer (Sam), Tell Ahmar (Mt), Tell Qpuleib (Mt). Sy. est de Deir 'Atiyé (Pb).
Teucrium montbretii Benth Subsp. montbretii	Lamiaceae	NE	Steppes	S. St. Entre Palmyre et Marbat 'Antar, Qaryatein (P), Jab. Abiad (Bl), Palmyre et N.W. de Palmyre (P, Sam, Mt, Pb), Jab. Bilas, Jab. Daoua, Ouadi à l'ouest d'Arak (Pb).
Teucrium socinianum Boiss	Lamiaceae	NE	Rocky lands	A.L. Ma'loula (Socin, Mt, Pb), Jab. Ma'loula (Pb), Yabroud (P, sous T. yebrudi, Mt, Pb), Jab. Halimé (Pb).
Thlaspi brevicaule Boiss. et Ky	Brassicaceae	NE	depending on the altitude and the thaw of snow spots. Mountain slopes in the Rocks.	S. A.L. Au-dessus de Bloudane (Ky), Jabal Abou-1-Haoua (Mt, Pb).
Thymus alfredae Post	Lamiaceae	NE	Steppes, arid lands	. A.L. Yabroud (Pb), Ma'loula (Mt), Jab. Halimé (Pb). Dam. Dimas à Jdeidé (Gaill), Doummar (Sam). St. Jab. Abiad (Bl), Palmyre à Jab-et-Tar (Mt), sud-est du Jab. Abiad (Pb), Jab. Bilas (Pb)
Torilis gaillardotii (Boiss.) Drude	Apiaceae	NE		S. Dam. Jab. Qasyoun (Gaill, récolte originale). J.D. Soueida (Mt). H.J. Deirik, Karatchok Dagh (Pb).
Trifolium alsadatni Post	Fabaceae	NE	grass lands	J.D. Entre Salkhad et Kafer (P, typus), Soueida et Q_anaouat (Mt).
Trifolium bonnevillei Moût	Fabaceae	NE		J.D. Chahba, forêt de Qanaouat (Mt).
Trifolium cassium Boiss	Fabaceae	NE	Wooded area	NLatt. Froulok (Pb, Mt, Khatib), 'Aïn Haramiyé (Sam, Pb), 20 km. S. d'El-Ourdou (Dinsm), S. de Kessab, Kizil Dagh, Chakrourane (Pb), Cassius (Boiss).
Trifolium medusaeum Blanche ex Boiss	Fabaceae	NE	Grassland areas, especially near afforestation. Strong preference for sandstone and non-calcareous soils	A.L. Jdeidat Yabouş (Sam). J.D. Kafer (Sam). Indications non contrôlées, un peu surprenantes.
Trifolium modestum Boiss.	Fabaceae	NE	Very humid places at altitude	Herm. Mejdel-ech-Chems (P).
Trifolium plebeium Boiss.	Fabaceae	NE	Grasslands, afforestation, especially at altitude	A.L. Ouadi-el-Qarn (Sam, Pb). Dam. Ghouta (Pb). J.D. 'Atil, Kafer-Salkhad, Qanaouat, au-dessus de Soueida (Sam), forêt de Qanaouat (Mt), Kafer (Sam, Pb).
Trifolium salmoneum Moût	Fabaceae	NE	More or less soggy soils	J.D. El-'Ayyoun (Mt). Haur. N. de Qneitra (Pb).
Tulipa aleppensis Regel 1873	Liliaceae	NE	Fields, pastures, Rocks.	Sy. (aleppensis de Regel). Hailane (Hkn, JL), sAïn Tell (JL), Mouslimiyé (Nahal).
Tulipa aucheriana Baker ssp. westîi ssp. nova	Liliaceae	NE	Rocks. High mountains	S. A.L. Au-dessus de Bloudane (Pr), Tala'at Moussa (Pb), Jabal Abou-1-Haoua (Mt, Pb
Tulipa lownei Baker	Liliaceae	LC	Mountains, especially	S. Jabal Ma'loula vers Yabroud (1500 m. au plus) (Mt), Jabal Abou-1-Haoua (Pb, Mt), Tala'at Moussa (Pb).

			Hermon and Anti-Lebanon	
Urtica fragilis Thiébaut	Urticaceae	NE		Mm. Slenfé (Sam
Valerianella antilibanotica Rech. f.	Caprifoliaceae	NE	subarides	. A.L. Qaldoun (P), Yabroud (Pb), Qara au-dessus de Nebk (Pb), Jab.-el-Qprn (Dinsm), Qastal (Pb), Jab. Abou 'Ata (Pb). St. Jab. 'Abou Qoch (Gb, Thiéb). Dam. Jab. Qasyoun (Bnm, Mt).
Velezia fasciculata Boiss	Caryophyllaceae	NE		H.J. Deirik (Pb).
Verbascum aliciae Post	Scrophulariaceae	NE		Mi-Mm. Slenfé (JL, Pb), Jaoubat Bourghal, Signal de Rouadi, pente orientale (Pb).
Verbascum antari Post	Scrophulariaceae	NE	Uncultivated land, Fields. Regions with contrasting climates, Mountains and non-desert interior, absent from the coastal parts	A.L. Anti-Liban (Bnm), Bloudane (Gb, Mt), N. Djebel Chakif (Pb), Ouadi Houreiré (Pb). Aire géogr.
Verbascum antilibanoticum Hub,-Mor.	Scrophulariaceae	NE	Stony grounds	S. A.L. 'Assal-el-Ouard (P), Ma'aret-el-Bach (P, Pb), Ma'loula (Mt).
Verbascum blancheanum Boiss	Scrophulariaceae	NE	Rocky lands	Dam. Mayssaloun (P), entre Dima et Mayssaloun (Gaill), Saliyé (Pr), Sahl-es-Sahra (Pb). A.L. Ouadi-el-Qarn (Pb), Madaya (Pb), au-dessus de Bloudane (Mt), Ma'loula (Mt), Ma'aret el-Bach (Pb), Jab. el-Qprn (Dinsm).
Verbascum glanduliferum (Post) Hub.-Mor	Scrophulariaceae	NE	Rocky lands	. Dam. Damas (Auch).
Verbascum leptostachyum DC	Scrophulariaceae	NE	Rocky lands	A.L. Ouadi-el-Qarn (P, Bl, Vt), Bloudane (Pr, Mt), Tala'at Moussa (P), au-dessus de Bloudane (Dinsm), Mnine-Saïdnaya (Wall), Ma'loula (Mt), Ma'loula à Saïdnaya (Pb), Qastal (Pb). Dam. Vers Damas (Lab, Boiss, Ky, Gb), Jab. Qasyoun (Pb, Bnm), Doummar (Mt), Ouadi Barada à Jdeidé (Sam), Mayssaloun (P), Sahl-es-Sahra (Sam).
Verbascum libanoticum Murb. et Thiéb	Scrophulariaceae	NE	Rocky lands, in the mountains and indoors.	A.L. Anti-Liban (Bnm), source de Yabroud (Pb), Ma'loula (Mt), Ma'ara (Gb), Jab. Halimé (Pb). Dam. Damas (Pr, Boiss, Pb), Jab. Qasyoun (Gaill, Sam, Pb), Souq Ouadi Barada (Mt). Sy. Jab. Abou Kosh (Gb), Jab. Abiad (Bl), S. du Jab. Abiad (Pb), Palmyre (Bl, Gb, Pb), Qaryatein (Mt).
Verbascum porter! Post	Scrophulariaceae	NE	Rocky lands, steppes.	.L. Anti-Liban (Letourneux), Source du Barada (Pr), Ouadi-Barada à Jdeidé (Wall), Souq Ouadi Barada (Pr), Ouadi-ej-Joz à Doummar (Bl), Douma (Mt), Jab. Qasyoun (Bl, Gaill, Pb, Bnm), Dimas, Doummar (Bl), Kissoué (Pb). St. Hassié (Pb), Palmyre (P), Jab.-el-Tar (Mt), Jab. Abiad (Pb), Jab.-el-Qprn (Dinsm), Deir Atiyé (Pb). J.D. E. de Rouchaidé (Pb).
Verbascum ptychophyllum Boiss.	Scrophulariaceae	NE	Rocky lands.	A.L. Entre Rachaya et Damas (Boiss), Ouadi-el-Qarn (Gaill), Qprnet Massadi (Pb), Jab. Charki (Ky), Bloudane (Wall). Herm. Qala'at Jendel (Sam), 'Arné (Aar). Dam. Vers Damas (Gaill), Dimas (Sam), Doummar (Mt), Jab. Krim (Pb), Jab. Abou Ata (Pb). J.D. Soueida, Kafer (Mt), Tell Qpuleib (Herb), Kafer à Salkhad (Sam). Haur. Samad à Ghariyé (Gb). St. Bir Khnaifis (P), Jabal Bichri (Pb), Jab. Abiad (Bl, Pb).
Verbascum tropidocarpum Murb	Scrophulariaceae	NE	Vines and cultivated or abandoned land.	A.L. Bloudane (Mt), Houreiré (Pb).
Vicia dionysiensis Moût	Fabaceae	NE	Volcanic terrains	S. J.D. Base du Tell Ahmar, 23 avril 1942 (Mt). Mi. Entre Homs et Tartous, 23 avril 1953 (Pb).
Vicia hyaeniscyamus Moût	Fabaceae	NE	Basalt	S. W. de Horns. Vers Tell Kalakh (Mt).
Vicia qatmensis Gomb.	Fabaceae	NT		Sy. Qatma (JL).
Vincetoxicum dionysiense Moût.	Apocynaceae	NE		H.J. sud de Deirik (Dlb, Pb).

Appendix 3:

Endemic plants to the forest ecosystems:

Species	***IUCN* Evaluation**	***Family***	***Habitat***	***Location***
Smyrniopsis syriaca Boiss. Diagn NE	*NE*	*Apiaceae*	*Rocky places, especially wooded.*	*J.D. Chahba (P, Mt, Pb), Tell Qpuleib (Mt).*
Centaurea hololeuca Boiss NE	*NE*	*Asteraceae*	*Wooded or grassy places.*	*NLatt. Bassit (Pb, peut-être l'espèce suivante?).*
Saponaria bargyliana Gombault	*NE*	*Caryophyllaceae*		*Mm. Slenfé (JL, typus, Muséum de Paris), Jabal Mattai au-dessus de Slenfé (Pb).*
Fumana oligosperma Boiss. et Ky.	*NE*	*Cictaceae*	*Wooded areas.*	*S. NLatt. Bois au sud du Cassius (Boiss), vers 'Aïp Haramiyé (Mt).*
Cytisus cassius Boiss.	*NE*	*Fabaceae*	*Wooded places*	*S. NLatt. Cassius (Boiss), 4 h. S. of Kessab (P), 'Aïn Haramiyé (JL, Sam), Froulok (Pb, Mt),*
Hedysarum atomarium Boiss	*NE*	*Fabaceae*		*Endémique du sud de la Turquie*
Lathyrus stenolobus Boiss	*NE*	*Fabaceae*	*Afforestation.*	*NLatt. «In sylvaticis montis Cassii» (Boiss), 'Aïn Haramiyé (Sam, Mt), Ouadi Qandil, Askorane (Sam).*
Lathyrus ciliolata Sam	*LC*	*Fabaceae*	*Rocky lands*	*S. Ct. Lattaquié-Banias (Wall). W. de Homs. 'Akkari-Tell Kalakh (Sam). Sy. Tell 'Aqibrin (Sam), Homs (Pb). Dam. Jab. Krim (Pb). Haut. Ghabagheb (Pb). J.D. Tell Ahmar, Qanaouat (Mt, tiges souterraines présentes), Saouet-el-Khodor, Tell Qpuleib (Mt, sans tiges souterraines).*
Trifolium bonnevillei Moût	*NE*	*Fabaceae*		*J.D. Chahba, forêt de Qanaouat (Mt).*
Trifolium cassium Boiss	*NE*	*Fabaceae*	*Wooded area*	*NLatt. Froulok (Pb, Mt, Khatib), 'Aïn Haramiyé (Sam, Pb), 20 km. S. d'El-Ourdou (Dinsm), S. de Kessab, Kizil Dagh, Chakrourane (Pb), Cassius (Boiss).*
Trifolium medusaeum Blanche ex Boiss	*NE*	*Fabaceae*	*Grassland areas, especially near afforestation. Strong preference for sandstone and non-calcareous soils*	*A.L. Jdeidat Yabouş (Sam). J.D. Kafer (Sam). Indications non contrôlées, un peu surprenantes.*
Trifolium modestum Boiss.	*NE*	*Fabaceae*	*Very humid places at altitude*	*Herm. Mejdel-ech-Chems (P).*
Trifolium plebeium Boiss.	*NE*	*Fabaceae*	*Grasslands, afforestation, especially at altitude*	*A.L. Ouadi-el-Qarn (Sam, Pb). Dam. Ghouta (Pb). J.D. 'Atil, Kafer-Salkhad, Qanaouat, au-dessus de Soueida (Sam), forêt de Qanaouat (Mt), Kafer (Sam, Pb).*
Vicia dionysiensis Moût	*NE*	*Fabaceae*	*Volcanic terrains*	*S. J.D. Base du Tell Ahmar, 23 avril 1942 (Mt). Mi. Entre Homs et Tartous, 23 avril 1953 (Pb).*
Crocus vitellinus Wahlenberg	*NE*	*Iridaceae*	*Various terrains.*	*S. Mi. Safita (Pb). Sy. Homs (Pb).*
Iris nusairiensis sp. nova	*CR*	*Iridaceae*	*Rocky soils.*	*S. Mm. Slenfé (Pb, Mt). Col de Chatha (Pb). Typus: Slenfé, 24 avril 1953, leg. PABOT (Herbier Mouterde, P 186).*
Phlomis brevilabris Ehrenb	*NE*	*Lamiaceae*	*Sandy slopes, fertile terrain.*	*S. Mm. Slenfé (Pb). K.D. Kutchuk Darmik (Pb).*
Salvia rubifolia Boiss	*NE*	*Lamiaceae*	*Elevated regions, on Rocky lands*	*Mm. Slenfé (JL).*
Fritillaria alfredae Post	*NE*	*Liliaceae*	*Wooded areas.*	*S. NLatt. 'Aïn-Haramiyé (Thiéb, Sam, Mt), Froulok (Pb), Cassius (Wall).*
Corydalis solida (L.) Swartz, var. brachyloba Boiss	*NE*	*Papaveraceae*	*Rich soils, generally above 1000 m.*	*NLatt. Kessab (P). A.L. Bloudane (P), Souq Ouadi Barada (Mt), au-dessus de la source du Barada (Pb), Ouadi-el-Qarn (Wall, Pb). Mm. Slenfé (Pb).*
Ranunculus myosuroides Boiss	*NE*	*Ranunculaceae*	*High Mountains.*	*A.L. Manchoura (Ky, récolte originale), Jabal Abou-1-Haoua (Mt, Pb), au-dessus de Bloudane (Gaill, Pr).*
Verbascum aliciae Post	*NE*	*Scrophulariaceae*		*Mi-Mm. Slenfé (JL, Pb), Jaoubat Bourghal, Signal de Rouadi, pente orientale (Pb).*
Daphne libanotica Moût	*NE*	*Thymelaeaceae*	*Degraded wood.*	*S. Mi. Jaoubat Bourghal (Mt/Nahal). Mm. Slenfé (JL).*
Urtica fragilis Thiébaut	*NE*	*Urticaceae*		*Mm. Slenfé (Sam*

Appendix 4:

Rare plant species in Syria

Species	Family	Location	Reference
Alnus orientalis	Betulaceae	Fronlouk forests-Latakia	Aswad 1991
Asplenium bourgai	Aspleniaceae	Wadi alnasara-west Homs	krzon 1998
Cornus mas	Cornaceae	Fronlouk forests-Latakia	Aswad 1991
Corylus avellana	Betulaceae	Fronlouk forests-Latakia	Aswad 1991
Cytisus syriacus	Fabaceae	Wadi alnasara-west Homs	krzon 1998
Dryopteris aculeata	Dryopteridaceae	Wadi alnasara-west Homs	krzon 1998
Fragaria vesca	Rosaceae	Coastal mountains	Nahal,UN
Lycopodium denticulata	Lycopodiaceae	Coastal mountains	Shalabi 1991
Malus trilobata var oxyloba	Rosaceae	Wadi alnasara-west Homs	krzon 1998
Mespilus germanica	Rosaceae	Fronlouk forests-Latakia	Aswad 1991
Paeonia mascula	Paeoniaceae	Fronlouk forests-Latakia	Aswad 1991
Polypodium aculeatum	Polypodiaceae	Coastal mountains	Shalabi 1991
Prangos hermonis	Apiaceae	Jabal al arab-al swayda	Post 1886
Solenanthus circinatus	Boraginaceae	Jabal al arab-al swayda	Post 1886
Vicia articulata	Fabaceae	Jabal halab- Aleppo	Ehrman et al 1990
Vicia noeana	Fabaceae	Jabal halab- Aleppo	Ehrman et al 1990
Pteris longifolia	Pteridaceae	Coastal mountains	Shalabi 1991

Appendix 5:

A check list of Birds Fauna of Syria according to birdlife international (http://datazone.birdlife.org/)

Scientific name	English name	Family	Global IUCN Red List Category
Coturnix coturnix	Common Quail	Phasianidae (Pheasants, Partridges, Turkeys, Grouse)	**LC**
Alectoris chukar	Chukar	Phasianidae (Pheasants, Partridges, Turkeys, Grouse)	**LC**
Ammoperdix griseogularis	See-see Partridge	Phasianidae (Pheasants, Partridges, Turkeys, Grouse)	**LC**
Ammoperdix heyi	Sand Partridge	Phasianidae (Pheasants, Partridges, Turkeys, Grouse)	**LC**
Francolinus francolinus	Black Francolin	Phasianidae (Pheasants, Partridges, Turkeys, Grouse)	**LC**
Oxyura leucocephala	White-headed Duck	Anatidae (Ducks, Geese, Swans)	**EN**
Anser anser	Greylag Goose	Anatidae (Ducks, Geese, Swans)	**LC**
Anser albifrons	Greater White-fronted Goose	Anatidae (Ducks, Geese, Swans)	**LC**
Anser erythropus	Lesser White-fronted Goose	Anatidae (Ducks, Geese, Swans)	**VU**
Mergellus albellus	Smew	Anatidae (Ducks, Geese, Swans)	**LC**
Tadorna tadorna	Common Shelduck	Anatidae (Ducks, Geese, Swans)	**LC**
Tadorna ferruginea	Ruddy Shelduck	Anatidae (Ducks, Geese, Swans)	**LC**
Marmaronetta angustirostris	Marbled Teal	Anatidae (Ducks, Geese, Swans)	**VU**
Netta rufina	Red-crested Pochard	Anatidae (Ducks, Geese, Swans)	**LC**
Aythya ferina	Common Pochard	Anatidae (Ducks, Geese, Swans)	**VU**

Aythya nyroca	Ferruginous Duck	Anatidae (Ducks, Geese, Swans)	**NT**
Aythya fuligula	Tufted Duck	Anatidae (Ducks, Geese, Swans)	**LC**
Spatula querquedula	Garganey	Anatidae (Ducks, Geese, Swans)	**LC**
Spatula clypeata	Northern Shoveler	Anatidae (Ducks, Geese, Swans)	**LC**
Mareca strepera	Gadwall	Anatidae (Ducks, Geese, Swans)	**LC**
Mareca penelope	Eurasian Wigeon	Anatidae (Ducks, Geese, Swans)	**LC**
Anas platyrhynchos	Mallard	Anatidae (Ducks, Geese, Swans)	**LC**
Anas acuta	Northern Pintail	Anatidae (Ducks, Geese, Swans)	**LC**
Anas crecca	Common Teal	Anatidae (Ducks, Geese, Swans)	**LC**
Tachybaptus ruficollis	Little Grebe	Podicipedidae (Grebes)	**LC**
Podiceps cristatus	Great Crested Grebe	Podicipedidae (Grebes)	**LC**
Podiceps nigricollis	Black-necked Grebe	Podicipedidae (Grebes)	**LC**
Phoenicopterus roseus	Greater Flamingo	Phoenicopteridae (Flamingos)	**LC**
Columba livia	Rock Dove	Columbidae (Pigeons, Doves)	**LC**
Columba oenas	Stock Dove	Columbidae (Pigeons, Doves)	**LC**
Columba palumbus	Common Woodpigeon	Columbidae (Pigeons, Doves)	**LC**
Streptopelia turtur	European Turtle-dove	Columbidae (Pigeons, Doves)	**VU**
Streptopelia decaocto	Eurasian Collared-dove	Columbidae (Pigeons, Doves)	**LC**
Spilopelia senegalensis	Laughing Dove	Columbidae (Pigeons, Doves)	**LC**
Oena capensis	Namaqua Dove	Columbidae (Pigeons, Doves)	**LC**
Pterocles orientalis	Black-bellied Sandgrouse	Pteroclidae (Sandgrouse)	**LC**
Pterocles senegallus	Spotted Sandgrouse	Pteroclidae (Sandgrouse)	**LC**
Pterocles alchata	Pin-tailed Sandgrouse	Pteroclidae (Sandgrouse)	**LC**

Caprimulgus europaeus	European Nightjar	Caprimulgidae (Nightjars)	**LC**
Tachymarptis melba	Alpine Swift	Apodidae (Swifts)	**LC**
Apus affinis	Little Swift	Apodidae (Swifts)	**LC**
Apus pallidus	Pallid Swift	Apodidae (Swifts)	**LC**
Apus apus	Common Swift	Apodidae (Swifts)	**LC**
Clamator glandarius	Great Spotted Cuckoo	Cuculidae (Cuckoos)	**LC**
Cuculus canorus	Common Cuckoo	Cuculidae (Cuckoos)	**LC**
Rallus aquaticus	Western Water Rail	Rallidae (Rails, Gallinules, Coots)	**LC**
Crex crex	Corncrake	Rallidae (Rails, Gallinules, Coots)	**LC**
Porzana porzana	Spotted Crake	Rallidae (Rails, Gallinules, Coots)	**LC**
Zapornia parva	Little Crake	Rallidae (Rails, Gallinules, Coots)	**LC**
Porphyrio porphyrio	Purple Swamphen	Rallidae (Rails, Gallinules, Coots)	**LC**
Gallinula chloropus	Common Moorhen	Rallidae (Rails, Gallinules, Coots)	**LC**
Fulica atra	Common Coot	Rallidae (Rails, Gallinules, Coots)	**LC**
Grus grus	Common Crane	Gruidae (Cranes)	**LC**
Tetrax tetrax	Little Bustard	Otididae (Bustards)	**NT**
Otis tarda	Great Bustard	Otididae (Bustards)	**VU**
Chlamydotis macqueenii	Asian Houbara	Otididae (Bustards)	**VU**
Calonectris diomedea	Scopoli's Shearwater	Procellariidae (Petrels, Shearwaters)	**LC**
Puffinus yelkouan	Yelkouan Shearwater	Procellariidae (Petrels, Shearwaters)	**VU**
Ciconia nigra	Black Stork	Ciconiidae (Storks)	**LC**
Ciconia ciconia	White Stork	Ciconiidae (Storks)	**LC**
Platalea leucorodia	Eurasian Spoonbill	Threskiornithidae (Ibises, Spoonbills)	**LC**
Geronticus eremita	Northern Bald Ibis	Threskiornithidae (Ibises, Spoonbills)	**EN**

Plegadis falcinellus	Glossy Ibis	Threskiornithidae (Ibises, Spoonbills)	**LC**
Botaurus stellaris	Eurasian Bittern	Ardeidae (Herons)	**LC**
Ixobrychus minutus	Common Little Bittern	Ardeidae (Herons)	**LC**
Nycticorax nycticorax	Black-crowned Night-heron	Ardeidae (Herons)	**LC**
Ardeola ralloides	Squacco Heron	Ardeidae (Herons)	**LC**
Bubulcus ibis	Cattle Egret	Ardeidae (Herons)	**LC**
Ardea cinerea	Grey Heron	Ardeidae (Herons)	**LC**
Ardea purpurea	Purple Heron	Ardeidae (Herons)	**LC**
Ardea alba	Great White Egret	Ardeidae (Herons)	**LC**
Egretta garzetta	Little Egret	Ardeidae (Herons)	**LC**
Pelecanus crispus	Dalmatian Pelican	Pelecanidae (Pelicans)	**NT**
Pelecanus onocrotalus	Great White Pelican	Pelecanidae (Pelicans)	**LC**
Microcarbo pygmaeus	Pygmy Cormorant	Phalacrocoracidae (Cormorants)	**LC**
Phalacrocorax carbo	Great Cormorant	Phalacrocoracidae (Cormorants)	**LC**
Anhinga rufa	African Darter	Anhingidae (Darters)	**LC**
Burhinus oedicnemus	Eurasian Thick-knee	Burhinidae (Thick-knees)	**LC**
Haematopus ostralegus	Eurasian Oystercatcher	Haematopodidae (Oystercatchers)	**NT**
Recurvirostra avosetta	Pied Avocet	Recurvirostridae (Avocets, Stilts)	**LC**
Himantopus himantopus	Black-winged Stilt	Recurvirostridae (Avocets, Stilts)	**LC**
Pluvialis squatarola	Grey Plover	Charadriidae (Plovers)	**LC**
Pluvialis apricaria	Eurasian Golden Plover	Charadriidae (Plovers)	**LC**
Eudromias morinellus	Eurasian Dotterel	Charadriidae (Plovers)	**LC**
Charadrius hiaticula	Common Ringed Plover	Charadriidae (Plovers)	**LC**
Charadrius dubius	Little Ringed Plover	Charadriidae (Plovers)	**LC**
Charadrius alexandrinus	Kentish Plover	Charadriidae (Plovers)	**LC**

Charadrius leschenaultii	Greater Sandplover	Charadriidae (Plovers)	**LC**
Charadrius asiaticus	Caspian Plover	Charadriidae (Plovers)	**LC**
Vanellus vanellus	Northern Lapwing	Charadriidae (Plovers)	**NT**
Vanellus spinosus	Spur-winged Lapwing	Charadriidae (Plovers)	**LC**
Vanellus indicus	Red-wattled Lapwing	Charadriidae (Plovers)	**LC**
Vanellus gregarius	Sociable Lapwing	Charadriidae (Plovers)	**CR**
Vanellus leucurus	White-tailed Lapwing	Charadriidae (Plovers)	**LC**
Numenius phaeopus	Whimbrel	Scolopacidae (Sandpipers, Snipes, Phalaropes)	**LC**
Numenius arquata	Eurasian Curlew	Scolopacidae (Sandpipers, Snipes, Phalaropes)	**NT**
Limosa lapponica	Bar-tailed Godwit	Scolopacidae (Sandpipers, Snipes, Phalaropes)	**NT**
Limosa limosa	Black-tailed Godwit	Scolopacidae (Sandpipers, Snipes, Phalaropes)	**NT**
Calidris pugnax	Ruff	Scolopacidae (Sandpipers, Snipes, Phalaropes)	**LC**
Calidris ferruginea	Curlew Sandpiper	Scolopacidae (Sandpipers, Snipes, Phalaropes)	**NT**
Calidris temminckii	Temminck's Stint	Scolopacidae (Sandpipers, Snipes, Phalaropes)	**LC**
Calidris alba	Sanderling	Scolopacidae (Sandpipers, Snipes, Phalaropes)	**LC**
Calidris alpina	Dunlin	Scolopacidae (Sandpipers, Snipes, Phalaropes)	**LC**
Calidris minuta	Little Stint	Scolopacidae (Sandpipers, Snipes, Phalaropes)	**LC**
Scolopax rusticola	Eurasian Woodcock	Scolopacidae (Sandpipers, Snipes, Phalaropes)	**LC**

Gallinago media	Great Snipe	Scolopacidae (Sandpipers, Snipes, Phalaropes)	**NT**
Gallinago gallinago	Common Snipe	Scolopacidae (Sandpipers, Snipes, Phalaropes)	**LC**
Lymnocryptes minimus	Jack Snipe	Scolopacidae (Sandpipers, Snipes, Phalaropes)	**LC**
Phalaropus lobatus	Red-necked Phalarope	Scolopacidae (Sandpipers, Snipes, Phalaropes)	**LC**
Xenus cinereus	Terek Sandpiper	Scolopacidae (Sandpipers, Snipes, Phalaropes)	**LC**
Actitis hypoleucos	Common Sandpiper	Scolopacidae (Sandpipers, Snipes, Phalaropes)	**LC**
Tringa ochropus	Green Sandpiper	Scolopacidae (Sandpipers, Snipes, Phalaropes)	**LC**
Tringa erythropus	Spotted Redshank	Scolopacidae (Sandpipers, Snipes, Phalaropes)	**LC**
Tringa nebularia	Common Greenshank	Scolopacidae (Sandpipers, Snipes, Phalaropes)	**LC**
Tringa totanus	Common Redshank	Scolopacidae (Sandpipers, Snipes, Phalaropes)	**LC**
Tringa glareola	Wood Sandpiper	Scolopacidae (Sandpipers, Snipes, Phalaropes)	**LC**
Tringa stagnatilis	Marsh Sandpiper	Scolopacidae (Sandpipers, Snipes, Phalaropes)	**LC**
Cursorius cursor	Cream-coloured Courser	Glareolidae (Coursers, Pratincoles)	**LC**
Glareola pratincola	Collared Pratincole	Glareolidae (Coursers, Pratincoles)	**LC**

Hydrocoloeus minutus	Little Gull	Laridae (Gulls, Terns, Skimmers)	**LC**
Larus genei	Slender-billed Gull	Laridae (Gulls, Terns, Skimmers)	**LC**
Larus ridibundus	Black-headed Gull	Laridae (Gulls, Terns, Skimmers)	**LC**
Larus ichthyaetus	Pallas's Gull	Laridae (Gulls, Terns, Skimmers)	**LC**
Larus melanocephalus	Mediterranean Gull	Laridae (Gulls, Terns, Skimmers)	**LC**
Larus canus	Mew Gull	Laridae (Gulls, Terns, Skimmers)	**LC**
Larus fuscus	Lesser Black-backed Gull	Laridae (Gulls, Terns, Skimmers)	**LC**
Larus armenicus	Armenian Gull	Laridae (Gulls, Terns, Skimmers)	**NT**
Larus michahellis	Yellow-legged Gull	Laridae (Gulls, Terns, Skimmers)	**LC**
Larus cachinnans	Caspian Gull	Laridae (Gulls, Terns, Skimmers)	**LC**
Sternula albifrons	Little Tern	Laridae (Gulls, Terns, Skimmers)	**LC**
Gelochelidon nilotica	Common Gull-billed Tern	Laridae (Gulls, Terns, Skimmers)	**LC**
Hydroprogne caspia	Caspian Tern	Laridae (Gulls, Terns, Skimmers)	**LC**
Chlidonias hybrida	Whiskered Tern	Laridae (Gulls, Terns, Skimmers)	**LC**
Chlidonias leucopterus	White-winged Tern	Laridae (Gulls, Terns, Skimmers)	**LC**
Chlidonias niger	Black Tern	Laridae (Gulls, Terns, Skimmers)	**LC**
Sterna hirundo	Common Tern	Laridae (Gulls, Terns, Skimmers)	**LC**

Thalasseus sandvicensis	Sandwich Tern	Laridae (Gulls, Terns, Skimmers)	**LC**
Tyto alba	Common Barn-owl	Tytonidae (Barn-owls)	**LC**
Athene noctua	Little Owl	Strigidae (Typical Owls)	**LC**
Otus scops	Eurasian Scops-owl	Strigidae (Typical Owls)	**LC**
Otus brucei	Pallid Scops-owl	Strigidae (Typical Owls)	**LC**
Asio otus	Northern Long-eared Owl	Strigidae (Typical Owls)	**LC**
Asio flammeus	Short-eared Owl	Strigidae (Typical Owls)	**LC**
Strix aluco	Tawny Owl	Strigidae (Typical Owls)	**LC**
Bubo bubo	Eurasian Eagle-owl	Strigidae (Typical Owls)	**LC**
Ketupa zeylonensis	Brown Fish-owl	Strigidae (Typical Owls)	**LC**
Pandion haliaetus	Osprey	Pandionidae (Osprey)	**LC**
Pernis apivorus	European Honey-buzzard	Accipitridae (Hawks, Eagles)	**LC**
Gypaetus barbatus	Bearded Vulture	Accipitridae (Hawks, Eagles)	**NT**
Neophron percnopterus	Egyptian Vulture	Accipitridae (Hawks, Eagles)	**EN**
Circaetus gallicus	Short-toed Snake-eagle	Accipitridae (Hawks, Eagles)	**LC**
Gyps fulvus	Griffon Vulture	Accipitridae (Hawks, Eagles)	**LC**
Aegypius monachus	Cinereous Vulture	Accipitridae (Hawks, Eagles)	**NT**
Torgos tracheliotos	Lappet-faced Vulture	Accipitridae (Hawks, Eagles)	**EN**
Clanga pomarina	Lesser Spotted Eagle	Accipitridae (Hawks, Eagles)	**LC**
Clanga clanga	Greater Spotted Eagle	Accipitridae (Hawks, Eagles)	**VU**
Aquila nipalensis	Steppe Eagle	Accipitridae (Hawks, Eagles)	**EN**
Aquila heliaca	Eastern Imperial Eagle	Accipitridae (Hawks, Eagles)	**VU**
Aquila chrysaetos	Golden Eagle	Accipitridae (Hawks, Eagles)	**LC**

Aquila fasciata	Bonelli's Eagle	Accipitridae (Hawks, Eagles)	**LC**
Hieraaetus pennatus	Booted Eagle	Accipitridae (Hawks, Eagles)	**LC**
Circus aeruginosus	Western Marsh-harrier	Accipitridae (Hawks, Eagles)	**LC**
Circus cyaneus	Hen Harrier	Accipitridae (Hawks, Eagles)	**LC**
Circus macrourus	Pallid Harrier	Accipitridae (Hawks, Eagles)	**NT**
Circus pygargus	Montagu's Harrier	Accipitridae (Hawks, Eagles)	**LC**
Accipiter brevipes	Levant Sparrowhawk	Accipitridae (Hawks, Eagles)	**LC**
Accipiter nisus	Eurasian Sparrowhawk	Accipitridae (Hawks, Eagles)	**LC**
Accipiter gentilis	Northern Goshawk	Accipitridae (Hawks, Eagles)	**LC**
Haliaeetus albicilla	White-tailed Sea-eagle	Accipitridae (Hawks, Eagles)	**LC**
Milvus migrans	Black Kite	Accipitridae (Hawks, Eagles)	**LC**
Buteo buteo	Eurasian Buzzard	Accipitridae (Hawks, Eagles)	**LC**
Buteo rufinus	Long-legged Buzzard	Accipitridae (Hawks, Eagles)	**LC**
Upupa epops	Common Hoopoe	Upupidae (Hoopoes)	**LC**
Merops persicus	Blue-cheeked Bee-eater	Meropidae (Bee-eaters)	**LC**
Merops apiaster	European Bee-eater	Meropidae (Bee-eaters)	**LC**
Coracias garrulus	European Roller	Coraciidae (Rollers)	**LC**
Alcedo atthis	Common Kingfisher	Alcedinidae (Kingfishers)	**LC**
Ceryle rudis	Pied Kingfisher	Alcedinidae (Kingfishers)	**LC**
Halcyon smyrnensis	White-breasted Kingfisher	Alcedinidae (Kingfishers)	**LC**
Jynx torquilla	Eurasian Wryneck	Picidae (Woodpeckers)	**LC**
Leiopicus medius	Middle Spotted Woodpecker	Picidae (Woodpeckers)	**LC**
Dendrocopos syriacus	Syrian Woodpecker	Picidae (Woodpeckers)	**LC**

Falco naumanni	Lesser Kestrel	Falconidae (Falcons, Caracaras)	**LC**
Falco tinnunculus	Common Kestrel	Falconidae (Falcons, Caracaras)	**LC**
Falco vespertinus	Red-footed Falcon	Falconidae (Falcons, Caracaras)	**NT**
Falco eleonorae	Eleonora's Falcon	Falconidae (Falcons, Caracaras)	**LC**
Falco columbarius	Merlin	Falconidae (Falcons, Caracaras)	**LC**
Falco subbuteo	Eurasian Hobby	Falconidae (Falcons, Caracaras)	**LC**
Falco biarmicus	Lanner Falcon	Falconidae (Falcons, Caracaras)	**LC**
Falco cherrug	Saker Falcon	Falconidae (Falcons, Caracaras)	**EN**
Falco peregrinus	Peregrine Falcon	Falconidae (Falcons, Caracaras)	**LC**
Oriolus oriolus	Eurasian Golden Oriole	Oriolidae (Orioles and figbirds)	**LC**
Lanius collurio	Red-backed Shrike	Laniidae (Shrikes)	**LC**
Lanius phoenicuroides	Red-tailed Shrike	Laniidae (Shrikes)	**LC**
Lanius isabellinus	Isabelline Shrike	Laniidae (Shrikes)	**LC**
Lanius minor	Lesser Grey Shrike	Laniidae (Shrikes)	**LC**
Lanius excubitor	Great Grey Shrike	Laniidae (Shrikes)	**LC**
Lanius senator	Woodchat Shrike	Laniidae (Shrikes)	**LC**
Lanius nubicus	Masked Shrike	Laniidae (Shrikes)	**LC**
Pyrrhocorax pyrrhocorax	Red-billed Chough	Corvidae (Crows and jays)	**LC**
Pyrrhocorax graculus	Yellow-billed Chough	Corvidae (Crows and jays)	**LC**
Garrulus glandarius	Eurasian Jay	Corvidae (Crows and jays)	**LC**
Pica pica	Eurasian Magpie	Corvidae (Crows and jays)	**LC**
Corvus monedula	Eurasian Jackdaw	Corvidae (Crows and jays)	**LC**
Corvus frugilegus	Rook	Corvidae (Crows and jays)	**LC**
Corvus corax	Common Raven	Corvidae (Crows and jays)	**LC**

Corvus ruficollis	Brown-necked Raven	Corvidae (Crows and jays)	**LC**
Corvus rhipidurus	Fan-tailed Raven	Corvidae (Crows and jays)	**LC**
Corvus corone	Carrion Crow	Corvidae (Crows and jays)	**LC**
Poecile lugubris	Sombre Tit	Paridae (Tits and chickadees)	**LC**
Cyanistes caeruleus	Eurasian Blue Tit	Paridae (Tits and chickadees)	**LC**
Parus major	Great Tit	Paridae (Tits and chickadees)	**LC**
Remiz pendulinus	Eurasian Penduline-tit	Remizidae (Penduline-tits)	**LC**
Alaemon alaudipes	Greater Hoopoe-lark	Alaudidae (Larks)	**LC**
Ammomanes cinctura	Bar-tailed Lark	Alaudidae (Larks)	**LC**
Ammomanes deserti	Desert Lark	Alaudidae (Larks)	**LC**
Eremalauda eremodites	Arabian Lark	Alaudidae (Larks)	**LC**
Alaudala rufescens	Lesser Short-toed Lark	Alaudidae (Larks)	**LC**
Melanocorypha bimaculata	Bimaculated Lark	Alaudidae (Larks)	**LC**
Melanocorypha calandra	Calandra Lark	Alaudidae (Larks)	**LC**
Calandrella brachydactyla	Greater Short-toed Lark	Alaudidae (Larks)	**LC**
Eremophila bilopha	Temminck's Lark	Alaudidae (Larks)	**LC**
Eremophila alpestris	Horned Lark	Alaudidae (Larks)	**LC**
Lullula arborea	Woodlark	Alaudidae (Larks)	**LC**
Alauda arvensis	Eurasian Skylark	Alaudidae (Larks)	**LC**
Galerida cristata	Crested Lark	Alaudidae (Larks)	**LC**
Panurus biarmicus	Bearded Reedling	Panuridae (Bearded Reedling)	**LC**
Cisticola juncidis	Zitting Cisticola	Cisticolidae (Cisticolas and allies)	**LC**
Prinia gracilis	Graceful Prinia	Cisticolidae (Cisticolas and allies)	**LC**
Iduna pallida	Olivaceous Warbler	Acrocephalidae (Reed-warblers)	**LC**
Hippolais languida	Upcher's Warbler	Acrocephalidae (Reed-warblers)	**LC**

Hippolais olivetorum	Olive-tree Warbler	Acrocephalidae (Reed-warblers)	**LC**
Hippolais icterina	Icterine Warbler	Acrocephalidae (Reed-warblers)	**LC**
Acrocephalus melanopogon	Moustached Warbler	Acrocephalidae (Reed-warblers)	**LC**
Acrocephalus schoenobaenus	Sedge Warbler	Acrocephalidae (Reed-warblers)	**LC**
Acrocephalus palustris	Marsh Warbler	Acrocephalidae (Reed-warblers)	**LC**
Acrocephalus scirpaceus	Common Reed-warbler	Acrocephalidae (Reed-warblers)	**LC**
Acrocephalus arundinaceus	Great Reed-warbler	Acrocephalidae (Reed-warblers)	**LC**
Acrocephalus stentoreus	Clamorous Reed-warbler	Acrocephalidae (Reed-warblers)	**LC**
Locustella luscinioides	Savi's Warbler	Locustellidae (Grasshopper-warblers and grassbirds)	**LC**
Locustella fluviatilis	River Warbler	Locustellidae (Grasshopper-warblers and grassbirds)	**LC**
Locustella naevia	Common Grasshopper-warbler	Locustellidae (Grasshopper-warblers and grassbirds)	**LC**
Delichon urbicum	Northern House Martin	Hirundinidae (Swallows and martins)	**LC**
Cecropis daurica	Red-rumped Swallow	Hirundinidae (Swallows and martins)	**LC**
Hirundo rustica	Barn Swallow	Hirundinidae (Swallows and martins)	**LC**
Ptyonoprogne rupestris	Eurasian Crag Martin	Hirundinidae (Swallows and martins)	**LC**
Riparia riparia	Collared Sand Martin	Hirundinidae (Swallows and martins)	**LC**
Pycnonotus xanthopygos	White-spectacled Bulbul	Pycnonotidae (Bulbuls)	**LC**
Phylloscopus orientalis	Eastern Bonelli's Warbler	Phylloscopidae (Leaf-warblers)	**LC**

Phylloscopus sibilatrix	Wood Warbler	Phylloscopidae (Leaf-warblers)	**LC**
Phylloscopus trochilus	Willow Warbler	Phylloscopidae (Leaf-warblers)	**LC**
Phylloscopus collybita	Common Chiffchaff	Phylloscopidae (Leaf-warblers)	**LC**
Scotocerca inquieta	Streaked Scrub-warbler	Scotocercidae (Bush-warblers)	**LC**
Cettia cetti	Cetti's Warbler	Scotocercidae (Bush-warblers)	**LC**
Aegithalos caudatus	Long-tailed Tit	Aegithalidae (Long-tailed Tits)	**LC**
Sylvia atricapilla	Eurasian Blackcap	Sylviidae (Old World warblers)	**LC**
Sylvia borin	Garden Warbler	Sylviidae (Old World warblers)	**LC**
Sylvia nana	Asian Desert Warbler	Sylviidae (Old World warblers)	**LC**
Sylvia nisoria	Barred Warbler	Sylviidae (Old World warblers)	**LC**
Sylvia crassirostris	Eastern Orphean Warbler	Sylviidae (Old World warblers)	**LC**
Sylvia curruca	Lesser Whitethroat	Sylviidae (Old World warblers)	**LC**
Sylvia mystacea	Menetries's Warbler	Sylviidae (Old World warblers)	**LC**
Sylvia melanocephala	Sardinian Warbler	Sylviidae (Old World warblers)	**LC**
Sylvia ruppeli	Rüppell's Warbler	Sylviidae (Old World warblers)	**LC**
Sylvia communis	Common Whitethroat	Sylviidae (Old World warblers)	**LC**
Sylvia conspicillata	Spectacled Warbler	Sylviidae (Old World warblers)	**LC**
Argya altirostris	Iraq Babbler	Leiotrichidae (Laughingthrushes and allies)	**LC**
Sitta europaea	Eurasian Nuthatch	Sittidae (Nuthatches and Wallcreeper)	**LC**
Sitta neumayer	Western Rock Nuthatch	Sittidae (Nuthatches and Wallcreeper)	**LC**

Tichodroma muraria	Wallcreeper	Sittidae (Nuthatches and Wallcreeper)	**LC**
Troglodytes troglodytes	Northern Wren	Troglodytidae (Wrens)	**LC**
Sturnus vulgaris	Common Starling	Sturnidae (Starlings)	**LC**
Pastor roseus	Rosy Starling	Sturnidae (Starlings)	**LC**
Turdus viscivorus	Mistle Thrush	Turdidae (Thrushes)	**LC**
Turdus philomelos	Song Thrush	Turdidae (Thrushes)	**LC**
Turdus iliacus	Redwing	Turdidae (Thrushes)	**NT**
Turdus merula	Eurasian Blackbird	Turdidae (Thrushes)	**LC**
Turdus pilaris	Fieldfare	Turdidae (Thrushes)	**LC**
Turdus torquatus	Ring Ouzel	Turdidae (Thrushes)	**LC**
Cercotrichas galactotes	Rufous-tailed Scrub-robin	Muscicapidae (Chats and Old World flycatchers)	**LC**
Muscicapa striata	Spotted Flycatcher	Muscicapidae (Chats and Old World flycatchers)	**LC**
Erithacus rubecula	European Robin	Muscicapidae (Chats and Old World flycatchers)	**LC**
Irania gutturalis	White-throated Robin	Muscicapidae (Chats and Old World flycatchers)	**LC**
Cyanecula svecica	Bluethroat	Muscicapidae (Chats and Old World flycatchers)	**LC**
Luscinia luscinia	Thrush Nightingale	Muscicapidae (Chats and Old World flycatchers)	**LC**
Luscinia megarhynchos	Common Nightingale	Muscicapidae (Chats and Old World flycatchers)	**LC**
Ficedula semitorquata	Semi-collared Flycatcher	Muscicapidae (Chats and Old World flycatchers)	**LC**
Ficedula hypoleuca	European Pied Flycatcher	Muscicapidae (Chats and Old World flycatchers)	**LC**

Ficedula albicollis	Collared Flycatcher	Muscicapidae (Chats and Old World flycatchers)	**LC**
Phoenicurus ochruros	Black Redstart	Muscicapidae (Chats and Old World flycatchers)	**LC**
Phoenicurus phoenicurus	Common Redstart	Muscicapidae (Chats and Old World flycatchers)	**LC**
Monticola saxatilis	Rufous-tailed Rock-thrush	Muscicapidae (Chats and Old World flycatchers)	**LC**
Monticola solitarius	Blue Rock-thrush	Muscicapidae (Chats and Old World flycatchers)	**LC**
Saxicola rubetra	Whinchat	Muscicapidae (Chats and Old World flycatchers)	**LC**
Saxicola torquatus	Common Stonechat	Muscicapidae (Chats and Old World flycatchers)	**LC**
Oenanthe oenanthe	Northern Wheatear	Muscicapidae (Chats and Old World flycatchers)	**LC**
Oenanthe isabellina	Isabelline Wheatear	Muscicapidae (Chats and Old World flycatchers)	**LC**
Oenanthe deserti	Desert Wheatear	Muscicapidae (Chats and Old World flycatchers)	**LC**
Oenanthe hispanica	Black-eared Wheatear	Muscicapidae (Chats and Old World flycatchers)	**LC**
Oenanthe cypriaca	Cyprus Wheatear	Muscicapidae (Chats and Old World flycatchers)	**LC**
Oenanthe pleschanka	Pied Wheatear	Muscicapidae (Chats and Old World flycatchers)	**LC**

Oenanthe moesta	Buff-rumped Wheatear	Muscicapidae (Chats and Old World flycatchers)	**LC**
Oenanthe melanura	Blackstart	Muscicapidae (Chats and Old World flycatchers)	**LC**
Oenanthe finschii	Finsch's Wheatear	Muscicapidae (Chats and Old World flycatchers)	**LC**
Oenanthe lugens	Mourning Wheatear	Muscicapidae (Chats and Old World flycatchers)	**LC**
Cinnyris osea	Palestine Sunbird	Nectariniidae (Sunbirds)	**LC**
Prunella collaris	Alpine Accentor	Prunellidae (Accentors)	**LC**
Prunella modularis	Dunnock	Prunellidae (Accentors)	**LC**
Prunella ocularis	Radde's Accentor	Prunellidae (Accentors)	**LC**
Passer domesticus	House Sparrow	Passeridae (Sparrows, snowfinches and allies)	**LC**
Passer hispaniolensis	Spanish Sparrow	Passeridae (Sparrows, snowfinches and allies)	**LC**
Passer moabiticus	Dead Sea Sparrow	Passeridae (Sparrows, snowfinches and allies)	**LC**
Passer montanus	Eurasian Tree Sparrow	Passeridae (Sparrows, snowfinches and allies)	**LC**
Carpospiza brachydactyla	Pale Sparrow	Passeridae (Sparrows, snowfinches and allies)	**LC**
Petronia petronia	Rock Sparrow	Passeridae (Sparrows, snowfinches and allies)	**LC**
Gymnoris xanthocollis	Chestnut-shouldered Bush-sparrow	Passeridae (Sparrows, snowfinches and allies)	**LC**
Anthus trivialis	Tree Pipit	Motacillidae (Wagtails and pipits)	**LC**
Anthus cervinus	Red-throated Pipit	Motacillidae (Wagtails and pipits)	**LC**
Anthus pratensis	Meadow Pipit	Motacillidae (Wagtails and pipits)	**NT**
Anthus spinoletta	Water Pipit	Motacillidae (Wagtails and pipits)	**LC**

Anthus campestris	Tawny Pipit	Motacillidae (Wagtails and pipits)	**LC**
Anthus similis	Long-billed Pipit	Motacillidae (Wagtails and pipits)	**LC**
Motacilla flava	Western Yellow Wagtail	Motacillidae (Wagtails and pipits)	**LC**
Motacilla cinerea	Grey Wagtail	Motacillidae (Wagtails and pipits)	**LC**
Motacilla citreola	Citrine Wagtail	Motacillidae (Wagtails and pipits)	**LC**
Motacilla alba	White Wagtail	Motacillidae (Wagtails and pipits)	**LC**
Fringilla coelebs	Common Chaffinch	Fringillidae (Finches and Hawaiian honeycreepers)	**LC**
Fringilla montifringilla	Brambling	Fringillidae (Finches and Hawaiian honeycreepers)	**LC**
Rhodopechys sanguineus	Eurasian Crimson-winged Finch	Fringillidae (Finches and Hawaiian honeycreepers)	**LC**
Bucanetes githagineus	Trumpeter Finch	Fringillidae (Finches and Hawaiian honeycreepers)	**LC**
Rhodospiza obsoleta	Desert Finch	Fringillidae (Finches and Hawaiian honeycreepers)	**LC**
Chloris chloris	European Greenfinch	Fringillidae (Finches and Hawaiian honeycreepers)	**LC**
Linaria cannabina	Common Linnet	Fringillidae (Finches and Hawaiian honeycreepers)	**LC**
Carduelis carduelis	European Goldfinch	Fringillidae (Finches and Hawaiian honeycreepers)	**LC**

Serinus serinus	European Serin	Fringillidae (Finches and Hawaiian honeycreepers)	**LC**
Serinus syriacus	Syrian Serin	Fringillidae (Finches and Hawaiian honeycreepers)	**VU**
Serinus pusillus	Red-fronted Serin	Fringillidae (Finches and Hawaiian honeycreepers)	**LC**
Spinus spinus	Eurasian Siskin	Fringillidae (Finches and Hawaiian honeycreepers)	**LC**
Emberiza melanocephala	Black-headed Bunting	Emberizidae (Buntings, American sparrows and allies)	**LC**
Emberiza calandra	Corn Bunting	Emberizidae (Buntings, American sparrows and allies)	**LC**
Emberiza cia	Rock Bunting	Emberizidae (Buntings, American sparrows and allies)	**LC**
Emberiza cineracea	Cinereous Bunting	Emberizidae (Buntings, American sparrows and allies)	**NT**
Emberiza hortulana	Ortolan Bunting	Emberizidae (Buntings, American sparrows and allies)	**LC**
Emberiza caesia	Cretzschmar's Bunting	Emberizidae (Buntings, American sparrows and allies)	**LC**
Emberiza citrinella	Yellowhammer	Emberizidae (Buntings, American sparrows and allies)	**LC**
Emberiza leucocephalos	Pine Bunting	Emberizidae (Buntings, American sparrows and allies)	**LC**
Emberiza schoeniclus	Reed Bunting	Emberizidae (Buntings, American sparrows and allies)	**LC**

Appendix 6:

A check list of Mammals of Syria:

List of Mammals in Syria according to the national report of biodiversity 1998 (UNEP)						
Insectivora	**Chiroptera**	**Rodentia**	**Perissodactyles Mesaxoniens**	**Lagomorpha**	**Proboscidiens**	**Paraxonieus**
Crocidula russula	*Asellia tridens*	*Acomys cahirinus*	*Equus arabium*	*Lepus capensis*	*Elephas maximus asurus*	*Camelus bactiranus*
Crocidula suaveolens	*Eptesicus bottae*	*Acomys rusatus*	*Equus asinus*			*Camelus dromedarius*
Erinaceus europeus	*Eptesicus serotinus*	*Allacataga euphratica*	*Equus hemionus*			*Capra aegagrus*
Hemiechinus auritus	*Miniopterus schreibersi*	*Allacataga tetradactyla*	*Equus syriacus*			*Bos bufalis*
Hemiechinus auritus syriacus	*Myotis blythii*	*Apodemus flavicollis*				*Capra damascena*
Suncus etruscus	*Myotis capacinii*	*Apodemus mystacinus*				*Capra arabea*
Suncus saser	*Myotis myotis*	*Apodemus sylvaticus*				*Capra hircus*
	Nesonycteris truncatus	*Arvicola terrestris*				*Bovis damascena*
	Nyctolus noctula	*Castor liber*				*Capra ibex*
	Otonycteris hemprichi	*Dryomys nitedula*				*Capreolus capreolus*
	Nycteris thebaira	*Cricetulus migratorius*				*Capredus copredus*
	Pipistrellus Pipistrellus	*Eliomys melanurus*				*Cervus dama*
	Plecotus auritus	*Eliomys quercinus*				*Cervus elaphus*
	Plecotus austriacus	*Gerbillus nanus*				*Dama dama*
	Rhinolophus blasii	*Gerbillus dasyurus*				*Gazella dorcas*
	Rhinolophus euryale	*Gerbillus henleyi*				*Gazella gazella*
	Rhinolophus hipposideros					*Gazella subgutturosa*
	Rhinols ferrumequinum					*Oviserlis syriacus*
	Rhinolophus mehelyi					*Procavia capensi*
	Rouseltus aegiptiacus					*Sus scrofa*
	Tadarida teniotis					
	Rhinopoma micophyllum					
	Rhinopoma hardwicki					
	Taphozous nudiventris					

Appendix 7.

Check list of Amphibians of Syria

Scientific name	Family	Global IUCN Red List Category	Habitat	Location	Reference	comments
Hyla savignyi AUDOUIN, 1827	Hylidae	LC	Freshwater	common in most of the freshwater bodies in Syria	Z. AMR & A. SPIEHAB & M. ABU BAKFR	
Triturus (Ommatotriton) vittatus vittatus (GRAY in JENYS, 1835)	Salamandridae	LC	Freshwater	distributed across Syria from north to south.	Z. AMR & A. SPIEHAB & M. ABU BAKFR	
Pelobates syriacus MS BOETTGER, 1889	Pelobatidae	LC				
Bufo bufo (LINNAEUS, 1758)	Bufonidae	LC				
Bufo viridis LAURENTI, 1768	Bufonidae	NE				
Rana levantina SCHNEIDER, SINSCH & NEVO, 1992	Ranidae	LC				
Salamandra infraimmaculata (Martens, 1885)	Salamandridae	NT				
Alytidae Fitzinger, 1843	Alytidae	NE				Existence is not confirmed but possible
Hyla felixarabica Gvoždík, Kotlík, and Moravec, 2010	Hylidae	NE	Freshwater	southwestern Syria,	Gvoždík, Kotlík, and Moravec, 2010	
Bufo verrucosissimus	Bufonidae	NT				
Bufotes variabilis	Bufonidae	DD				

Appendix 8.

Check list of Reptiles of Syria.

Scientific name	Family	Global IUCN Red List Category
Ablepharus budaki GÖCMEN, KUMLUTAS & TOSUNOGLU, 1996	Scincidae	LC
Ablepharus chernovi DAREVSKY, 1953	Scincidae	LC
Ablepharus kitaibelii kitaibelii (BIBRON & BORY, 1833)	Scincidae	NE
Ablepharus rueppellii (GRAY, 1839)	Scincidae	LC
Acanthodactylus bosldanus (DAUDIN, 1802)	Lacertidae	NE
Acanthodactylus grandis BOULENGER, 1909	Lacertidae	LC
Acanthodactylus opheodurus ARNOLD, 1980	Lacertidae	NE
Acanthodactylus orientalis ANGEL, 1936	Lacertidae	LC
Acanthodactylus pardalis (LICHTENSTEIN, 1823)	Lacertidae	NE
Acanthodactylus robustus WERNER, 1929	Lacertidae	LC
Acanthodactylus schreiben syriacus BOETTGER, 1878	Lacertidae	NE

Acanthodactylus scutellatus (AUDOUIN, 1829)	Lacertidae	NE
Acanthodactylus tristrami (GÜNTHER, 1864)	Lacertidae	LC
Asaccus elisae (WERNER, 1895)	Gekkonidae	LC
Blanus strauchi (BEDRIAGA, 1884)	Blanidae	LC
Bunopus crassicauda NIKOLSKY, 1907	Gekkonidae	DD
Bunopus tuberculatus BLANFORD, 1874	Gekkonidae	LC
Caretta caretta (LINNAEUS, 1758)	Cheloniidae	VU
Cerastes cerastes (LINNAEUS, 1758)	Viperidae	NE
Chalcides guentheri BOULENGER, 1823	Scincidae	VU
Chalcides ocellatus (FORSKAL, 1775)	Scincidae	NE
Chamaeleo chamaeleon recticrista BOETTGER,1880	Chamaeleonidae	LC
Chelonia mydas (LINNAEUS, 1758)	Cheloniidae	NE
Coluber jugularis jugularis (LINNAEUS,1758)	Colubridae	LC
Coluber najadum (EICHWALD,1831)	Colubridae	LC
Coluber nummifer (REUSS,1834)	Colubridae	LC
Coluber ravergieri (MENETRIES,1832)	Colubridae	LC
Coluber rubriceps (VENZMER, 1919)	Colubridae	LC
Coluber schmidti NIKOLSKY, 1909	Colubridae	LC
Coluber ventromaculatus GRAY, 1837	Colubridae	NE
Cyrtopodion amictopholis HOOFIEN, 1967	Gekkonidae	EN
Cyrtopodion heterocercus mardinensis (MERTENS, 1924)	Gekkonidae	NE
Cyrtopodion kotschyi orientalis STEPANEK, 1937	Gekkonidae	NE
Cyrtopodion scabrum (HEYDEN, 1827)	Gekkonidae	LC
Daboia palaestinae (WERNER, 1938)	Viperidae	LC
Dermochelys coriacea (VANDELLI, 1761)	Dermochelyidae	VU
Eirenis barani SCHMIDTLER 1988	Colubridae	LC
Eirenis coronella (SCHLEGEL , 1837)	Colubridae	LC
Eirenis coronelloides — SIVAN & WERNER 2003	Colubridae	LC
Eirenis decemlineatus (DUMERIL & BIBRON, 1854)	Colubridae	LC
Eirenis eiselti SCHMIDTLER & SCHMIDTLER, 1978	Colubridae	LC
Eirenis levantinus — SCHMIDTLER 1997	Colubridae	LC
Eirenis lineomaculatus SCHMIDT, 1939	Colubridae	LC
Eirenis modestus (MARTIN, 1838)	Colubridae	LC
Eirnis rothi JAN, 1863	Colubridae	LC
Elaphe hohenackeri taurica (WERNER,1898)	Colubridae	LC
Elaphe quatuorlineata sauromates (PALLAS, 1814)	Colubridae	NE
Elaphe quatuorlineata LACEPEDE, 1789	Colubridae	LC
Emys orbicularis (LINNAEUS, 1758)	Emydidae	LC
Eryx jaculus jaculus (LINNAEUS,1758)	Boidae	NE
Eryx jaculus turcicus (OLIVIER,1801)	Boidae	NE
Eublepharis angramainyu ANDERSON & LEVTTON, 1966	Gekkonidae	DD
Eumeces schneiderii princeps EICHWALD, 1839	Scincidae	NE
Eumeces schneiderri pavimentatus (GEOFFROY-ST. HILAIRE, 1827)	Scincidae	NE
Hemidactylus turcicus turcicus (LINNAEUS, 1758)	Gekkonidae	NE
Heremites auratus (LINNAEUS, 1758)	Gekkonidae	LC
Heremites septemtaeniatus (REUSS, 1834)	Gekkonidae	LC

Heremites vittatus (OLIVIER, 1804)	Gekkonidae	LC
Lacerta cappadocica wollen (BIRD, 1936)	Lacertidae	LC
Lacerta cf. kulzeri MÜLLER & WETTSTEIN, 1932	Lacertidae	NE
Lacerta laevis laevis GRAY, 1838	Lacertidae	LC
Lacerta media israelica PETERS, 1964	Lacertidae	LC
Lacerta media wolterstorffi MERTENS, 1922	Lacertidae	LC
Laudakia stellio picea (PARKER, 1935)	Agamidae	NE
Laudakia stellio stellio (LINNAEUS, 1758)	Agamidae	LC
Leptotyphlops macrorhynchus (JAN, 1860)	Leptotyphlopidae	NE
Lytorhynchus diadema (DUMERIL &BIBRON, 1854)	Colubridae	LC
Lytorhynchus kennedyi SCHMIDT, 1939	Colubridae	NE
Mabuya vinata (OUVIER, 1804)	Scincidae	NE
Macrovipera lebetina obtusa DWIGUBSKY, 1832	Viperidae	NE
Malpolon moilensis (REUSS,1834)	Colubridae	NE
Malpolon monspessulanus insignitus (GEOFFROY, 1827)	Colubridae	NE
Mauremys caspica rivaluta (VALENCIENNES, 1833)	Emydidae	NE
Mesalina brevirostris BLANFORD, 1874	Lacertidae	LC
Mesalina guttulata (LICHTESTEIN, 1823)	Lacertidae	NE
Micrelaps muelleri BOETTEGER, 1880	Colubridae	LC
Natrix natrix (LINNAEUS, 1758)	Colubridae	LC
Natrix tessellata (LAURENTI,1768)	Colubridae	LC
Ophiomorus latastii BOULENGER, 1887	Scincidae	DD
Ophisaurus apodus PALLAS, 1772	Anguidae	NE
Ophisops elegans ehrenbergi WIEGMANN, 1835	Lacertidae	NE
Ophisops elegans elegans MENETRIES, 1832	Lacertidae	NE
Parvilacerta fraasii (LEHRS, 1910)	Lacertidae	EN
Phoenicolacerta cyanisparsa (SCHMIDTLER & BISCHOFF, 1999)	Lacertidae	LC
Platyceps rogersi (ANDERSON, 1893)	Colubridae	LC
Psammophis schokari (FORSKAL,1775)	Colubridae	NE
Pseudocerastes persicus fieldi SCHMIDT,1930	Viperidae	LC
Pseudotrapelus sinaitus (HEYDEN, 1827)	Agamidae	NE
Ptyodactylus guttatus HEYDEN, 1827	Gekkonidae	NE
Ptyodactylus hasselquistii (DONNDORFF, 1798)	Gekkonidae	NE
Ptyodactylus puiseuxi BOUTAN, 1893	Gekkonidae	NE
Rafetus euphraticus (DAUDlti, 1802)	Trionychidae	EN
Rhynchocalamus melanocephalus (JAN, 1862)	Colubridae	LC
Scincus scincus conirostris BLANFORD, 1881	Scincidae	NE
Spalerosophis diadema cliffordi (SCLEGEL, 1837)	Colubridae	NE
Stenodactylus grandiceps HAAS, 1952	Gekkonidae	LC
Telescopus fallax syriacus (BOETTGER, 1880)	Colubridae	LC
Telescopus nigriceps (AHL, 1924)	Colubridae	LC
Testudo graeca terrestris FORSKAL, 1775	Testudinidae	VU
Trapelus pallidus haasi (WERNER, 1971)	Agamidae	NE
Trapelus persicus fieldi (HAAS & WERNER, 1969)	Agamidae	NE
Trapelus ruderatus (OLIVIER, 1804)	Agamidae	LC
Trionyx triunguis (FORSKAL, 1775)	Trionychidae	VU

Typhlops simoni (BOETTGER, 1879)	Typhlopidae	LC
Typhlops vermicularis MERREM, 1820	Typhlopidae	LC
Uromastyx aegyptia microlepis BLANFORD,1874	Agamidae	VU
Varanus griseus (DAUDIN, 1802)	Varanidae	NE
Vipera ammodytes (LINNAEUS , 1758)	Viperidae	NE
Vipera bornmuelleri WERNER,1898	Viperidae	EN
Vipera palaestinae WERNER, 1938	Cheloniidae	NE
Walterinnesia aegyptia LATASTE, 1887	Elapidae	LC

Appendix 9 :List of threatened species used in the biodiversity hotspots maps					
Plants	**Mammals**	**Reptiles**	**Amphibians**	**Insects**	**Birds**
Acer hyrcanum	Capra nubiana	Chalcides guentheri	Salamandra infraimmaculata	Clytus kabateki	Aegypius monachus
Acer obtusifolium	Gazella gazella	Mediodactylus amictopholis		Molorchus juglandis	Anser erythropus
Aegilops biuncialis	Gazella marica	Montivipera bornmuelleri			Anthus pratensis
Aegilops caudata	Hyaena hyaena	Parvilacerta fraasii			Aquila heliaca
Aegilops columnaris	Lutra lutra	Phoenicolacerta kulzeri			Aquila nipalensis
Aegilops crassa	Miniopterus schreibersii	Rafetus euphraticus			Aythya ferina
Aegilops cylindrica	Myotis capaccinii	Trionyx triunguis			Aythya nyroca
Aegilops geniculata	Panthera pardus	Uromastyx aegyptia			Chlamydotis macqueenii
Aegilops juvenalis	Rhinolophus euryale				Circus macrourus
Aegilops kotschyi	Rhinolophus mehelyi				Clanga clanga
Aegilops neglecta	Vormela peregusna				Emberiza cineracea
Aegilops peregrina					Falco cherrug
Aegilops searsii					Falco vespertinus
Aegilops speltoides					Gallinago media
Aegilops tauschii					Geronticus eremita
Aegilops triuncialis					Glareola nordmanni
Aegilops umbellulata					Haematopus ostralegus
Aegilops vavilovii					Larus armenicus
Allium carmeli					Limosa limosa
Allium noeanum					Marmaronetta angustirostris
Allium trachycoleum					Neophron percnopterus
Ambrosia maritima					Numenius arquata
Anacamptis sancta					Otis tarda
Anagyris foetida					Oxyura leucocephala
Arum hygrophilum					Pelecanus crispus
Brassica nigra					Puffinus yelkouan
Capparis spinosa					Serinus syriacus
Daucus aureus					Streptopelia turtur
Daucus durieua					Tetrax tetrax
Daucus littoralis					Turdus iliacus
Dioscorea orientalis					Vanellus gregarius
Elymus elongatus					Vanellus vanellus
Ficus sycomorus					
Fraxinus angustifolia					
Lathyrus annuus					
Lathyrus aphaca					
Lathyrus blepharicarpus					
Lathyrus cassius					
Lathyrus chrysanthus					

Lathyrus cicera					
Lathyrus cilicicus					
Lathyrus ciliolatus					
Lathyrus cyaneus					
Lathyrus digitatus					
Lathyrus gloeosperma					
Lathyrus gorgoni					
Lathyrus hierosolymitanus					
Lathyrus inconspicuus					
Lathyrus laxiflorus					
Lathyrus marmoratus					
Lathyrus niger					
Lathyrus nissolia					
Lathyrus ochrus					
Lathyrus pseudocicera					
Lathyrus setifolius					
Lathyrus spathulatus					
Lathyrus sphaericus					
Lathyrus stenolobus					
Lathyrus stenophyllus					
Lupinus pilosus					
Malus trilobata					
Moringa peregrina					
Nasturtium officinale					
Populus euphratica					
Prunus boissieri					
Prunus discolor					
Pyrus syriaca					
Quercus brantii					
Quercus coccifera					
Quercus infectoria					
Quercus ithaburensis					
Quercus libani					
Quercus look					
Rhamnus alaternus					
Sorbus umbellata					
Triticum monococcum					
Triticum turgidum					
Triticum urartu					
Vachellia farnesiana					
Vicia aintabensis					
Vicia anatolica					
Vicia bithynica					
Vicia cuspidata					
Vicia eristalioides					

Vicia lathyroides					
Vicia michauxii					
Vicia noeana					
Vicia peregrina					
Vicia sativa					
Vitex agnus-castus					