



## FINAL REPORT

# BIODIVERSITY ASSESSMENT AND MONITORING IN THE JABAL MOUSSA BIOSPHERE RESERVE



February 2012



<b>Task Manager</b> <b>Dr. Ghassan Ramadan-Jaradi</b>	<b>Project Coordinator</b> <b>Ms. Diane Matar</b>
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### Experts

<b>Botany &amp; Phyto-ecology.....</b>	<b>: Dr. Henriette Tohmé</b>
<b>Mammalogy.....</b>	<b>: Dr. Mounir Abi Saeed</b>
<b>Ornithology.....</b>	<b>: Dr. Ghassan Ramadan-Jaradi</b>
<b>Herpetology.....</b>	<b>: Dr. Souad Hraoui-Bloquet</b>
<b>Editor &amp; Translator.....</b>	<b>: Dr. Ghassan Ramadan-Jaradi</b>
<b>Second Editor.....</b>	<b>: Ms. Diane Matar</b>

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# BIODIVERSITY ASSESSMENT AND MONITORING IN THE JABAL MOUSSA BIOSPHERE RESERVE

## Overview and Objectives

The Jabal Moussa Biosphere Reserve (Latitude 34° 03' 43.93"N; Longitude 35° 46' 09.84"E) covers an area of 6,500 ha. at an altitude ranging between 350 meters in the west at Fatre and 1,700 meters to the east, at Bhassis and Chouabi hamlets; and extends c. 500 meters beyond Nahr (River) Ibrahim to the north and Nahr Ed Dahab to the south. The Jabal Moussa Biosphere Reserve, which overlooks the Mediterranean sea to the west is a true mosaic of ecological systems, broadly representing the "evergreen sclerophyllic broussailles and forests" biogeographic region within a Mediterranean biome. A dominant feature of this biosphere reserve is its pristine world of steep, verdant mountainsides rising from a river lined with cool, aromatic sycamore trees to reach summits of statue-like karstic rocks. The mountainous relief gives rise to a number of eco-zones, thus promoting diversity in biotopes harbouring many species. The numerous valleys of Jabal Moussa generally run in direction NE-WS. From a more aesthetic point of view, the various landscapes dominated by peaks and basins, offer wonderful limitless views that are not influenced by the geographical position alone but also by the variety of altitudes and the exposure of slopes to several directions. In the core area alone, it was possible to identify 14 phyto-ecologic groups and two agricultural types. In addition, Jabal Moussa is unique because it has not yet been touched by the uncontrolled urbanism, dissemination of roads, and heavy quarries that have devastated other similar mountains.

The core area of Jabal Moussa Biosphere Reserve is composed of those public municipal and governmental lands mentioned as National Forest Reserve in the Decision 1/399/08, in addition to considerable tracts of church-owned ("Waqf") and some private property, whereas the buffer zone comprises lands that are cited by the same decision or protected by the Forestry Law 558/96 and the Ministerial Decision 34/1. All other areas of villages and their immediate surrounding make the transition zone that is in majority made up of private lands.

The Jabal Moussa Biosphere Reserve lies along the main regional avian migratory flyway and hosts 137 bird species, of which 7 are regionally and/or globally threatened. It is declared an Important Bird Area (IBA) by BirdLife International not only because of the proportion of its globally threatened species but also because of the massive migration that occurs on its territories. Its mammals ranging from bats to wolves and hyenas include 20 species. Of them 1 is globally threatened, 9 are nationally threatened, 5 rare species and significantly declining, none is endemic, but half of the range of Jabal Moussa's mammals consists of species that are wholly or partially limited to the Middle East region. In addition to the 26 endemic plant species (about 23% of the endemic species of Lebanon), many plants are of high genetic and economic values, including wild relatives; and a significant number is formed from plants that are at their biogeographic southern limit.

Generally, Jabal Moussa is a low populated (c. 8,279 individuals) biosphere reserve. In winter, this number drops down to about 4,715 as the professional men and women,



move to Beirut, Jounieh and their suburbs where jobs and better schools are available, and where the weather conditions are more convenient during this season.

The vision for the coming 5 years for the Jabal Moussa Biosphere Reserve is that its communities are supportive and committed to manage the Jabal Moussa Biosphere Reserve sustainably through: the active participation in achieving the management objectives of Jabal Moussa Biosphere Reserve, striving for a greener economy characterized by small eco-friendly enterprises, environmental protection and sustainability, cultural and natural heritage valorization and protection.

The objectives of the present study drain into the biosphere reserves' basin but they focus here on the following immediate objectives:

1. to highlight the importance and viability of JMBR,
2. to provide a comprehensive audit of key species and habitats, and make relevant information available in the form of a database,
3. to initiate and encourage long-term habitats/species monitoring schemes and progress on actions in the JMBR site.

These will inevitably improve the implementation of the conservation measures, promote participatory actions, and enhance the capacities of the research society to handle ecological and socio-economic data and identify future research needs.

Being aware of all these positive outcomes, the Spanish authority has funded the development of a biodiversity assessment and monitoring study for JMBR through UNESCO.

Subsequently, a Professional Consulting Contract was signed between UNESCO and APJM on 14/05/2011 to undertake this study funded by Spain. In this contract the roles of UNESCO and APJM are clearly indicated.

On their turn, the APJM and its team are aware that the development of a biodiversity assessment and monitoring study in the JMBR is a task that increases people's skills, knowledge and awareness about their natural heritage. It develops the necessary expertise to address challenges; and fosters attitudes, motivations, and commitments to make informed decisions and take responsible actions. Increased knowledge based on solid scientific data could be a part of an overall strategy to reach key community leaders like teachers, school board members, elected officials, business owners, news media, etc., since it can effectively help support outreach goals, and ultimately affect change and motivate action on behalf of biocoenoses and their habitats. The preparation of maps and the development of databases, which inform the management teams of the JMBR about the available key species and habitats, how they should be appreciated, and about how, where and when to monitor them, are effective tools for conservation.

In accordance with the above mentioned contract, the APJM has prepared and signed the necessary contracts between APJM and experts (see sample in the First Progress Report) and developed a working document (see also First Progress Report) aiming at securing integration and providing detailed instructions for the implementation of the Project, both at the Project level, as well as at the level of each individual activity and each expert. This working document is in English but also translated into Arabic for the non-Anglophone experts.

The objective of the working document is to define:

- the methodologies, tools and techniques to be applied,
- the Terms of Reference (TORs) and work schedule for each expert of the team and,
- the Workplan and Timetable of the activities to be implemented.

On 1/9/2011, the APJM submitted to the UNESCO the **First Progress Report**, which aimed at reflecting achievements related to the following activities:

1. Revising all the previous biodiversity assessment work/research conducted within JMBR, in order to enable the working team to initiate the re-assessment process and avoid work duplication;
2. Assessing the accuracy of the gathered information of relevance, in order to ensure consistency;
3. Proposing a standard methodology for the study on a selected number of species of ecological interest of the site, in order to demonstrate which species need most conservation actions;
4. Reporting on the chronology of the selected number of species;
5. Identifying the habitats within JMBR (physical, biological and quality characteristics) with reference to the classical nomenclature (CORINE, EU Manual of Habitat Interpretation) in order to ensure compatibility in future exchange of information;
6. Conducting field assessments within the JMBR to verify the different status of the selected number of species, and effectuating samples, photography, and/or other approved scientific procedures.

**The Detailed Outline Final Report** included the final outputs of the previous activities, and reflected achievements related to the following activities:

- Based on findings, including the cover in %, the height of layers and the dominant species in each layer with habitat description;
- Determining changing dynamics and the level of sensitivity of the habitats based on findings, field research and literature (natural evolution processes – nature and importance of threat-induced dysfunctions – major human-induced deteriorations);
- Analyzing the nature of major gradients, identification of the main mechanisms (soil/vegetation-exploitation relationships, habitat/biocoenosis-exploitation relationship, fertility, salinity, erosion capacity, various impacts);
- Developing recommendations for urgent conservation actions and sustainable management practices specific to each site;
- Development of appropriate mitigation measures for the identified impacts on the entire ecosystem;
- Proposal of site-specific strategies and indicators for monitoring, taking into account relevant previous work conducted in Lebanon;
- Conducting at least one consultation workshops with concerned stakeholders to discuss findings;
- Identifying further research profiles based on fieldwork and findings.

# JABAL MOUSSA BIOSPHERE RESERVE

## 1. GENERAL PRESENTATION OF THE SITE

### 1.1 Location

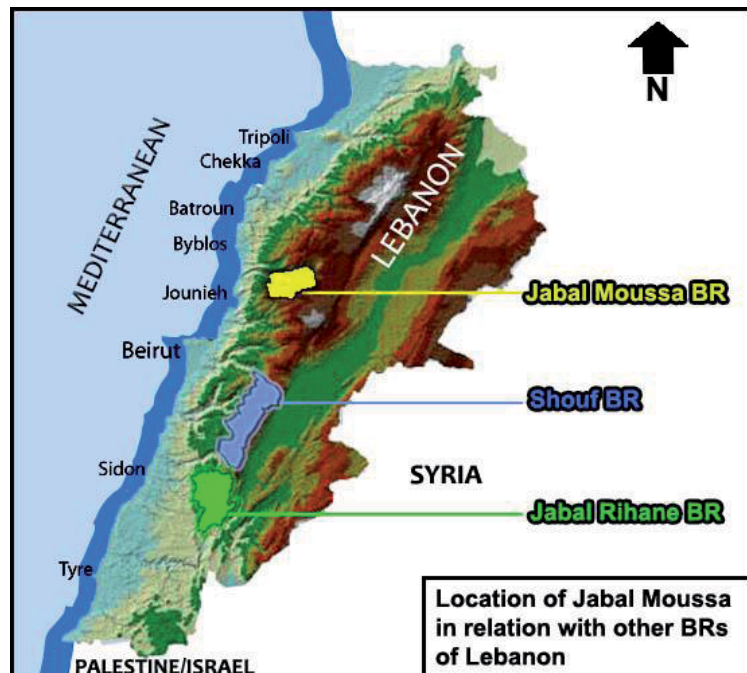
The Jabal Moussa Biosphere Reserve is situated on the shoulders of the western slopes of the Mount Lebanon Chain ( $34^{\circ} 03' 43.93''N$ ,  $35^{\circ} 46' 09.84''E$ ), at an altitude ranging between 350 meters in the north-west, and 1,700 meters to the south-east where it overlooks the Mediterranean Sea to the west. The area of Jabal Moussa is 6,500 ha of public and private lands, whereas the core area of conservation covers a little area of 19.23%; and the buffer zone covers 25.40%.

### 1.2 Legal status

The JMBR area is formed from parts of the public and communal lands, mainly of Yahchouch, Snoubar, Chouene, Nahr Ed Dahab, Aabri, Mcheti, Qorqraiya and Broqta that acquired protection from the Decrees # 194/1 & Decision # 1/399/08 issued by the Minister of Agriculture; from the Decision # 34/1 of the Ministry of Environment and from the forestry law # 558. It is given high priority for conservation in the National Master Plan that was developed by the Council for Development and Reconstruction in collaboration with the Directorate General of Urban Planning and the Ministry of Environment.

### 1.3 Description

Jabal Moussa is a mountainous ecosystem located 30 km NE of Beirut. Pampered by mist, prevalent throughout parts of the year and the comparatively high precipitation, JMBR offers a multitude of rare and endemic plants. Extending over several valleys, the forest harbors many



endangered mammals and birds, colorful butterflies and insects and most of the tree species naturally found in Lebanon. Groves of oak are bordered by a mixed forest, including pine, wild plum and pear.

The Jabal Moussa Biosphere Reserve, which is an important water-catchment area, provides protection to an excellent representation of the Ibrahim and Ed Dahab rivers that border the core area from north and south respectively; several streams and springs particularly in Aabri, Chouene and Yahchouch, and to dense riparian habitats along river Ibrahim. Moreover, it harbors the undisturbed historic Adonis Valley, landraces and economically important plant species areas, rangelands, caves that were used in the past as a refuge from the Ottomans, historic agricultural terraces; historic trails that date back to Roman time, historic areas with tombs and sarcophagi; old winepress with stone hods; old (more than 200 years) mixed forests with oak (*Quercus spp.*) as dominant species; pine groves, olive groves, maquis, garrigues, and undisturbed wildlife habitats for wolves, hyaenas, hyraxes, birds and reptiles. The Jabal Moussa core area represents the meso (500-1,000 m. altitude) and supra (1,000-1,500 m. altitude) Mediterranean levels described in the CORINE classification.

## **1.4 Abiotic characteristics**

### **1.4.1 Physiographic characteristics**

#### **1.4.1.1 Geology**

The exposed rock in Jabal Moussa Biosphere Reserve is a calcareous rock comprising mainly limestone that is eroded on the surface to form the ectokarst (form of surface erosion of limestone and carbonate rocks), which is well represented in the Jabal Moussa and its surroundings. These structures are often of importance to ecotourism (in the south of France, hundreds of thousands of tourists visit them each year). The most impressive structure in Jabal Moussa is the local canyon of Nahr Ibrahim.

#### **1.4.1.2 Hydrology**

The water remains a problem over the top of Jabal Moussa that is dolomitic limestone, and consists of porous and permeable rocks.

Only a few scattered man-made water cisterns historically created by farmers to collect rain water for cattle, irrigation and potentially domestic use (Bir el Masbek, and Bir el Byut), now provide the pastoral transhumance and fauna of Jabal Moussa with the needed drinking water. The Association for the Protection of Jabal Moussa (APJM), has identified the heritage and ecological value of these cisterns and has actively worked on rehabilitating them within a bigger ecotourism project (PEBCO, a project funded by the Italian Cooperation/Embassy of Italy in Lebanon), during which the "Byut" (old houses) and surroundings were rehabilitated and consolidated for conservation and ecotourism purposes.

Apart from the high Qehmez agricultural area, with irrigation from Nabaa el Hadid, and Yahchouch waters, other resources in the region of Jabal Moussa are themselves almost anecdotal. However, several hundred feet below, Nahr Ibrahim runs in the canyon and constitutes one of the most permanent rivers. Elsewhere, the mammalian and avian wildlife must make great travel up to the edge of the core area to find water.

#### **1.4.1.3 Climatology**

The annual rainfall average is 1,350 mm. The mean daily maximum temperature is 26.5° C in August, whereas the mean minimum temperature in January is 3.5° C. The mean relative humidity lies around 58%. The site of Jabal Moussa and its immediate surroundings are rain-attracting areas, not only because of the topography but also due to the convergence of two air currents in it, one cool coming from north through the Beqaa Valley and one wet coming from the Mediterranean to the west. These conditions created an important water-catchment area and a variety of ecological units in JMBR.

Snow may cover the land for a few days in the winter. In summer time, fog becomes frequent. Both affect the landscape and the activity and distribution of the flora and fauna.

### **1.5 Biotic characteristics**

#### **1.5.1 FLORA**

The total number of plant species observed by the author in JMBR is 717 (See Annex2). Over the past fifteen years, Henriette and Georges Tohmé scoured the villages all around JM mountains slopes and the hills near Nahr Ibrahim and Nahr Ed-Dahab to study the rich biodiversity of the region. They personally have collected and identified all species, sub-species and varieties of wild plants, which they have photographed. They offered specimens to be conserved in the Tohmé's Herbarium of the National Council for Scientific Research (CNRS). Post (1932) did not mention any places from JM or around it. Mouterde (1966-1970-1983) has been in Nahr Ibrahim for several times, between Mayrouba and Qehmez, near Yahchouch and all villages around. But it is not sure that he penetrated inside the hills of JM. The author reviewed what was published by others concerning the plants of JMBR. Those who visited JM spent not more than one or few days in the area.

##### **1.5.1.1 Discussion**

In the list of plants of JMBR (Annex1), several bio-indicator species as well as 119 medicinal species were recognized. Details on bio-indicator species are given below. Several new species are expected to be added to the list that was already updated during the verification field work and the increased effort of observation. Evidence for this assumption is the fact that the flora specialist added 10 more species between November and December 2011. As for the introduced species, there are few privately planted walnut trees *Juglans regia* and some false acacia trees *Robinia pseudoacacia* of

minor importance in backyards of some houses at the border of the reserve, beside five other species: *Lantana camara*, *Lobularia maritima*, *Passiflora caerulea*, *Tilia silvestris intermedia* (threatened), and *Bidens frondosa* and *Bidens pilosa radiata* that are considered invasive species.

#### 1.5.1.2 Characteristics of the floristic species

**Two species appeared to be of distinguished chronology:** *Bidens pilosa* var. *radiata* (from around Beirut) and *Bidens frondosa* (seen once near Kfarchima) are 2 plant species (ASTERACEAE) that Mouterde (1983; p. 395) considered as rare and recently introduced to Lebanon. They are now very common all over Lebanon (Tohmé, 2007), especially near cultivated fields in Chouene of JMBR area (Tohmé, 2011; p. 20).

**Non-native species are limited to five:** *Lantana camara* (VERBENACEAE), *Lobularia maritima* (BRASSICACEAE), *Passiflora caerulea* (PASSIFLORACEAE), *Tilia silvestris intermedia* (TILIACEAE, threatened), *Bidens frondosa* and *Bidens pilosa radiata* (invasive species of the ASTERACEAE family)

**Four species are of special concern:** ASTERACEAE: *Gundelia tournefortii* (edible); *Matricaria chamomilla* (medicinal); FABACEAE: *Ceratonia siliqua*, (medicinal and economic interest) *Cercis siliquastrum* (ornamental and medicinal interest).

**Fourteen species are indicators of humidity. They are limited to the grounds of Nahr Ed Dahab, Nahr Ibrahim and Qehmez:** *Adiantum capillus-veneris* (PTERIDACEAE), *Cornucopiae cucullatum* (POACEAE), *Cyperus rotundus* (CYPERACEAE), *Arabis turrita* and *Nasturium officinale* (BRASSICACEAE), *Silene aegyptiaca* in cultivated fields (CARYOPHYLLACEAE), *Rubus hedycarpus* (ROSACEAE) and *Platanus orientalis* (near water, near rivers), *Pulicaria dysenterica* (ASTERACEAE), with: *Alnus orientalis*, *Laurus nobilis*, *Nerium oleander*, *Hedera helix* (at bottom valleys), and *Rhododendron ponticum brachycarpum* on wet soils on sandstone (ERICACEAE).

#### **Twenty-six plant species are endemic to Lebanon:**

*Sison exaltatum*, *Helichrysum virgineum*, *Alkanna leiocarpa*, *Erophila gilgiana*, *Rorippa macrocarpa*, *Arenaria libanotica*, *Rosularia kesrouanensis*, *Pentapera sicula libanotica*, *Rhododendron ponticum brachycarpum*, *Cytisus syriacus*, *Vicia narbonensis libani*, *Melissa inodora*, *Origanum ehrenbergii*, *Origanum libanoticum*, *Salvia fruticosa*, *Salvia peyronii*, *Teucrium montbretii libanoticum*, *Allium chloranthum montanum*, *Puschkinia scilloides libanotica*, *Bromus madritensis purpurascens*, *Lychochloa avenacea*, *Cyclamen libanoticum*, *Malus trilobata*, *Asperula libanotica*, *Galium pestalozzae*, *Odontites lutea hispidula*.

#### 1.5.1.2.1 Selected species

The selection of the species that are in need of special attention is achieved through a methodology of filtering the species using three types of filters: "**Coarse filter**" analysis: this phase selects the species that are globally threatened, regionally threatened, nationally threatened, endemic, keystones, flagship species, indicators, rare species, alien invasive species, noteworthy species and species of special concern. "**Mid-coarse filter**" analysis: this second phase will examine the species that are selected in the previous phase in terms of vulnerability and accessibility. For example, a globally

threatened species that is protected in its distribution range and occurs accidentally in a study site is of lower significance than another globally threatened species found to be limited to this site. However, it is worth to note that the identification of the species that are in most need of conservation action can also be done by monitoring the numbers and distribution of the species in question. In this phase, it is preferable to only deal with the most endangered, locally or nationally rare, endemic, and noteworthy species (see Annex6 for definition of these categories). **"Fine filter"** analysis: this third phase will address the requirements of the species of the "mid-coarse filter" that are considered to be of special management significance; mainly in relation to the study site (the hypothesis calling for the need to often protect the species beyond the limits of the site is recognized).

The plants selected through the fine filter add up to 17 species: Six are endemic to the Jabal Moussa BR and the Nahr Ibrahim basin: *Alkanna leiocarpa*, *Rosularia kesrouanensis*, *Pentapera sicula libanotica*, *Vicia narbonensis libani*, *Salvia peyronii* and *Cyclamen libanoticum*; three are not endemic but characterize Jabal Moussa : *Ophrys scolopax*, *Thalictrum orientale* and *Verbascum oreophyllum joannis*; and 8 are mainly of high economic value : *Helichrysum Virgineum*, *Geum urbanum*, *Gundelia tournefortii*, *Helichrysum pallasii*, *Origanum ehrenbergii*, *Origanum syriacum*, *Rhus coriara* and *Malus trilobata*.


Distribution, status and flowering time of the species that are endemic and characteristic to Jabal Moussa are shown in the table below (additional studies in relation to their characteristics are in progress and accordingly they will not be cited under useful information of the selected species):

Species	English name	Location	Status	Flowering month
<i>Alkanna leiocarpa</i>	Smooth-fruited alkanet	Jabal Moussa slopes, Chahtoul, Nahr Ed Dahab	Endemic	3-6
<i>Rosularia kesrouanensis</i>	Kesrouan rosularia	Qehmez, Jabal Moussa slopes	Endemic	5-6
<i>Pentapera sicula libanotica</i>	Lebanese pentapera	Nahr Ibrahim	Endemic	12-6
<i>Vicia narbonensis libani</i>	Lebanese vetch	Jabal Moussa slopes	Endemic	4-6
<i>Salvia peyronii</i>	Peyron's sage	Jabal Moussa slopes	Endemic	4-6
<i>Cyclamen libanoticum</i>	Lebanon cyclamen	Nahr Ed Dahab, Aabri, Chouene	Endemic	2-3


<i>Ophrys scolopax</i>	Woodcock ophrys	Jabal Moussa slopes, Chahtoul	Characteristic to JM	4-6
<i>Thalictrum orientale</i>	Oriental meadow-rue	Chouene	Characteristic to JM	3-4
<i>Verbascum oreophyllum joannis</i>	Mountain mullein	Aabri, Yahchouch	Characteristic to JM	6-9




1.5.1.2.2. Useful information about the selected species

Genus, Latin	<i>Helichrysum</i>
Species, Latin	<i>virgineum</i>
Author	DC.
	
	Photo: Georges Tohmé
Family	ASTERACEAE
Common name, English	White everlasting
Common name, Arabic	Khalida bayda


Chorotype	Endemic to North Lebanon and localized
Life form Raunkiaer	Chasmophyte at supra-Mediterranean level
Summer shedding	Flowering period and leaves between May and July
Succulence	Non-succulent
Salt resistance	Glycophyte
Habitat or affinity to Vegetation formation	Rocks, sand stones and near woodlands
Synanthropy	Grows only in natural habitats
Status	It becomes rare
Chronology	First reported by Blanche from Ehden prior to 1884 but there were no further reports from there. Tohmé ( <i>pers. comm.</i> ) found it at Hadchite (13 Jun. 2002), Bcharri (17 Jul. 2002 & 4 Aug. 2003) and on top of Wadi el Jouz (5 Aug. 2002). Endemic to north Lebanon, rare and merits conservation
Usage	<i>It can be used in horticulture.</i>
Identification	Bracts of the involucre are white. It is the only species with this color.

Genus, Latin	<i>Geum</i>
Species, Latin	<i>urbanum</i>
Author	L.
	
	Photo: Georges Tohmé
Family	ROSACEAE
Common name, English	Herb-bennet
Common name, Arabic	Geum
Chorotype	Europe, North Africa, Western Asia, Himalayas, Siberia
Life form Raunkiaer	Perennial chamaephyte
Summer shedding	Flowering time May to early September in Ehden forest
Succulence	Non-succulent
Salt resistance	Glycophyte

Habitat or affinity to Vegetation formation	Grassy lands in supra and Montane-Mediterranean levels
Synanthropy	Grows only in natural habitats
Status	Not very abundant it is collected for medicinal use
Chronology	First reported from AL_Shouf Cedar by Blanche (1883). Also found at the same place by Georges and Henriette Tohmé (2002).
Usage	<i>Used to treat digestive malfunctions and bronchitis and as mouth antiseptic.</i>
Identification	Yellow petals, erect stem 20-50 cm long


Genus, Latin	Gundelia
Species, Latin	<i>tournefortii</i>
Author	L.
	
	Photo: Georges Tohmé

Family	ASTERACEAE
Common name, English	Tournefort's gundelia
Common name, Arabic	Akkoub
Chorotype	East Mediterranean Region
Life form Raunkiaer	Perennial chamephyte
Summer shedding	Flowering period April-May
Succulence	Succulent
Salt resistance	Glycophyte
Habitat or affinity to Vegetation formation	Not in cultivated fields, from coastal to desert areas. Not in very high mountains
Synanthropy	Grows only in Natural habitats
Status	Threatened because edible
Chronology	Known since ages as appreciated edible plant in Lebanon but never reported from this particular reserve till it was found by G. & H. Tohmé in 1998 ( <i>pers. obs.</i> ) as abundant species above the Barouk.
Usage	<i>Used since ages as distinguished food in all parts of Lebanon and Syria. Its buds are cooked in a special way and its prices are high. In addition, it may be preserved under pressure in hermetically closed jars. It can be wisely invested if properly managed and cultivated.</i>
Identification	Very spiny plant corolla yellow


Genus, Latin	Helichrysum
Species, Latin	<i>pallasii</i>
Author	(Sprengel) Ledeb.
	
	Photo: Georges Tohmé
Family	ASTERACEAE
Common name, English	Pallas' everlasting
Common name, Arabic	Khalidat Pallas
Chorotype	East Mediterranean Region
Life form Raunkiaer	Perennial chamephyte
Summer shedding	Flowering period summer
Succulence	Non-succulent

Salt resistance	Glycophyte
Habitat or affinity to	Rocky slopes up to 2600 m
Vegetation formation	
Synanthropy	Grows only in natural habitats.
Status	Protected now in Natural Reserve against over collecting
Chronology	Mouterde (1983) mentioned it from the Cedars of Ain-Zhalta and from the Cedars of Barouk. Prior to 1934, René Gombault collected it also from the Cedars of Barouk.
Usage	<i>Sold by villagers on the sides of the roads due to its beautiful golden color. This is maintained after pluck. The Globe everlasting showed obvious degradation in the near past due to excessive plucking by flower collectors.</i>
Identification	Involucres bright yellow



Genus, Latin	Origanum
Species, Latin	<i>ehrenbergii</i>
Author	Boiss.
	
	Photo: Georges Tohmé
Family	LAMIACEAE
Common	Ehrenberg marjoram


name, English	
Common name, Arabic	Zaatar as-sanawbar
Chorotype	Endemic to Lebanon
Life form Raunkiaer	Perennial chamephyte
Summer shedding	Flowering period June-October
Succulence	Non-succulent
Salt resistance	Glycophyte
Habitat or affinity to Vegetation formation	Sandstone in association with Pine wood
Synanthropy	Grows only in natural habitats
Status	It is collected for being edible
Chronology	It lives under pine groves on sandy soil. Like the Syrian origanum, it is used in making the Manakish (Thym Pizza). It was reported by Post from Ain Zhalta in 1890, Frère Louis from Jabal Barouk in 1932 and by Mouterde (1983) from Ain Zhalta. Endemic to Lebanon but common and deserves protection.
Identification	Inflorescence in many levels from the 2/3 of the stem until top

Genus, Latin	<i>Origanum</i>
Species, Latin	<b><i>syriacum</i></b>
Author	L.
	
	Photo: Georges Tohmé
Family	LAMIACEAE
Common name, English	Syrian origanum
Common name, Arabic	Zaatar soury
Chorotype	East Mediterranean Region
Life form Raunkiaer	Perennial sub-frutescent plant
Summer shedding	Evergreen
Succulence	Non-succulent
Salt resistance	Glycophyte

Habitat or affinity to Vegetation formation	All soils, especially rocky and old walls
Synanthropy	Grows in natural habitats. Planted in gardens
Status	Very common but threatened because it is edible
Chronology	Widespread over all Lebanon, mainly on calcareous soil. First reported from AL_Shouf Cedar by Blanche (1880).
Usage	<i>Medicinal and consumable plant of high economic value. Heavily harvested by locals.</i>
Identification	Aromatic plant with white flowers

Genus, Latin	Rhus
Species, Latin	<i>coriara</i>
Author	L.
	
	Photo: Georges Tohmé
Family	ANACARDIACEAE
Common name, English	Tanner's sumach
Common name, Arabic	Soummaq

Chorotype	South Europe and western Asia
Life form Raunkiaer	Phanerophyte
Summer shedding	Flowering and fructification time from April to October
Succulence	Non-succulent
Salt resistance	Glycophyte
Habitat or affinity to Vegetation formation	Waste grounds dry slopes near cultivated fields
Synanthropy	Grows in natural habitats. Planted in gardens
Status	Abundant
Chronology	Mentioned first by Post in 1890 from Jabal Barouk and by Mouterde from Ain Zhalta where it was also seen by Tohmé in 1998.
Usage	Medicinal and edible plant of significant economic value
Identification	Leaves alternate flowers yellow-pale

Genus, Latin	<i>Malus</i>
Species, Latin	<i>trilobata</i>
Author	(Lab.) Schneider
	
	Photo: Georges Tohmé
Family	ROSACEAE
Common name, English	Three-lobed apple
Common name, Arabic	Touffah lubnan
Chorotype	Endemic to Lebanon
Life form Raunkiaer	Phanerophyte; Perennial small tree

Summer shedding	Flowering period May-June, leaves until October
Succulence	Non-succulent
Salt resistance	Glycophyte
Habitat or affinity to Vegetation formation	Supra-Mediterranean level with oak and pine trees
Synanthropy	Grows in natural habitats, it may grow in gardens
Status	Rare, now protected inside Natural Reserve
Chronology	An endemic species to Lebanon that was mentioned by Blanche prior to 1884 and cited by Mouterde in 1970 from Horsh Ehdén. A small tree that is in good health and submitted to study since few years only.
Usage	<i>genetic resource/ Wild relative</i>
Identification	White flowers, globular fruits keep sepals



### 1.5.1.3 The vegetal communities

This site is located about 350-1,700 meters above sea level. According to the CORINE Classification (1999), the reserve belongs to four Mediterranean levels: (1) the "Thermo-Mediterranean Level" of vegetation, which covers areas up to 500 meters ASL; (2) the "Meso-Mediterranean Level" that expands between 500 and 1,000 meters ASL; (3) the "Supra-Mediterranean Level" of vegetation, which extends over the higher parts of the slopes up to 1,500 meters of altitude, with oak trees as dominant species; and (4) the "Montane Mediterranean Level" that covers all slopes between 1,500 and 1,700 meters.

#### 1.5.1.3.1 Characteristics

**1.5.1.3.1.1 Physical:** the substratum and the rocks of the reserve consist almost exclusively of sedimentary rocks and most of these are pale limestone. Despite the vast thicknesses of limestone, the variation in limestone types is rather limited; much of it is so fine grained that it needs a microscope to show any interesting features. Few areas, especially around Mcheti, Qehmez and Broqta are of sandy nature. The most varied sequence of sediments is the one, which extends from Late Jurassic to the Middle Cretaceous and shows a considerable variety of kinds of limestone, sandstones and clay minerals. The only igneous rocks are basaltic flows and intrusions of a variety of ages, as in the case of the basalt to the west of Qehmez.

**1.5.1.3.1.2 Biotic:** wilderness areas that include a variety of ecosystems as a result of the quasi-absence of human activities and different bioclimatic conditions over a large area characterize the Jabal Moussa Biosphere Reserve. Several micro-habitats, such as those created by the shade of trees and rocks or provided by glades within the forests or woods, add to the diversity of the reserve.

**1.5.1.3.1.3 Quality:** the initiative to declare the Jabal Moussa area a UNESCO Biosphere Reserve in 2009 constituted the first step towards effective conservation and protection of natural resources. In fact, the many oriented activities that are implemented to stop tree cutting, grazing and hunting within the reserve are currently reflected by an improved ecological balance. Because of all these reasons beside the guided and controlled tours, the identified negative impacts of humans in the conservation zone may be classified as ranging from very weak to weak.

**1.5.1.3.1.4 Habitats & Vegetal formations:** Beside the four "CORINE" levels of vegetation that are mentioned above, the Jabal Moussa Biosphere Reserve encompasses few vegetation formation types that are not incorporated in the CORINE classification which deals with Mediterranean habitats of European countries from Spain in the west up to Greece in the east. Accordingly, the habitat types below are described by the author of this section as new to CORINE classification.

#### 1. Forest places often with rocky ground. Villages: Chouene, Jabal Moussa

Mainly formed of *Tamus orientalis*, *Phleum montanum*, *Briza maxima*, *Ruscus aculeatus*, *Geranium pyrenaicum*, *Symphytum palaestinum* (BORAGINACEAE).

**2. Silica ground. Villages: Jabal Moussa, Qehmez, Snoubar**

Chiefly formed of *Cytisus syriacus*, *Corynephorus deschampsoides*, *Anthoxantum odoratum*, *Pinus spp.* with *Calycotome villosa*, *Cyclamen persica*, *Anthoxanthum odoratum*, *Lavandula stoechas* and *Erica manipuliflora*

**3. Rocky places, karsts. Villages: Jabal Moussa, Qehmez, etc.**

Composed of *Bupleurum nodiflorum*, *Rosularia kesrouanensis*, *Quercus calliprinos*, *Quercus cerris pseudocerris*, *Quercus infectoria*, *Acer syriacum*, *Crataegus azarolus*, *Cyclamen persicum*, *Eryngium falcatum*, *Pistacia palaestina* and *Smyrniopsis syriaca*.

**4. Volcanic places (bio-indicator of dolomitic ground). Villages: Qehmez, Jabal Moussa**

Formed from *Trifolium arvense*, *Cnicus benedictus* and *Staelhelina lobelii*.

**5. Threatened woodlands bio-indicator. Villages: Jabal Moussa Biosphere Reserve (everywhere)**

The association includes *Spartium junceum*, *Asphodelus microcarpus*, *Calycotome villosa*, *Hypericum thymifolium*, *Spartium junceum*, *Hyparrhenia hirta*, *Allium trifoliatum* and *Stachys distans*.

**6. Humus lands, under-trees organic ground, wetlands. Villages: Jabal Moussa, Qehmez, Aabri**

Mainly formed from *Sambucus ebulus* (very common) and *Cyclamen libanoticum* (common but not abundant).

**1.5.1.3.1.5. Vegetation cover/Types of dominant species**

- Trees: one dominant species from the Fagaceae family is *Quercus calliprinos* or Kermes oak reaching a height of 20 m with a crown of persistent leaves (about 60 %); two others from the same family (about 10%) have caducous leaves: *Quercus cerris pseudo-cerris* or Turkey oak (Lebanese forms) reaching 20-35 m, and *Quercus infectoria* or Cyprus oak reaching a height of ± 10 m. All other species of trees (see the list in Annex1) are spread in different parts of the JMBR, especially *Pinus brutia* or Calabrian pine (Aabri roadsides).
- Shrubs: are small (usually about 2 m in height) ligneous perennial plants with branches arising from ground level. Two dominant shrubs are selected from the Fabaceae family: *Calycotome villosa* or thorny-broom, 1-2 m high with spiny branches and *Spartium junceum* or Spanish broom, 1 to 4 m with spineless branches. Both species are very common in degraded woodlands (especially places used in the past to prepare charcoal or around quarries for extraction of stones or sand).

- Herbs: are between 5 cm and 1 m high. They are covering the ground (wet or dry sites under trees, on fertile, sandy or rocky soils, , and along roadsides, ) during winter time or throughout the year. We give some examples: from the family of Poaceae, *Alopecurus utriculatus* or Vernal fox-tail (5-20 cm high); *Avena sterilis* or Wild oat ( $\pm 1$  m); *Digitaria sanguinalis* or Crab-grass (3-10 cm); *Oryzopsis miliacea* or Millet mountain-rice ( $\pm 150$  cm) with a flowering time covering all the year. From the family of Fabaceae: *Psoralea bituminosa* or Bitumen pea (30-100 cm); *Trifolium campestre* or Hop trefoil (5-30 cm); *Trifolium clusii* on sandy ground (20-50 cm). The family of Valerianaceae is nicely represented by *Centranthus longiflorus latifolius* or Long-flowered spur-valerian (60-150 cm), common on rocky grounds. The family Asteraceae is the most represented, the best example is *Bellis perennis* (10-25 cm) or Perennial daisy and *B. sylvestris* (10-30 cm) or Southern daisy. They have a flowering time covering all the year. From the genus *Centaurea* we mention *C. eryngioides* var. *Ochroleuca*, which is common in spring.

1.5.1.3.1.6. Phyto-geo-ecologic characteristics (Source: Deirex et al., 1999)

Code	Station	Formation, Structure and main Nature	Series of vegetation	Area (ha)	Stratum	Height (m)	Cover%
J1	Grassland	Mediterranean and Supramediterranean of <i>Quercus calliprinos</i>	Eumediterranean Supramediterranean	150	Arboreal	7	5
					Shrubby	2	20
					Grassy	0.5	70
J2	High Garrigue with <i>Calycotome villosa</i> & <i>Spartium junceum</i>	Mediterranean & Supramediterranean of <i>Quercus calliprinos</i>	Eumediterranean Supramediterranean	32	Arboreal	2	5
					Shrubby	1	50–80
					Grassy	< 0.5	40–70
J3	Open forest with <i>Quercus calliprinos</i>	Mediterranean & Supramediterranean of <i>Quercus calliprinos</i>	Eumediterranean Supramediterranean	64	Arboreal	3–6	20–30
					Shrubby	1	15–30
					Grassy	0.5	20–30
J3t	Open forest with <i>Quercus calliprinos</i> (on abandoned terraces)	Mediterranean of <i>Quercus calliprinos</i>	Eumediterranean		Arboreal	8	30–35
					Shrubby	1	30
					Grassy	< 0.5	15

J4	Dense forest with <i>Quercus calliprinos</i>	Mediterranean and Supramediterranean of <i>Quercus calliprinos</i>	Eumediterranean Supramediterranean	260 + 5	Arboreal	6–8	90
					Shrubby	1	5
					Grassy	0,5	10
J5	Dense forest with <i>Quercus calliprinos</i> . <i>Pinus brutia</i> facies	Mediterranean of <i>Quercus calliprinos</i> , <i>Pinus brutia</i> facies	Eumediterranean	231	Arboreal	10– 15	60– 95
					Shrubby	4	5– 40
					Grassy	< 0.5	20
J6	Dense forest of <i>Quercus calliprinos</i> (& dispersed <i>Pinus brutia</i> )	Mediterranean of <i>Quercus calliprinos</i>	Eumediterranean	55	Arboreal	6–10	40– 60
					Shrubby	1–2	20– 70
					Grassy	0.5	30– 50
J7	Open forest with <i>Quercus calliprinos</i> & <i>Quercus infectoria</i>	Mediterranean of <i>Quercus infectoria</i>	Eumediterranean	167	Arboreal	6–7	30– 40
					Shrubby	1– 1.5	30
					Grassy	< 0.5	30– 60

J8	Dense forest with <i>Quercus cerris</i>	Series of <i>Quercus cerris</i>	Supramediterranean Mountain- Mediterranean	Arboreal	6–13	60– 90
				Shrubby	1–3	10– 40
				Grassy	0.5– 1	40– 70
J9	Dense forest with <i>Fraxinus ornus</i> et <i>Ostrya carpinifolia</i>	Series of Hop-Hornbeam and Manna Ash	Supramediterranean Mountain- Mediterranean	Arboreal	6–8	50– 60
				Shrubby	2–3	20
				Grassy	0.5	35– 60
J10	Dense forest with <i>Quercus calliprinos</i> (+ deciduous)	Mediterranean of <i>Quercus calliprinos</i>	Eumediterranean	Arboreal	8	70
				Shrubby	2	40
				Grassy	< 0.5	20
J11	Dense forest with <i>Styrax officinalis</i>	Mediterranean of <i>Quercus infectoria</i>	Eumediterranean Supramediterranean	Arboreal	5–6	85
				Shrubby	1	10
				Grassy	0.5	10

J12	Dense riparian with <i>Platanus orientalis</i>	Series of <i>Platanus orientalis</i>	Eumediterranean	5	Arboreal	10	40-70
				+	Shrubby	2	10
				2	Grassy	< 0.5	70
J13	Urbanized zone / Cultivated land (orchard)			9	Arboreal	-	-
					Shrubby	-	-
					Grassy	-	-
J14	Dense forest with <i>Ostrya carpinifolia</i>	Series of Hop-Hornbeam and Manna Ash	Supramediterranean Mountain-Mediterranean		Arboreal	6	90
					Shrubby	-	-
					Grassy	< 0.5	40

For more information see map below.

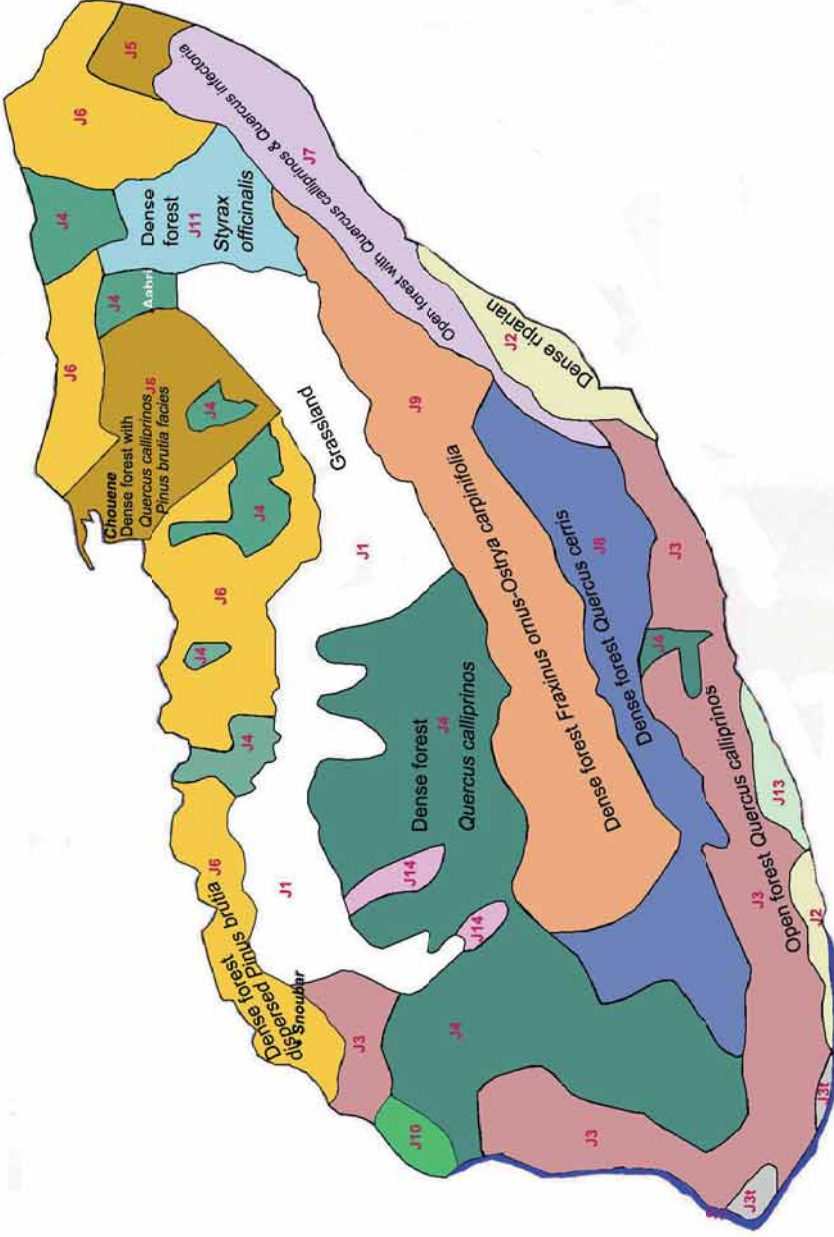


LEBANON

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Phyto-ecological Map: Jabal Mousa

- J1 Grassland
- J2 High Quercus with Calycotome villosa & Spartium junceum
- J3 Open forest with Quercus calliprinos
- J32 Open forest with Quercus calliprinos (on abandoned terraces)
- J4 Dense forest with Quercus calliprinos
- J5 Dense forest with Quercus calliprinos, Pinus brutia facies
- J6 Dense forest with Quercus calliprinos, Quercus calliprinos & Quercus ilex
- J7 Open forest with Quercus calliprinos & Quercus ilex
- J8 Dense forest with Quercus coccinea
- J9 Dense forest with Fraxinus ornus et Castanea sativa
- J10 Dense forest with Quercus calliprinos (+ deciduous)
- J11 Dense forest with Styxax officinalis
- J12 Dense riparian with Platanus orientalis
- J13 Urbanized zone / Cultivated land (orchard)
- J14 Dense forest with Ostrya carpinifolia



Sources

Site Jabal Mousa

Villes:  
 Department of the geographical affairs of the Lebanese Army.  
 Map 1967.  
 Scale 1:100 000

Physicoecological data  
 Project PAPCVL, 1999

Leafy cover	Area (m <sup>2</sup> )	Area (%)
1	215000	5000
2	215000	10000
3	215000	10000
4	215000	10000



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 INSTITUT NATIONAL DE RECHERCHES SCIENTIFIQUES  
 DEPARTEMENT DE GÉOLOGIE  
 GÉOLOGIE GÉNÉRALE  
 1999



#### **1.5.1.2.1.7 Qualitative evaluation of the habitats**

##### **1.5.1.2.1.7.1 Dynamic and ecological succession**

Some of the vegetal formations of JMBR, such as the old oak stands, are at the climax stages (stable) whilst the vegetation of the barren and rocky areas is subject to alternation of regressive dynamics when poaching and illegal grazing occur, and progressive dynamics when protection is successful.

##### **1.5.1.2.1.7.2 Evaluation of the degree of anthropogenic impacts**

The artificialization is observed as a result of the past human intervention (glades created by wood cutting and reduced cover of spontaneous trees) and recent human interference (agricultural activities on the biosphere reserve's edges).

##### **1.5.1.2.1.7.3 Regeneration rate of the high ligneous formations**

The main high ligneous formations of the Jabal Moussa Biosphere Reserve are Pine and Oak trees. These formations are of very low regeneration rate mainly due to the reached climax stage. The other ligneous plants, such as wild fruit trees, are considered of medium regeneration rate.

## 1.5.2 MAMMALS

Mammal explorations in the country were shy and almost limited to around the middle of the twentieth century. They are fragmentary and provided little information on the mammals of Lebanon. Many species and sub-species were lacking or not yet mentioned in Lebanon till early seventies. Between 1980 and 1985, Tohmé, G. and Tohmé, H. produced alone 33 % of the known published papers on the Lebanese mammals. In the twenty first century more intensive work is being conducted and several species new to Lebanon have been recorded by Abi-Said, M.. Whatsoever, the only documented data on the mammals of the Jabal Moussa Biosphere Reserve apparently appeared in the report of Abi-Said, M. that was prepared on behalf of the Jabal Moussa Association in 2009. This report was based on inventory and field surveys. A list of 20 mammal species belonging to 15 orders was produced (see Annex3). It is worthy to state that some of the mammal species are not limited in their habitat to Jabal Moussa Biosphere Reserve. They may live in the surrounding, but they access the reserve as part of their range of action and/or predation activities.

### 1.5.2.1 The Mammal species

#### 1.5.2.1.1 Selected species

These are the most threatened and rare species. They include the gray wolf *Canis lupus pallipes*, weasel *Mustella nivalis*, badger *Meles meles canescens*, wild cat *Felis silvestris*, striped hyaena *Hyaena hyaena syriaca*, rock hyrax *Procavia capensis syriaca* and Persian squirrel *Sciurus anomalous syriacus*, as well as the economic species hedgehog *Erinaceus europaeus concolor*. They deserve protection and monitoring for several reasons: the first five including wolves, weasels, badgers, wild cats and striped hyaenas, which occupy the top of the trophic chain are in continuous decline since they are constantly persecuted by people due to lack of awareness at all economic, social and ecological levels. The latter two are threatened, besides persecution, by habitat destruction through deforestation, forest fires and quarries. As for the *Erinaceus europaeus concolor*, its role is well known for controlling outbreaks of agricultural pests that are harmful for flora and agricultural crops. In addition to the 8 species above, the red fox *Vulpes vulpes palaestina* and the stone marten *Martes foina syriaca* that are very common in Jabal Moussa Biosphere Reserve (mainly because of their opportunistic feeding behavior besides their competitors like wolves and badgers) might pose a negative effect to the fauna and flora if their number boosts. Furthermore, the numbers of Wild Boar *Sus scrofa lybicus* that is probably introduced are still numerically under control, probably due to the presence of wolves. However, they have to be monitored before their population boosts and a negative impacts the reserve.

1.5.2.1.1.1 Rare mammal species (11)

<b>SPECIES</b>	<b>ENGLISH NAME</b>	<b>LOCAL NAME</b>	<b>HABITAT</b>	<b>ABUNDANCE*</b>
<i>Erinaceus europaeus concolor</i>	<b>Hedgehog</b>	Quonfoz	Oak and mixed forest	Low
<i>Rhinolophus euryale judaicus</i>	<b>Mediterranean horse shoe bat</b>	A'ammash Saghir	Caves	Low
<i>Tadarida teniotis</i>	<b>European Free-Tailed bat</b>	Watwat Abo Zanab Horr	Rock cervices	Low
<i>Pipistrelle kuhlii ikhawanius</i>	<b>Kuhl's Pipistrelle</b>	Khaffash Kouhli	Rock cervices and old houses	Common
<i>Canis lupus pallipes</i>	<b>Wolf</b>	Dib	Apparently all over	Extremely low
<i>Mustela nivalis</i>	<b>Weasel</b>	Ibn Ers	Rocky open areas	Extremely low
<i>Meles meles canescens</i>	<b>Eurasian badger</b>	Ghrair	Forested areas at the upper part of the reserve	Low
<i>Felis silvestris</i>	<b>Wild cat</b>	Herr Barree	Oak forest	Low
<i>Hyaena hyaena syriaca</i>	<b>Striped Hyaena</b>	Daba'a	All over	Abundant
<i>Procavia capensis syriaca</i>	<b>Rock hyrax</b>	Tabsoon	Sunny rocky habitat	low
<i>Sciurus anomalus syriacus</i>	<b>Persian squirrel</b>	Sinjab	All over with high concentration in the oak forest	Abundant

\* Abundance: depended on the number of sighting of the animal, its tracks, or number of captured photos.

#### 1.5.2.1.1.2 Noteworthy mammal species (5)

SPECIES	ENGLISH NAME	LOCAL NAME	VALUE
<i>Erinaceus europaeus concolor</i>	<b>Hedgehog</b>	Quonfoz	Economic Bio-indicator
<i>Rhinolophus euryale judaicus</i>	<b>Mediterranean horseshoe bat</b>	A'ammash Saghir	Economic
<i>Tadarida teniotis</i>	<b>European Free-Tailed bat</b>	Watwat Abo Zanab Horr	Economic
<i>Pipistrelle kuhlii ikhawanius</i>	<b>Kuhl's Pipistrelle</b>	Khaffash Kouhli	Economic
<i>Mustela nivalis</i>	<b>Weasel</b>	Ibn A'ars	Economic


#### 1.5.2.1.1.3 Threatened mammal species (10)

SPECIES	ENGLISH NAME	LOCAL NAME	LEVEL OF THREAT
<i>Rhinolophus euryale judaicus</i>	<b>Mediterranean horse shoe bat</b>	A'ammash Saghir	Globally and regionally near threatened
<i>Tadarida teniotis</i>	<b>European Free-Tailed bat</b>	Watwat Abo Zanab Horr	Threatened on the national level
<i>Pipistrelle kuhlii ikhawanius</i>	<b>Kuhl's Pipistrelle</b>	Khaffash Kouhli	Threatened on the national level
<i>Canis lupus pallipes</i>	<b>Wolf</b>	Dib	Threatened on the national level
<i>Mustela nivalis</i>	<b>Weasel</b>	Ibn a'ars	Threatened on the national level
<i>Meles meles canescens</i>	<b>Eurasian badger</b>	Ghrair	Threatened on the national level
<i>Felis silvestris</i>	<b>Wild cat</b>	Herr Barree	Threatened on the national level
<i>Hyaena hyaena syriaca</i>	<b>Striped Hyaena</b>	Daba'a	Globally and regionally near threatened
<i>Procavia capensis syriaca</i>	<b>Rock hyrax</b>	Tabsoon	Threatened at the National level.
<i>Sciurus anomalus syriacus</i>	<b>Persian squirrel</b>	Sinjab	Threatened at the National level.

**1.5.2.1.1.4 Useful information and details about the selected species.**

The status of mammals whether endangered, threatened, common, etc., was based on previous surveys and work conducted in Lebanon since the Lebanese redlist is not yet established.

**1.5.2.1.1.4.1**

<i>Erinaceus europaeus concolor</i> <b>Hedgehog</b>	
<b>Distribution</b>	
The hedgehogs are distributed in Africa and Asia and from Central Europe to the Caspian sea. The subspecies <i>Erinaceus europaeus concolor</i> is widespread in most countries of the Middle East.	
<b>Lebanon:</b> This species was common in Lebanon, especially in the coastal plain. However, at present the species is endangered due to excessive use of pesticides and road kills. Its habitat does not apparently exceed 2.5 hectares. The hedgehogs are reported from Hadath, Kfarchima, Bsaba, Nahr Ibrahim, Saida, Jaj, Laqlouq, Baalbek, Zahleh, Chmistar, Sarafand, Tamnine Tahta, Barouk, Mokhtara, Rihane, Jezzine, Tyre, Koura, Farayya, and Nahr Ibrahim that are not far from Jabal Moussa. However, this is the first time for hedgehogs to be reported in JMBR through camera and live trap.	
	
Photo: Mounir Abi Said	
<b>Population</b>	
In their areas of distribution, these animals are well represented. <b>In Lebanon:</b> Endangered.	
<b>Chronology</b>	
The hedgehog was first reported by Lewis et al. (1967). Tohmé and Tohmé (1985) gave a detailed description and distribution of the species in Lebanon.	
<b>Identification</b>	
The Hedgehogs have rounded bodies up to 33 cm long, very short tails, and pointed snouts; their backs and sides are covered with stiff brownish and beige striped spines and their undersides with coarse hair usually brownish. They have an annular muscle that is connected to the spine-bearing skin and extends around the animal's entire body. When frightened, this muscle enables the hedgehog to roll itself into a tight ball with its spines pointing outward; when rolled up it is invulnerable to almost any predator.	
<b>Habitat</b>	

The Hedgehog's suitable habitats are those rich in insects and invertebrates. Being insectivorous, the hedgehog is considered an animal of high economic importance because it controls pests. Besides, its presence serves as bio-indicator for unpolluted habitats. Dumps are excellent source of food for hedgehogs besides cultivated or semi-desert areas. They are also found in Pine and olive groves as well as in forest edges, gardens and parks.

#### 1.5.2.1.1.4.2

*Rhinolophus euryale judaicus* **Mediterranean horseshoe bat**

#### **Distribution**

The Mediterranean horseshoe bats are distributed in North Africa, Europe and Asia

**Lebanon:** This species is threatened in Lebanon due to habitat destruction and excessive use of pesticides. This species was reported from Nahr Beirut, Amcheet, and Kfour in Kesrouane that is not far from Jabal Moussa.



Photo: Mounir Abi Said

#### **Population**

In their areas of distribution, these animals are near threatened. **In Lebanon:** Endangered.

#### **Chronology**

The Mediterranean horseshoe bat was first reported by Harrison (1964), Atallah (1970) and Tohmé and Tohmé (1985) gave a detailed description and showed the distribution of the species in Lebanon.

#### **Identification**

The horseshoe is a medium-sized insectivorous bat. The noseleaf looks like a horseshoe. The ears are large and strongly concave.


#### **Habitat**

The horseshoe bat hibernates solely from December to January in rock crevices and caves. Its feeding habit reflects its economic importance and its major role in the ecosystem.

#### 1.5.2.1.1.4.3


<i>Tadarida teniotis</i> <b>European Free-Tailed bat</b>	
<b>Distribution</b>	
The European free-tailed bats are distributed in North Africa, Southern Europe, Far East Asia, and in the Middle East	
<b>Lebanon:</b> This species is threatened in Lebanon due to habitat destruction, excessive use of pesticides and road kills. This species was reported from Faraya which is not far from Jabal Moussa.	
	
Photo: <a href="http://en.wikipedia.org/wiki/File:Tadarida_Teniotis263.JPG">http://en.wikipedia.org/wiki/File:Tadarida_Teniotis263.JPG</a>	
<b>Population</b>	
In its area of distribution, this animal is near threatened. <b>In Lebanon:</b> Endangered.	
<b>Chronology</b>	
The European free tailed bat was first reported by Harrison (1962), and Tohmé and Tohmé (1985).	
<b>Identification</b>	
This is a large species with large long ears and narrow wings.	
<b>Habitat</b>	
The European free tailed bat inhabits narrow and inaccessible rock cervices. It roosts in large colonies in narrow cervices in the chalk cliffs - Its feeding habit (insectivorous) reveals its economic value and its major role in the ecosystem.	

#### 1.5.2.1.1.4.4

<i>Pipistrelle kuhlii ikhawanius</i> <b>Kuhl's Pipistrelle</b>
<b>Distribution</b>
The Kuhl's Pipistrelle is a very widely distributed bat. Its range extends from southern Europe to Pakistan, most of Africa and the Middle East.
<b>Lebanon:</b> This species is well distributed in Lebanon where it was reported from Baalbek, Zahle, Machghara, Ehden, Tyr, Saida, Mount Lebanon, and Ajaltoun. The latter is not far from Jabal Moussa

Photo: Mounir Abi Said
<b>Population</b>
In its area of distribution, this species of bat is common. <b>In Lebanon:</b> Common.
<b>Chronology</b>
The khul's pipistrelle was first reported by Stencel (1961) Lewis and Harrison (1962), Harrison (1964), Atallah (1970) and Tohmé and Tohmé (1985).
<b>Identification</b>
This is the smallest insectivorous bat present in Lebanon
<b>Habitat</b>
The khul's pipistrelle is a colonial species. The colonies are usually found in crevices in the walls and roofs of buildings. Being insectivorous, it plays an important role in the ecosystem and in controlling agricultural pests.



#### 1.5.2.1.1.4.5

<i>Canis lupus pallipus</i> <b>Gray Wolf</b>
<b>Distribution</b>
The grey wolf, <i>Canis lupus Pallipus</i> , occurs all over Europe after being exterminated for several years in most of these European countries. The species also occurs in most Middle Eastern countries like Syria, Jordan, Iraq, Palestine, besides some Gulf countries where it is facing the risk of being extinct due to persecution and habitat destruction.
<b>Lebanon:</b> Gray wolves are endangered in Lebanon due to hunting, poisoning and habitat destruction. However, their distribution has expanded in the last couple of years, which is probably due to the reduced impact on natural areas by people, PA establishment and the increase in the numbers of wild boars. Wolves are reported from Harbata and Aammiq (Tohmé et al. 1975), Hermel and Anti-Lebanon (Tohmé and Tohmé 1985) and personal observation (by Abi Said, M.) from Anti-Lebanon (Aarsal, Hermel and Ras Baalbak), Maaser AlChouf, Qournet Alsawda, Ehden, Karm AlMohr, Niha, Tannourine in the north, and lately in Jabal Moussa Biosphere Reserve (Abi-Said 2008, 2010).

Photo: Mounir Abi Said
<b>Population:</b>
This species still faces high risk in the area of its distribution. <b>In Lebanon:</b> Highly Endangered

**Chronology:** First reported in Zahle by Maalouf (1911) followed by Lewis *et al.* (1967) and Tohmé and Tohmé (1985). Since 2000 it was reported in different areas of Lebanon including Aarsal in the Anti Lebanon, Mount Lebanon, and the North (Personal observation). The only times the Gray wolf was seen and caught by the camera traps in Lebanon were in Niha Cedars and Tannourine Cedar Nature Reserve (Abi-Said 2008). At the same time (2007-2008), a couple of Gray wolves (with pregnant female) was trapped by camera at Jabal Moussa. In 2006 a couple was killed in Maasser Al Shouf. In 2007, three were killed in Rachaya - West Beqa'a and lately in 2010, a male was trapped in Mishmish Jbeil.

The first breeding record of this Gray wolf species in the country was documented in JMBR during 2008-2009 (Abi-Said, 2010a,b).


**Identification:**

The wolves are large and heavy animals. There is much individual variation in color but in general the flank is beige darkening gradually towards the spinal crest and fading to creamy white on the side of the neck and cheeks. The ears are medium in size compared to German Shepherd dog the ears are shorter. The tail is short and fluffy. The wolf weighs on average 35 kgs and measures 1.3 m.

**Habitat:**

Their habitat ranges from dense forests to bare lands with lots of caves or cave-like structures for wolves to hide. They also inhabit arid and semi-arid areas.

#### 1.5.2.1.1.4.6

<i>Vulpes vulpes palaestina</i> <b>Red fox</b>
<b>Distribution</b>
The Red fox is an urban omnivores that is common in every country where it exists. It occur all over Europe. <i>Vulpes vulpes palaestina</i> occurs as well in the Middle Eastern countries like Syria, Jordan, Iraq, and Palestine in addition to some Gulf countries where they are common due to their opportunistic feeding behavior.
<b>Lebanon:</b> Foxes are common in Lebanon due to their opportunistic behavior and extermination of their competitors by humans. Foxes are well distributed all over Lebanon, including Jabal Moussa Biosphere Reserve.

Photo: Mounir Abi Said
<b>Population:</b>
This species is very common wherever it exists. <b>In Lebanon:</b> Very common
<b>Chronology:</b> Foxes were reported in many old publications, and lately they were reported by Lewis <i>et al.</i> (1968), Harrison and Bates (1991), Tohmé and Tohmé (1985). Foxes are common all over the country, including Jabal Moussa Biosphere Reserve.
<b>Identification:</b>
The foxes belong to the dog family. They are famous for their fluffy tail that ends with a white spot. Their body is covered with a brownish to yellowish coat and under the neck, there is a patch of either white or black fur. The ears are relatively tall compared to other

members of the dog family. A Red fox weighs on average 7 kg and measures around 1 m including the tail that measures ~ 40 cm. Red foxes are nocturnal and solitary animals that have an omnivorous diet, which facilitates their existence.

**Habitat:**

Red foxes can accommodate any habitat as long as food is available. Their habitat ranges from dense forests to bare lands, from rural to urban areas, from industrial to agricultural land.

**1.5.2.1.1.4.7**

*Canis aureus syriacus* **Jackal**

**Distribution**

The jackals like foxes are urban omnivores that are common wherever they occur. Jackals occur in the Middle Eastern countries like Syria, Jordan, Iraq, and Palestine besides some Gulf countries where they are common due to their opportunistic feeding behavior.

**Lebanon:** Jackals are common in Lebanon due to their opportunistic behavior and extermination of their competitors by humans. Jackals are well distributed all over Lebanon and in lower villages surrounding JMBR. However, only one encounter of a dead jackal was seen in Jabal Moussa vicinity of Aabri village. This could be probably to the high altitude of the reserve.




Photo: Ghassan Ramadan Jaradi

**Population:**

<p>This species is very common wherever it exists. <b>In Lebanon:</b> Very common</p>
<p><b>Chronology:</b> Jackals were reported in many old publications and lately, they were reported by Lewis <i>et al.</i> (1968), Harrison and Bates (1991), Tohme <i>et al.</i> (1975), Tohmé and Tohmé (1985). Although jackals are common all over the country, this is the first time they are reported in Jabal Moussa BR region.</p>
<p><b>Identification:</b></p>
<p>The Jackals belong to the dog family. They are famous for their howls that are named after “Ibn A’awa” (in Arabic). They closely resemble wolves but are smaller in size. Jackals weigh on average 7 kg and measure around 1 m including the tail that measures ~ 25 cm. Jackals are nocturnal and live in packs.</p>
<p><b>Habitat:</b></p>
<p>Jackals can accommodate any habitat below 1200 m asl as long as food is available. Their habitat ranges from dense forests to bare lands, from rural to urban areas, from industrial to agricultural land.</p>

#### 1.5.2.1.1.4.8

<i>Martes foina syriaca</i> . <b>Stone Marten</b>
<b>Distribution</b>
The Stone marten occurs in Europe, Asia, Asia Minor and the Middle East. <i>Martes foina syriaca</i> occurs in Syria, Lebanon, Jordan, and Palestine.
<b>Lebanon:</b> the Stone Marten is very common and well distributed in Lebanon, including Jabal Moussa Biosphere Reserve.
 <p>ABI SAID 2008/07/09 00:14:37</p>
Photo: Mounir Abi Said
<b>Population:</b>
Stone marten is common in the area of its distribution. <b>In Lebanon:</b> Common
<b>Chronology:</b> Even though there is no report of its first existence in Lebanon, it has existed for a long time. It was first reported by Lewis et al. (1968), Tohmé and Tohmé (1985) Harrison and Bates (1991) to be found in Beqa'a and Mount Lebanon. More recently, according to different faunal surveys conducted by M. Abi-Said since 1995 it was very common all over Lebanon.
<b>Identification:</b>


The Stone marten is a medium-sized Mustelid of slender graceful build. The tail is long and it has full and bushy rounded ears and short legs. The body is covered with dark brown fur with a white patch under the chin that extends to the neck. The stone marten measures 50 cm and weighs around 1.5 kg.

It is a nocturnal solitary animal with an omnivorous diet.

**Habitat:**

Stone martens live in wooded areas as well as barren stony hills and mountains

#### 1.5.2.1.1.4.9

<i>Mustela nivalisa</i> . <b>Weasel</b>
<b>Distribution</b>
The Weasels <i>Mustela nivalisa</i> are wide spread in Europe, Asia and North Africa.
<b>Lebanon:</b> Weasels are rare in Lebanon due to their diurnal behavior and being misunderstood by humans. They were reported from Qammouha and Sannine and a new record of their distribution in Lebanon was in Jabal Moussa Biosphere Reserve

Photo: Mounir Abi Said
<b>Population:</b>
This species is widespread in Europe, Asia Minor, and north Africa. <b>In Lebanon:</b> Rare
<b>Chronology:</b> The weasel was first reported by David Potter (1951) in Qammouha – Akkar (ref. Tohmé and Tohmé 1985) followed by Harrison and Lewis (1964), Tohmé (1969) and Tohmé and Tohmé (1985).
<b>Identification:</b>
The weasel is the smallest Mustelid in the region. It is distinguished by its slender body, long neck and short tail and limbs. The back is covered with brown to grayish fur and the underpart of the body is white. They measure up to 30cms. Weasels are diurnal solitary animals that feed on small rodents, birds, reptiles and amphibians.



**Habitat:**

Weasels inhabit a variety of habitats including farmlands, cultivated fields, forests, scrubs, steppe and semi-deserts. This species occurs from sea level and ascending high into the subalpine zones of mountains.

**1.5.2.1.1.4.10*****Meles meles canescens* Eurasian Badger****Distribution**

The Badger *Meles meles* is the only species of its genus that is spread throughout Europe and Asia. The race *Meles meles canescens* occurs in Iran and the Middle East.

**Lebanon:** Badgers are endangered in Lebanon and considered as rare in Jabal Moussa Biosphere Reserve.



Photo: Mounir Abi Said

**Population:**

This species is widespread in Europe and Asia. **In Lebanon:** Rare

**Chronology:** It was reported by Lewis *et al.* (1968) and by Tohmé and Tohmé (1985) in several areas of Mount Lebanon and East Beqa'a. It was reported in Ehden and Tannourine Reserve (Abi-Said, 2008) and lately in Jabal Moussa Biosphere Reserve (Abi-Said, 2010a,b).

**Identification:**

The badger is a fairly large stocky animal with short, rounded ears, legs and tail. The head is white with broad black stripes. The upper body part is covered with grizzled gray fur with blackish underparts and legs. The badger measures ~ 60 cm. They are nocturnal and fossorial mammals.

**Habitat:**

Badgers occur in woods, open areas, orchards and vineyards.

**1.5.2.1.1.4.11**

*Hyaena hyaena syriaca* **Striped Hyaena**

**Distribution**

The Striped hyaena *Hyaena hyaena* is the only member of the Hyaenidae family that is distributed in three continents: Africa, Asia, and Europe. It is well distributed in the Middle East. *Hyaena hyaena syriaca* is the sub-species that is found in Syria, Jordan, Iraq, Palestine, and Lebanon.

**Lebanon:** Even though striped hyaenas are well distributed in Lebanon, they remain threatened in the country due to conflict with humans. Hyaenas occur in most areas of Lebanon, except the capital Beirut (Abi-Said, M. and Abi-Said, M., 2007).



Photo by Mounir Abi Said

**Chronology:** The Striped hyaena was reported in Lebanon as early as 1911 by Maalouf in Zahle and later by Lewis et al. (1968), Herrison (1968), Kumerlovee (1975) and Tohmé and Tohmé (1985). A detailed survey of their distribution was reported by Abi-

Said, M. and Abi-Said, M. (2007).

However, it is the first time to be reported in Jabal Moussa region. It was reported by locals that striped hyaenas appeared and were seen in the past 25 years (since the 1980s: during the Civil war in Lebanon).

**Population:**

This species is near-threatened in its area of distribution. **In Lebanon:** Threatened

**Identification:**

The Striped hyaena is a medium sized carnivore and the second largest member of the *Hyaenidae* family. The coat color of the striped hyaena is gray with dark stripes on the body and legs. It has a well developed mane from neck to tail which is erected to enlarge the hyaena's size whenever it feels threatened. The striped hyaena's rear legs are less developed than the front legs, giving it the appearance of backward inclination. The ears are tall and narrow with bluntly pointed tips. They have exceptionally very strong jaws that characterize their feeding habits. It measures approximately 1 m and weighs up to 55 kg. Striped hyaenas are generally solitary scavengers. They feed on dead animals, domestic waste, fruits and insects. Striped hyaenas are exclusively nocturnal throughout their range (Kruuk 1972, Mills 1989, Abi-Said 2006).

**Habitat**

The Striped hyaena inhabits ravines and rocky deserts, where the vegetation comprises a sparse cover of bushes across plains or gentle slopes with few low herbs and grasses and also close to dense human settlement. During the day they hide or rest in caves or under bushy trees.

#### 1.5.2.1.1.4.12

*Felis silvestris tristrami* **Wild cat**

#### **Distribution**

The Wild cat *Felis silvestris* is widely spread in Europe, Asia and Africa. However, *Felis silvestris tristrami* is found in Syria, Lebanon, Jordan and Palestine.

**Lebanon:** Wild cats are threatened due to cross breeding with abandoned domestic cats. They were reported in most reserves, as well as non protected areas, at the coastal areas and east Beqa'a, as well as Jabal Moussa Biosphere Reserve.



Photo: Mounir Abi Said

#### **Population:**

The population of this species is decreasing worldwide. **In Lebanon:** Threatened

**Chronology:** This species was reported by Tohmé and Tohmé (1985) and through several personal observations between 1995-2005 (Nature Reserves of Ehden, Tannourine and Al Shouf, and in East Beqa'a area); and in Jabal Moussa Biosphere Reserve (2009).

#### **Identification:**

The Wild cat is smaller than the domestic cat with a pelage that is light grayish to olive in color. The tail is relatively long with five blackish rings and a black tip. It measures up to 50 cm.

**Habitat:**

Wild cats are nocturnal animals that inhabit steppes, hills, valleys, forested and rocky areas.

1.5.2.1.1.4.13

*Procavia capensis syriaca* **Rock Hyrax**

**Distribution**

The Rock hyrax *Procavia capensis* is found in Africa and the Middle East. The subspecies *Procavia capensis syriaca* is known from Syria, Lebanon and Palestine.

**Lebanon:** The Rock hyrax is endangered in Lebanon. However, a good colony size occurs in one site: Jabal Moussa Biosphere Reserve.



Photo: Mounir Abi Said

**Population:** This species is common in Africa. **In Lebanon:** Rare

**Chronology:** This species was reported by Tohmé and Tohmé (1985) in Mohtokra,

Nahr El Kalb and Deir El Moukhales and by Harrison and Bates (1991) in Mount Lebanon and near Tyre, and by personal observation (2005–2010) in Niha Al Shouf and Abadieh Mount Lebanon and in Shqeef ruins in the South. The first record of the Hyrax in Jabal Moussa region was during the studies undertaken by Abi Said, M. in 2007-2008.

**Identification:** The Rock hyrax is stocky animal with short, rounded ears and legs. The body is covered with light brownish fur. The Rock hyrax measures ~ 45 cm. It is a social diurnal mammal.

The Rock hyrax occurs among large rocks and cliffs. It retains a number of early mammalian characteristics; in particular, it has a poorly developed internal temperature regulation (which Hyraxes deal with by huddling together for warmth, and by basking in the sun like reptiles). Unlike other browsing and grazing animals, it does not use the incisors at the front of the jaw for slicing off leaves and grass, but uses the molar teeth at the side of the jaw, instead. The incisors are nonetheless large, and grow continuously through life, in a manner similar to those of rodents. The feet have rubbery pads with numerous sweat glands, which help the animal maintain its grip when moving fast up steep, rocky surfaces. Efficient kidneys retain water so it can survive in arid environments.

#### 1.5.2.1.1.4.14

<i>Sus scrofa lybicus</i> <b>Wild Boar</b>
<b>Distribution</b>
<p>The Wild boar distribution ranges from Palaeartic through South-East Asia to Java and Solomon Islands. In Africa, it occurs in Morocco, Algeria and Sudan. In the Middle East, it is reported in Iraq, Syria, Jordan and Palestine.</p>
<p><b>Lebanon:</b> Wild boars are very abundant in Lebanon and in some areas they are causing problems to farmers. They are reported in most Lebanese villages, excluding Beqaa region, starting from the coastal areas like Jbeil going up to the highest mountains in Ehden and Al Shouf. However, in Jabal Moussa Biosphere Reserve the balance is still found (restored by predators).</p>

Photo: Mounir Abi Said
<b>Population:</b>
This species is well distributed. <b>In Lebanon:</b> Abundant, very common
<b>Identification:</b>
The Wild boar is a large pig with a medium tail length, which is well covered with hair. The muzzle is very elongated and narrow. The feet have four well developed toes. Hair color shows some variation with adults, but most are brown although some are

blackish, grayish or even very pale. The Wild boar measures up to 170 cm and weighs up to 250-300 kg.

**Habitat**

The Wild boars is inhabitant of dense thickest forests, wooded hills and forests, and river valleys.



#### 1.5.2.1.1.4.15

##### *Sciurus anomalus syriacus* **Persian Squirrel**

##### **Distribution**

The Persian squirrel *Sciurus anomalus* is distributed in Europe, Asia Minor and Asia. The subspecies *Sciurus anomalus syriacus* is known from Syria, Lebanon, Jordan and Palestine.

**Lebanon:** Squirrels are endangered in Lebanon. They used to occur in most oak and pine forests in Mount Lebanon, the North and the South. It still exists in most reserves in Lebanon: Tannourine, Horch Ehden, and Al Shouf BR (personal observation by Abi Said, M.). However, a good and healthy population occurs in Jabal Moussa Biosphere Reserve.



Photo: Mounir Abi Said

##### **Population:**

This species is decreasing in Europe due to competition with gray squirrels and their population are decreasing elsewhere. **In Lebanon:** Rare

**Chronology:** This species was widely spread in Lebanon (Lewis *et al.*, 1967). Tohmé and Tohmé (1985) reported this species in the North and Mount Lebanon. The population of Persian squirrel has decreased and its distribution has reduced in size in Lebanon. However, in Jabal Moussa Biosphere Reserve it is represented in a good and healthy population and is well distributed in the reserve.

**Identification:**

The Persian squirrel is a subspecies of the common red squirrel of Eurasia. It is distinguished by its brownish reddish upper coat and pale orange belly, and grizzled bushy tail. The fairly large ears are surrounded by tufts of hair that might get longer in winter. It measures ~35 cm.

**Habitat:**

Wooded area as Oak, Pine, and Cedar forests.

#### 1.5.2.1.1.4.16

*Hystrix indica indica* **Porcupine**

#### **Distribution**

The porcupine's distribution ranges from Arabia to Asia minor, eastern Europe, Iran, Afghanistan, Nepal, India to Srilanka. It is also known from Syria, Lebanon, Jordan, Palestine and the Gulf countries.

**Lebanon:** Porcupines are common in Lebanon. They occur mainly in the oak forest of Mount Lebanon, the North and the South. A good and healthy population occurs in Jabal Moussa Biosphere Reserve.



Photo: Mounir Abi Said

#### **Population:**

This species is common wherever it exists **In Lebanon:** Common

**Chronology:** This species was widely spread in Lebanon (Lewis et al.,1967). Tohmé and Tohmé (1985) reported this species from Mount Lebanon. The population of porcupine has increased especially during the civil war when people were displaced from their villages and agricultural land was abandoned providing an abundant habitat for porcupines to reproduce and grow their population. However, this is the first time to be reported in the Jabal Moussa BR region; they exist in good and healthy population

and are well distributed in the reserve.

**Identification:**

The porcupines is a large rodent, the largest in Lebanon. It is adapted to strictly terrestrial and fossorial life. The body is covered with modified hair, called quills, the eyes and ears are small. A porcupine measures 88 cm and may reach 35 kg in body weight.

**Habitat:**

This massive rodent lives in large holes within colonies that are located on an elevated spot (about 50 cm) and are concealed amongst vegetation. Their main habitat is rocky terrain within oak forests. It makes its lair in caves or cervices.

1.5.2.1.1.4.17

***Spalax leucodon ehrenbergi* Mole Rat**

**Distribution**

The Mole rat's distribution ranges from Lybia to the Arabian peninsula, Asia minor, Transcaucasia, and south-eastern Europe. It occurs in Syria, Lebanon, Jordan and Palestine.

**Lebanon:** Mole rats are well distributed all over Lebanonas well as in JMBR, and this is evident from the hilly traces that they leave behind.



Photo: Pierre Doumet

**Population:**

This species is common wherever it exists. **In Lebanon:** Common

**Chronology:** This species is locally abundant all over Lebanon from sea level to the higher mountain valleys (Lewis et al, 1967, Tohmé and Tohmé 1985). In JMBR, it is also abundant.

**Identification:**

The Mole rat lives entirely underground. The eyes are vestigial without any trace externally. The external ears are also vestigial and the tail is virtually absent. It

measures 18 cm and weighs ~ 125 g.

**Habitat:**

The Mole rat lives entirely underground. It lives in all terrains and at different altitudes.

1.5.2.1.1.4.18

***Apodemus mystacinus mystacinus* The Broad Tooth Field Mouse**

**Distribution**

The Broad tooth field mouse occurs in Arabia, Asia Minor, western Transcaucasia, Greece, Yugoslavia and Crete. It occurs in Iraq, Syria, Lebanon, Jordan and Palestine.

**Lebanon:** The Broad tooth field mouse is well distributed all over Lebanon, ranging from sea level to the alpine zone above tree line. In JMBR, it is very abundant and found all over the reserve.



Photo: Mounir Abi Said

**Population:**

This species is common wherever it exists. **In Lebanon:** Common

**Chronology:** This species is locally abundant all over Lebanon from sea level to the higher mountain valleys (Lewis et al, 1967, Tohmé and Tohmé 1985). In JMBR, it is also abundant.

**Identification:**


The Broad tooth field mouse is a small to medium sized mouse with soft fur that is grey dorsally and white ventrally. The tail is moderately tall; ears are large and broadly ovate above. The eyes are lustrous and well developed.

**Habitat:**

The field mouse inhabits moisture hills, rocky scrub land and mountain ranges of the Mediterranean. It frequents the terrace walls of orchards and vineyards. It lives in dense oak forests where the canopy of trees creates a continuous layer of foliage.



1.5.2.1.1.4.19

<b><i>Gerbillus dasyurus gallagheri</i> The Wagner's Gerbil</b>
<b>Distribution</b>
The Wagner's gerbil is essentially endemic to Arabia and north-eastern Egypt. It occurs in Syria, Jordan, Palestine and the Gulf countries.
<b>Lebanon:</b> Its observation in JMBR constitutes the first record of wagner's gerbil in Lebanon (Abi-Said 2009).

Photo: Mounir Abi Said
<b>Population:</b>
Endemic to Arabia
<b>Chronology:</b> This species was first reported by Abi-Said (2009) in JMBR for Lebanon.
<b>Identification:</b>
The Wagner's gerbil is a medium size gerbil, of slender and graceful build. Its tail is long, ears are roundish and rear limbs are much longer than the fore ones. It measures 20 cm.
<b>Habitat:</b>
The gerbil inhabits rocky steppe deserts or rocky scrub land with burrows constructed beneath shrubs.

1.5.2.1.1.5 List of mammal species encountered in JMBR according to their order, family, species, common English name and Arabic names.

ORDER	FAMILY	SPECIES	ENGLISH NAME	LOCAL NAME
<i>Insectivora</i>	<i>Erinaceidae</i>	<i>Erinaceus europaeus concolor</i>	Hedgehog	Quonfoz
<i>Chiroptera</i>	<i>Rhinolophidae</i>	<i>Rhinolophus euryale judaicus</i>	Mediterranean horseshoe bat	Aamash Saghir
	<i>Molossidae</i>	<i>Tadarida teniotis</i>	European Free-Tailed bat	Watwat Abo Danab Horr
	<i>Vespertilionidae</i>	<i>Pipistrelle kuhli ikhawanius</i>	Kuhl's Pipistrelle	Khaffash kuhli
<i>Carnivora</i>	<i>Canidae</i>	<i>Canis aureus syriacus</i>	Jackal	Ibn A'awa
		<i>Canis lupus pallipe</i>	Wolf	Dib
		<i>Vulpus vulpus palaestina</i>	Red fox	Tha'alab
	<i>Mustelidae</i>	<i>Martes foina syriaca</i>	Stone martin	Nemes
		<i>Mustela nivalis</i>	Weasel	Ibn Ers
		<i>Meles meles canescens</i>	Eurasian badger	Ghrait
	<i>Hyaenidae</i>	<i>Hyaena hyaena syriaca</i>	Striped Hyaena	Daba'a
	<i>Felidae</i>	<i>Felis silvestris</i>	Wild cat	Herr Barree
<i>Hyracoidea</i>	<i>Proviidae</i>	<i>Procavia capensis syriaca</i>	Rock hyrax	Tabsoon
<i>Artiodactyla</i>	<i>Suidae</i>	<i>Sus scrofa lybicus</i>	Wild boar	Khanzeer barri
<i>Rodentia</i>	<i>Sciuridae</i>	<i>Sciurus anomalus syriacus</i>	Persian squirrel	Sinjab
	<i>Hystricidae</i>	<i>Hystrix indica indica</i>	Porcupine	Al-Nees
	<i>Spalacidae</i>	<i>Spalax leucodon ehrenbergi</i>	Mole rat	Kheled

	<i>Muridae</i>	<i>Apodemus mystacinus</i> <i>mystacinus</i>	The broad tooth field mouse	Fa'er Haqel
	<i>Gerbillinae (sub- family)</i>	<i>Gerbillus dasyurus</i> <i>gallagheri</i>	Wagners gerbil	Gerbil

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### 1.5.3 BIRDS

There is a relative paucity of ornithological information on Jabal Moussa Biosphere Reserve. Available information is scanty and/or insufficient. Prior to the declaration of Jabal Moussa a Biosphere Reserve in 2009, the area was known as Wadi Nahr Ibrahim and Wadi Nahr Ed Dahab. Throughout the past 40 years (1970-2010), there were only very few visits and studies in this region. Among these it is worth mentioning the following: J. Neuschwander (1971, 1972, 1973), G. Ramadan Jaradi (1972, 1973, 1993, 1995, 1998, 2001, 2004, 2005, 2008, 2009, 2011), Marc Almecija (2005-2008), Thierry Bara (2000-2009), Arocha (2008-2009). All these short-term studies provided a list consisting of only 95 bird species.

Results reported in a published paper by Ramadan-Jaradi, G. & Ramadan-Jaradi, M. (2008) are based on all previous ornithological works. The present paper considers the observations made after 2008, especially by Arocha and our systematic and continuous observations (often once monthly) in the Jabal Moussa BR throughout August 2010 until end of May 2011. These observations have provided enough data to chart breeding, wintering and migration patterns for 137 species distributed over 33 families. Of these species, 113 occur in migration and 54 in winter. Of the migrating species, 36 proved to breed in the area as Summer Breeders (SB). Of the remaining **species**, 25 are resident breeders (R) (see Annex 4).

However complete the above list may be, it must be kept in mind that there are still many gaps in the information about the species because some of our surveys were thwarted by the vagaries of the weather, most notably winter and early spring storms. Sometimes, the easterly warm dry air caused inversion and suppressed the formation of proper thermals during the early spring migration period. Thus, the visits were not quite evenly distributed along the year. Consequently, the periods given for passages are not necessarily representative of the real dates of their arrival and departure but they point to the periods, during which these birds were observed.

All the cited difficulties and the constraints mentioned above didn't prevent the study from providing sufficient data to highlight the composition of the avifauna in the Jabal Moussa BR area.

As a result, 137 bird species (see Annex 4) were recorded with varied number of individuals and frequencies; of which 61 species definitely breed in the area, 20 are probable summer breeders (SB), and one rare resident but not yet recorded with breeding evidence during the study period. In addition to all the species above, 31 more species were expected to be recorded due to suitability of habitats, but have not yet been seen or heard.

**1.5.3.1 Selected species:** The fine filter retained 24 species: the globally threatened *Crex crex*, four regionally threatened species *Ciconia ciconia*, *Pernis apivorus*, *Accipiter brevipes*, and *Aquila pomarina* for their high accessibility, for their use of the reserve as roosting site and for their count, which indicates global warming, migration peaks and level of conservation within Jabal Moussa Biosphere Reserve. Of the Middle Eastern species of the mid-coarse filter, only the *Serinus syriacus* is selected here for being the most accessible and persecuted by people as cage bird and because of its high indication about the productivity of certain habitats within the site. The fine filter also retains the game birds *Scolopax rusticola*, *Coturnix coturnix*, *Sptreptopelia turtur*, *Turdus philomelos*, *Turdus iliacus* and *Turdus viscivorus*, which give an indication on the hunting pressure outside the reserve boundary and the conservation status within the reserve. Of the breeding birds, only 12 species will be selected: *Buteo rufinus*, *Hieraaetus fasciatus* and *Circaetus gallicus* for their place on the summit of the trophic chain and their role played in the ecological balance of the site; *Alectoris chukar* for being the symbol of the reserve's avifauna; *Cuculus canorus* for its utility in controlling the toxic hairy pine-tree caterpillar; *Bubo bubo* as

nocturnal rare top food chain predator; *Sylvia melanocephala*, *Prinia gracilis*, *Iduna pallida*, *Carduelis chloris chlorotica* and *Lanius collurio*, which are Middle Eastern, find their refuge in the reserve, and finally *Corvus corone cornix*, which provides nesting sites to the rare Falcon species.

#### 1.5.3.1.1.1 Rare (3)

SPECIES	ENGLISH NAME	LOCAL NAME	LOCALIZATION		ABUNDANCE
			HABITAT	GPS	
<i>Crex crex</i>	<b>Corncrake</b>	Salwa	Open areas		2 individuals/ year
<i>Bubo bubo</i>	<b>Eagle Owl</b>	Bouma	Slight forested rocky slopes		2 records
<i>Iduna pallida</i>	<b>Eastern Olivaceous Warbler</b>	Boubana	Forested areas		About 13 pairs

#### 1.5.3.1.1.2 Endemic (1)

SPECIES	ENGLISH NAME	LOCAL NAME	ENDEMISM	LOCALIZATION		ABUNDANCE
				HABITAT	GPS	
<i>Serinus syriacus</i>	<b>Syrian Serin</b>	Na'ar souri	To Middle East	Bushes, shrubs, scrubs		Medium

#### 1.5.3.1.1.3 Noteworthy (13)

SPECIES	ENGLISH NAME	LOCAL NAME	VALUE	LOCALIZATION		ABUNDANCE
				HABITAT	GPS	
<i>Ciconia ciconia</i>	<b>White Stork</b>	Liqlaq	Birdwatching, pest control	All over, especially meadows		Very High  Around 3000/year
<i>Coturnix coturnix</i>	<b>Quail</b>	Firri	Potential gamebird	Open areas		Medium  Tens
<i>Buteo rufinus</i>	<b>Long-legged Buzzard</b>	-	Birdwatching, pest control	All over		Very Low  2 pairs (one pair in Broqta)
<i>Hieraaetus fasciatus</i>	<b>Bonelli's Eagle</b>	Bonelli	Birdwatching, pest control, flagship	All over overhead		Very Low  At least one or two pairs
<i>Scolopax rusticola</i>	<b>Woodcock</b>	Djaj el Ard	Gamebird, pest control	Climax forested area		Low  7 indiv.

<i>Alectoris chukar</i>	<b>Chukar</b>	Hajal	Gamebird	All over		High >60 pairs
<i>Cuculus canorus</i>	<b>Cuckoo</b>	Qayqab	Pest control of excellence	All over		Low About ten
<i>Streptopelia turtur</i>	<b>Turtle Dove</b>	Tirghal	Gamebird	Open woods		Medium Few tens
<i>Turdus philomelos</i>	<b>Song Thrush</b>	Simmon	Gamebird	All over		Medium Hundreds
<i>Turdus iliacus</i>	<b>Redwing</b>	Simmon	Potential gamebird	All over		Low Few tens
<i>Turdus viscivorus</i>	<b>Mistle Thrush</b>	Simmon	Potential gamebird	All over		Medium Tens
<i>Serinus syriacus</i>	<b>Syrian Serin</b>	Na'ar Soury	Birdwatching Bioindicator	All over		Low Tens
<i>Corvus cornix</i>	<b>Hooded Crow</b>	Qaq	Bioindicator	All over		High Hundreds

#### 1.5.3.1.1.4 Introduced (Alien invasive) (0)

SPECIES	ENGLISH NAME	LOCAL NAME	ORIGIN	LOCALIZATION		ABUNDANCE
				HABITAT	GPS	

#### 1.5.3.1.1.5 Threatened (7)


SPECIES	ENGLISH NAME	LOCAL NAME	LEVEL OF THREAT	LOCALIZATION		ABUNDANCE
				HABITAT	GPS	
<i>Crex crex</i>	<b>Corncrake</b>	Salwa	Global	All over		Low 2-4 indiv./year
<i>Ciconia ciconia</i>	<b>White Stork</b>	Liqlaq	Regional	All over, especially meadows		High c.3000/year
<i>Serinus syriacus</i>	<b>Syrian Serin</b>	Na'ar Soury	Regional	All over, mainly in glades and forest edges		Low Tens

<i>Iduna pallida</i>	<b>Eastern Olivaceous Warbler</b>		Local	All over		Low About 13 pairs
<i>Bubo bubo</i>	<b>Eagle Owl</b>	Bouma	Regional	All over, mainly rocky slopes		Very low 2 records
<i>Circaetus gallicus</i>	<b>Short-toed Eagle</b>	Ouqab El Hayyat	Regional	All over		Very high
<i>Aquila clanga</i>	<b>Greater Spotted Eagle</b>	Ouqab Nasari Kabir	International	All over		Very few




### 1.5.3.1.1.6 Useful information and details about the selected species


#### 1.5.3.1.1.6.1

<b><i>Alectoris chukar</i> Chukar Partridge</b>
<b>Distribution</b>
<b>Middle East:</b> Resident in Middle Eastern Countries.
<b>Lebanon:</b> Common resident breeder over the country with peaks of up to thirty birds after breeding season. Recorded in most parts of the Lebanese mountains.
 <p style="text-align: right;">Drawing: <a href="http://www.birdguides.com">http://www.birdguides.com</a></p>
<b>Population</b>
In the 1970's and 1980's thousands of pure or hybrid birds were released in Lebanon. These bred well in captivity, but their release threatened the survival of the wild Chukar. Those birds that had already been released have had a poor rate of reproduction in the wild, so these hybrids will soon disappear. <b>In Lebanon</b> , wild Chukars count c. 7,,000 breeding pairs, widespread at higher altitudes, but uncommon across low hills and coastal areas.
<b>Identification</b>
Feral birds can increasingly be found in mountains, but are often overlooked. A Middle-eastern species, which can be found in many parts of Turkey, including the Camlica Hills, Istanbul and also the hills of north-east Greece. Perhaps the easiest places to see them though are on some of the Aegean islands - they are particularly numerous on Aghios Efstratios, for example.
<b>Habitat</b>
Resident in rocky areas, especially in mountainous country, but in some parts of its range also present down to sea level or in lowland scrub.


### 1.5.3.1.1.6.2

<b><i>Bubo bubo</i> Eagle Owl</b>
<b>Distribution</b>
<b>Middle East:</b> Resident. Quite widespread in Europe and Middle East, but usually scarce and difficult to find.
<b>Lebanon:</b> Recently discovered breeding in very low number in the country.
 <p style="text-align: right;">Drawing: <a href="http://www.birdguides.com">http://www.birdguides.com</a></p>
<b>Population</b>
10,000-13,000 breeding pairs, like the Barn Owl, widely ranging across Europe, Asia and north Africa. Most abundant in Siberia, Norway and Finland, it occurs in most of mainland Europe. <b>In Lebanon</b> , tens of pairs were spotted during the last ten years, mainly in the Beqaa Valley, Barouk and Rihane Mountains.
<b>Identification</b>
What an impressive beast the Eagle Owl is. Ten times heavier than a Long-eared Owl, this bird is powerful enough to tackle prey as large as a small deer or a Capercaillie. At rest it is the only big owl with ear tufts. Even if these are flattened, they are still distinctive, creating a frowning expression not found in other large owls. It's rich, orange-brownish colours and flaming red eyes are further differences, giving the impression of a huge Long-eared Owl. In flight they are shorter tailed than the other large owls and the pointed head is usually obvious.
<b>Habitat</b>
Breeds and winters in rocky gorges or ridges, often amidst woodland.

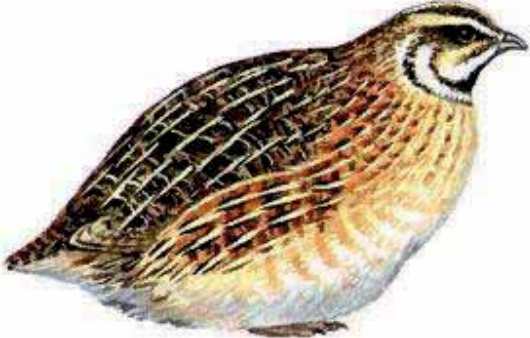
### 1.5.3.1.1.6.3

<b><i>Buteo rufinus</i> Long-legged Buzzard</b>
<b>Distribution</b>
<b>Middle East:</b> A widespread breeding bird in Turkey, but it can also be found in parts of Greece, Romania, Bulgaria and even Hungary, where a few pairs now breed on the Hortobagy. <b>Lebanon:</b> Resident and passage migrant breeder in scattered areas of Lebanon and found to breed at Broqta. Another pair is suspected near Snawbar Village.

Drawing: <a href="http://www.birdguides.com">http://www.birdguides.com</a>
<b>Population</b>
10,000-13,000 breeding pairs, like the Barn Owl, widely ranging across the Europe, Asia and north Africa. Most abundant in Siberia, Norway and Finland, it occurs in most of mainland Europe. <b>In Lebanon</b> , about a total of 65 pairs has been identified in all areas of the country.
<b>Identification</b>
In plumage, Long-legs look generally rufous, often becoming paler on the head and darker on the belly, and with a plain orange tail, which may appear translucent. Such features make them look quite different from most Buzzards, but there is an eastern race of Common Buzzard, known colloquially as 'Steppe Buzzard', which can look just as rufous. Apart from the differences in shape, a Long-leg seen from below will have an unbarred belly, solid dark carpel patches and a tail, which is either unbarred if its an adult, or faintly, but evenly barred if it's a juvenile. More convincingly, from above, the same bird will have pale, rather greyish panels in the primaries and the tail will become paler towards the base, so it looks almost white near the rump.
<b>Habitat</b>
Resident in areas of open country.

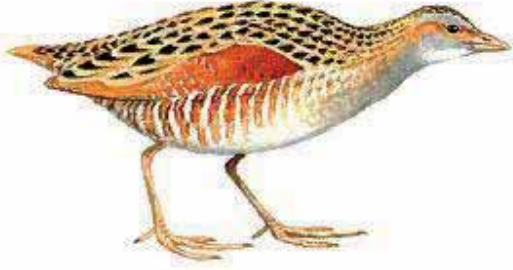
#### 1.5.3.1.1.6.4

<b><i>Ciconia ciconia</i> White Stork</b>
<b>Distribution</b>
<b>Middle East:</b> Breeding summer visitor and common passage migrant.
<b>Lebanon:</b> Abundant and regular on both passages, over the whole country. Recorded at Aaichyeh, Aammiq, Ainata, Azour, Beirut, Beiteddine, Beqaa Valley, Bikfaya, Byblos, Dalhoun, Damour, Deir Mimas, Fatre, Harissa, Hasrout, Jamhour, Jounieh, Krak des Chevaliers, Nabatyeh, Niha, Qaraoun, Rayhan, Tripoli, Jabal Moussa and Tyre.

Drawing: <a href="http://www.birdguides.com">http://www.birdguides.com</a>
<b>Population</b>
The European population is estimated at about 100,000 pairs. The Russian population between 3,500 and 4,000, and the Turkish population between 15,000 to 35,000 pairs. <b>In Lebanon:</b> Regular on passage with daily peaks between 30-10,000 individuals.
<b>Identification</b>
It is unmistakable, with a white body, mostly black wings, red legs and a long red bill.
<b>Chronology:</b> First mentioned at Aammiq by MacFarlane (1978). At least during the last 10 years, the number of individuals is generally constant from one year to another ( <i>pers. obs.</i> ).
<b>Habitat</b>
Feeds mostly in fields and meadows.


1.5.3.1.1.6.5

<b><i>Coturnix coturnix</i> Quail</b>
<b>Distribution</b>
<b>Middle East:</b> Breeding summer visitor, widespread on passage and few are overwintering.
<b>Lebanon:</b> Uncommon and localized migrant. Common passage migrant over most parts of the country. Few overwinter, mainly in the Beqaa valley. Recorded at Aammiq, Aichyeh, Aramta, Beirut, Beqaa Valley, Jiyeh, Joub Jannine, Kfarhouneh, Khaldeh, Mlikh, Ryhan, Tripoli, Palm Islands and Tyre.

Drawing: <a href="http://www.birdguides.com">http://www.birdguides.com</a>
<b>Population</b>
650,000-900,000 breeding pairs are common across Europe, but rare in the north. <b>In Lebanon:</b> The passing birds are in thousands whilst the winterers are very few and the summer breeders are widely fluctuating due to excessive hunting pressure.
<b>Identification</b>
The Quail is a tiny gamebird, most likely to be mistaken for a half-grown young Partridge, but the male has a black and white head pattern, which is mimicked in a duller brown version by the female. If you are lucky enough to flush one you'll see a dumpy, hump-backed, narrow-winged gamebird skimming low over the vegetation with quick, shallow wing-beats. More usually though, you will hear its diagnostic call.
<b>Chronology:</b> First mentioned at Aammiq by MacFarlane (1978) and then by NCSR (1999). There is a recent tendency for wintering (pers. obs.) that may reflect stability conditions in winter over the site.
<b>Habitat</b>
Breeds in arable fields and long grass.

#### 1.5.3.1.1.6.6

<b>Crex crex Corncrake</b>
<b>Distribution</b>
<b>Middle East:</b> Widespread on passage throughout region.
<b>Lebanon:</b> Uncommon passage migrant over the country with peaks of up to six birds. Recorded at Aammiq, Beirut, Palm Islands, Tyre.

Drawing: <a href="http://www.birdguides.com">http://www.birdguides.com</a>
<b>Population</b>
87,000-97,000 breeding pairs widespread, but uncommon across Europe and rare in the north. <b>In Lebanon:</b> The yearly recorded birds are apparently not exceeding a dozen.
<b>Identification</b>
If you are lucky enough to catch a glimpse it will probably be of a bird flying weakly away, with its rufous wings standing out and with its legs dangling behind it. Birds seen on the ground are quite distinctive, particularly the yellow bill and legs, grey facial stripes, dark back and rufous wings. They could almost be a cross between a Partridge and a Water Rail. (The distinctive call of the Corncrake is usually the only contact you will have in the European breeding ground with this elusive and declining species.)
<b>Habitat</b>
Found in cultivated lands, meadows and other open grassy lands.

1.5.3.1.1.6.7

<b><i>Cuculus canorus</i> Cuckoo</b>
<b>Distribution</b>
<b>Middle East:</b> Widespread and locally common throughout Europe and the Middle East.
<b>Lebanon:</b> Uncommon and widely distributed across all of Lebanon. Adults are usually present from April to early August, with juveniles leaving slightly later.

Drawing: <a href="http://www.birdguides.com">http://www.birdguides.com</a>
<b>Population</b>
More than a million birds widespread throughout Europe and unknown population size in the Middle East. <b>In Lebanon:</b> The yearly recorded birds are apparently not exceeding tens.
<b>Identification</b>
Cuckoos are blue-grey birds with white, closely barred underparts. Their short wings and long tail are suggestive of a Sparrowhawk, but the wings are clearly pointed more like a falcon. However, their fluttering flight with quick shallow wing-beats is distinctive, mainly because the wings are always held below the horizontal level. Juveniles are usually a dull dark brown, heavily marked with black and with a pale patch on the nape.
<b>Habitat</b>
Breeds on moorland, wasteground, reedbeds and woodland edges.

1.5.3.1.1.6.8

<b><i>Hieraetus fasciatus</i> Bonelli's Eagle</b>
<b>Distribution</b>
<b>Middle East:</b> The adults are very faithful to their breeding sites throughout the year in all Middle Eastern countries
<b>Lebanon:</b> The adults are very faithful to their breeding sites throughout the year, so places, such as the Jabal Aitou in the North or Kfarhim above Multaqa Al_Nahrein, are usually reliable. Young birds move around more and are therefore less predictable.

Drawing: <a href="http://www.birdguides.com">http://www.birdguides.com</a>
<b>Population</b>
820-900 breeding pairs. Most of these live in Spain, Portugal, France, Turkey and Greece. <b>In Lebanon:</b> The yearly recorded birds are apparently around ten pairs.
<b>Identification</b>
The adults are easy to identify. There are several medium-sized raptors with black and white underwing markings but Bonelli's don't have completely white coverts like Booted Eagle and Egyptian Vulture or black carpal patches like Ospreys. Instead, their coverts are mostly dark, contrasting with a variable amount of white at the leading edge of the wing. The overall impression is usually of a raptor, which is relatively dark on the underwing, but with a startlingly white head, body and forewing. They are equally distinctive from above, being the only medium-sized raptor with a pale patch on the back, though this can vary in size. The juveniles are pale rufous below, recalling Long-legged Buzzard in colour, but the eagle is larger, with broader, more rectangular wings, a longer head and tail, and no dark carpal patches. Sub-adult Bonelli's may be neither white-bodied nor rufous and may have to be identified by shape alone; the combination of long tail, long head and straight rear edge to the wing is usually distinctive enough, but look also for a diagnostic black band across the middle of each wing.
<b>Habitat</b>



Nests on rocky cliffs and is therefore associated with mountains and gorges. In winter, immature birds disperse to lower altitudes and may be seen by marshes.

#### 1.5.3.1.1.6.9

### *Scolopax rusticola* Woodcock

#### Distribution

**Middle East:** An extremely secretive woodland species, usually only seen when flushed. Large numbers of birds arrive from mid-October onwards and are often seen at different localities.

**Lebanon:** Winterer in most woodlands.



Drawing: <http://www.birdguides.com>

#### Population

The population of Europe (excluding Russia) is estimated at between 500-700,000 pairs. **In Lebanon:** small numbers occur during migration. Wintering figures are much higher, but reliable estimates have not been made.




#### Identification

The Woodcock is fat-bodied and rather round-winged and can look rather owl-like (except for the long pointed bill). A big, bulky, brown bird flushed from a woodland floor is more likely to be a Woodcock than an owl and the rich red-brown plumage, rapid zig-zagging flight and long bill will confirm this. At rest, a Woodcock is easily told from a Snipe because the head stripes go across the top of the crown rather than along it.

#### Habitat

Winters in woods, parks, orchards, hedgerows and gardens, but mainly in woodland with ground cover and damp areas. Feeds in nearby fields after dusk.

1.5.3.1.1.6.10

<b><i>Serinus syriacus</i> Syrian Serin</b>
<b>Distribution</b>
<b>Middle East:</b> Resident, dispersive, migrant to partial migratory and winterer.
<b>Lebanon:</b> Resident augmented by migrants and winterers. Reported from Aammiq, Aichyeh, Ain Zhalta, Ainata, Anti-Lebanon, Aramta, Azour, Baalbek, Barouk, Bcharre, Bmouhreh, Ehden, Hermon, Jaj, Jebel Barouk, Kammouha:, Kefraya, Kfarhouneh, Masser El chouf, Mlikh, Ryhan, Tannourine, Tyre and Yammouna.

<b>Population</b>
Numbers of this Middle Eastern bird are not known. Instead, the average number of breeding pairs in suitable habitats of Lebanon is 14 (between 8.29 and 20.7).
 <b>identification</b>
Relatively paler and tail slightly longer than the European Serin. Yellowish washed with grey on the upper parts, head and chest. The front and the ocular circle, as well as the upper tail and the wing bares, are more yellowish.
 <b>habitat</b>
Nests on hill's slopes with shrubs, bushes, cedar or juniper trees. Winters at lower

altitudes in bottom of valleys or in cultivated lands.

#### 1.5.3.1.1.6.11

### *Turdus iliacus* Redwing

#### Distribution

**Middle East:** Occurs in large numbers in many parts of central and southern Europe and Middle East in winter.

**Lebanon:** scarce passage migrant in mid-February–late March and early November–mid-December and more common in winter from early December–early February. Most frequently recorded in montane orchards, olive groves, open cedar groves, open mixed woodland, open country and cultivation. Rare in Beqaa and on the coast.



Drawing:<http://www.birdguides.com>

#### Population

5-7 million breeding pairs mostly in Scandinavia. The wintering population in Europe and Middle East, however, can reach at least 1,500,000 birds. **In Lebanon**, the records are not enough to estimate the wintering population.


#### Identification

The Redwing most closely resembles the Song Thrush but is best identified by the obvious buff stripes over its eye and through the moustache. These features are often more obvious than the red flanks and red underwing, which give the species its name.


#### Habitat

Winters in hedges, fields, and gardens.

1.5.3.1.1.6.12

<b><i>Turdus philomelos</i> Song Thrush</b>
<b>Distribution</b>
<b>Middle East:</b> Widespread and numerous in most of Europe, although in many areas of southern Europe and Middle East they are restricted to hilly or mountainous regions.
<b>Lebanon:</b> very common passage migrant in early October–late November and mid-February–early April, and an uncommon to scarce winter visitor from late November–late February. Recorded in orchards, olive groves, open cedar groves, cultivation, maquis, isolated trees and around Ammiq swamp. Rare on the coast.

Drawing: <a href="http://www.birdguides.com">http://www.birdguides.com</a>
<b>Population</b>
14-18 million breeding pairs widespread across north-western Europe, but rare in Spain, Italy and Greece. Finland, Germany, Sweden and Britain support the largest numbers. In Middle East, the figures are unknown. <b>In Lebanon</b> , the records are not enough to estimate the wintering population.
<b>Identification</b>
Its brown plumage and speckled chest is typical of a thrush. It lacks the white eye stripes of a Redwing and is so most easily mistaken for a Mistle Thrush. The Song Thrush, however, is smaller, more neatly proportioned, with warm brown upperparts and a rather dark face. It lacks the white tips to the corners of the tail and the white edges to many of the wing feathers shown by a Mistle Thrush. The underwing coverts are clearly orange, but not as deep and red as in a Redwing, which is a potential source of confusion.
<b>Habitat</b>
Winters in gardens, farmland, woodland and hedges.

1.5.3.1.1.6.13

<b><i>Turdus viscivorus</i> Mistle Thrush</b>
<b>Distribution</b>
<b>Middle East:</b> Widespread and numerous in most of Europe, although in many areas of southern Europe and Middle East they are restricted to hilly or mountainous regions.
<b>Lebanon:</b> very scarce and local migrant breeder to remote areas of the north, mainly in wooded parkland of fir at Qammouha, <i>Quercus cilicica</i> at Fneideq and cedar at Karm Al Mohr, near Ehden. Uncommon to scarce on passage and common in winter from late October–late March in open montane woodland.

Drawing: <a href="http://www.birdguides.com">http://www.birdguides.com</a>
<b>Population</b>
2-3 million breeding pairs in Europe extending eastwards to Russia. <b>In Lebanon</b> , the records are not enough to estimate the wintering population, but the known breeding population is limited to c. 25 pairs.
<b>Identification</b>
The Mistle Thrush is a big, bold, aggressive bird, larger than a Blackbird and more fat-bellied, longer-tailed and smaller-headed than other thrushes. Its upperparts are paler, more grey-brown than on a Song Thrush and there are white edges to many of the wing feathers and the corners of the tail. The face is generally paler making the dark eye more prominent and giving a 'wide-eyed' expression.
<b>Habitat</b>
Breeds in woods, parks, gardens and orchards. Also found in winter in fields and moorland edges.

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#### 1.5.4 REPTILES AND AMPHIBIANS

Apparently there is no true<sup>1</sup> herpetological work conducted at JMBR prior to 2010 when the author of this section established the first list of the JMBR herpetofauna (Hraoui-Bloquet in Tohmé et al., 2011). In 2001, Hraoui-Bloquet (author of this section) *et al.* published a comprehensive paper on the distribution of the herpetofauna species over the Lebanese territories (including Jabal Moussa). They noted the presence at Yahchouch (Jabal Moussa BR) of the Newt *Triturus vittatus vittatus* for the first time in Lebanon, and the toad *Bufo bufo* at Chouene, also for the first time in the country. Some old monographs are also known for the region (Lebanon and Syria): Angel, 1936; Boulanger, 1923; Lortet, 1883; Muller and Wettstein, 1933; Werner, 1939; Wettstein, 1928. Other recent works on the Lebanese herpetofauna have been published by Bosch (1998) and Bosch et al (1998).

The work of Hraoui-Bloquet in Jabal Moussa BR has resulted in a species list shown in Annex 5. This list comprises 30 species distributed over 15 families. They include 6 species of amphibians distributed over 4 families. Only the *Chamaeleo chamaeleon restricta*, *Testudo graeca terrestris* and *Hemidactylus turcicus* are globally threatened. The regionally threatened (*Salamandra infraimmaculata infraimmaculata*, *Bufo viridis*, *Rana levantina*, *Hyla savignyi*, *Lacerta media wolterstorffi*, *Peonicolacerta laevis*, *Cyrtopodion kotschy orientalis*, *Platiceps najadum dahlii*, *Malpolon monspessulanus insignatus*, *Hierophis jugularis*, *Natrix tessellata tessellata*, *Vipera palaestinae* and *Macrovipera lebetina* are limited to 13 species (43% of the Jabal Moussa Reserve's herpetofauna). Two species (*Chamaeleo chamaeleon restricta* and *Cyrtopodion kotschy orientalis*) are endemic. The uncertain status of 6 species indicates that further field verification is needed to fill the gaps found in the acquired knowledge.

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<sup>1</sup> A visit of three non-specialists to JMBR revealed the presence of three common species during 2010. They are *Laudakia stellio stellio*, *phoenicolacerta laevis* and *Ophisops elegans*.

### 1.5.4.1. Selected species

#### 1.5.4.1.1 Rare (3)

SPECIES	ENGLISH NAME	LOCAL NAME	LOCALIZATION		ABUNDANCE
			HABITAT	GPS	
<i>Chamaeleo chamaeleon recticrista</i>	<b>Chameleon</b>	Harba'a	Trees & Bushes in the forest		Low May pass unnoticed due to camouflage and behaviour.
<i>Testudo graeca terrestris</i>	<b>Greek Tortoise</b>	Sulhafat ard	Shrubby areas		Medium
<i>Salamandra infraimmaculata infraimmaculata</i>	<b>Fire Salamander</b>	Salamander	Damp woodland for juveniles and adults -Aquatic habitat for larva		Low May pass unnoticed due to nature of behaviour and nocturnal activities

#### 1.5.4.1.2 Endemic (2)

SPECIES	ENGLISH NAME	LOCAL NAME	ENDEMISM	LOCALIZATION		ABUNDANCE
				HABITAT	GPS	
<i>Lacerta media wolterstorffi</i>	<b>Green lizard</b>	Suhliat Khdra'a	Regionally	Moist		Medium
<i>Chamaeleo chamaeleon recticrista</i>	<b>Chameleon</b>	Harba'a	Regionally	Trees & Bushes in the forest		Low May pass unnoticed due to camouflage and behaviour.



### 1.5.4.1.3 Noteworthy (6)

SPECIES	ENGLISH NAME	LOCAL NAME	VALUE	LOCALIZATION		ABUNDANCE
				Habitat	GPS	
<i>Salamandra infraimmaculata infraimmaculata</i>	<b>Fire salamander</b>	Salamander	Pest control	Damp woodland of the forest		Low
<i>Tetudo graeca terrestris</i>	<b>Greek tortoise</b>	Soulhafat ard	Vegetarian	In the forest		Medium
<i>Chamaeleo chamaeleon recticrista</i>	<b>Chameleon</b>	Harba'a	Pest control	Trees, Bushes in the forest		Low
<i>Lacerta media wolterstorffi</i>	<b>Green lizard</b>	Suhleia Khdra'a	Pest control	In the forest but principally its boundaries		Medium
<i>Laudakia stellio stellio</i>	<b>Hardun</b>	Hardun	Pest control	In the forest where there are rocks with trees		High
<i>Malpolon monspessulanus insignitus</i>	<b>Montpellier snake</b>	Hayat montpellier	Rodent control	In the forest and its boundaries		High

#### 1.5.4.1.4 Introduced (Alien invasive) (0)

SPECIES	ENGLISH NAME	LOCAL NAME	ORIGIN	LOCALIZATION		ABUNDANCE
				HABITAT	GPS	

#### 1.5.4.1.5 Threatened (4)

SPECIES	ENGLISH NAME	LOCAL NAME	LEVEL OF THREAT	LOCALIZATION		ABUNDANCE
				HABITAT	GPS	
<i>Salamandra infraimmaculata</i>	<b>Fire salamander</b>	Salamander	Regionally	Damp woodland of the forest		Low
<i>Testudo graeca terrestris</i>	<b>Greek tortoise</b>	Soulhafat	Regionally	In the forest		Medium
<i>Chamaeleo chamaeleon recticrista</i>	<b>Chamelon</b>	Harba'a	Regionally	Trees & Bushes		Low
<i>Malpolon monspessulanus insignitus</i>	<b>Montpellier snake</b>	Hayat montpellier	Nationally	In the forest and its boundaries		Abundant

### 1.5.4.2 Useful information and details about the selected species

#### 1.5.4.2.1

*Chamaeleo chamaeleon relictus* (Böttger, 1880). **Common chameleon. Local name: Herbaya or berbakteh**

#### **distribution**

**Middle East:** This species is also present in Syria, Jordan, Palestine, Iraq where it is common (Leviton *et al.*, 1992).

**Lebanon:** The Common chameleon is observed in Lebanon from the sea shore to c. 1,600 m of altitude. This species of lizard is widespread in all the regions of Lebanon (Bekaa, Mount Lebanon, Anti-Lebanon and from the north to the south of the country).



Photo by Ryad Sadek

#### **population**

The population size of this species is not well known in the Middle East. **In Lebanon:** the abundance is medium. This arboreal species is threatened in Lebanon, mainly due to the uncontrolled use of pesticides and deforestation.

#### **identification**

The body and head are bilaterally compressed, tail prehensile, prominent eyes with 180 degrees vision field. Grey olive to brownish with light dots on both sides of the body,

placed in 2 rows. Changes color according to mood and background. Adult size 12 cm. Oviparous. Reproduction in autumn.

**Chronology:** Reported from Lebanon for the first time by S. Hraoui-Bloquet (1981) “les reptiles du Liban: 1) Nomenclature et notes écologiques”. And in the paper “The herpetofauna of Lebanon: new data on distribution” 2002 by S. Hraoui-Bloquet *et al.*



**habitat , reproduction and diet**

In agriculture areas, woodlands, orchards and other tree areas. It is arboreal (living on trees, bushes...). It goes on ground for hibernation during the cold season or to lay eggs during autumn. Its diet are mostly insects.

#### 1.5.4.2.2

*Laudakia stellio stellio* (Linnaeus, 1758). **Hardun. Local name: Hardun**



**distribution**

**Middle East:** This species is widespread in Lebanon, Syria, Palestine, Egypt, Jordan, Iraq, Turkey...

**Lebanon:** Widespread and very common. Lives in rocky areas and woodlands. It is sociable observed on the walls of houses, ruins, orchards, etc. Breeds on the ground in spring. It occurs from the sea shore up to 2,200 m of altitude.



Photo by Ghassan Ramadan Jaradi



**population**

The population size of this species is not well known in the Middle East, **In Lebanon:** the abundance is high. This species is not considered as an arboreal species. It hunts its prey (mostly insects) in trees and eventually feeds on some kinds of fruits, such as cherry. But most of the time, it is observed on rocky terrain where it stays for long periods of time taking sun baths. It spends its night and hibernation time hiding in rocky

holes. It fiercely protects its territory. This species is persecuted in Lebanon mainly by apiculturists.

 **identification**

The body and head are compressed dorso-ventrally, gular fold, dorso-lateral folds, scales of tail arranged in spiny rings. Spiny and keeled dorsal and dorso-lateral scales, ventral scales smooth. Color is grey with black and creamy dorso vertebral blotches in new-borns and juveniles. This pattern will stay in some adults and disappears in some others. It is oviparous and reproduces in spring giving 2 clutches per years.

**Chronology:** It was cited for the first time in Lebanon by S. Hraoui-Bloquet (1981) in the article "Les reptiles du Liban (Nomenclature et notes écologiques)" and in the paper "The herpetofauna of Lebanon: new data on distribution" by S. Hraoui-Bloquet *et al.* (2002).

 **habitat and diet**

Rocky areas and woodlands (maquis, garrigue, fruit trees...) Diet mostly insects (it likes bees and it is not appreciated by apiculturists) and sometimes it eats fruits (cherry , black berries...).

### 1.5.4.2.3

*Malpolon monspessulanus insignitus* (Geoffroy, 1827) **Montpellier snake. Local name: Hannash ahmar**

#### **distribution**

**Middle East:** Common and widespread in Syria, Palestine, Jordan. It occurs in North Africa, from Algeria to Egypt, on the Arabian Peninsula, Southeastern Europe, Turkey and Iran (Leviton *et al.*, 1992).

**Lebanon:** It is very common and widespread in open areas and field edges. It has been observed from the sea shore to about 1,700 m in altitude.



Photo by Ryad Sadek

#### **population**

The population size of this species is not well known in the Middle East or **in Lebanon** but the abundance seems to be high. It is one of the species among reptiles that are affected the most by roadkills.

#### **identification**

It is a colubrid, but it has a rear fang to inoculate venom. The adult size can reach 160 cm or more, the pupil of the eyes is round, the dorsal surface of snout is marked with a longitudinal concave furrow. The dorsal color is uniformly steel-gray. During the

reproduction period, the throat of the male turns reddish-orange.

**Chronology:** It was cited for the first time in Lebanon by S. Hraoui-Bloquet (1981) in the article “Les reptiles du Liban (Nomenclature et notes écologiques)” and in the paper “The herpetofauna of Lebanon: new data on distribution” by S. Hraoui-Bloquet *et al.* (2002).



**habitat and diet**

Field edges, open fields, sunny scrubland. It is diurnal and feeds on birds, lizards and small mammals

#### 1.5.4.2.4

*Hierophis jugularis* (Linnaeus, 1758). **Large whipe snake. Local name: Black snake, Hannash asswad**

#### **distribution**

**Middle East:** Common and widespread in Syria, Palestine, Iran, Iraq, Southern Turkey, and Greece.

**Lebanon:** It is very common and widespread in Lebanon, and has been recorded from the sea shore up to 1,800m of altitude



Photo by Ryad Sadek

#### **population**

The population size of this species is not well known in the Middle East. **In Lebanon** it appears to be abundant.

#### **identification**

This is a non-venomous colubrid and aglyph. The adult size can reach 2 m or perhaps more, the pupils of the eyes are rounded, the tail is long,. Adults are uniformly black, juveniles and subadults are grey-olive with brown transversal patterns. Throat and abdomen are sometimes salmon-red. It is diurnal, feeding mainly on small mammals, lizards, birds and frogs. Reproduction is oviparous and in spring time.

**Chronology:** First reported from Lebanon in 1981 by S. Hraoui-Bloquet and then by S.




Hraoui-Bloquet *et al.* in 2002.



Wide variety of places. This serpent is observed in forests, rocky area, steppes, urban zones, ruins.

#### 1.5.4.2.5

<i>Salamandra infraimmaculata infraimmaculata</i> . <b>Salamander</b>	
 <b>distribution</b>	
<b>Middle East:</b> Common and widespread in most countries of the Middle East. Cited by Beukema, (2003) in Turkey, Irak, Palestine and Syria. This species is similar to <i>Salamandra salamandra</i> ( <b>fire salamander</b> ) living in Europe.	
<b>Lebanon:</b> Common and widespread. Reported from most fresh water bodies (during reproduction period) and from damp woodland out of this period. This species is generally found from 400 m to 1,800 m of altitude.	
	
Photo by Ryad Sadek	
 <b>population</b>	
The population size of this species is not well known in the Middle East or <b>in Lebanon</b> but the abundance seems to be medium.	
 <b>identification</b>	
This species possesses 2 large parotid glands that secrete toxic substance. The tail is cylindrical and shorter than the body. The 4 fingers are not palmed. The body is robust and stocky. The color is black with irregularly yellow spots on the back. The belly is black without spots. This corresponds to the term (infraimmaculata). Adult size 15 to 18 mm from snout to vent.	

**Chronology:** It was cited for the first time in Lebanon by S. Hraoui-Bloquet in 2001 in the article “Les Amphibiens du Liban: inventaire, répartition géographique et altitudinale” and in the paper “The herpetofauna of Lebanon: new data on distribution” by S. Hraoui-Bloquet *et al.* (2002).



The Salamander is ovoviviparous. Females in water deliver the larvae at the stage of external gills where they live and achieve metamorphosis. It is crepuscular and nocturnal. In autumn and spring it comes out during day when it rains. Juveniles and adults leave water bodies to live in damp regions. During the daytime, they remain under tree barks, stones, rocks, etc. Main diet is insects.

#### 1.5.4.2.6

*Testudo graeca terrestris*, (Forsskal, 1775). **Greek terrestrial tortoise. Local name: Sulhafat ard.**

#### **distribution**

**Middle East:** Widespread in most countries of the Middle East (Lebanon, Syria, Jordan, Palestine, Iran, Iraq, Turkey, North Africa du Nord (GASPERETTI *et al.*, 1993).

**Lebanon:** Common and widespread. Reported from sea shore to c.1,800 m of altitude.



Photo by Ghassan Ramadan Jaradi

#### **population**

The population size of this species is not well known in the Middle East or **in Lebanon**, but the abundance seems to be medium.

#### **identification**

The head is covered by shields, the digits are not webbed. Submarginals are absent. The tail is not flattened and shorter in females than in males. Its hind limbs elephantine. The forefeet bear five claws. The supracaudal is single. The head has an uncolored tan or is gray. The dorsal carapace is round (convex). Lifespan: 100 years.

**Chronology:** It was cited for the first time in Lebanon by S. Hraoui-Bloquet (1981) in the article “Les reptiles du Liban (Nomenclature et notes écologiques)” and in the paper “The herpetofauna of Lebanon: new data on distribution” by S. Hraoui-Bloquet *et al.* (2002).



**habitat**

In grasslands, maquis, guarrigue, cultivated areas, semi-arid zones (like in some regions of the Beqaa Valley). The species is diurnal, oviparous and vegetarian. Many individuals from Syria are sold in Lebanon.

#### 1.5.4.2.7

*Lacerta media wolterstorffi* (Mertens, 1992). **Green lizard. Local name: Qarout.**

#### **distribution**

**Middle East:** Also common in Syria, Palestine, Jordan and Turkey

**Lebanon:** Common and widespread in Lebanon. It is the largest among the Lacertidae in the country. It measures 15 cm from snout to vent. It has been recorded between 500 and 1,800 m of altitude in moist zones.



Photo by Souad Hraoui-Bloquet

#### **population**

The population size of this species is not well known in the Middle East or **in Lebanon**, but the abundance seems to be medium.

#### **identification**

It is a strong lizard, the collar is well developed and strongly serrated. Femoral pores are present. The tail is very long. The ventral plates are trapezoidal, with notches in between. Adults are green with small black blotches on the back and laterally; young and juveniles are green with four longitudinal brown lines.

**Chronology:** It was cited for the first time in Lebanon by S. Hraoui-Bloquet (1981) in the article “Les reptiles du Liban (Nomenclature et notes écologiques)” and in the paper “The herpetofauna of Lebanon: new data on distribution” by S. Hraoui-Bloquet *et al.* (2002).



Dwells in moist zones, cultivated and agricultural lands, forests, grasslands, and near streams or rivers. It climbs on trees and bushes. It is diurnal and its diet consists of insects. It is oviparous and reproduces in spring, giving 2 clutches.

#### 1.5.4.2.8

*Cyrtopodion kotschyi orientalis* (Stepanek, 1937). **Tree Gecko Local name: Abu Breiss el Shajar**



**Middle East:** Recorded in Jordan, Syria and Palestine (Leviton *et al.*, 1992).

**Lebanon:** common and widespread in Lebanon from the littoral to c.1,500m altitude



Photo by Ryad Sadek



The population size of this species is not well known, but is qualified abundant at least in the Jabal Moussa Biosphere Reserve. It is threatened by using chemical products or pesticides in orchards.



It is a small gecko with vertically elliptic pupil, body covered with tubercles, adhesive

lamella under toes and grey with dark transversal and irregular bar lines on the back. Adults size between 4 and 5 cm from snout to vent.





**Chronology:** It was cited for the first time in Lebanon by S. Hraoui-Bloquet (1981) in the article “Les reptiles du Liban (Nomenclature et notes écologiques)” and in the paper “The herpetofauna of Lebanon: new data on distribution” by S. Hraoui-Bloquet *et al.* (2002).



It lives in trunks and branches of trees. The body matches the bark color or other supports as a mean of camouflage. This nocturnal and crepuscular insectivore is also found in rocky areas and on house walls. It is oviparous and reproduces in spring.



#### 1.5.4.2.9

<i>Triturus vittatus vittatus</i> (Gray, 1835). <b>Southern Banded Newt</b>
 <b>distribution</b>
<b>Middle East:</b> Common and widespread in North Asia Minor, Turkey, Iraq, Syria, Lebanon, Palestine, Caucasus (USSR) (Leviton <i>et al.</i> , 1992)
<b>Lebanon:</b> It is common and aquatic living in permanent ponds or fed by rain, streams, rivers... Observed from 300 to about 1500 m in altitude. Hraoui-Bloquet <i>et al.</i> , 1997; Hraoui-Bloquet <i>et al.</i> , 2001; Hraoui-Bloquet <i>et al.</i> , 2002).

Photo by Souad Hraoui-Bloquet
 <b>population</b>
The population size of this species is not well known in the Middle East. <b>In Lebanon</b> the abundance seems to be medium. It is threatened by the destruction of its habitat (suppression of ponds) and also by the rarity of rains (dryness).
 <b>identification</b>
It is a caudate amphibian. The adult size can reach 6 to 8 cm from snout to vent. Parotid glands are absent. The rear feet are strongly webbed. The tail is compressed laterally, the pupils of the eyes are round. On the dorsal side, the ground is yellow with brown blotches. Two large white lateral bands are observed. The belly is yellow-orange

with very small black points. During the reproduction period, males develop a crest on their back and on the dorsal side of their tail presenting the same color of the back.

**Chronology:** First reported from Lebanon in 1992 by Leviton *et al.* and by Hraoui-Bloquet *et al.* (1997); Hraoui Bloquet *et al.* (2001), and Hraoui-Bloquet *et al.* (2002).



Dwells in fresh water habitats, such as permanent ponds or ponds fed by rain, streams, rivers, etc. When ponds are dried out, some populations estivate waiting for the first rain to become active. These populations are active from autumn to the end of spring. They reproduce in water during autumn and winter. The species is crepuscular and nocturnal. It feeds on insects and practices cannibalism (adults eat larvae, which are in metamorphosis).

#### 1.5.4.2.10

*Bufo viridis* (Laurenti, 1768). **Green toad. Local name: Oljoun Akhdar, Dofdaa Baale**

#### **distribution**

**Middle East:** very common and widespread on Cyprus, in Egypt, Greece, Palestine, Jordan, Syria, and Turkey (KUZMIN, 2011)

Very common in Europe, North Africa, Arabian Peninsula and Iran (Leviton *et al.*, 1992)

**Lebanon:** It is very common and widespread and has been observed from the sea shore to about 2,400 m in altitude. It lives in moist habitat, near water. It is terrestrial (S. Hraoui-Bloquet *et al.*, 2001; S. Hraoui-Bloquet *et al.* 2002)



Photo by Souad Hraoui-Bloquet

#### **population**

The population size of this species is not well known in the Middle East or **in Lebanon**, but the abundance seems to be high.

#### **identification**

It is an amphibian that loses its tail. Parotid Glands on neck secrete liquid poison. The pupils of the eyes are horizontal. The dorsal skin is granular with many large, prominent





warts. The ventral skin is granular as well. Males are smaller than females. The dorsal side is covered by green spots.

**Chronology:** First reported from Lebanon by S. Hraoui-Bloquet *et al.* (2001); and S. Hraoui-Bloquet *et al.* (2002).



It is crepuscular, nocturnal and insectivorous. It is ubiquitous and lives in different kinds of habitats (garrigues, agricultural lands, urban zones, arid region both rocky or sandy). After metamorphosis, this species becomes terrestrial living in moist habitat or near water points. Reproduction is observed in spring and summer in water ponds. The black eggs in water are retained by a long gelatinous band. Larvae in metamorphose stay in water.

#### 1.5.4.2.11

<i>Bufo bufo</i> spc. <b>Common frog or common toad. Local name: Oljoum sha'e3</b>
 <b>distribution</b>
<b>Middle East:</b> This species has not yet its definitive determination statut. It has close characteristics with the <i>Bufo bufo</i> from Europe (S. Hraoui-Bloquet <i>et al.</i> , 2001).
<b>Lebanon:</b> Uncommon and not widespread, Observed in some regions in Lebanon from 600 to 800 m of altitude. It lives in moist habitats, near water. Terrestria (S. Hraoui-Bloquet <i>et al.</i> , 2001).

Photo by Souad Hraoui-Bloquet
 <b>population</b>
The population size of this species is not well known in the Middle East or <b>in Lebanon</b> , but the abundance seems to be reduced in Lebanon and the populations are fragmented or isolated.
 <b>identification</b>
It is an amphibian that loses its tail. Parotid Glands on neck secrete a liquid poison. The pupils of the eyes are horizontal. Some individuals have copper colored irises. The dorsal skin is granular with many large, prominent warts. The ventral skin is granular as





well. Males are smaller than females. They are of dark brown color without spots. It is bigger than *Bufo viridis*. An adult female's length is more than 15 cm.

**Chronology:** First reported from Lebanon by S. Hraoui-Bloquet *et al.* (2001).



It is nocturnal but active after 10-11 PM. The Common Toad is insectivorous, very discrete and fearful. Its habitat is limited to the moist forest near rivers and in agricultural lands. Reproduction is observed early in spring in water ponds or streams. The black eggs in water are retained by a long gelatinous band. Tadpole or Larvea in metamorphose stay in water. It is threatened by urbanization, deforestation, suppression of water plans.

#### 1.5.4.2.12

<i>Hyla savignii</i> (Audouin, 1812). <b>Tree frog. Local name: dofdaa khadra</b>
 <b>distribution</b>
<b>Middle East:</b> Common and widespread in Turkey, Iraq, Syria, Palestine, Iran, Armenia, Azerbaijan, and on the Arabian Peninsula (Leviton <i>et al.</i> , 1992).
<b>Lebanon:</b> It is very common and widespread in moist lands, orchards, agricultural lands, near rivers and streams. It has been observed from the sea shore to about 1,700 m in altitude. S. Hraoui-Bloquet <i>et al.</i> (2001); S. Hraoui-Bloquet <i>et al.</i> (2002).

Photo by Ghassan Ramadan-Jaradi
 <b>population</b>
The population size of this species is not well known in the Middle East or <b>in Lebanon</b> , but the abundance seems to be high.
 <b>identification</b>
It is an amphibian that loses its tail. Parotid Glands are absent. The pupils of the eyes are horizontal. The toes are webbed. The last phalanges of fingers and toes are dilated into discs. The dorsum is usually bright green, sometimes tan or brownish; and sometimes with dark spots. A grayish-brown stripe, edged above and below by a yellowish-brown line, leads from the nostril through the eye and tympanum to a groin

along both sides of body. This is a camouflage characteristic. Males are smaller than females, with a big vocal bag. NB: The term Hyla is given for this group of amphibians because their voices are similar to the sound of dogs.





**Chronology:** First reported from Lebanon by S. Hraoui-Bloquet *et al.* (2001); S. Hraoui-Bloquet *et al.* (2002).



The tadpoles are aquatic. It is a crepuscular and nocturnal insectivore, and its habitat are moist land, orchards, agricultural lands, near rivers and streams. Reproduction is observed in spring in water ponds or streams. The brown or yellow eggs in water are retained by a gelatinous mass. Metamorphosis happens in water. It is threatened by urbanization, deforestation, suppression of water plans (drainage) etc.



#### 1.5.4.2.13

<i>Rana bedriagae</i> (Camerano, 1882). <b>Common frog. Local name: Dofdaa el May</b>
 <b>distribution</b>
<b>Middle East:</b> Common and widespread in Turkey, Syria, Jordan, Palestine, Egypt, Greece, Cyprus (Baha El Din, 2006)
<b>Lebanon:</b> It is very common, widespread and abundant. It stays in and near bodies of water: rivers, streams, basins, water ponds. It is aquatic and has been observed from the sea shore to about 1,700 m in altitude (S. Hraoui-Bloquet <i>et al.</i> , 2001; S. Hraoui-Bloquet <i>et al.</i> , 2002)

Photo by Ryad Sadek
 <b>population</b>
The population size of this species is not well known in the Middle East or <b>in Lebanon</b> , but the abundance seems to be high.
 <b>identification</b>
It is an amphibian that loses its tail. Parotid glands are absent. The head is triangular. The pupils are horizontal. Males possess two lateral vocal sacs. No significant difference in length between male and female. The pupils of the eyes are horizontal. It is a very complex group related to the different patterns of color. The dorsum side is green, sometimes brownish, with dark spots. Some individuals have a middle longitudinal line

on the back, others lose the spots etc. The Belly is creamy without spots.

**Chronology:** First reported from Lebanon by S. Hraoui-Bloquet and al. 2001 and S. Hraoui-Bloquet *et al.*, 2002.



The tadpoles are aquatic. The frog is crepuscular, nocturnal and insectivorous. Reproduction is observed in spring in water ponds or streams. The brown or yellow eggs in water are retained by a gelatinous mass. Metamorphosis happens in water. It lives on edges and in the water of ponds, basins, streams, rivers, damp lands, etc. It is threatened by urbanization, deforestation, suppression of water expanses, etc. It is edible.

#### 1.5.4.2.14

*Blanus strauchi aporus* (Werner, 1898). **Anatolian worm-lizard**

#### **distribution**

**Middle East:** Common in Iraq, Syria, Lebanon, Palestine, and also Turkey, Lycian, Pamphylian, Cilician and Kurdistan in Syria (Alexander, 1966)

**Lebanon:** It is common and widespread from the sea shore to about 900 m in altitude. It is a burrowing and apod lizard.



Photo by Ryad Sadek

#### **population**

The population size of this species is not well known in the Middle East or **in Lebanon**, but the abundance seems to be medium.

#### **identification**

It is an apod lizard. Snout and anterior part of head are not sloping, the snout is rounded, not spatulated; dorsal and ventral scales are separated by lateral groove

containing smaller scales The body presents annuli. The tail is very short. The adult size can reach 15 to 20 cm from snout to vent. The color is dark brown to black grey. The eyes are without lids, covered by a transparent scale.

**Chronology:** First reported from Lebanon in 1966 by **Alexander**, then by S. Hraoui-Bloquet in 1981 and by S. Hraoui-Bloquet *et al.* in 2002.



Lives in borrows of garden walls. It leaves the borrow in the evening to feed on insects, mainly ants.

#### 1.5.4.2.15

*Pseudopus apodus* (Pallas, 1775). **Orvet du Balkan. Local name: Barkil**

#### **distribution**

**Middle East:** Common and widespread in Syria, Palestine, Jordan, Iraq, Afghanistan, Turkey, Iran (Leviton *et al.*, 1992)

**Lebanon:** It is very common and widespread and has been observed from the sea shore to about 1,500 m in altitude. It was recorded by S. Hraoui-Bloquet in 1981 and by S. Hraoui-Bloquet *et al.*, in 2002.



Photo by Daniel Jablonski

#### **population**

The population size of this species is not well known in the Middle East or **in Lebanon**, but the abundance seems to be high.

#### **identification**

It is a big apod lizard and looks like a snake. It has a length of approximately 100 cm from snout to vent. The head is not distinct from the body. The eyes are without lids, covered by a transparent scale like the eyes of serpents. Males and females have the same length. Its long Tail is subject to autotomy and regenerates rapidly. Dorsal and ventral scales are separated by lateral groove containing smaller scales. It possesses a dermal

bone, giving it a hard body. Adults are of uniform brown color; juveniles are grayish-beige with dark transversal strips. It is oviparous and reproduces in spring.

**Chronology:** First reported from Lebanon in 1981 by S. Hraoui-Bloquet and in 2002 by S. Hraoui-Bloquet *et al.*



It occurs mostly in open, grassy areas among riparian vegetation in forests and on irrigated fields in open land.

#### 1.5.4.2.16

*Hemidactylus turcicus turcicus* (Linnaeus, 1758). **Turkish Gecko. Local name: Abu Breiss**

#### **distribution**

**Middle East It is** Common and widespread in Syria, Palestine, Israel, Jordan, Iraq. It occurs in KSA, Yemen, Oman, North Africa, Egypt, Somalia, Kenya, Iran, Pakistan and the Caribbean (Carranza and Arnold, 2006).

**Lebanon:** It is very common and widespread from the sea shore to 900 (1,000) m of altitude on walls and in houses, or on rocks.



Photo by Ghassan Ramadan-Jaradi

#### **population**

The population size of this species is not well known in the Middle East or **in Lebanon**, but the abundance seems to be high.

#### **identification**

The size is usually 5cm from snout to vent. The tail is very fragile (autotomy). The pupil of the

eyes are vertical. Dorsal scales are granular, sub-embedded with enlarged intermixed tubercles. All digits are clawed. The tail is cylindrical with dark and light rings. The body is creamy-pink. The dorsal tubercles are brown. The eyes are without eyelids, covered by a transparent scale. It is oviparous and reproduces in spring. The eggs are laid in holes of walls and in the attics. It is sociable.

**Chronology:** First reported from Lebanon in 1981 by S. Hraoui-Bloquet and in 2002 by S. Hraoui-Bloquet *et al.*



Dwells on walls in houses, ruins, and on rocks. It is persecuted by people in Lebanon, even though it is an inoffensive and nocturnal insectivore.



#### 1.5.4.2.17

*Phoenicolacerta laevis laevis* (Gray, 1838). **Common wall lizard. Local name: shimmaysseh**

#### **distribution**

**Middle East:** Common and widespread in Syria, Palestine, Jordan, and Turkey (Disi, 2002)

**Lebanon:** It is very common and widespread in forests, guarriges, gardens, walls of house, trees, rocks, etc., and has been observed from the sea shore to about 1,700 m in altitude.



Photo by Vernal Makdissi

#### **population**

The population size of this species is not well known in the Middle East or **in Lebanon**, but the abundance seems to be high.

#### **identification**

The throat is collared, the eyelids are moveable. Ventral scales are smooth, rectangular and bigger than dorsal scales. Femoral pores are present. The tail is long, the pupils of the eyes are round. Males are bigger than females. The length is 6 to 10 cm from snout to vent. The color is brown, grey or green olive, with two lateral dark bands. It is

oviparous with reproduction in spring giving three clutches by season. During reproduction period the throat of the male turns blue

**Chronology:** First reported from Lebanon in 1981 by S. Hraoui-Bloquet and in 2002 by S. Hraoui-Bloquet *et al.*.



Habitats differ: garrigue, forest, orchards, agricultural lands, walls of houses, ruins, rocks, or trees. It is diurnal and feeds on insects, but cannibalism is observed and photographed (G. Ramadan Jaradi, *pers. comm.*).

#### 1.5.4.2.18

*Ophisops elegans* (Menetries, 1832). **Snake-eyed lizard**

#### **distribution**

**Middle East:** Common and widespread in Syria, Palestine and Jordan. It occurs in Greece, Cyprus, Turkey, Iraq and Iran. (Leviton *et al.*, 1992 ).

**Lebanon:** It is very common and widespread in open areas. It prefers sandy soils (sandstone). It has been observed from the sea shore to about 1,600 m in altitude.



Photo by Souad Hraoui-Bloquet

#### **population**

The population size of this species is not well known in the Middle East or **in Lebanon**, but the abundance seems to be high.

#### **identification**

The throat is not colored, it has no eyelids, but a transparent scale that covers each eye. The pupils are round. The dorsal scales are rhombic, imbricate, and strongly keeled. The ventral plates are smooth, with femoral pores present. The color is brown with two

longitudinal latero-dorsal lines. Adults' size can reach up to 5-6 cm.

**Chronology:** First reported from Lebanon in 1981 by S. Hraoui-Bloquet and in 2002 by S. Hraoui-Bloquet *et al.*



Habitat: scrub and open woodland. It is diurnal and feeds on insects, but cannibalism is observed. It is oviparous and reproduces in spring.

#### 1.5.4.2.19

***Ablepharus budaki budaki*** (Gocmen, Kumlutaset Tosunoglu, 1996). **Budak's Snake-Eyed Skink**

#### **distribution**

**Middle East:** Common and widespread in Syria, Palestine, Jordan. It occurs in Turkey and Cyprus.

**Lebanon:** It is very common and widespread in forest and orchards and has been observed from the sea shore to about 1,500 m in altitude.



Photo by Augusta Stylianou

#### **population**

The population size of this species is not well known in the Middle East or **in Lebanon**, but the abundance seems to be high.

#### **identification**

Eyelids are absent, the body is slender, the head is small and narrow. The limbs are short and strikingly slim. The adult size can reach 5 cm to 6 cm. The pupils of the eyes are round. It shows no dorsal pattern, the scales of the dorsum are smooth, bright and

embedded. The tail is round, but longer than body. The color is black or dark brown without pattern.

**Chronology:** First reported from Lebanon in 1981 by S. Hraoui-Bloquet and in 2002 by S. Hraoui-Bloquet *et al.*



Forest and woodland. It is diurnal and feeds on insects.

#### 1.5.4.2.20

*Trachylepis vittata* (Olliver, 1804). **Common skink**

#### **distribution**

**Middle East:** Common and widespread in Syria, Palestine, Jordan. It occurs in North Africa, Turkey and Iran.

**Lebanon:** It is very common and widespread in open areas and field edges and has been observed from the sea shore up to 2,500 m of altitude.



Photo by Souad Hraoui-Bloquet

#### **population**

The population size of this species is not well known in the Middle East or in **Lebanon**, but the abundance seems to be high.

#### **identification**

The term *vittatus* means strip lines. This lizard possesses 4 white, lateral, longitudinal lines. The color is grey-brown, or grey-olive with black dorsal dots. The belly is creamy. The neck is not distinct from the head. The scales are keeled and bright. The pupils of the eyes are round, the low eyelids with a transparent disc. The body is compressed dorso-ventrally. The legs are short. Females are longer than males. It is viviparous and reproduces in spring. The adult size is 6 to 10 cm.

**Chronology:** First reported from Lebanon in 1981 by S. Hraoui-Bloquet and in 2002 by S. Hraoui-Bloquet *et al.*



Dwells in many different habitats, such as open scrubland, woodland, rocky zones, sandy lands, moist or dry lands. It is diurnal and feeds on insects.



#### 1.5.4.3 Herptiles References

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### 1.5.5 INSECTS

A study conducted in Jabal Moussa during August 28-29 2010 by Jaakko and Ansii Kullberg (*pers. comm.*) produced a list of 141 species, of them 27 belong to microlepidoptera families whilst the others are macrolepidoptera. The latter are almost all determined while the majority of the first mentioned are still under identification process (Finnish Museum of Natural History, *unpubl.*). The list (Annex 7) contains a remarkable portion of endemic species and other species that may be new to science and/or to Lebanon. Examples of species new to Lebanon are: *Catocala weiserti*, *Agrochola gratiosa* and *Dryobota labecula*. It is expected that more than 1,000 species of moths will be identified in the Jabal Moussa Biosphere Reserve if the entomological survey will cover the whole season in forthcoming years 2012-2013.

### 1.6 Ecological interest of the site

Jabal Moussa Biosphere Reserve site may be considered as unique of its kind in Lebanon and subsequently has a great heritage value. Its biodiversity is of high significance, especially since part of its components is of global concern. Ecologically, Jabal Moussa Biosphere Reserve is formed from particular and diversified habitats. Socio-economically, Jabal Moussa Biosphere Reserve has real significance with its water resources and potential significance with eco-tourism.

Its uniqueness derives from the fact that:

- It is mainly represented by eight major habitats where each has its own characteristic species and plant association. They are: 1) the rocky summit, 2) dense forests of the northern and western slopes, 3) influenced forests by humans on the eastern and south eastern slopes, 4) Ibrahim River and its riparian vegetation, 5) pastoral lands, 6) cultivated lands and orchards, 7) abandoned historic terraces, and 8) urban lands.
- It has not yet been touched by the uncontrolled urbanism, dissemination of roads, and to some extent quarries that have devastated other similar mountains.
- It is extremely diversified over a relatively small area not exceeding 65 square km.
- Despite its limited size, it has offered habitat to 51 % of the national breeding avifauna.
- It is a frequent refuge to seven globally threatened bird species. Also, it is refuge to nationally threatened species of mammals, such as the Hyaena, the Wolf, the Hyrax, etc., which find in the site the necessary elements of their ecological niche.

## 1.7 Impact on the site by each exploitation/ production system

### 1.7.1 Agriculture

Very little impact of traditional agriculture at the periphery, but the area also witnesses agricultural activities from the near past.

### 1.7.2 Pasture

APJM is not allowing grazing activities inside the JMBR core area. Pasture activity is seldom practiced in some areas of the site, such as near villages, but practically still not within the core area. It is difficult to pretend that there is overgrazing in the area. Instead, one may suggest that herds of goats and sheep can more or less perturb nature rejuvenation of wild rare plant species, or can have an effect on the microfauna and on the populations of the ground-nesting bird species, such as larks or quails. However, the pasture activity cannot be qualified as an overgrazing, not only because of its ban or limitation in time and space but also because of the weak numbers of livestock involved at JMBR.

### 1.7.3 Fishing and frogging

These activities are limited to Nahr Ibrahim River within the buffer zone of JMBR.

### 1.7.4 Ecotourism and sustainable development activities

#### 1.7.4.1 Ecotourism

Eco-tourism is presently limited to bird watching activities, hiking and walking. It is organized by APJM, sometimes with tour operators for group hikes, or with schools for educational visits by students from the surrounding schools and from Beirut area. These activities are apparently well-guided by the managing authority in collaboration with the local community so that the impact of the visitors on the site is practically very low. Indeed, APJM has recruited local youth from the villages of JMBR through a well defined selection process following a comprehensive socio-economic survey that identified talents in the region. The selected individuals underwent a full (theoretical and field) training with ecotourism and scientific experts, as well as knowledgeable members of the community, after which they became familiar with: (1) the biodiversity and historic/cultural sites of the JMBR; (2) the objectives of the UNESCO Man and Biosphere Reserve program, and the aligned mission of the Association; (3) effective guiding principles and practices, such as *managing different groups, effectively communicating information about the biodiversity and cultural values specific to the region, internal policies for respect of nature and conservation objectives*.

Moreover, a well-designed and indicated network of trails has been established inside the JMBR, whereby important species and historic sites are indicated with explanatory panels, and the "Byut" site constitutes a "hub" for all the established trails.

The ecotourism activity is still at its beginnings, but seems to be promising, since the APJM has developed a *5-Year Vision/Strategy* for its ecotourism plans, which include yearly Action Plans to develop the region and create sustainable income-generating activities inside the reserve.

In order to keep ecotourism a well-controlled activity that goes along with conservation objectives, APJM is planning to keep the visits limited inside the core area (keep numbers low), and plans to conduct a capacity-building study in the near future to better define its potential thresholds for sustainable visitations.

#### **1.7.4.2 Sustainable development**

Ecotourism is one of the activities initiated by APJM for the sustainable development of the area. However, it is not the only activity. Indeed, the APJM has conducted a full socio-economic survey on the 7 villages of the BR (529 households) in partnership with the University St Joseph (USJ), Department of Sociology and Anthropology. This survey resulted in the identification of potential development projects for those villages. The local initiatives with the highest potential were defined as Handicraft and traditional food production, and are currently being supported by APJM through the SIFOHR (**S**upporting local **I**nitiatives of **F**ood and **H**andicraft production in **R**ural areas of Jabal Moussa Biosphere Reserve) project sponsored by the American Embassy (MEPI initiative). This project (2011-2012) aims at supporting local women who have been identified to produce handicraft and food products of economic and cultural heritage value to create higher quality products and better promote their final produce. Planned outcomes of SIFOHR include: (1) Better trained women in entrepreneurship, marketing & promotion, collaboration & management (2) Higher quality standardized products with the JM logo, (3) Sales points provided by APJM through an ecotourism kiosk at the trails' entrance, festivals etc., (4) A fully equipped kitchen that will be shared by women producing food items, with a known standardized level of hygiene. These initiatives are believed to have positive impacts on the management of the JMBR, since they create a better interaction between the managing authority (APJM) and the local communities and a more collaborative environment between them. They also encourage the communities living inside the BR to support the designation of the region as a protected area, since they start feeling a direct economic benefit within their households.

#### **1.7.5 Exploitation of resources**

With the exception of the visitation activity, the remaining activities are relatively of unnoticeable impact on the environment and the biodiversity of this site. In fact:

- The hunting pressure was considerably reduced during the last years as a result of cooperation and understanding between the local community and the managing team. Despite the laws, which ban hunting within a 500 meter belt around reserves, some hunting activities are observed during the autumn migration seasons on the hills immediately surrounding the reserve. However, poaching is still occurring and the efforts done to reduce it are effective.
- The cutting of wood for fuel is nowadays little exercised within the site and people are satisfied with the collection of dead branches from the wooded areas of the reserve for charcoal production. This activity is planned to be better organized and "guided" by the Association for the Protection of Jabal Moussa (APJM) within its Forest Action Plan in order to make it more sustainable on the long-term.
- The collection by individuals of culinary, medicinal or aromatic and other economical wild plant species for personal use is not well controlled at Jabal Moussa Biosphere Reserve, and therefore it is difficult to assess its impact over the site. APJM will also take these species and their potential use/exploitation into consideration in its Forest Action Plan, which is currently under development.

### 1.7.6 Industrialization - urbanization

The only identified urbanization is located at the edges of the site. It consists of few villages with traditional activities of rural aspect. The ecological integrity of the Jabal Moussa Biosphere Reserve does not seem to be negatively affected by the centers of urbanization around the reserve. Instead, the inhabitants of these centers show willingness to cooperate with the management team and to contribute to the sustainable use of the natural resources.

### 1.7.7 Water management

The reserve contains small rain water reservoirs in the rocks. They supply the fauna with bathing and drinking water, and attract granivorous species that are in daily need of water due to their nature of diet. However, the management of the Nahr Ibrahim water lies beyond the capabilities of the reserve's managing authority, whereas the management of the watershed in the reserve is assured by the protection actions.

### 1.7.8 Forest management

More than 20 species of trees constitute the forest of Jabal Moussa, some of which are of high conservation value. These species include the *Ostrya carpinifolia*, which exists in JMBR in its southernmost limit (Dereix *et al.*, 1999<sup>2</sup>).

One of the first initiatives of APJM to protect the JM forest has been carried out through the "Tree Nurseries" project supported by the GEF-SGP programme. This project aimed at the creation of a local platform of specific tree species nurseries that will revive and conserve the native species of Jabal Moussa Forest, and support local reforestation efforts that would, in turn, prevent land erosion and support water percolation.

Three tree nurseries planted with 14 species' seeds native to Jabal Moussa (see table below) were installed in the villages of Qehmez, Mcheti, and Yahshoush, in lands rented from local owners contracted by APJM to do regular maintenance for the nurseries. More than 20,000 bags filled with fertile soil mixture have been seeded so far and this number is growing. APJM has so far managed to promote the local species through selling the seedlings to other NGOs involved in national planting activities. However, APJM is now working with regional experts to develop a thorough Forest Action Plan that will address its own reforestation needs and other forest resource management activities through a well designed site specific plan.

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<sup>2</sup> Dereix, C., Ohannessian-Charpin, A., Khouzami, M., Safi, S., Zreik, R., El-Hanna, R., Hanna, K., Assaf, N., El-Riachy, R., Habr, A., Munzer, M. & L. Fortunat. 1999. Plan de Gestion Durable. Site pilote N°2 – Jabal Moussa. Project d'Assistance a la protection de la couverture végétale au Liban. Ministère de L'agriculture et Office National des Forets. Liban.

The Table below shows native species of Jabal Moussa grown in the 3 tree nurseries

Scientific name of species	Common name of species
<i>Quercus calliprinos</i>	سنديان
<i>Quercus cerris</i>	عذر
<i>Quercus infectoria</i>	عقص
<i>Styrax officinalis</i>	حوز
<i>Ostrya carpinifolia</i>	شرك
<i>Fraxinus ornus</i>	دردار
<i>Pyrus syriaca</i>	إجاص بري
<i>Prunus amygdalus</i>	لوز بري
<i>Prunus ursina</i>	خوخ الدب
<i>Cercis siliquastrum</i>	زمزيق/شيري
<i>Pistacia paelestina</i>	بطم
<i>Sorbus torminalis</i>	غبيراء
<i>Laurus nobilis</i>	غار
<i>Ceratonia siliqua</i>	خرنوب

1.8 Sensitivity level of the different habitats used by the selected species

HABITAT	SPECIES CATEGORY	SENSITIVITY	THREATS
<b>All “J” habitats + rocky and riparian habitats</b>	Selected flora Selected trees of forest, mainly <i>Quercus</i> and <i>Pinus</i> species.	- Sensitivity index = high - Micro-habitats diversified - Refuge for species	Degradation Fire Fragmentation Habitat destruction Habitat disturbance Pollution Sensitivity to human disturbance Plant harvest
	Selected mammals	- Sensitivity index = Medium - Vital habitats for the survival of wolves, hyaenas and other species	Deliberate killing Garbage Hunting Pollution Sensitivity to human disturbance Trapping
	Selected birds	- Sensitivity index = medium - Micro-habitats diversified - Refuge for sedentary species for breeding, roosting and feeding	Deliberate killing Garbage Hunting Pollution Sensitivity to human disturbance Trapping
	Selected herptiles	- Sensitivity index=low - Micro-habitats diversified - Refuge for species for breeding, sunning and feeding	Deliberate killing Garbage Pollution Sensitivity to human disturbance Trapping Pesticides

## **1.9 Constraints and opportunities for the conservation**

### **1.9.1 Main constraints**

- The immediate surrounding area is heavily inspected during the summer week-ends by hunters and picnickers.
- There is lack of awareness, especially on the importance of conservation and value of endemic or threatened species.
- The extension of the quarry areas is likely to happen on the basis of more used forest edges, affecting as such the integrity of the ecosystems.

### **1.9.2 Main opportunities**

- Highly desired area for eco-tourism and education.
- Highly desired area for biological studies and research.
- Hunting activity is reduced.
- High potentiality for resource-generating activities.
- Quasi absence of inhabitants or workers.
- Inexistent polluting industrial activities.

## **1.10 Socio-economic impacts of taken measures**

### **1.10.1 Economically**

- Investment in the field of eco-tourism (birdwatching, fauna observing, hiking, tour-guiding, etc.).
- Investment in banking with genetic resources and wild relative plants.
- Investment in biological and natural education.
- Investment in new alternatives.

### **1.10.2 Socially**

- Depriving locals from free access rights.
- Depriving shepherders from pasture areas.
- Providing locals with work opportunities.



## **1.11 Proposed conservation management actions**

### **1.11.1 Short term**

#### **1.11.1.1 Protection:**

- Putting in place a responsible and wise use measures in the site;
- Protecting the economic plants from over-exploitation;
- Prohibition of the access of excursionists to fragile spots;
- Limitation and canalizing the access to the sensitive places of the site.
- Banning the hunting within a 500m belt around the site even during the hunting season.
- Stopping the plant picking and collecting activities.
- Stopping unregulated and regulated activities from generating garbage in the area.
- Maintaining the site clean from solid waste and other garbage.
- Banning illegal taking and poaching.

#### **1.11.1.2 Rehabilitation**

Link the management of the site with that of the surrounding environ as an integral conservation action, especially that some mammals and many birds of Jabal Moussa use the whole area for breeding or refuging and resting or roosting.

#### **1.11.1.3 Valorization/Added value**

- Creating a package of activities to include several areas.
- Creating additional eco-touristic activities that may generate incomes for the local community.
- Creating a center of information on the main place of Jabal Moussa to attract passing people.

### **1.11.2 Mid term**

#### **1.11.2.1 Protection:**

- Sensitise visitors and local communities
- Regulating pastoral activities within on on the edges of the reserve.
- Rationalizing the exploitation of natural resources.
- Controlling the commercialization of threatened species and their product thereof.

#### **1.11.2.2 Rehabilitation**

Maintaining the diversity of the habitat through conservation of wilderness and scenic landscape, and avoidance of alien or exotic species introduction.

### **1.11.2.3 Valorization/Added value:**

- Establishing an eco-museum for the biodiversity of the site.
- Valorising the site for biological study purposes
- Valorising the site for educational purposes
- Valorising the site for ecotourism purposes (Hides for observation, Footpath and equestrian path) through local community management.

## **1.12 Zonation of the space**

### **1.12.1 Strictly protected zones**

- The core area.
- The steep slopes (soil erosion avoidance).
- The glades.
- The water bodies.
- The dense forests.

### **1.12.2 Zones with limited access**

. These are all zones outside existing trails.

### **1.12.3 Zones with free access**

. These are the trails.

## **1.13 Site-specific strategies and indicators for monitoring**

### **1.13.1 Site-specific strategies**

The technology that is used in biodiversity monitoring varies from plants to animals and from one animal species to another. Accordingly, we propose a strategy for monitoring based on a medium monitoring program, which provides the technology to be used in the Jabal Moussa Biosphere Reserve.

The table below summarizes the strategic steps that are to be taken in a logical framework:

Issue/ General question	Fragmentation of habitats, degradation of forest, alteration of wilderness, garbage, pollution.  Consequences: loss of habitats, loss of natural resources, reduction of feeding, breeding, resting areas, disturbance and poaching.
Issue/ Specific question	Decrease in number of the species individuals, including the selected species.
Objectives	Following up on the variation in numbers, especially for the selected species.
Hypothesis	With improved situation and favorable conditions, the affected species will increase in number and the selected threatened or rare species could find shelter and security in the site.
Methods	Seasonal recording  Regular monitoring and study of behavior during the flowering, wintering, breeding seasons, etc.
Feasibility	The necessity to train people on monitoring activities.
Pilot study	Usage of the present study as study/reference. It could be handled to members of the management team to ensure monitoring sustainability.
Sampling	Counting species and individuals on trimestrial basis and increasing of the effort of observation during breeding/reproduction season.
Sample analysis	Elaborating matrix to express results  Project data (species/ individuals) on maps of habitats.
Report preparation	Analyzing data at the end of each annual cycle and comparing with previous data (study/reference).  Discussing the reasons of variations in relation to different parameters (mainly management measures).
Management actions and project evaluation	Evaluating the outputs of monitoring and formulating appropriate conservation measures

### 1.13.2 Ecological monitoring - Indicators

Target group for monitoring	Key elements	Indicators	Method	Means
Mammals	<i>Selected species</i>	<ul style="list-style-type: none"> <li>- Population size</li> <li>- Area of the available appropriate habitat</li> <li>- Size of the specific ecological niche available</li> <li>- Number of burrows</li> <li>- Habitats occupied by each species</li> <li>- Species movement</li> <li>- Distribution areas</li> </ul>	<ul style="list-style-type: none"> <li>- Trimestrial surveys</li> <li>- These mammals are mainly nocturnal and therefore difficult to see. However, the best time to see them is in the early morning or at dusk where they often feed in the open at dawn and retire to the cover of woodland when it becomes warm or when human activity increases. Looking for droppings will often show the best places to watch, and there are many other signs of animal presence such as remains of eaten prey and tracks left in mud and perhaps snow. Remember that most mammals, have very sensitive noses-choose a spot down-wind from the place where you expect to see them. During dawn watch you may also be lucky enough to see one of the more strictly nocturnal animals</li> </ul>	<ul style="list-style-type: none"> <li>- Binoculars are very helpful. They allow to watch from a distance, without disturbing the animals.</li> <li>- Use a torch, if possible with a red glass.</li> <li>- 4x4 vehicle</li> <li>- Night camera</li> <li>- Mammal traps</li> <li>- Light projector</li> </ul>

			<p>getting home late, perhaps a wolf or a wild cat. This goes equally for the more elusive carnivores, like otter that might be found at Nahr Ibrahim. The small rodents are particularly difficult to see. Many come out only at night, but even the diurnal ones generally stick to dense cover. However, they can sometimes be seen at night by regularly putting down bait, such as seeds of any kind, at a suitable spot.</p> <ul style="list-style-type: none"> <li>- Questioning of villagers and shepherders, etc.</li> </ul>	
Birds	<i>Selected species</i>	<ul style="list-style-type: none"> <li>- Diversity index</li> <li>- Number of nesting couples</li> <li>- Size of populations</li> <li>- Number of wintering individuals</li> <li>- Number of passing birds</li> <li>- Frequency of roosting birds</li> <li>- Distribution per habitat</li> <li>- Sectorial geographic distribution</li> </ul>	<ul style="list-style-type: none"> <li>- Surveys every 15 days mainly from March to May.</li> <li>- To monitor birds there are several techniques, which differ with the species and habitats, but certain techniques are necessary to achieve success. Birds are mostly active in the morning and evening, and may rest or shelter from the</li> </ul>	<ul style="list-style-type: none"> <li>- Binoculars 10x50 or 7x48</li> <li>- Telescope 20-60 x 80</li> <li>- Note book</li> <li>- Tape recorder</li> <li>- 4x4 vehicle</li> <li>- Camera.</li> <li>- Field guide book</li> </ul>

		<p>- Density</p>	<p>heat of the sun during the day. The most rewarding times to see them are therefore from sunrise until 10 AM and again after 3 PM; and in order to see some marshy or rare birds, one needs to remain until dusk. Raptors and other soaring birds become active usually after 10 AM. This is due to the fact that they are dependent on ascending air, which helps them to soar and economize energy during their flight.</p> <p>To avoid alarming the birds, it is essential to approach slowly and silently, avoiding any sudden movement. If one is on foot, a slow walk round a likely bird spot may reveal all but the most secretive species. In case of more than one observer, one person may advance while others observe.</p> <p>Birds should not</p>	
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			be alerted to the observer's presence at all. One may use a car, which can make a most useful mobile hide, as birds may accept the arrival of a car if the passengers remain still and do not open and slam the doors.	
Herpetofauna	<i>Selected species</i>	<ul style="list-style-type: none"> <li>- Density of populations</li> <li>- Evolution of numbers</li> <li>-Species localization</li> <li>- Number of individuals</li> <li>- Density of populations</li> <li>- Distribution of species</li> </ul>	<ul style="list-style-type: none"> <li>- 4 spring census</li> <li>- 4 summer census</li> <li>- 4 autumn census</li> <li>- Few traces are left by reptiles, through the few that can be found are useful indicators, such as cast or 'sloughed' snake skins. Lizards often lie out on the same stone each day when basking in the sun. Such a stone is likely to be covered with their droppings. These are easily mistaken for bird droppings, being dark at one end and whitish at the other. There is every chance that they will be found in the same place, or within a meter or so, on successive day. However, there are exceptions to this. Some reptiles, for</li> </ul>	<ul style="list-style-type: none"> <li>- Binocular 8x40</li> <li>- Broad beamed lamp</li> <li>- Soft forceps</li> <li>- 4x4 vehicle</li> <li>- ¼ litre glass jars</li> <li>- vinegar</li> <li>- net "fauchoir"</li> </ul>

			<p>example, tend to shift their quarters after mating, frequently by a kilometer or so, but come spring and it will be found back at the previous year's courtship ground.</p> <p>In general, reptiles and amphibians are much easier to approach than most mammals and it is often possible to get near enough to examine them in detail. Most species usually sleep through the winter, but the spring, when they come out of hiding and begin courtship, is a good time to look for them. In the summer they become more retiring and more difficult to find. Early morning searches are most productive for seeing species that are regularly active by day, but if searching with a broad-beamed lamp: rainy evenings are best for this. At spring time, especially frogs and toads can be located by their voices. Each species has its own distinctive call, ranging from</p>	
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			<p>the echoing croak to the soft, mournful piping. The continuous rustling of a tortoise ploughing through dense herbage can soon be recognized as different from the intermittent scrabbling of a foraging lizard.</p> <p>Because they can be approached closely, it is tempting to try to catch reptiles and amphibians, but they are delicate animals and even slight injury may seriously reduce their chances of survival. A lizard will shed its tail if grasped by it and, although the animal can grow a new one, it will be at a serious disadvantage while doing so, especially since the process requires a great deal of protein. If handling cannot be avoided, it should be done with great care and amphibians should be held only with wet hands to protect their soft, usually moist skins. It goes without saying that venomous snakes should not be handled in</p>	
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			any circumstances. Monitoring with the quadrat method or surveying at night are two rewarding methods implicating the search under stones and the use of traps.	
Flora	<i>Selected species</i>	<ul style="list-style-type: none"> <li>- Study of dynamics of change</li> <li>- Locality of the species</li> <li>- Distribution of the species</li> <li>- Density</li>   <li>- Density of the vegetal community</li> <li>- Occupied area</li> <li>- Cover%</li> <li>- Stratification</li> </ul>	Transect method involving 4 seasonal missions per year or trimestrial inspection all year round	<ul style="list-style-type: none"> <li>- 4x4 vehicle</li> <li>- GPS</li> <li>- Topographic map</li> <li>- Aerial photo</li> <li>- Digital camera</li> </ul>

### 1.13.3 Socio-economic monitoring- Indicators

Nature of monitoring	Key elements	Indicators	Method	Means
	Grazing activity	# of heads/ type Period and degree of grazing # of birth given/ year	Questionnaire Interview	Vehicle
	Eco-touristic activity	# of visitors/month # of locals involved in eco-tourism and recreation Quantity of waste left by visitors/ day Degree of satisfaction for the local community	Questionnaire Interview	Vehicle

### 1.14 Favorable and unfavorable elements to biodiversity

Favorable elements to biodiversity	Unfavorable elements to biodiversity
<p><b>Vegetal biodiversity</b></p> <ul style="list-style-type: none"> <li>• Endemic 26</li> <li>• Rare 20</li> <li>• Threatened 11</li> <li>• Notworthy 134</li> <li>• Biotopes 15</li> </ul> <p><b>Animal biodiversity</b></p> <ul style="list-style-type: none"> <li>• Endemic 3 (reptiles) 2 (birds)</li> <li>• Rare 79</li> <li>• Threatened 36</li> <li>• Notworthy 101</li> <li>• Biocenosis 15</li> </ul>	<p>Illegal collection or taking</p> <p>Grazing</p> <p>Fire</p> <p>Loss of wilderness</p> <p>Habitat transformation</p> <p>Lack of infrastructure</p> <p>Lack of job in domains other than the exploitation of natural resources</p> <p>Frequentation</p> <p>Pollution</p> <p>Poaching</p> <p>Hunting</p>

### 1.15 Identified environmental values

Value	Asset	Limiting factors
High rate of threatened species	<ul style="list-style-type: none"> <li>• Weak urbanism</li> <li>• Willigness of local community for protection</li> </ul>	<ul style="list-style-type: none"> <li>• High frequentation by poachers</li> <li>• Fire</li> <li>• Pollution</li> </ul>
Exceptional eco-tourism potentiality	<ul style="list-style-type: none"> <li>• Location of site along an important flyway</li> <li>• Hotspot site</li> <li>• Unique remnant landscape</li> </ul>	<ul style="list-style-type: none"> <li>• Hunting</li> <li>• Poaching</li> <li>• Pollution</li> <li>• Fire</li> </ul>

## 1.16 Management measures and threat/hazard mitigation

Target	Management measures/ threat mitigation
<p><b>Phyto-ecology</b></p> <ul style="list-style-type: none"> <li>- Protection of economically important wild plant species (medicinal, aromatic, culinary, wild relatives, etc).</li> <li>- Protection of conifers on the site</li> <li>- Protection of steep slopes from erosion</li> <li>- Protection of the edges of the forest from urban encroachment.</li> </ul>	<p><b>Management actions</b></p> <p><b>Protection</b></p> <ul style="list-style-type: none"> <li>- Raising awareness of visitors</li> <li>- Reduction of poaching</li> <li>- Regulation of pasture</li> <li>- Regulation of dead wood collecting</li> <li>- Updating the law of the reserve</li> </ul> <p><b>Rehabilitation</b></p> <ul style="list-style-type: none"> <li>- Protection of seedlings from pedestrians</li> </ul> <p><b>Valorisation</b></p> <ul style="list-style-type: none"> <li>- Promotion of eco-tourism through improved access to micro hotspots, managed recreational zones, equestrian surveillance patrols, and development of trails for pedestrians, etc.</li> <li>- Creation of neighboring or bordering areas as alternative places for camping and barbecuing.</li> </ul>
<p><b>Herpetofauna</b></p>	<p><b>Management actions</b></p> <p><b>Protection</b></p> <ul style="list-style-type: none"> <li>- Raising awareness of visitors</li> <li>- Reduction of poaching</li> <li>- Regulation of pasture</li> <li>- Protection of the forest edges mainly for integrity of ecosystems</li> <li>- Updating the law of the reserve</li> </ul>

	<p><b>Rehabilitation</b></p> <ul style="list-style-type: none"> <li>- Keeping the forest clean from visitor's garbage</li> </ul> <p><b>Valorisation</b></p> <ul style="list-style-type: none"> <li>- Promotion of eco-tourism through improved access to micro hotspots, managed recreational zones, equestrian surveillance patrols, development of trails for pedestrians, etc.</li> <li>- Creation of neighboring or bordering areas as alternative places for camping and barbecuing.</li> </ul>
<p><b>Avifauna</b></p>	<p><b>Management actions</b></p> <p><b>Protection</b></p> <ul style="list-style-type: none"> <li>- Raising awareness of visitors</li> <li>- Reduction of poaching and illegal taking</li> <li>- Regulation or canalizing of grazing</li> <li>- Imposing a wise use of resources and protection of threatened species, when necessary.</li> <li>- Banning of hunting activities within the APJM and in a belt of 500 meters around the site.</li> </ul> <p><b>Rehabilitation</b></p> <p><b>Valorisation</b></p> <ul style="list-style-type: none"> <li>- Promotion of eco-tourism through improved access to micro hotspots, managed recreational zones, equestrian surveillance patrols, development of trails for pedestrians;</li> <li>- Creation of neighboring or bordering areas as alternative places for camping and barbecuing;</li> <li>- Building a Birdwatching tower or birdwatching hides</li> </ul>

<p><b>Mammals</b></p>	<p><b>Management actions</b></p> <p><b>Protection</b></p> <ul style="list-style-type: none"> <li>- Raising awareness of visitors</li> <li>- Reduction of poaching and illegal taking</li> <li>- Regulation or canalizing of grazing</li> <li>- Imposing a wise use of resources and protection of threatened species, when necessary.</li> <li>- Banning of hunting activities within the reserve and in a belt of 500 meters around the site.</li> </ul> <p><b>Rehabilitation</b></p> <p><b>Valorisation</b></p> <ul style="list-style-type: none"> <li>- Promotion of eco-tourism through improved access to micro hotspots, managed recreational zones, equestrian surveillance patrols, development of trails for pedestrians;</li> <li>- Creation of small patches of bushy areas to facilitate a safe mammal movement;</li> <li>- Creation of neighboring or bordering areas as alternative places for camping and barbecuing;</li> <li>- Building an elevated hide to watch nocturnal mammal species.</li> </ul>

## 1.17 Need for Complementary studies

### 1.17.1 Ecological studies

- Monitoring the dynamism of the different vegetal communities.
- Localization, estimation of numbers and dynamism of *Hyaena hyaena*, *Canis lupus*, *Testudo graeca* and *Chamaeleo chamaeleon* populations.
- The relation between the vegetal stratification and bird breeding success.
- The size and distribution of the Jay within the site.
- The impact of the visitors on the ground bird breeding species.
- The present phenological distribution of some bird species within the site, such as Blue Thrush, Syrian Serin, etc.
- Study of the Wolves population and dynamism.
- Phenological monitoring of habitats and animal communities.
- Micro-distribution of snake species.
- Study of the entomofauna and its role within the trophic chain of the site.

### 1.17.2 Socio-economic studies

- Socio-economic impact of the proposed conservation measures.
- The impact of wildboars on the agriculture exploitation.
- The impact of hunters on the threatened species and the awareness level of the local population.
- The hydrology of the hydrographic web in the area for wise and sustainable use purposes.

## 1.18 Significant conservation actions

1. Development and implementation of a memo of understanding with owners of adjacent lands to adopt a conservation policy and to contribute to conservation actions in general.
2. Ensuring that extension of cultivated lands is stopped through a local agreement.
3. Ensuring that diversity of adjacent cultivated lands is maintained
4. Limiting the needed grazing activities to non breeding seasons only.
5. Banning the collection of medicinal and aromatic plant species.
6. Insisting on banning of hunting all the year round.
7. Insisting on eco-tourism and promoting it.
8. Protecting the plants from over-exploitation;
9. Prohibition of the access of excursionists to areas with degraded soil;
10. Obstruction of any burning activities, especially in the surrounding;
11. Limiting and canalizing the access to the sensitive places (glades and summits) of the site.

12. Banning the introduction of foreign species.
13. Preventing unregulated and regulated pesticides from reaching water bodies or water streams.
14. Banning illegal taking and poaching.
15. Keeping the site clean from solid waste and other garbage.
16. Ensuring that the reserve's environ is clean as it is an integral part of the protected area
17. Creating a center of information
18. Creating a package of activities to include the cultural sites and the natural sites of the Reserve.
19. Creating eco-touristic activities that may generate incomes for the local community such as bird watching and horse riding, etc.
20. Establishing an eco-museum on the biodiversity of the site.
21. Valorizing the site for biological agriculture purposes and wild relative importance
22. Valorizing the site for educational purposes
23. Valorizing the site for ecotourism purposes (Hides for observation, Footpath and equestrian path) through local community management.
24. Regular analyzation of water for pollutants and composition.
25. Producing TV spots, Brochures, Leaflets, bird sound CDs, Postal cards, Posters and other souvenir items.
26. Determining past and current conservation practices as a need to develop species management plans.
27. Development of species action plans.
28. Conducting seminars, workshops and other activities to sensitize people, educate students and advice politicians.
29. Expansion of the participation range of stakeholders.



## ANNEXES

### Annex1: List of plants (1)

- (1) refers to species on their way to disappearing at local and national levels  
 (2) refers to endemic to Lebanon species  
 (3) refers to rare species  
 (4) refers to endemic species to Lebanon & Syria or Lebanon and Palestine or wholly or partially restricted species to East Mediterranean area  
 (5) Species searched by people for their culinary or ornamental values  
 (6) Species of hights  
 (7) Bio-indicator species  
 (8) Plants of economic importance: Medicinal (M), Fodder (F), Ornamental (O)  
 (9) Common species.  
 (10) Cosmopolitan species or species of the Mediterranean basin or species of Europe and Asia.

SCIENTIFIC NAME IN ALPHABETICAL ORDER	English name	الإسم العربي Arabic name	1	2	3	4	5	6	7	8	9	10
ACANTHACEAE	<b>Acanthaceae</b>	أقنثيات										
<i>Acanthus syriacus</i> Mch	Syrian acanthus	كف الدب				+					+	
ACERACEAE	<b>Aceraceae</b>	فقيبيات										
<i>Acer syriacum</i> JM, Chw	Syrian maple	فقيب سوري				+		+				
<i>Acer tauricum</i> JM	Taurus maple	فقيب طوروس				+						
AMARANTHACEAE	<b>Amaranthaceae</b>	قطيفيات										
<i>Amaranthus caudatus</i> ND, >Chah	Love-lies-bleeding	عرف الديك								O		+
<i>Amaranthus hybridus chlorostachys</i> Q	Hybrid amaranth	رعاف اخضر										+
<i>Amaranthus hybridus erytostachys</i>	Hybrid amaranth	رعاف احمر										+

Q															
<i>Amaranthus gracilis</i> NI	Slender amaranth	قطيفة رفيعة													+
<i>Amaranthus retroflexus</i> Q	Hairy amaranth	دلاق													+
AMARYLLIDACEAE	<b>Amaryllidaceae</b>	نرجسيات													
<i>Narcissus tazetta</i> ND, Chw	Bunch-flowered narcissus	نرجس طاسي													+
<i>Sternbergia clusiana</i> JM	Clusius' sternbergia	لحلاح ذهبي					+								
ANACARDIACEAE	<b>Anacardiaceae</b>	سماقيات													
<i>Pistacia mutica</i> > Chah	Pointless terebinth	شقيير					+						M		
<i>Pistacia palaestina</i> JM	Palestine pistachio	بطم					+						M	+	
<i>Rhus coriaria</i> JM	Sumach	سماق											M		+
APIACEAE	<b>Apiaceae</b>	خيميائيات													
<i>Ainsworthia cordata</i> JM	Cordate ainsworthia	سلة قلبية الشكل					+								
<i>Ainsworthia trachycarpa</i> MG	Common ainsworthia	سلة منتشرة					+								
<i>Anthriscus lamprocarpa</i> >Cha, JM	Bright-fruited beak chervil	ثمر لامع					+								
<i>Bunium ferulaceum</i> NI	Balkan pignut	جوزة الانجدان													+
<i>Bunium pestalozzae</i> MG	Bunium pestalozza	جوزة بستلوزا					+								
<i>Bupleurum fruticosum</i> NI	Shrubby hare's ear	أذن الأرنب													+
<i>Bupleurum libanoticum</i> >May	Lebanon hare's ear	حلوان لبنان					+								
<i>Bupleurum nodiflorum</i> JM	Sessile-flowered hare's ear	حلباب عقدي					+					+			
<i>Chaetosciadium trichospermum</i> _NI	Hairy-seeded chervil	شيتوسيديوم					+								
<i>Coriandrum sativum</i> Q	Coriander	كزبرة						+					M		+
<i>Daucus broteri</i> NI	Brotero's carrot	دوقو بروترو					+								
<i>Daucus carota maximus</i> Aab	Wild carrot	جزر بري												+	+
<i>Daucus guttatus brachylaenus</i> JM	Spotted carrot	دوقو مرقط					+								

<i>Eryngium billardieri</i> JM	Labillardiere's eryngo	شنداب					+						
<i>Eryngium creticum</i> JM	Cretan eryngo	قرصنة					+						+
<i>Eryngium falcatum</i> JM	Falcate eryngo	شنداب منجلي					+						
<i>Ferula tingitana</i> NI	Tangier giant-fennel	شومر الحمار											+
<i>Foeniculum vulgare</i> Q, NI	Common fennel	شمار										M	+
<i>Heptaptera anisoptera</i> JM	Unequal-winged heptaptera	هبتبيرة					+						
<i>Helosciadum nodiflorum</i> ND	Procumbent marshwort	جزر العفاريث											+
<i>Lagoecia cuminoides</i> JM, MG	Bastard cumin	كراوية جبلية					+						+
<i>Lecoquia cretica</i> ND, Mch	Cretan lecoquia	تلكية كريت					+						
<i>Orlaya platycarpus</i> Aa, MG	Flat-fruited orlaya	أرلاية كسطحة											+
<i>Pimpinella cretica</i> NI	Cretan burnet-saxifrage	بسياس											+
<i>Pimpinella peregrina</i> JM	Burnet saxifrage	بمبيلة											+
<i>Prangos asperula</i> JM	Rough Prangos	فرش الضبع					+					M	
<i>Scandix pecten-veneris</i> JM	Venus'-comb	مشط الزهرة									+		+
<i>Sison exaltatum</i> JM, Chw	Lofty sison	غرة باسفة											+
<i>Smyrniopsis syriaca</i> JM	Syrian smyrniopsis	سمرنيوبس					+						
<i>Smyrniium connatum</i> JM	Connate Alexander's	كرفس كالبجة					+						
<i>Torilis leptophylla</i> Chw	Slender-leaved hedge-parsley	توريلس نحيل											+
<i>Torilis leptophylla erythrotricha</i> JM	Red hedge-parsley	توريلس أحمر											+
APOCYNACEAE	<b>Apocynaceae</b>	دقليات											
<i>Nerium oleander</i> NI	Oleander	دقلة											+
ARACEAE	<b>Araceae</b>	لوفيات									+		
<i>Arisarum vulgare veslingii</i> Chw	Friar's-cowl	قبوع الراهب					+					M	+
<i>Arum hygrophilum</i> Chw	Green arum	لوف رطوبي									+	+	+

<i>Arum palaestinum</i> Chw, NY	Palestine arum	لوف فلسطيني																	+									
ARALIACEAE	Araliaceae	لبلايات																										
<i>Hedera helix</i> Chw, >Cha, Aab	Common ivy	لبلاب برّي																								+		
ARISTOLOCHIACEAE	Aristolochiaceae	زراونديات																										
<i>Aristolochia altissima</i> JM	Tall birthwort	زراوند شاهق				+																				+		
<i>Aristolochia billardieri</i> Q	Labillardiere's birthwort	زراوند لابيديري								+																		
<i>Aristolochia poecilantha</i> Q, JM	Party-colored birthwort	خيار الغنم								+																		
<i>Aristolochia scabridula</i> JM, MG	Rough birthwort	زراوند قاس								+																		
ASPIDIACEAE	Aspdiaceae	شمشاريات																										
<i>Dryopteris pallida libanotica</i> Aab	Lebanon fern	شمشار شاحب								+																M		
ASPLENIACEAE	Asplniaceae	سرخسيات																										
<i>Asplenium adiantum-nigrum onopteris</i> Q	Silver fern	سرخس البلوط																								+		
<i>Ceterach officinarum</i> Aab, ND, Mch	Miltwast	حشيشة الذهب																								M	+	+
ASTERACEAE	Asteraceae	مركبات																										



<i>Centaurea cheirolopha</i> JM	Palmate-pappused knapweed	قنطريون أصفر					+													
<i>Centaurea eryngioides</i> JM	Eryngo knapweed	قنطريون ملون					+													
<i>Centaurea hololeuca</i> Q	White knapweed	قنطريون الجبال					+													
<i>Centaurea hyalolepis</i> NI	Transparent-bracted knapweed	قنطريون شفاف					+													
<i>Centaurea iberica hermonis</i> JM	Iberian knapweed	دردار					+	+												
<i>Centaurea solstitialis solstitialis</i> JM	St Barnaby's-thistle	قنطريون مداري														M		+		
<i>Chondrilla juncea</i> Chw	Rushy gum-succory	يعضيض																+		
<i>Cicerbita mulgedioides</i> JM	Mulgedium sow-thistle	سيسربيتة					+													
<i>Cichorium intybus</i> JM	Common chicory	هنديا برية						+									+	+		
<i>Cirsium phyllocephalum</i> Yah, JM	Leaved-headed thistle	شرشار					+													
<i>Cnicus benedictus</i> JM	Blessed thistle	شوكة مباركة														+	M	+		
<i>Conyza (Erigeron) bonariensis</i> NI	Buenos Aires fleabane	كونيزا بونس أيرس															M	+	+	
<i>Conyza (Erigeron) canadense</i> NI	Canadian fleabane	اريفارون كندي																M	+	
<i>Conyza (Erigeron) naudinii</i> NI	Naudin's fleabane	اريفارون نودان																M	+	
<i>Crepis foetida</i> Q, Biout	Fetid hawkweed	سراغة صفراء																	+	
<i>Crepis reuteriana reuteriana</i> Q	Reuter's hawkweed	سراغة روتر					+													
<i>Crupina crupinastrum</i> JM	False sow-wort	زحافة حمراء																	+	
<i>Doronycum orientale</i> > Cha	Oriental leopard's-bane	درونق شرقي																	+	
<i>Echinops adenocaulios</i> > Cha	Viscous globe-thistle	خرشف أزرق																	+	+
<i>Echinops gaillardotii</i> JM	Gaillardot's globe-thistle	قرقفان غيردوه					+													
<i>Echinops viscosus macrocarpus</i> Q	Viscous globe-thistle	خرشف ذو قنابة																	+	
<i>Eupatorium cannabinum indivisum</i> Q	Common hemp-agrimony	خد البننت																M	+	
<i>Gundelia tournefortii</i> Q	Gundelia	عكوب	+				+	+	+								+			

<i>Helichrysum sanguineum</i> JM	Blood-red everlasting	خالدة حمراء	+			+												
<i>Helichrysum virgineum</i> Aab	White everlasting	خالدة بيضاء	+	+														
<i>Inula graveolens</i> Q	Heavy-sented inula	راسن عبق																+
<i>Inula viscosa</i> JM, Q	Viscous inula	طيون																+ +
<i>Inula vulgaris</i> >Cha	Ploughman's-spikenard	طيون الذباب															M	+
<i>Lactuca serriola</i> Aabri	Prickly lettuce	خس الزيت																+
<i>Lapsana communis ramossissima</i> JM	Common nipplewort	خفج																
<i>Leontodon tuberosus</i> NI	Tuberous dandelion	بعضيض عسقولي																+
<i>Matricaria chamomilla</i> Q	Wild chamomile	بابونج															M	+
<i>Notobasis syriaca</i> Mch, ND, Q, MG	Syrian thistle	لحلاح																+ +
<i>Onopordum carduiforme</i> JM	False plumed-thistle	أقسون قردوسي																
<i>Onopordum cynarocephalum</i> JM	Artichoke cotton-thistle	اقسون حرشفي																
<i>Pallenis spinosa</i> JM, Y	Spiny pallenis	زباد																+
<i>Phagnalon rupestre</i> NI	African fleabane	قذى																+
<i>Picnomon acarna</i> Q, JM	Yellow cnicus	لحلاح																+
<i>Picris strigosa</i> JM	Strigose ox-tongue	مرير شانك																
<i>Ptilostemon chamaepeuce</i> NI	Shrubby ptilostemon	صنوبر الأرض																M +
<i>Ptilostemon diacantha diacantha</i> JM	Two-spined ptilostemon	بتيلستمون																M
<i>Pulicaria dysenterica</i> NI	Common fleabane	رعراع أيوب																+ M +
<i>Rhagadiolus edulis</i> JM	Edible hawkbit	رغديولس مأكول																+
<i>Rhagadiolus stellatus</i> JM, MG	Stellate hawkbit	ابرة العجوز																+ +
<i>Reichardia glauca</i> Aab	Glaucus reichardia	ريخردية حواء																
<i>Reichardia intermedia</i> Chw	Intermediate reichardia	ريخردية وسط																+
<i>Scariola viminea</i> JM	Pliant scariola	سكيولة صفراء																+
<i>Senecio vernalis</i> Mch, ND	Spring groundsel	مُرار																+

<i>Senecio vulgaris</i> Chw, Mch	Common groundsel	بابونج الطير										M	+
<i>Sonchus oleraceus</i> Q	Common sow-thistle	ألبين											+
<i>Stachelina lobelia</i> JM	Lobelius' stachelina	كف العجوز				+							
<i>Steptorhamphus tuberosus</i> JM	Tuberous steptorhamphus	سنتور عسقولي				+							
<i>Tanacetum aucheri</i> JM	Aucher's tansy	تناسنوم اوشيه				+		+					
<i>Taraxacum aleppicum</i> Mch	Aleppo dandelion	طرخشقون حلب				+							
<i>Taraxacum megalorrhizon</i> JM	Large-rooted dandelion	طرخشقون جذري											+
<i>Tragopogon longirostris</i> JM	Goat's-beard	لحية التيس				+							
<i>Tussilago farfara</i> NI, Mch	Coltsfoot	حشيشة السعال						+				M	+
<i>Xanthium strumarium</i> Q	Broad cocklebur	شبيط ضد السعلة										M	+
BETULACEAE	<b>Betulaceae</b>	بتوليات											
<i>Alnus orientalis</i> NI	Oriental alder	مغث شرقي				+							
BORAGINACEAE	<b>Boraginaceae</b>	محميات											
<i>Alkanna leiocarpa</i> JM, >Chah, ND	Smooth-fruited alkanet	شنجار أملس	+	+	+								
<i>Anchusa hybrida</i> Q, JM	Hybrid bugloss	ذنب القط هجين				+							
<i>Anchusa strigosa</i> NI	Strigose bugloss	لسان الثور شانك				+							
<i>Echium glomeratum</i> Q	Clustered viper's-bugloss	أخيوم متجمع				+							
<i>Echium italicum</i> Chw	Italian viper's- bugloss	اخيوم ايطالي											+
<i>Cynoglossum nebrodense</i> Chah	Nebrodi hound's-tongue	لسان تكلب أحمر											+
<i>Heliotropium hirsutissimum</i> Q	Hairy heliotrope	إكرير				+							
<i>Heliotropium lasiocarpum</i> Y, Q	Woolly-fruited heliotrope	رقيب الشمس				+							
<i>Myosotis ramosissima</i> > May	Branching forget-me-not	ميوزوتيس فرع								+			+
<i>Onosma frutescens</i> NI	Bushy golden-drop	شنجار دغلي				+							



<i>Onosma orientalis</i> NI	Oriental golden-drop	اونسما شرقية							+										
<i>Symphytum palaestinum</i> >Chah	Palestine comfrey	لسان الثور							+				+	M					
<b>BRASSICACEAE</b>	<b>Brassicaceae</b>	صلبييات																	
<i>Alyssum contemptum</i> JM	Dwarf madwort	الوسن قزم							+		+								
<i>Alyssum murale</i> JM	Wall madwort	الوسن الحيطان									+			F					+
<i>Alyssum szowitsianum</i> >Achqout	Szovits' madwort	الوسن زوقفس							+										
<i>Arabis caucasica</i> Aab	Caucasian rock cress	شمراخ							+										
<i>Arabis laxa cremocarpa</i> Ghineh	Refracted rock cress	عربية متدليلة							+										
<i>Arabis sagittate</i> > Chah, Aab	Sagittate rock-cress	عربية السهم																	+
<i>Arabis turrita</i> Q, Chw, Biout	Tower cress	اربيس برجى											+						+
<i>Arabis verna</i> Chw, MG, JM	Early rocket	اربيس ربيعي																	+
<i>Biscutella ciliata</i> Aab, Mch, MG	Flat-fruit buckler-mustard	بسكوتلة							+										
<i>Brassica cretica</i> Chw	Cretan cabbage	ملفوف كريت							+										
<i>Brassica cretica nivea</i> Chw	White Cretan cabbage	ملفوف كريت أبيض							+										
<i>Capsella bursa-pastoris</i> Mch	Common shepherd's-purse	جراب الراعي												M					+
<i>Capsella rubella</i> Mch	Pink shepherd's-purse	قرملة حمرة																	+
<i>Cardamine graeca</i> , Chw, Mch	Greek bittercress	صناب الروم																	+
<i>Cardamine hirsute</i> Aab	Hairy land-cress	قرة الكروم												M					+
<i>Clypeola jonthlaspis</i> JM	Disk-cress	تريس قرصي																	+
<i>Erophila gilgiana</i> > Chah, JM	Gilg's faverel	أرفيلة جلج						+											
<i>Erophila minima</i> Mch	Least faverel	أرفيلة قزماة							+										
<i>Eruca vesicaria</i> Q, JM	Bladder rocket-salad	ركة (مزروعة)												M					+
<i>Erysimum crassipes</i> Q, JM	Thick-stalked erysimum	اريسموم ثخين							+										
<i>Fibigia clypeata</i> JM, Aab	Shield fibigia	حشيشة القونة												F					+

<i>Lepidium hirtum microstylum</i> JM	Small styled pepperwort	عصاب قليمي					+		+		M			
<i>Lobularia maritima</i> ND	Sea lobularia	خرم الإبرة											+	
<i>Malcolmia chia</i> JM	Chian malcolmia	ملكلمية خيوس					+							
<i>Malcolmia crenulata</i> Mch	Common malcolmia	ملكلمية مفرضة					+							
<i>Malcolmia exacoides</i> Mch	Yellow malcolmia	ملكلمية صفراء					+							
<i>Lobularia maritima</i> ND	Sea lobularia	خرم الابرة						+					+	
<i>Nasturium officinale</i> Q	Common water-cress	قرة									+	M	+	+
<i>Raphanus raphanistrum</i> Mch, Chw	Wild radish	فجل برّي												+
<i>Rorippa macrocarpa</i> > May, Q	Yellow-cress	روربية	+	+							+			
<i>Sisymbrium officinale</i> JM	Hedged mustard	سمارة طيبة										M		+
<i>Thlaspi annuum</i> Aab, Chw, JM	Annual penny-cress	تلسبي حولي					+							
<i>Thlaspi perfoliatum</i> Biout	Perfoliate penny-cress	تلسبي الريحان								+				+
<i>Texiera glassifolia</i> JM	Globe mustard	نسيجية ليلية					+							
CACTACEAE	<b>Cactaceae</b>	الصبر												
<i>Opuntia ficus-indica</i> Chw	Barbary fig	صبير شائع								+		+	+	
CAESALPINACEAE	<b>Caesalpinaceae</b>	خروبيات												
<i>Ceratonia siliqua</i> Chw	Carob	خروب								+				+
<i>Cercis siliquastrum</i> JM, ND,	Judas tree	زمزيق								+				+
CAMPANULACEAE	<b>Campanulaceae</b>	بوقيات												
<i>Campanulacymbalaria</i> JM	Cymbal bellflower	جريس صنجي					+							
<i>Campanula peregrine</i> NI, Aab	Foreign bellflower	جريس رحال					+				+			
<i>Campanula rapunculus speciformis</i> ChJM	Rampion	جريس لفتي												+
<i>Campanula retrorsa</i> NI	Retorse bellflower	جريس منقلب					+							
<i>Campanula stellaris</i> NI	Starry bellflower	جريس نجمي					+							

<i>Campanula stricta libanotica</i> JM	Lebanon bellflower	جريس لبناني				+							
<i>Campanula trichopoda</i> NI	Capillary-stemmed bellflower	رفيع الساق				+							
<i>Legousia falcate</i> JM	Falcate Venus' looking-glass	لغوزية منجلية											+
<i>Legousia pentagonia</i> JM	Large Venus' looking-glass	لغوزية خماسية				+							
<i>Michauxia campanuloides</i> JM	Rough-leaved michauxia	مشكسية جريسية				+							
CAPPARIDACEAE	<b>Capparidaceae</b>	الكبر											
<i>Capparis spinosa</i> NI, Chw	Spiny caper	كبر شانك				+		+					+
CAPRIFOLIACEAE	<b>Caprifoliaceae</b>	بلسانيات											
<i>Sambucus ebulus</i> Q	Dwarf elder	دمدمون							+				+
<i>Sambucus nigra</i> >Chah, Q	Black elder	بيلسان						+		M			+
<i>Viburnum tinus</i> NI, Y	Laurestine	مران				+							+
CARYOPHYLLACEAE	<b>Caryophyllaceae</b>	قرنفليات											
<i>Arenaria leptoclados</i> NI	Sadwort	رملية											+
<i>Arenaria libanotica</i> JM	Lebanon sandwort	زهرة رمال لبنانية			+								
<i>Cerastium brachypetalum roeseri</i> Ch	Short-petalled mouse-ear	قرفاء قصيرة البتلات											+
<i>Cerastium comatum</i> >Chah	Hairy mouse-ear-chickweed	قرفاء الشعراء				+							
<i>Cerastium glomeratum</i> MG	Clustred mouse-ear-chickweed	أذن فار متجمعة											+
<i>Dianthus orientalis brachyodontus</i> JM	Oriental pink	قرنفل الشرق				+							
<i>Dianthus strictus multipunctatus</i> JM	Upright pink	قرنفل قائم				+						+	+
<i>Dianthus tripunctatus</i> JM	Three-spotted pink	قرنفل مثلث النقط				+							

<i>Minuartia hybrida</i> Chw	Hybrid sandwort	منورتية هجينة					+							
<i>Minuartia mesogytana</i> NI	Mount Mesogis sandwort	منورتية ميسوجيس					+							
<i>Paronychia argentea</i> JM	Silvery milwort	حربت فضي										M		+
<i>Polycarpon tetraphyllum</i> NI	Four-leaved allseed	مطاء												+
<i>Saponaria officinalis</i> Q	Common soapwort	صابونية طبية										M		+
<i>Silene aegyptiaca</i> Q, Mch, ND, Aab	Egyptian catchfly	شنتان النورية								+			+	+
<i>Silene astartes</i> Mch	Astarte's catchfly	سيلان عشروت	+				+							
<i>Silene damascena</i> JM, >Chah	Damascus catchfly	سيلان دمشق					+		+					
<i>Silene juncea</i> JM	Rushy catchfly	سيلان اسلية					+						+	
<i>Silene juncea pallida</i> JM	Colored rushy catchfly	سيلان ملون الزهر					+							
<i>Silene kotschy</i> Yah	Kotschy catchfly	سيلان كوتشي					+							
<i>Silene nocturna</i> NI	Night catchfly	سيلان ليلي					+							
<i>Silene papillosa</i> Snobar	Pimpled catchfly	سيلان حليمات					+							
<i>Silene racemosa</i> Qih, JM	Racemose catchfly	سيلان عقودية					+							
<i>Silene vulgaris</i> NI, Chw, Q, JM	Common catchfly	سيلان مبذولة											+	+
<i>Silene vulgaris colorata</i> Chw	Common catchfly	سيلان مبذولة				+								+
<i>Stellaria cilicica</i> JM	Cilician starwort	نجمة قيليقيا					+							
<i>Stellaria media</i> Aab, ND	Common chickweed	عشبة العلق												+
<i>Telephium imperati orientale</i> JM	True orpine	بخور البربر					+		+	+				
<i>Velezia rigida</i> JM	Rigid velezia	دبيقية												+
CHENOPODIACEAE	<b>Chenopodiaceae</b>	سرمقيات												
<i>Chenopodium ambrosoides</i> NI	Mexican tea	ماتي										M		+
<i>Chenopodium botrys</i> Q	Sticky goosefoot	سرمق عطر										M		+
<i>Chenopodium opulifolium</i>	Maple-leaved goosefoot	متين												+



<i>Rosularia kesrouanensis</i> JM, Q	Kesrouan rosularia	وردية كسروان	+	+	+			+	+					
<i>Rosularia libanotica</i> JM	Lebanon rosularia	وريدة لبنانية				+		+				+		
<i>Sedum hispanicum</i> Aab	Spanish stonecrop	حيون اسباني							+				+	
<i>Sedum tenuifolium</i> JM	Slender-leaved stonecrop	حيون نحيل الورق							+				+	
<i>Umbilicus erectus</i> JM	Yellow navelwort	سرة منتصبية				+								
<i>Umbilicus intermedius</i> Q, MG	Intermediate navelwort	سرة متوسطة				+						+		
CUCURBITACEAE	Cucurbitaceae	البطيخيات												
<i>Bryonia multiflora</i> Q, JM	Many-flowered bryonia	عنب الحبة				+					M			
<i>Ecballium elaterum</i> JM	Squirting cucumber	قثاء الحمار										+	+	+
CUPRESSACEAE	Cupressaceae	سرويات												
<i>Arceuthos drupacea</i> JM	Drupe-bearing arceuthos	دفران				+	+	+			M			
<i>Juniperus oxycedrus</i> JM	Prickly juniper	عرعر كادي						+	+				+	
CUSCUTACEAE	Cuscutaceae	كشوت												
<i>Cuscuta balansa</i> Q	Balansa's dodder	قشقوق بلنسا						+					+	
<i>Cuscuta monogyna</i> ND	Oriental dodder	قشقوق شرقي											+	
CYPERACEAE	Cyperaceae	سعديات												
<i>Carex distans</i> Ghineh	Loose sedge	سعادى متباعد										+	+	
<i>Carex divulsa</i> NI	Grey sedge	سعادى منفصل											+	
<i>Carex otrubae</i> Chw	Otruba's sedge	سعادى اوتروبا											+	



<i>Pentapera sicula libanotica</i> NI	Lebanese pentapera	خلنج لبنان	+	+	+													
<i>Rhododendron ponticum brachycarpum</i> JM	Short-fruit rhododendron	البقيل	+	+				+	+								O	
EUPHORBIACEAE	<b>Euphorbiaceae</b>	فربيونيات																
<i>Andrachne telephioides</i> JM	Bastard sedum	لبانة																+
<i>Chrosophora tinctoria</i> Q	Turnsole	عباد الشمس						+										
<i>Euphorbia apios lamprocarpa</i> JM	Pear-rooted spurge	شلجم لامع																+
<i>Euphorbia arguta</i> NI	Toothed spurge	فربيون حاد						+										
<i>Euphorbia cassia</i> Chw	Cassius spurge	فربيون الأقرع						+										
<i>Euphorbia helioscopia</i> JM, Mch	Sun spurge	فربيون الشمس																+
<i>Euphorbia indica</i> NI	Indian spurge	فربيون الهند																+
<i>Euphorbia kostchyana</i> >Cha, Aab	Kotschy's spurge	فربيون كتشي						+										
<i>Euphorbia macroclada schyzoceras</i> JM	Large-branched spurge	فربيون مشقوق						+										
<i>Euphorbia maculata</i> JM	Maculated spurge	فربيون موشح																+
<i>Euphorbia peplis</i> NI	Purple spurge	زرق															M	+
<i>Euphorbia peplus</i> NY	Petty spurge	فرسخ															M	+
<i>Euphorbia petiolate</i> JM	Petiolate spurge	فربيون معنق						+										
<i>Euphorbia terracina</i> NI	Terracina spurge	فربيون ترتشينا																+
<i>Euphorbia thamnoides</i> NI, Aab	Woody spurge	حليبية						+										
<i>Mercurialis annua</i> Partout	Annual mercury	حلوب حولي																+
FABACEAE	<b>Fabaceae</b>	فراشيات																
<i>Adenocarpus complicates</i> Q	Folded adenocarpus	ادينوقريس مطوي																+
<i>Astragalus gummifer</i> Q	Gum milk-vetch	كثيراء															M	+
<i>Astragalus hamosus</i> JM	Hooked milk-vetch	قرين																+
<i>Calycotome villosa</i> Aabri	Thorny-broom	قندول																+



<i>Colutea cilicica</i> Q	Bladder-senna	سنا كانب					+		+		M			
<i>Coronilla cretica</i> NI	Cretan crown-vetch	اكليل كريت											+	
<i>Coronilla emeroides</i> Y, Chw, JM	False senna	اكليل امروسي					+							
<i>Coronilla varia libanotica</i> JM	Lebnon crown-vetch	اكليل لبنان					+				M			
<i>Cytisus drepanolobus</i> Q	Sickle-podded broom	لزان منجلي					+							
<i>Cytisus syriacus</i> Q, JM	Syrian broom	لزان سوري		+						+		+		
<i>Dorycnium hirsutum</i> >Chah	Hairy dorycnium	دوركنيوم أشعر											+	
<i>Dorycnium rectum</i> Q	Straight dorycnium	دوركنيوم قائم											+	
<i>Hymenocarpus circinatus</i> JM	Circular medick	هيمنوقربوس											+	
<i>Lathyrus aphaca</i> ND, MG	Yellow vetchling	جلبان افاق											+	+
<i>Lathyrus blepharicarpus</i> MG	Fringed-podded vetchling	جليبينة					+						+	
<i>Lathyrus cassius</i> Chw	Cassius vetchling	جلبان الأقرع					+							
<i>Lathyrus digitatus</i> Y, JM, Biout	Fingered vetching	جلبان طويل					+				F			
<i>Lathyrus hierosolymitanus</i> JM	Jerusalem vetchling	جلبان القدس					+							
<i>Lathyrus hirsutus</i> Q	Hairy vetching	سعيدة												+
<i>Lathyrus inermis glabriusculus</i> >Ch	Unarmed vetchling	جلبان امرط					+				+			
<i>Lotus carmeli</i> JM	Carmel birdsfoot-trefoil	قرن غزال كرمل					+							
<i>Lotus judaicus</i> JM	Judean birdsfoot-trefoil	قرن الغزال اليهودية					+							
<i>Lotus palustris</i> Q	Marsh birdsfoot-trefoil	لوطس المناقع					+				+			
<i>Medicago blancheana</i> NI	Blanche's medick	فصة بلانش					+							
<i>Medicago hispidula denticulate</i> JM	Toothed medick	فصة مسننة					+							+
<i>Medicago lupulina</i> Q, JM	Black medick	فصة جنجالية									F			+
<i>Medicago rigidula</i> >Cha, JM	Rigid medick	فصة قاسية												+
<i>Medicago x varia</i> Q	Lucerne	قنات												+

<i>Melilotus italica</i> NI	Italian melilot	حنديوق ايطالي										M		
<i>Ononis natrix</i> Q	Shrubby rest harrow	شبرق ثعباني										F	+	+
<i>Ononis spinosa leiosperma</i> Q	Spiny rest harrow	شبرق شانك				+						M		
<i>Ononis viscosa brevisflora</i> Y, Snobra	Viscous rest harrow	شبرق صغير										O		+
<i>Ornithopus compressus</i> Y	Bird's-foot	ربيدان									+			+
<i>Pisum arvense</i> Aabri	Field pea	بسلة الحقول												+
<i>Pisum elatius</i> JM	Purple pea	بسلة عالية												+
<i>Psoralea bituminosa</i> JM, MG	Scurf pea	حومان												+
<i>Securigera securidaca</i> NI	Hatchet-vetch	صبيرة												+
<i>Spartium junceum</i> Yah, JM	Spanish broom	وزال									+	M		+
<i>Trifolium arvense</i> Q	Hare's-foot trefoil	نفل الحقول										+		+
<i>Trifolium campestre</i> JM	Hop trefoil	نفل حقل										+		+
<i>Trifolium clusii</i> JM	Clusius' clover	نفل كلوزيوس											+	+
<i>Trifolium clypeatum</i> ND, Chw, Aab	Hemet clover	بزاز البقر				+							+	
<i>Trifolium echinatum</i> Yah	Prickly clover	نفل مقتنف												+
<i>Trifolium erubescens</i> NI	Blushing clover	نفل متورد				+								
<i>Trifolium medusaeum</i> Q	Medusa's clover	نفل ميدوسا				+					+			
<i>Trifolium physodes</i> JM	Bladder clover	نفل مثاني						+	+			F		+
<i>Trifolium pilulare</i> JM	Ball cotton clover	نفل حباتي				+							+	
<i>Trifolium plebium</i> Q, Biout	Common clever	نفل شانع				+			+	+				
<i>Trifolium purpureum</i> Q	Purple clover	نفل ارجواني											+	+
<i>Trifolium repens</i> Q	White clover	نفل زاحف								+		M		+
<i>Trifolium scabrum</i> JM	Rugged clover	نفل أحرش												+
<i>Trifolium scutatum</i> Q	Shield clover	نفل درعي				+								
<i>Trifolium squarosum</i> NI	Squarrose clover	نفل محرشف										F		+





<i>Ajuga chia</i> Chw	Chian bugle	مسيكه				+								
<i>Ajuga tridactylites</i> JM	3-fingered bugle	مسيكه فلسطيني				+								
<i>Calamintha vulgaris</i> JM	Common calamint	نعناع الجبل												+
<i>Eremostachys laciniata</i> JM	Cut-leaved phlomis	هجنبل مشرشر				+					+	M		
<i>Lamium purpureum</i> MG, Aab, Mch	Purplr dead-nettle	لميون ارجواني										M		+
<i>Lamium striatum</i> JM. Aab	Striate dead-nettle	لميوم مخطط				+					+			
<i>Lamium truncatum</i> MG, Chw	Truncate dead-nettle	لميوم مقطوم				+					+			
<i>Lavandula stoechas</i> Y-Snobar	French lavender	لاوند										M		+
<i>Lycopus europaeus</i> NI	Gypsywort	فراسيون الماء										M		+
<i>Melissa inodora</i> NI, JM	Scentless balm	ترنجان عديم الرائحة						+						+
<i>Melissa officinalis</i> Ghbali	Common balm	ترنجان طبي						+				M		+
<i>Mentha aquatica</i> Aab	Water minth	نعنع الماء										M		+
<i>Mentha microphylla</i> NI, JM	Small-leaved mint	نعنع صغير الورق										+	M	+
<i>Micromeria graeca</i> JM	Greek savory	شميسه يونانية												+
<i>Micromeria graeca laxiflora</i> Aab	Lax-flowered savory	شميسه مترهلة								+				
<i>Micromeria juliana</i> JM	Linear-leaved savory	زوفاجوليانا									+			+
<i>Nepeta cilicica</i> JM	Cilician catmint	قطرم قليقيا									+			
<i>Nepeta curviflora</i> JM	Syrian catmint	قطرم مقوس الزهر									+		+	
<i>Nepeta italic</i> JM	Italian catmint	قطرم ايطالي									+			+
<i>Nepeta leucostegia</i> JM	White-covered catmint	قطرم ابيض									+			
<i>Nepeta nuda pubescens</i> JM	Downy catmint	قطرم أزغب									+			
<i>Origanum ehrenbergii</i> Q	Ehrenberg's marjoram	زعترا رملي									+		+	M
<i>Origanum libanoticum</i> NI, Snobar	Lebanon marjoram	زعترا لبنان										+		M
<i>Origanum syriacum</i> JM	Syrian marjoram	زعترا									+		+	M
<i>Phlomis longifolia</i> JM	Long-leaved phlomis	عضينة طويلة الورق									+		+	



LILIACEAE	Liliaceae	زنبقيات													
<i>Allium affine</i> > Chah	Related garlic	ثوم مشابه				+		+							
<i>Allium ampeloprasum</i> JM	Wild leek	كرات بري													+
<i>Allium ampeloprasum leucanthum</i> Q	White wild leek	كرات بري ابيض													+
<i>Allium chloranthum montanum</i> JM	Mountain garlic	ثوم جبلي	+	+				+							
<i>Allium coppoleri</i> Q	Coppoler's garlic	ثوم كبولر													+
<i>Allium emarginatum</i> Chaw	Emarginated garlic	ثوم مفوق					+	+							
<i>Allium neapolitanum</i> JM	White garlic	ثوم ابيض													+
<i>Allium nigrum</i> Chw	Black garlic	ثوم أسود													+
<i>Allium rotundum</i> JM	Round garlic	ثوم مدور													+
<i>Allium stamineum</i> JM	Long-stamened garlic	ثوم طويل الاشدية						+							
<i>Allium trifoliatum</i> JM, NY, Chw	Three-leaved garlic	ثوم ثلاثي الورق						+							
<i>Asparagus acutifolius</i> Q, Yah, Chw	Sharp-leaved asparagus	هليون حاد الورق										+	M		+
<i>Asphodelus microcarpus</i> JM	Common asphodel	اشراس											+	M	+
<i>Bellevalia flexuosa</i> JM	Flexuous bellevalia	بلفلية متلوية						+							+
<i>Bellevalia trifoliata</i> Chw	Three-leaved bellevalia	بلفلية ثلاثية الورق													+
<i>Colchicum decaisnei</i> JM	Decaisne's meadow-saffron	سورنجان دكين						+							+
<i>Colchicum steveni</i> NI	Steven's meadow-saffron	سورنجان ستيفن						+						M	+
<i>Fritillaria acmopetala</i> ND	Sharp-petalled fritillary	عرار حاد البتلات	+					+						O	
<i>Fritillaria alfreda</i> Ghini	Alfreda's fritillary	عرار الفريدا	+					+						O	
<i>Fritillaria libanotica</i> Mch, ND	Lebanon fritillary	عرار لبناني						+							+
<i>Hyacinthus orientalis</i> >Cha, ND	Oriental hyacinth	خزام شرقي						+							+
<i>Lilium candidum</i> Chw	Madona lily	زنبق مار يوسف												M	+
<i>Muscari comosum</i> Chw, JM	Tassel-hyacinth	حلحل اشعر													+





<i>Melia azedarach</i> NI	Persian lilac	زنزلخة																	+	+	+	
MORACEAE	<b>Moraceae</b>	التوتيات																				
<i>Ficus carica</i> Aabri	Common fig	تين شائع																		+	+	
<i>Morus alba</i> Aabri	White mulberry-tree	توت ابيض																		+		
MYRTACEAE	<b>Myrtaceae</b>	آسيات																				
<i>Myrtus communis</i> NI	Common myrtle	أس شائع																		M	+	
OLEACEAE	<b>Oleaceae</b>	الزيتون																				
<i>Fraxinus ornus</i> JM	Manna ash	مران زهري																		+	+	
<i>Olea europaea</i> (var sauvages) NI	Common olive	زيتون بري																		+	+	+
<i>Phillyrea media</i> JM, Aabri	Intermediate phillyrea	برزة																		M	+	
ONAGRACEAE	<b>Onagraceae</b>	أخدريات																				
<i>Epilobium hirsutum</i> Q	Hairy willow-herb	فرفور								+				+							+	
<i>Epilobium parviflorum menthoides</i> Q	Small-flowered willow-herb	ند صغير الزهر																		+	M	+
<i>Epilobium tetragonum</i> Mch	Square-stalked willow-herbe	ذنب القبط																		+	M	
ORCHIDACEAE	<b>Orchidaceae</b>	سحلبيات																				
<i>Anacamptis pyramidalis</i> JM	Pyramidal orchid	سحلب هرمي	+																			+
<i>Limodorum abortivum</i> > Kfour	Aborted limodore	ليمودورم خديج	+		+																M	+
<i>Ophrys attica</i> JM	Attic ophrys	حاجبية اتكا	+				+															
<i>Ophrys bornmuelleri</i> Ghini	Bornmueller's ophrys	حاجبية برنملر	+							+												
<i>Ophrys fuciflora</i> JM, Chw	Drone ophrys	حاجبية الزنبور	+																			+
<i>Ophrys scolopax</i> Chahtoul, JM	Woodcock ophrys	العصفور	+			+																
<i>Orchis anatolica</i> JM, MG	Anatolian orchid	سحلب الاناضول	+										+									
<i>Orchis comperiana</i> JM, >Chah	Comper's orchid	سحلب كمير	+					+	+													
<i>Orchis holocheilos</i> Qjh	Entire lipped orchid	سحلب صيفي	+							+												

<i>Orchis italica</i> Chw	Italian orchid	سحلب ايطالي	+							+			+
<i>Orchis maculata macrostachys</i> Q	Spotted orchid	سحلب منقط	+			+							
<i>Orchis morio picta libani</i> Gh	Green-winged orchid	سحلب مهرج	+			+							
<i>Orchis papilionacea</i> NI	Butterfly orchid	سحلب فراشي	+			+							
<i>Orchis punctulata galilaea</i> JM Chw	Galilean orchid	سحلب الجليل	+			+							
<i>Orchis simia</i> NI, JM	Monkey orchid	سحلب السعدان	+										+
<i>Orchis tridentata</i> JM, MG	Three-toothed orchid	سحلب ثلاثي الاسنان	+			+	+						
<i>Serapias vomeracea</i> Q	Ploughshare orchid	سربياس محراثي	+				+		+				+
OROBANCHACEAE	<b>Orobanchaceae</b>	جعفيليات											
<i>Orobanche aegyptiaca</i> Q, Br	Egyptian broomrape	جعفيل مصري				+							+
<i>Orobanche minor</i> Yah	Lesser broomrape	جعفيل أبيض											+
<i>Orobanche ramosa</i> Q	Branching broomrape	جعفيل متفرع											+
OXALIDACEAE	<b>Oxalidaceae</b>	حماضيات											
<i>Oxalis articulata</i> Chw	Pink wood-sorrel	حماض احمر										O	+
<i>Oxalis pes-caprae</i> NI, Chw	Cape-sorrel	حميضة											+
PAEONIACEAE	<b>Paeoniacea</b>	ودحيات											
<i>Paeonia kesrouanensis</i> > Cha	Kesrouan peony	ودح كسروان	+			+						O	
<i>Paeonia mascula</i> JM	Male peony	ودح مرجاني	+									O	+
PAPAVERACEAE	<b>Papaveraceae</b>	خشخاشيات											
<i>Fumaria asepala</i> JM	White fumitory	شاهترج لاسيلي					+						
<i>Fumaria densiflora</i> route Afqa	Dense-flowered fumitory	زويته											+
<i>Fumaria gaillardotii</i> NI, Biout	Gaillardot's fumitory	شاهترج غيرده					+						
<i>Fumaria macrocarpa</i> > Chaht	Large-fruited fumitory	شاهترج كبير الورق					+						
<i>Fumaria parviflora</i> MG	Small-flowered fumitory	شاهترج صغير											+

<i>Hypecoum imberbe</i> JM?	Beardless hypecoum	هيبيقون امرد						+							
<i>Papaver dubium laevigatum</i> Q	Smooth pale-red laevigatum	خشخاش محير										M			+
<i>Papaver libanoticum</i> JM	Lebanon poppy	خشخاش لبنان						+							
<i>Papaver subpiriforme</i> > Cha	Pear-shaped poppy	خشخاش اجاصي					+	+							
PASSIFLORACEAE	<b>Passifloraceae</b>	آلاميات													
<i>Passiflora caerulea</i> ND	Blue passiflora	ساعة زرقاء										M			+
PINACEAE	<b>Pinaceae</b>	مخروطيات													
<i>Pinus brutia</i> Aabri	Calabrian pine	صنوبر بري						+				+			
<i>Pinus pinea</i> Y	Stone pine	صنوبر جوي										+	+		+
PLANTAGINACEAE	<b>Plantaginaceae</b>	فصيلة لسان الحمل													
<i>Plantago lanceolate</i> Q, JM	Lanceolate plantain	لسان الحمل سناني										M	+		+
<i>Plantago major</i> N I, Aa, Q	Greater plantain	لسان الحمل كبير										M			+
PLATANACEAE	<b>Platanaceae</b>	دلبيات													
<i>Platanus orientalis</i> ND	Oriental plane	دلب شرقي										+			
PLUMBAGINACEAE	<b>Plumbaginaceae</b>	رصاصيات													
<i>Plumbago europaea</i> Q	European leadwort	حشيشة الأسنان												+	+
POACEAE	<b>Gramineae</b>	نجليات													
<i>Aegilops ova</i> Q, JM	Ovate goat-grass	شعير ايليس													+
<i>Aegilops triuncialis</i> Q	Three-inch goat-grass	شعير طويل													+
<i>Agropyron panormitanum</i> JM	Palermo couch-grass	سيفون													+
<i>Alopecurus myosuroides</i> Q	Slender fox-tail	ذيل الثعلب قصير													+
<i>Alopecurus utriculatus</i> JM	Vernal fox-tail	ايل الثعلب						+							
<i>Anthoxanthum odoratum</i> Gh	Sweet vernal-grass	زهرة ستي مريم									+	+			+
<i>Arundo donax</i> ND	Giant reed	قصب شائع											M	+	+





PORTULACACEAE	Portulacaceae	رجليات																	
<i>Portulaca oleracea</i> NI, Mch	Common purslane	بقلة																M	+
PRIMULACEAE	Primulaceae	ربيقيات																	
<i>Anagallis arvensis caerulea</i> NI, Aab	Field pimpernel	عين العصفورة																	+
<i>Anagallis arv. phaenicea</i> NI, Aab	Phenician pimpernel	عين عصفورة فينيقي																	+
<i>Cyclamen coum</i> >Chahtoul	Kos cyclamen	بخور مريم جبلي	+				+			+									
<i>Cyclamen libanoticum</i> ND, Chw, Aab	Lebanon cyclamen	بخور مريم لبناني	+	+	+														+
<i>Cyclamen persicum</i> Gh	Persian cyclamen	يا سيدي																	+ +
<i>Primula vulgaris</i> Aab, Chw, ND	Common primrose	زهرة الربيع																	+
<i>Samolus valerandi</i> Chw	Water pimpernel	لبين الماء																M	+
PTERIDACEAE	Pteridaceae	سرخسيات																	
<i>Adiantum capillus-veneris</i> ND Chw	True maiden-hair	كزبرة البير							+									M	+ +
<i>Anogramma leptophylla</i> ND	Jersey fern	انغرامة																	+
<i>Cheilanthes fragrans</i> Mch	Sweet lip-fern	قيعون شذي																	+
<i>Pteris vitata</i> Chouane Aa NI	Long brake	بتريس																	+
<i>Pteridium aquilinum</i> Q, Aa, Chw	Eagle fern	خنشار العقاب																	+
PUNICACEAE	Punicaceae	رمانيات																	
<i>Punica granatum</i> Aab	Common pomegranate	رمان																	+
RANUNCULACEAE	Ranunculaceae	حوذانيات																	
<i>Anemone coronaria cyanea</i> Mch	Blue crown anemone	شقائق زرقاء																M	+
<i>Anemone co.r phoenicea</i> Chw, ND	Phoenician crown anemone	شقائق حمراء																M	+
<i>Clematis cirrhoza</i> Chw	Evergreen virgin's-bower	مرعان																	+
<i>Clematis flammula</i> JM	Sweet virgin's-bower	عنصرة																	+ +
<i>Delphinium peregrinum</i> JM	Violet-dolphin flower	رجل القنبرة																	+

<i>Ficaria grandiflora</i> Aab, Chw	Great-flowered ficaria	تينية كبيرة الزهر																	M		+		
<i>Ranunculus arvensis</i> ND	Field buttercup	كف الهر																			+	+	
<i>Ranunculus asiaticus</i> NI	Turban buttercup	كف الضبع							+														
<i>Ranunculus chius</i> NI, Chw	Chian buttercup	حودان خيوس																				+	
<i>Ranunculus cuneatus</i> >Cha	Cuneate buttercup	حودان اسفيني							+														
<i>Ranunculus hierosolymitanus</i> Q	Jerusalem buttercup	حودان القدس							+														
<i>Ranunculus millefoliatus</i> Ghi	Thousand leaved buttercup	حودان الف ورقة																				+	
<i>Ranunculus neapolitanus</i> May	Naples buttercup	حودان نابولي																				+	
<i>Ranunculus paludosus</i> Chw	Jersey buttercup	حودان المناقع																				+	
<i>Ranunculus sericeus</i> NI	Silky buttercup	حودان حريري							+														
<i>Thalictrum orientale</i> Chw	Oriental meadow-rue	سذاب شرقي							+														
RHAMNACEAE	<b>Rhamnaceae</b>	زفرينيات																					
<i>Rhamnus alaternus</i> NI, Chw, JM	Mediterranean buckhorn	زقرين الجرد																			M	+	
<i>Rhamnus punctata</i> JM	Dotted buckhorn	عجرم							+												+		
ROSACEAE	<b>Rosaceae</b>	ورديات																					
<i>Cotonoaster nummularia</i> JM	Nummular cotoneaster	سفرجلية																				+	
<i>Crataegus azarolus</i> JM	Common hawthorn	زعرور شائع							+												M		
<i>Crataegus monogyna</i> Chw, JM	White hawthorn	زعرور احادي القلم																			M	+	+
<i>Geum urbanum</i> JM	Herb-bennet	جيوم الحواضر											+								M	+	
<i>Malus trilobata</i> JM	Three-lobed apple	تفاح بري		+	+								+										
<i>Pirus syriaca</i> JM, NI	Syrian pear	نجااص بري							+				+								+		
<i>Poterium gaillardoti</i> JM	Gaillardot's burnet	بلان غيردو							+														
<i>Poterium verrucosum</i> MG	Warty burnet	زيتة																				+	+
<i>Prunus amygdalus</i> JM	Common almond	لوز مر بري																				+	

<i>Prunus mahaleb</i> >Chah	Mahaleb	محب							+					+
<i>Prunus orientalis</i> JM	Oriental almond	لوز شرقي					+							
<i>Prunus ursina</i> JM	Bear plume	خوخ الدب					+							
<i>Rosa canina</i> JM	Dog rose	ورد الكلاب									M			+
<i>Rosa dumetorum</i> Yah	Thicket rose	ورد الهيشة											+	
<i>Rosa sicula</i> Q	Sicilian rose	ورد صقلية												+
<i>Rubus collinus</i> Y	Hill blackberry	عليق الروابي												+
<i>Rubus hedycarpus</i> NI, ND	Edible-fruited blackberry	عليق مأكول الثمر										+		+
<i>Rubus sanctus</i> Aab, Q	Palestine blackberry	كبوش عادي												+
<i>Rubus tomentosus</i> Q	Tomentose blackberry	عليق بلدي												+
<i>Sorbus torminalis</i> JM	Wild service-tree	غبيراء												+
RUBIACEAE	<b>Rubiaceae</b>	فويات												
<i>Asperula breviflora</i> JM	Short-flowered woodruff	جويسة قصيرة						+						
<i>Asperula libanotica</i> JM	Lebanon woodruff	أسيرولة لبنانية	+	+					+					
<i>Crucianella macrostachya</i> JM, Aa	Common crosswort	صليبية شائعة						+						
<i>Galium canum</i> JM, Q	White bedstraw	غاليم احمر						+						
<i>Galium constrictum</i> Q	Constricted bedstraw	غاليم نحيف												+
<i>Galium divaricatum</i> >May, Q	Thin bedstraw	غاليم رفيع												+
<i>Galium hierosolymitanum</i> JM	Jerusalem bedstraw	غاليم القدس						+						
<i>Galium judaicum</i> NI, JM	Judean bedstraw	غاليم اليهودية						+						
<i>Galium libanoticum</i> JM	Lebanon bedstraw	غاليم لبنان						+						
<i>Galium pestalozzae</i> >Cha, JM, MG	Pestalozza's bedstraw	غاليم بستلوزا					+							
<i>Galium pisiferum</i> NI	Pea-bearing bedstraw	غاليم بسلي الثمر						+						
<i>Gallium prusense</i> Qih, Aab	Prusa bedstraw	غاليم بروسا						+						



<i>Galium verum</i> Q	Ladies bedstraw	غالسيوم حقيقي																	M	+		
<i>Putoria calabrica</i> > Chah	Calabrian putoria	منتنة كلبريا																		+		
<i>Rubia aucheri</i> >Aabr	Aucher's madder	فوة أوشيه																				
<i>Rubia tenuifolia elliptica</i> MG	Elliptic-leaved madder	فوة اهليلجية																				
<i>Rubia tenuifolia stenophylla</i> JM	Narrow-leaved madder	فوة ضيقة																				
<i>Sherardia arvensis</i> Chw	Field mader	شرردية الحقول																		+		
<i>Valantia muralis</i> JM	Wall valantia	فلنتية الحيطان	+																	+		
SALICACEAE	<b>Salicaceae</b>	صفصافيات																				
<i>Populus nigra</i> Chw	Black poplar	حور اسود																		O	+	
<i>Salix libani</i> Aab	Lebanon willow	صفصاف لبنان																				
SANTALACEAE	<b>Santalaceae</b>	صندليات																				
<i>Osyris alba</i> >Chah	Poet's cassia	صندل ابيض																			+	
<i>Thesium bergeri</i> Qih, JM	Berger's thesium	ثيزيوم برغر																				
SAXIFRAGACEAE	<b>Saxifragaceae</b>	كاسرات الحجر																				
<i>Saxifraga cymbalaria huetiana</i> Chw	Cymbale saxifrage	سفرس صنجي																				
<i>Saxifraga hederacea</i> >Cha, Chw	Ivy-leaved saxifrage	سفرس العمشق																			+	
<i>Saxifraga scotophila</i> ND	Shade saxifrage	سفرس الظلال																				
SCROPHULARIACEAE	<b>Scrophulariaceae</b>	خنزيريات																				
<i>Anarrhinum orientale</i> JM	Oriental anarrhinum	سوسل شرقي																				
<i>Digitalis ferruginea</i> >Chah	Rusty foxglove	دجتال الحديد																		+	M	+
<i>Kickxia spuria</i> Yah	Round-leaved fluellen	ككسية الرمل																				+
<i>Odontites lutea hispidula</i> > NI	Yellow odotites	عرقون أصفر																				
<i>Scrophularia rubricaulis</i> Q, JM	Red-stemmed figwort	خنزيرية حمراء																				
<i>Scrophularia umbrosa</i> Chah	Shade figwort	خنزيرية الماء																				+
<i>Verbascum berytheum</i> JM	Beirut mullein	بوصير بيروت																				





<i>Viola odorata</i> Aab	Sweet violet	بنفسج عطر					+						M	+	
<i>Viola parvula</i> >Chah	Dwarf violet	بنفسج قزم													+
ZYGOPHYLLACEAE	<b>Zygophyllaceae</b>	القلابيات													
<i>Tribulus terrestris</i> Q	Small caltrops	حسك الأرض													+

## ANNEX2: List of plants (2)

Places where plants are found inside the Reserve and in limitroph villages

>Chah = up Chahtoul near ND

Aa = Aabri north-East

Bro = Broqta south-East

Chw = Chouwane north

Gh = Ghbali and Ghineh near Yahchouch

JM = Jabal Moussa (hills slopes)

MG = Mar Geryes above Yahchouch

May = above Mayrouba near Q

Mch = Mchati departure point to summit

ND = Nahr ed-Dahab south or Nahr Yahchouch (NY) west

NI = Nahr Ibrahim north of the Reserve

Q = Qihmiz at East

Y= Yahchouch departure point

1 annual herb or 2 biennial; P= perennial herb; S= shrub a small woody perennial plant with branches from ground level. Total number = 717 species.

SCIENTIFIC NAMES IN ALPHABETICAL ORDER	T tree S shrub	English name	الاسم العر	Flowering time
<b>ACANTHACEAE</b>		<b>Acanthaceae</b>	أقنثيات	
<i>Acanthus syriacus</i> Mch	P	Syrian acanthus	كف الدب	3-6
<b>ACERACEAE</b>		<b>Aceraceae</b>	قيقيات	
<i>Acer syriacum</i> JM, Chw	T	Syrian maple	قيقب سوري	2-3
<i>Acer tauricum</i> JM	T	Taurus maple	قيقب طوروس	3-6
<b>AMARANTHACEAE</b>		<b>Amaranthaceae</b>	قطيفيات	
<i>Amaranthus caudatus</i> ND, >Chah	1	Love-lies-bleeding	عرف الديك	4-12

<i>Amaranthus hybridus chlorostachys</i> Q	1	Hybrid amaranth	رعاف اخضر	5-12
<i>Amaranthus hybridus erytostachys</i> Q	1	Hybrid amaranth	رعاف احمر	5-12
<i>Amaranthus gracilis</i> NI	1	Slender amaranth	قطيفة رفيعة	6-12
<i>Amaranthus retroflexus</i> Q	1	Hairy amaranth	دلاق	6-12
<b>AMARYLLIDACEAE</b>		<b>Amaryllidaceae</b>	نرجسيات	
<i>Narcissus tazetta</i> ND, Chw	P	Bunch-flowered narcissus	نرجس طاسي	10-2
<i>Sternbergia clusiana</i> JM	P	Clusius' sternbergia	لحلاح ذهبي	9-11
<b>ANACARDIACEAE</b>		<b>Anacardiaceae</b>	سماقيات	
<i>Pistacia mutica</i> > Chah	T	Pointless terebinth	شقيقير	2-4
<i>Pistacia palaestina</i> JM	T	Palestine pistachio	بطم	2-4
<i>Rhus coriaria</i> JM	T	Sumach	سماق	4-8
<b>APIACEAE</b>		<b>Apiaceae</b>	خيمييات	
<i>Ainsworthia cordata</i> JM	1	Cordate ainsworthia	سلة قلبية الشكل	3-5
<i>Ainsworthia trachycarpa</i> MG	1	Common ainsworthia	سلة منتشرة	2-5
<i>Anthriscus lamprocarpa</i> >Cha, JM	2	Bright-fruited beak chervil	ثمر لامع	3-5
<i>Bunium ferulaceum</i> NI	P	Balkan pignut	جوزة الانجدان	1-5
<i>Bunium pestalozzae</i> MG	P	Bunium pestalozza	جوزة بستلوزا	5-8
<i>Bupleurum fontanesii</i> JM	1	Desfontaines hare's ear	حلوان دبيق	3-6
<i>Bupleurum fruticosum</i> Chw, Aab	S	Shrubby hare's ear	أذن الأرنب	8-9
<i>Bupleurum libanoticum</i> >May	1	Lebanon hare's ear	حلوان لبنان	6-8
<i>Bupleurum nodiflorum</i> JM	1	Sessile-flowered hare's ear	حلبلاب عقدي	3-5
<i>Chaetosciadium trichospermum</i> NI	1	Hairy-seeded chervil	شيتوسيديوم	3-4
<i>Coriandrum sativum</i> Q	1	Coriander	كزبرة	1-4

<i>Daucus broteri</i> NI	1	Brotero's carrot	دوقو بروترو	4-7
<i>Daucus carota maximus</i> Aab	2	Wild carrot	جزر بري	4-6
<i>Daucus guttatus brachylaenus</i> JM	1	Spotted carrot	دوقو مرقط	4-8
<i>Eryngium billardieri</i> JM	P	Labillardiere's eryngo	شنداب	6-9
<i>Eryngium creticum</i> JM	P	Cretan eryngo	قرصعة	5-9
<i>Eryngium falcatum</i> JM	P	Falcate eryngo	شنداب منجلي	6-10
<i>Ferula tingitana</i> NI	P	Tangier giant-fennel	شومر الحمار	4-6
<i>Foeniculum vulgare</i> Q, NI	P	Common fennel	شمار	5-8
<i>Helosciadum nodiflorum</i> ND	P	Procumbent marshwort	جزر العفاريت	5-9
<i>Heptaptera anisoptera</i> JM	P	Unequal-winged heptaptera	هبتبيرة	4-6
<i>Lagoecia cuminoides</i> JM, MG	1	Bastard cumin	كراوية جبلية	3-5
<i>Lecoquia cretica</i> ND, Mch	P	Cretan lecoquia	تككية كريت	3-4
<i>Orlaya platycarpus</i> Aa, MG	1	Flat-fruited orlaya	أرلاية كسطحة	4-5
<i>Pimpinella cretica</i> NI	1	Cretan burnet-saxifrage	بسباس	4-5
<i>Pimpinella peregrina</i> JM	2	Burnet saxifrage	بمينة	4-7
<i>Prangos asperula</i> JM	P	Rough Prangos	فرش الضبع	5-6
<i>Scandix pecten-veneris</i> JM	1	Venus'-comb	مشط الزهرة	2-3
<i>Sison exaltatum</i> JM, Chw	2	Lofty sison	غرة باسقة	6-9
<i>Smyrniopsis syriaca</i> JM	P	Syrian smyrniopsis	سمرنيوبس	4-6
<i>Smyrnum connatum</i> JM	2	Connate Alexander's	كرفس كالقبة	3-5
<i>Torilis leptophylla</i> Chw	1	Slender-leaved hedge-parsley	توريلس نحيل	3-5
<i>Torilis leptophylla erythrotricha</i> JM	1	Red hedge-parsley	توريلس أحمر	3-5
<b>APOCYNACEAE</b>		<b>Apocynaceae</b>	دفلبات	

<i>Nerium oleander</i> NI	T	Oleander	دفلّة	4-10
<b>ARACEAE</b>		<b>Araceae</b>	لوفيات	
<i>Arisarum vulgare veslingii</i> Chw	P	Friar's-cowl	قَبّوع الراهب	11-3
<i>Arum hygrophilum</i> Chw	P	Green arum	لوف رطوبي	2-6
<i>Arum palaestinum</i> Chw, NY	P	Palestine arum	لوف فلسطيني	3-5
<b>ARALIACEAE</b>		<b>Araliaceae</b>	لبلايبات	
<i>Hedera helix</i> Chw, >Cha, Aab	S	Common ivy	لبلاب برّي	10-3
<b>ARISTOLOCHIACEAE</b>		<b>Aristolochiaceae</b>	زراونديات	
<i>Aristolochia altissima</i> JM	P	Tall birthwort	زراوند شاهق	1-12
<i>Aristolochia billardieri</i> Q	P	Labillardiere's birthwort	زراوند لابيديير	4-5
<i>Aristolochia poecilantha</i> Q, JM	P	Party-colored birthwort	خيار الغم	4-6
<i>Aristolochia scabridula</i> JM, MG	P	Rough birthwort	زراوند قاس	2-5
<b>ASPIDIACEAE</b>		<b>Aspidiaceae</b>	شمشاريات	
<i>Dryopteris pallida libanotica</i> Aab	1	Lebanon fern	شمشار شاحب	3-12
<b>ASPLENIACEAE</b>		<b>Aspleniaceae</b>	سرخسيات	
<i>Asplenium adiantum-nigrum onopteris</i> Q	P	Silver fern	سرخس البلوط	11-7
<i>Ceterach officinarum</i> Aab, ND, Mch	P	Miltwast	حشيشة الذهب	3-6
<b>ASTERACEAE</b>		<b>Asteraceae</b>	مركبات	



<i>Achillea kotschyi</i> Q, JM	P	Kotschy's milfoil	اخلبة كتشي	6-8
<i>Achillea tanacetifolia</i> Y	P	Tansyfolia milfoil	حشيشة الشفا	6-9
<i>Aetheorhiza bulbosa</i> NI	P	Bulbous hawk's-beard	بيض الأرض	3-4
<i>Anacyclus clavatus</i> NI	1	Club-shaped anacyclus	بيسوم	4-6
<i>Anthemis altissima</i> JM	1	Tall-chamomile	اقحوان مرتفع	4-5
<i>Anthemis chia</i> NI, Chw, Mch	1	Chian chamomile	بهار خيوس	12-5
<i>Anthemis cotula</i> JM	1	Fetid chamomile	اقحوان شائع	4-8
<i>Anthemis melanolepis</i> Chw	1	Black-scaled chamomile	اقحوان اسود	3-8
<i>Anthemis pauciloba</i> JM	P	Few-lobbed chamomile	بهار كاذب	3-7
<i>Anthemis tinctoria</i> JM	P	Yellow chamomile	بهار صباغي	5-7
<i>Anthemis tinctoria discoidea</i> JM	P	Discoidea yellow chamomile	بابونج أصفر	5-7
<i>Artemisia scoparia</i> Q	2	Broom wormwood	شبح سلماس	9-10
<i>Artemisia verlotorum</i> Q	P	Verlot's wormwood	شبح فرلوه	9-12
<i>Bellis perennis</i> Aab	P	Perennial daisy	بليس معمر	1-12
<i>Bellis sylvestris</i> JM, Q, Aab	P	Southern daisy	بليس حرجي	1-12
<i>Bidens frondosa</i> Chw	1	Leafy bur-marigold	حسيكة وريقة	10-3
<i>Bidens pilosa radiata</i> Chw	1	Rayed hairy bur-marigold	حسيكة وبرة	10-1
<i>Calandula arvensis</i> Chw, Mch	1	Field marigold	آذريون الحقول	1-5
<i>Carduus argentatus</i> Chw	1	Silvery plumed-thistle	شوك عنتر	4-5
<i>Carlina curetum orientalis</i> JM	P	Oriental curetum carline	كرلين شرقي	6-9
<i>Carlina involucrate libanotica</i> JM	P	Lebanon thistle	كرلين لبنان	6-11
<i>Carlina lanata</i> >Aaramoun	1	Purple carline	كرلين احمر	6-8
<i>Carthamus tenuis</i> Q, JM	1	Slender safflower	قرطم نحيل	7-10
<i>Centaurea calcitrapa</i> JM	2	Red star-thistle	مرار	5-7
<i>Centaurea cheirolopha</i> JM	P	Palmate-pappused knapweed	قنطريون أصفر	5-7

<i>Centaurea eryngioides</i> JM	P	Eryngo knapweed	قنطريون ملون	5-7
<i>Centaurea hololeuca</i> Q	P	White knapweed	قنطريون الجبال	6-8
<i>Centaurea hyalolepis</i> NI	2	Transparent-bracted knapweed	قنطريون شفاف	3-7
<i>Centaurea iberica hermonis</i> JM	1, 2	Iberian knapweed	دردار	5-7
<i>Centaurea solstitialis solstitialis</i> JM	1	St Barnaby's-thistle	قنطريون مداري	4-8
<i>Chondrilla juncea</i> Chw	2	Rushy gum-succory	يعضيض	7-10
<i>Cicerbita mulgedioides</i> JM	P	Mulgedium sow-thistle	سيسربيتة	6-9
<i>Cichorium intybus</i> JM	P	Common chicory	هندبا برية	5-7
<i>Cirsium phyllocephalum</i> Yah, JM	P	Leaved-headed thistle	شرشار	7-10
<i>Cnicus benedictus</i> JM	1	Blessed thistle	شوكة مباركة	3-5
<i>Conyza (Erigeron) bonariensis</i> NI	1	Buenos Aires fleabane	كونيزا بونس أيرس	1-12
<i>Conyza (Erigeron) canadense</i> NI	1	Canadian fleabane	اريغارون كندي	1-12
<i>Conyza (Erigeron) naudinii</i> NI	1, 2	Naudin's fleabane	اريغارون نودان	8-11
<i>Crepis foetida</i> Q, Biout	1	Fetid hawkweed	سراغة صفراء	4-9
<i>Crepis reuteriana reuteriana</i> Q	P	Reuter's hawkweed	سراغة روتر	2-8
<i>Crupina crupinastrum</i> JM	1	False sow-wort	زحافة حمراء	4-6
<i>Doronicum orientale</i> > Cha	P	Oriental leopard's-bane	درونق شرقي	4-6
<i>Echinops adenocaulos</i> > Cha	P	Viscous globe-thistle	خرشف ازرق	6-8
<i>Echinops gaillardotii</i> JM	P	Gaillardot's globe-thistle	قرقفان غيردوه	5-9
<i>Echinops viscosus macrolepis</i> Q	P	Viscous globe-thistle	خرشف ذو قنابة	5-11
<i>Eupatorium cannabinum indivisum</i> Q	P	Common hemp-agrimony	خد البننت	8-11
<i>Gundelia tournefortii</i> Q	P	Gundelia	عكوب	4-6
<i>Helichrysum sanguineum</i> JM	P	Blood-red everlasting	خالدة حمراء	4-6

<i>Helichrysum virgineum</i> Aab	P	White everlasting	خالدة بيضاء	5-7
<i>Inula graveolens</i> Q	1	Heavy-sented inula	راسن عبق	7-12
<i>Inula viscosa</i> JM, Q	P	Viscous inula	طيون	7-12
<i>Inula vulgaris</i> >Cha	2	Ploughman's-spikenard	طيون الذباب	6-10
<i>Lactuca serriola</i> Aab	1, 2	Prickly lettuce	خس الزيت	6-9
<i>Lapsana communis ramossissima</i> JM	1	Common nipplewort	خفج	6-9
<i>Leontodon tuberosus</i> NI	P	Tuberous dandelion	يعضيض عسقولي	10-5
<i>Matricaria chamomilla</i> Q	1	Wild chamomile	بابونج	3-6
<i>Notobasis syriaca</i> Mch, ND, Q, MG	1	Syrian thistle	لحلاح	4-6
<i>Onopordum carduiforme</i> JM	2	False plumed-thistle	أقسون قردوسي	3-8
<i>Onopordum cynarocephalum</i> JM	2	Artichoke cotton-thistle	اقسون حرشفي	4-8
<i>Pallenis spinosa</i> JM, Y	1	Spiny pallenis	زباد	2-6
<i>Phagnalon rupestre</i> NI	S	African fleabane	قذى	3-4
<i>Picnomon acarna</i> Q, JM	2	Yellow cnicus	لحلاح	7-8
<i>Picris strigosa</i> JM	2	Strigose ox-tongue	مرير شانك	6-8
<i>Ptilostemon chamaepeuce</i> NI	S	Shrubby ptilostemon	صنوبر الأرض	3-7
<i>Ptilostemon diacantha diacantha</i> JM	P	Two-spined ptilostemon	بتيلستمون	6-9
<i>Pulicaria dysenterica</i> NI	P	Common fleabane	رعراع أيوب	8-11
<i>Rhagadiolus edulis</i> JM	1	Edible hawkbit	رغديولس مأكول	3-5
<i>Rhagadiolus stellatus</i> JM, MG	1	Stellate hawkbit	ابرة العجوز	2-5
<i>Reichardia glauca</i> Aab	P	Glaucus reichardia	ريخردية حواء	3-8
<i>Reichardia intermedia</i> Chw	1	Intermediate reichardia	ريخردية وسط	10-11
<i>Scariola viminea</i> JM	2	Pliant scariola	سكريولة صفراء	8-9

<i>Senecio vernalis</i> Mch, ND	1	Spring groundsel	مُرار	11-5
<i>Senecio vulgaris</i> Chw, Mch	1	Common groundsel	بابونج الطير	11-3
<i>Serratula cerinthifolia</i> JM	p	Honeywort-leaved saw-wort	راس الشوك	5-8
<i>Sonchus oleraceus</i> Q	1	Common sow-thistle	لبين	1-12
<i>Stachelina lobelii</i> JM	S	Lobelius' stachelina	كف العجوز	7-10
<i>Steptorhamphus tuberosus</i> JM	2	Tuberous steptorhamphus	ستبتور عسقولي	4-6
<i>Tanacetum aucheri</i> JM	P	Aucher's tansy	تناسوم اوشبه	6-8
<i>Taraxacum aleppicum</i> Mch	P	Aleppo dandelion	طرخشقون حلب	11-4
<i>Taraxacum megalorrhizon</i> JM	P	Large-rooted dandelion	طرخشقون جذري	9-3
<i>Tragopogon longirostris</i> JM	2	Goat's-beard	لحية التيس	3-7
<i>Tussilago farfara</i> NI, Mch	P	Coltsfoot	حشيشة السعال	1-6
<i>Xanthium strumarium</i> Q	1	Broad cocklebur	شبيط ضد السعلة	1-12
<b>BETULACEAE</b>		<b>Betulaceae</b>	بتوليات	
<i>Alnus orientalis</i> NI	T	Oriental alder	نغت شرقي	1-3
<b>BORAGINACEAE</b>		<b>Boraginaceae</b>	حمحميات	
<i>Alkanna leiocarpa</i> JM, >Chah, ND	P	Smooth-fruited alkanet	شنجار أملس	3-6
<i>Anchusa hybrida</i> Q, JM	2	Hybrid bugloss	ذنب القط هجين	2-6
<i>Anchusa strigosa</i> NI	P	Strigose bugloss	لسان الثور شانك	3-6
<i>Cynoglossum nebrodense</i> Chah	1	Nebrodi hound's-tongue	لسان تلكلب أحمر	4-7
<i>Echium glomeratum</i> Q	2	Clustered viper's- bugloss	أخيوم متجمع	5-8
<i>Echium italicum</i> Chw	2	Italian viper's- bugloss	اخيوم ايطالي	5-8
<i>Heliotropium hirsutissimum</i> Q	1	Hairy heliotrope	إكرير	6-9
<i>Heliotropium lasiocarpum</i> Y, Q	1	Woolly-fruited heliotrope	رقيب الشمس	5-9
<i>Myosotis ramosissima</i> > May	1	Branching forget-me-not	ميوزوتيس فرع	3-6

<i>Onosma frutescens</i> NI	S	Bushy golden-drop	شنجار دغلي	3-6
<i>Onosma orientalis</i> NI	P	Oriental golden-drop	اونسما شرقية	2-5
<i>Symphytum palaestinum</i> >Chah	P	Palestine comfrey	لسان الثور	3-7
<b>BRASSICACEAE</b>		<b>Brassicaceae</b>	صليبيات	
<i>Alyssum contemptum</i> JM	1	Dwarf madwort	الوسن قزم	2-4
<i>Alyssum murale</i> JM	P	Wall madwort	الوسن الحيطان	4-11
<i>Alyssum szowitsianum</i> >Achqout	1	Szovits' madwort	الوسن زوفتس	3-5
<i>Arabis caucasica</i> Aab	P	Caucasian rock cress	شمراخ	4-7
<i>Arabis laxa cremocarpa</i> Ghineh	2	Refracted rock cress	عربية متدليلة	3-5
<i>Arabis sagittate</i> > Chah, Aab	2	Sagittate rock-cress	عربية السهم	3-5
<i>Arabis turrita</i> Q, Chw, Biout	2, P	Tower cress	اربيس برجى	3-5
<i>Arabis verna</i> Chw, MG, JM	1	Early rocket	اربيس ربيعي	3-4
<i>Biscutella ciliata</i> Aab, Mch, MG	1	Flat-fruit buckler-mustard	بسكوتلة	2-4
<i>Brassica cretica</i> Chw	P	Cretan cabbage	ملفوف كريت	2-5
<i>Brassica cretica nivea</i> Chw	P	White Cretan cabbage	ملفوف كريت ابيض	2-5
<i>Capsella bursa-pastoris</i> Mch	1	Common shepherd's-purse	جراب الراعي	12-8
<i>Capsella rubella</i> Mch	1	Pink shepherd's-purse	قرملة محمرة	12-7
<i>Cardamine graeca</i> , Chw, Mch	1	Greek bittercress	صناب الروم	3-4
<i>Cardamine hirsuta</i> Aab	1	Hairy land-cress	قرة الكروم	1-4
<i>Clypeola jonthlaspi</i> JM	1	Disk-cress	تريس قرصي	1-5
<i>Erophila gilgiana</i> > Chah, JM	1	Gilg's faverel	أرفيلة جلج	3-6
<i>Erophila minima</i> Mch	1	Least faverel	أرفيلة قزما	1-4
<i>Eruca vesicaria</i> Q, JM	1	Bladder rocket-salad	ركة (مزروعة)	1-6
<i>Erysimum crassipes</i> Q, JM	P	Thick-stalked erysimum	اريسوم ثخين	4-6
<i>Fibigia clypeata</i> JM, Aab	P	Shield fibigia	حشيشة القونة	3-5

<i>Lepidium hirtum microstylum</i> JM	2, P	Small styled pepperwort	عصاب قليمي	4-6
<i>Lobularia maritima</i> ND	P	Sea lobularia	خرم الإبرة	12-4
<i>Malcolmia chia</i> JM	1	Chian malcolmia	ملكلمية خيوس	4-5
<i>Malcolmia crenulata</i> Mch	1	Common malcolmia	ملكلمية مفرصة	12-4
<i>Malcolmia exacoides</i> Mch	1	Yellow malcolmia	ملكلمية صفراء	2-6
<i>Nasturtium officinale</i> Q	P	Common water-cress	قرة	1-7
<i>Raphanus raphanistrum</i> Mch, Chw	1	Wild radish	فجل بري	12-5
<i>Rorippa macrocarpa</i> > May, Q	P	Yellow-cress	روربية	3-5
<i>Sisymbrium officinale</i> JM	1	Hedged mustard	سمارة طبية	1-6
<i>Texiera glastifolia</i> JM	1	Globe mustard	نسيجية ليلية	3-4
<i>Thlaspi annuum</i> Aab, Chw, JM	1	Annual penny-cress	تلسبي حولي	1-5
<i>Thlaspi perfoliatum</i> Biout	1	Perfoliate penny-cress	تلسبي الريحان	2-4
<b>CACTACEAE</b>		<b>Cactaceae</b>	الصير	
<i>Opuntia ficus-indica</i> Chw	S	Barbary fig	صبير شانع	2-10
<b>CAESALPINACEAE</b>		<b>Caesalpinaceae</b>	خروببات	
<i>Ceratonia siliqua</i> Chw	T	Carob	خروب	7-10
<i>Cercis siliquastrum</i> JM, ND,	T	Judas tree	زمزيق	2-5
<b>CAMPANULACEAE</b>		<b>Campanulaceae</b>	بوقيات	
<i>Campanula cymbalaria</i> JM	P	Cymbal bellflower	جريس صنجي	6-9
<i>Campanula peregrina</i> NI, Aab	2	Foreign bellflower	جريس رحال	5-11
<i>Campanula rapunculus spiciformis</i> JM	2	Rampion	جريس لفتي	4-7
<i>Campanula retrorsa</i> NI	1	Retorse bellflower	جريس منقلب	4-6
<i>Campanula stellaris</i> NI	1	Starry bellflower	جريس نجمي	3-5
<i>Campanula stricta libanotica</i> JM	P	Lebanon bellflower	جريس لبناني	6-10

<i>Campanula trichopoda</i> NI	P	Capillary-stemmed bellflower	رفيع الساق	5-9
<i>Legousia falcata</i> JM	1	Falcate Venus' looking-glass	لغوزية منجلية	4-5
<i>Legousia pentagonia</i> JM	1	Large Venus' looking-glass	لغوزية خماسية	4-5
<i>Michauxia campanuloides</i> JM	2	Rough-leaved michauxia	مشكسية جريسية	5-8
<b>CAPPARIDACEAE</b>		<b>Capparidaceae</b>	كبريات	
<i>Capparis spinosa</i> NI, Chw	S	Spiny caper	كبر شانك	2-8
<b>CAPRIFOLIACEAE</b>		<b>Caprifoliaceae</b>	بلسانيات	
<i>Sambucus ebulus</i> Q	P	Dwarf elder	دمدمون	5-7
<i>Sambucus nigra</i> >Chah, Q	T	Black elder	بيلسان	4-5
<i>Viburnum tinus</i> NI, Y	S	Laurestine	مران	2-4
<b>CARYOPHYLLACEAE</b>		<b>Caryophyllaceae</b>	قرنفليات	
<i>Arenaria leptoclados</i> NI	1	Sadwort	رملية	3-5
<i>Arenaria libanotica</i> JM	P	Lebanon sandwort	زهرة رمال لبنانية	5-8
<i>Cerastium brachypetalum roeseri</i> Ch	1	Short-petalled mouse-ear	قرفاء قصيرة بتلات	4-6
<i>Cerastium comatum</i> >Chah	1	Hairy mouse-ear-chickweed	قرفاء الشعراء	4-5
<i>Cerastium glomeratum</i> MG	1	Clustred mouse-ear-chickweed	أذن فار متجمعة	2-5
<i>Dianthus orientalis brachyodontus</i> JM	P	Oriental pink	قرنفل الشرق	7-11
<i>Dianthus strictus multipunctatus</i> JM	1	Upright pink	قرنفل قائم	5-9
<i>Dianthus tripunctatus</i> JM	1	Three-spotted pink	قرنفل مثلث النقط	5-6
<i>Minuartia hybrida</i> Chw	1	Hybrid sandwort	منورتية هجينة	2-5
<i>Minuartia mesogitana</i> NI	1	Mount Mesogis sandwort	منورتية ميسوجيس	1-4
<i>Paronychia argentea</i> JM	P	Silvery milwort	حربت فضي	3-5
<i>Polycarpon tetraphyllum</i> NI	1	Four-leaved allseed	مطاء	2-9

<i>Saponaria officinalis</i> Q	P	Common soapwort	صابونية طبية	3-9
<i>Silene aegyptiaca</i> Q, Mch, ND, Aab	1	Egyptian catchfly	شنتان النورية	12-7
<i>Silene astartes</i> Mch	P	Astarte's catchfly	سيلان عشتروت	5-6
<i>Silene damascene</i> JM, >Chah	1	Damascus catchfly	سيلان دمشق	3-5
<i>Silene juncea</i> JM, MG	1	Rushy catchfly	سيلان اسلية	1-12
<i>Silene juncea pallida</i> JM	1	Colored rushy catchfly	سيلان ملون الزهر	4-6
<i>Silene kotschy</i> Yah	1	Kotschy catchfly	سيلان كوتشي	5-7
<i>Silene nocturna</i> NI	1	Night catchfly	سيلان ليلي	2-5
<i>Silene papillosa</i> Snobar	1	Pimpled catchfly	سيلان حليمات	2-5
<i>Silene racemosa</i> Qih, JM	1, 2	Racemose catchfly	سيلان عنقودية	2-6
<i>Silene vulgaris</i> NI, Chw, Q, JM	P	Common catchfly	سيلان مبدولة	1-7
<i>Silene vulgaris colorata</i> Chw	P	Common colored catchfly	سيلان ملونة	1-7
<i>Stellaria cilicica</i> JM	1	Cilician starwort	نجمة قيليقيا	3-4
<i>Stellaria media</i> Aab, ND	1	Common chickweed	عشبة العلق	1-5
<i>Telephium imperati orientale</i> JM	P	True orpine	بخور البربر	6-7
<i>Velezia rigida</i> JM	1	Rigid velezia	دبيقه	4-6
<b>CHENOPODIACEAE</b>		<b>Chenopodiaceae</b>	سرمقيات	
<i>Chenopodium album</i> ND	1	White goosefoot	رجل الأوز	1-12
<i>Chenopodium ambrosoides</i> NI	1	Mexican tea	ماتي	5-11
<i>Chenopodium botrys</i> Q	1	Sticky goosefoot	سرمق عطر	5-8
<i>Chenopodium urbicum</i> Aab, Q	1	Upright goosefoot	اثينة الحوافر	4-11
<b>CISTACEAE</b>		<b>Cistaceae</b>	لاذانيات	
<i>Cistus creticus</i> NI, Chw, Aab,	S	Cretan cistus	لادن	2-5
<i>Cistus salviifolius</i> Chw	S	Sage-leaved cistus	غبرة بيضاء	2-5



<i>Fumana arabica</i> MG	S	Arabian fumana	دخانية عربية	2-4
<i>Fumana thymifolia</i> > Kfour	S	Thyme-leaved fumana	دخانية سعترية	3-6
<i>Tuberaria guttata</i> >May	1	Spotted rockrose	عسقلية مرقطة	2-5
<b>COMMELINACEAE</b>		<b>Commelinaceae</b>	كُمَّلِنِيَّات	
<i>Commelina forskalii</i> ND	p	Forskall dayflower	زهرة الصباح	7-10
<b>CONVOLVULACEAE</b>		<b>Convolvulaceae</b>	محموديات	
<i>Convolvulus althaeoides</i> NI	P	Mallow-leaved bindweed	لبلاب الختمية	4-8
<i>Convolvulus arvensis</i> JM	P	Field bindweed	لبلاب الحقول	4-9
<i>Convolvulus betonicifolius</i> Q	P	Betony-leaved bindweed	لبلاب قطني	4-8
<i>Convolvulus scammonia</i> JM	P	Syrian bindweed	سقمونيا	4-7
<i>Ipomoea purpurea</i> Q	P	Morning-glory	أثمان ارجواني	4-11
<b>CORNACEAE</b>		<b>Cornaceae</b>	قَرَانِيَّات	
<i>Cornus australis</i> > Chah	S	Southern dogwood	قَرَانِيَّة جنوبية	5-6
<b>CORYLACEAE</b>		<b>Corylaceae</b>	مرانيات	
<i>Ostrya carpinifolia</i> JM	S	Hop-hornbeam	مران	3-4
<b>CRASSULACEAE</b>		<b>Crassulaceae</b>	مخلدات	
<i>Rosularia kesrouanensis</i> JM, Q	P	Kesrouan rosularia	وردية كسروان	5-6
<i>Rosularia libanotica</i> JM	P	Lebanon rosularia	وريدة لبنانية	5-7

<i>Sedum hispanicum</i> Aab	1	Spanish stonecrop	حيون اسباني	3-6
<i>Sedum tenuifolium</i> JM	P	Slender-leaved stonecrop	حيون نحيل الورق	4-6
<i>Umbilicus erectus</i> JM	P	Yellow navelwort	سرة منتصبية	5-7
<i>Umbilicus intermedius</i> Q, MG	P	Intermediate navelwort	سرة متوسطة	3-5
<b>CUCURBITACEAE</b>		<b>Cucurbitaceae</b>	البطيخيات	
<i>Bryonia multiflora</i> Q, JM	P	Many-flowered bryonia	عنب الحية	2-6
<i>Ecballium elaterum</i> JM	P	Squirting cucumber	قثاء الحمار	1-12
<b>CUPRESSACEAE</b>		<b>Cupressaceae</b>	سرويات	
<i>Arceuthos drupacea</i> JM	T	Drupe-bearing arceuthos	دفران	3-6
<i>Juniperus oxycedrus</i> JM	T	Prickly juniper	عرعر كادي	3-6
<b>CUSCUTACEAE</b>		<b>Cuscutaceae</b>	كشوت	
<i>Cuscuta balansae</i> Q	1	Balansa's dodder	قشقوق بلنسا	6-8
<i>Cuscuta monogyna</i> ND	1	Oriental dodder	قشقوق شرقي	5-7
<b>CYPERACEAE</b>		<b>Cyperaceae</b>	سعديات	
<i>Carex distans</i> Ghineh	P	Loose sedge	سعادي متباعد	4-6
<i>Carex divulsa</i> NI	P	Grey sedge	سعادي منفصل	3-6
<i>Carex otrubae</i> Chw	P	Otruba's sedge	سعادي اوتروبا	4-6
<i>Cyperus alopecuroides</i> ND	P	Foxtail cyperus	سعد الحصر	1-12
<i>Cyperus difformis</i> May-Q	1	Various-leaved cyperus	سعد متباين	5-10
<i>Cyperus flavescens</i> Chw	1	Yellowish cyperus	سعد مصفر	6-11

<i>Cyperus longus</i> Q	P	Sweet cyperus	سعد طويل	4-10
<i>Cyperus rotundus</i> Q	P	Nut-grass	سعد مدور	5-12
<i>Scirpus cernuus</i> Q	P	Drooping club-rush	ديس منحني	5-8
<i>Schoenus nigricans</i> Chw	p	Blackish sedge	شبيه السعد	3-10
<b>DATISCAEEA</b>		<b>Datisceae</b>	داتسكة	
<i>Datisca cannabina</i> NI	P	Bastard hemp	داتسكة قنبية	4-11
<b>DIOSCOREACEAE</b>		<b>Dioscoridaceae</b>	ديوسقوريات	
<i>Tamus orientalis</i> Chw, JM	P	Oriental black-bryony	جرموم شرقي	12-2
<i>Tamus communis</i> Aab	P	Common black-bryony	جرموم شائع	2-5
<b>DIPSACACEA</b>		<b>Dipsacaceae</b>	ديساسيات	
<i>Cephalaria dipsacoides</i> JM, Q	P	Teasel cephalaria	زوان ديساسي	6-9
<i>Cephalaria joppensis</i> >Chah	1	Jaffa cephalaria	سيوان يافا	5-9
<i>Pteroccephalus plumosus</i> JM	1	Annual winghead	عقس ريشي	4-6
<i>Scabiosa argentea</i> Q, JM	2 P	Silvery scabious	جربية فضية	5-9
<b>EPHEDRACEAE</b>		<b>Ephedraceae</b>	علديات	
<i>Ephedra campylopoda</i> NI	S	Leafless joint-pine	قضاب	6-1
<b>EQUISETACEAE</b>		<b>Equisetaceae</b>	ذنب الخيل	
<i>Equisetum ramosissimum</i> Q	P	Branching horse-tail	نمص	3-6
<i>Equisetum telmateia</i> Q	P	Great horsetail	كنبات مرتفع	3-6
<b>ERICACEAE</b>		<b>Ericaceae</b>	قطليات	
<i>Arbutus andrachne</i> JM	T	Oriental strawberry-tree	قطلب شائع	1-4
<i>Arbutus unedo</i> Chw	T	Common strawberry-tree	طعمة الحمراء	10-3
<i>Erica manipuliflora</i> Aab	S	Spray-flowered heath	خلنج	1-12
<i>Pentapera sicula libanotica</i> NI	S	Lebanese pentapera	خلنج لبنان	12-6

<i>Rhododendron ponticum brachycarpum</i> JM	S	Short-fruit rhododendron	البقييل	5-6
<b>EUPHORBIACEAE</b>		<b>Euphorbiaceae</b>	فربيونيات	
<i>Andrachne telephioides</i> JM	P	Bastard sedum	لبانة	3-8
<i>Chrozophora tinctoria</i> Q	P	Turnsole	عباد الشمس	5-10
<i>Euphorbia apios lamprocarpa</i> JM	P	Pear-rooted spurge	شلجم لامع	3-4
<i>Euphorbia arguta</i> NI	1	Toothed spurge	فربيون حاد	3-6
<i>Euphorbia cassia</i> Chw	S	Cassius spurge	فربيون الأقرع	6-9
<i>Euphorbia helioscopia</i> JM, Mch	1	Sun spurge	فربيون الشمس	2-7
<i>Euphorbia indica</i> NI	1	Indian spurge	فربيون الهند	6-9
<i>Euphorbia kotschyana</i> >Cha, Aab	S	Kotschy's spurge	فربيون كنتشي	3-6
<i>Euphorbia macroclada schyzoceras</i> JM	P	Large-branched spurge	فربيون مشقوق	4-8
<i>Euphorbia maculata</i> JM	1	Maculated spurge	فربيون موشح	5-8
<i>Euphorbia peplis</i> NI	1	Purple spurge	زرق	3-9
<i>Euphorbia peplus</i> NY	1	Petty spurge	فرسخ	12-7
<i>Euphorbia petiolata</i> JM	1	Petiolate spurge	فربيون معنق	6-9
<i>Euphorbia terracina</i> NI	P	Terracina spurge	فربيون ترتشينا	3-7
<i>Euphorbia thamnoides</i> NI, Aab	S	Woody spurge	حليبة	3-6
<i>Mercurialis annua</i> Partout	P	Annual mercury	حلبوب حولي	1-12
<b>FABACEAE</b>		<b>Fabaceae</b>	فراشيات	
<i>Adenocarpus complicatus</i> Q	S	Folded adenocarpus	ادينوقريس مطوي	5-7
<i>Astragalus gummifer</i> Q	S	Gum milk-vetch	كثيراء	5-11
<i>Astragalus hamosus</i> JM	1	Hooked milk-vetch	قرين	2-4
<i>Calycotome villosa</i> JM	S	Thorny-broom	قندول	1-4
<i>Colutea cilicica</i> Q	S	Bladder-senna	سنا كاذب	4-7

<i>Coronilla cretica</i> NI	1	Cretan crown-vetch	اكليل كريت	3-5
<i>Coronilla emeroides</i> Y, Chw, JM	P	False senna	اكليل امروسي	2-6
<i>Coronilla varia libanotica</i> JM	P	Lebnon crown-vetch	اكليل لبنان	5-10
<i>Cytisus drepanolobus</i> Q	S	Sickle-podded broom	لزان منجلي	5-6
<i>Cytisus syriacus</i> Q, JM	S	Syrian broom	لزان سوري	5-8
<i>Dorycnium hirsutum</i> >Chah	S	Hairy dorycnium	دوركنيوم أشعر	3-7
<i>Dorycnium rectum</i> Q	S	Straight dorycnium	دوركنيوم قائم	4-7
<i>Hymenocarpus circinatus</i> JM	1	Circular medick	هيمنوقربوس	2-5
<i>Lathyrus aphaca</i> ND, MG	1	Yellow vetchling	جلبان افاق	2-5
<i>Lathyrus blepharicarpus</i> MG	1	Fringed-podded vetchling	جليبينة	2-5
<i>Lathyrus cassius</i> Chw	1	Cassius vetchling	جلبان الأقرع	5-7
<i>Lathyrus digitatus</i> Y, JM, Biout	P	Fingered vetching	جلبان طويل	3-5
<i>Lathyrus hierosolymitanus</i> JM	1	Jerusalem vetchling	جلبان القدس	1-5
<i>Lathyrus hirsutus</i> Q	1	Hairy vetching	سعيدة	6-7
<i>Lathyrus inermis glabriusculus</i> >Ch	P	Unarmed vetchling	جلبان امرط	4-6
<i>Lotus carmeli</i> JM	1	Carmel birdsfoot-trefoil	قرن غزال كرمل	3-5
<i>Lotus judaicus</i> JM	P	Judean birdsfoot-trefoil	قرن الغزال اليهودية	3-5
<i>Lotus palustris</i> Q	P	Marsh birdsfoot-trefoil	لوطس المناقع	4-9
<i>Medicago blancheana</i> NI	1	Blanche's medick	فصة بلانش	2-5
<i>Medicago hispida denticulata</i> JM	1	Toothed medick	فصة مسننة	1-5
<i>Medicago lupulina</i> Q, JM	1, 2	Black medick	فصة جنجلية	3-9
<i>Medicago rigidula</i> >Cha, JM	1	Rigid medick	فصة قاسية	2-5
<i>Medicago x varia</i> Q	P	Lucerne	قتات	6-9
<i>Melilotus italica</i> NI	1	Italian melilot	حندقوق ايطالي	2-5

<i>Ononis natrix</i> MG, Q	S	Shrubby rest harrow	شبيرق ثعباني	1-12
<i>Ononis spinosa leiosperma</i> Q	S	Spiny rest harrow	شبيرق شانك	4-8
<i>Ononis viscosa brevisflora</i> Y, Snobra	1	Viscous rest harrow	شبيرق صغير	3-4
<i>Ornithopus compressus</i> Y	1	Bird's-foot	ربيدان	4-5
<i>Pisum arvense</i> Aab	1	Field pea	بسلة الحقول	3-4
<i>Pisum elatius</i> JM	1	Purple pea	بسلة عالية	3-4
<i>Psoralea bituminosa</i> JM, MG	P	bitumen pea	حومان حمري	4-7
<i>Securigera securidaca</i> NI	1	Hatchet-vetch	صبيرة	3-5
<i>Spartium junceum</i> Yah, JM	S	Spanish broom	وزال	4-8
<i>Trifolium arvense</i> Q	1	Hare's-foot trefoil	نفل الحقول	4-7
<i>Trifolium campestre</i> JM	1	Hop trefoil	نفل حقلي	2-5
<i>Trifolium clusii</i> JM	1	Clusius' clover	نفل كلوزيوس	3-4
<i>Trifolium clypeatum</i> ND, Chw, Aab	1	Hemet clover	بزاز البقر	12-4
<i>Trifolium echinatum</i> Yah	1	Prickly clover	نفل مقتفد	4-6
<i>Trifolium erubescens</i> NI	1	Blushing clover	نفل متورد	2-5
<i>Trifolium medusaeum</i> Q	1	Medusa's clover	نفل ميدوسا	3-5
<i>Trifolium physodes</i> JM	P	Bladder clover	نفل مثاني	3-7
<i>Trifolium pilulare</i> JM	1	Ball cotton clover	نفل حباتي	3-5
<i>Trifolium plebium</i> Q, Biout	1	Common clever	نفل شائع	4-7
<i>Trifolium purpureum</i> Q	1	Purple clover	نفل ارجواني	3-6
<i>Trifolium repens</i> Q	P	White clover	نفل زاحف	1-12
<i>Trifolium scabrum</i> JM	1	Rugged clover	نفل أحرش	4-6
<i>Trifolium scutatum</i> Q	1	Shield clover	نفل درعي	4-5
<i>Trifolium squarosum</i> NI	1	Squarrose clover	نفل محرشف	3-5

<i>Trifolium stellatum</i> JM	1	Stellate clover	نفل نجمي	3-5
<i>Trifolium tomentosum</i> MG, JM	1	Tomentose clover	نفل قطني	2-5
<i>Trigonella berythea</i> Aab	1	Beirut fenugreek	حلبة بيروت	3-5
<i>Trigonella monspeliaca</i> JM, MG	1	Montpellier fenugreek	حلبة مونبيليه	2-4
<i>Trigonella spicata</i> NI	1	Spiked fenugreek	حلبة سنبلية	4-6
<i>Vicia cassubica</i> Q	P	Bitter-vetch	بيقية مرة	5-9
<i>Vicia ervilia</i> Aab	1	Hairy yellow vetch	كرسنة	2-5
<i>Vicia lutea hirta</i> ND	1	Hispid vetch	بيقية مشعرة	4-5
<i>Vicia narbonensis</i> >Ghin, JM	1	Narbonne vetch	فول الجياد	2-4
<i>Vicia narbonensis libani</i> JM	1	Lebanese vetch	بيقية لبنان	4-6
<i>Vicia palaestina</i> Aab	1	Palestine vetch	بيقية فلسطين	2-5
<i>Vicia tenuifolia</i> JM	P	Slender-leaved vetch	بيقية رفيعة	5-7
<b>FAGACEAE</b>		<b>Fagaceae</b>	بلوطيات	
<i>Quercus calliprinos</i> JM, NI	T	Kermes oak	سنديان	2-4
<i>Quercus cerris pseudocerris</i> JM	T	Turkey oak	عزر	3-5
<i>Quercus infectoria</i> JM, MG	T	Cyprus oak	ملول	3-4
<b>GENTIANACEAE</b>		<b>Gentianaceae</b>	جنطياتيات	
<i>Blackstonia perfoliata</i> Q, ND	1	Perfoliate blackstonia	بلكستونية مخروقة	2-9
<b>GERANIACEAE</b>		<b>Geraniaceae</b>	غرناقيات	
<i>Erodium botrys</i> JM	1	Botrys stork's-bill	جزاب عنقودي	2-4
<i>Erodium moschatum</i> Chw, Mch	1, 2	Musky stork's-bill	مسيكه	1-4
<i>Geranium crenophilum</i> Q	P	Spring geranium	غرناق الينابيع	4-10
<i>Geranium libani</i> JM, MG	P	Lebanon geranium	غرناقي لبنان	3-6
<i>Geranium lucidum</i> JM, Chw	1	Shining geranium	غرناقي لامع	2-5
<i>Geranium molle</i> Aab, Q, >Chah	1	Dove's-foot geranium	غرناقي لين	2-6

<i>Geranium purpureum</i> Aab	1	Purple geranium	غرناق ارجواني	2-5
<i>Geranium pyrenaicum</i> JM	1	Pyrenean geranium	غرناق البيرينيه	4-9
<i>Geranium robertianum</i> >Chah	1	Herb-Robert	ابرة الراعي	4-8
<i>Geranium tuberosum</i> JM	P	Tuberous geranium	غرناق عسقولي	2-6
<b>HYPERICACEAE</b>		<b>Hypericaceae</b>	هيوفاريقون	
<i>Hypericum hircinum</i> Qih	S	Stinking St John's-wort	دموع البسينات	6-9
<i>Hypericum lanuginosum</i> JM	P	Woolly St John's-wort	عشبة الجرح	5-7
<i>Hypericum libanoticum</i> JM	P	Lebanon St John's-wort	داذي لبنان	5-8
<i>Hypericum thymifolium</i> JM	S	Thyme leaved St John's-wort	داذي سعترى الورق	1-12
<b>IRIDACEAE</b>		<b>Iridaceae</b>	سوسنيات	
<i>Crocus graveolens</i> Yah	P	Heavy-sented crocus	زعفران ابو ريحه	10-1
<i>Crocus ochroleucus</i> Chw, Mg	P	Cream-colored crocus	زعفران مصفر	10-12
<i>Gladiolus segetum</i> JM	P	Field gladiolus	عرف الديك	3-5
<i>Gynandris sisyrinchium</i> >Cha, JM	P	Barbary nut	سوسن الخنازير	2-5
<i>Iris florentina</i> Y	P	White flag	سوسن أبيض	4-5
<i>Iris histrio</i> JM	P	Histrio iris	سوسن مقلد	2-3
<i>Romulea bulbocodium</i> NI	P	Crocus-leaved romulea	حرسنة	12-5
<b>JUGLANDACEAE</b>		<b>Juglandaceae</b>	جوزيات	
<i>Juglans regia</i> JM, ND, NI	T	Common walnut	جوز	4-5
<b>JUNCACEAE</b>		<b>Juncaceae</b>	أسليات	
<i>Juncus articulatus</i> Q, Chw	P	Jointed rush	اسل مفصلي	4-8
<i>Juncus buffonius congestus</i> Q	1	Toad-rush	شعر القرد	3-8
<i>Juncus effusus</i> Q	P	Soft rush	اسل منبسط	4-6
<i>Juncus inflexus</i> Q	P	Inflexed rush	اسل البستاني	4-8
<b>LAMIACEAE</b>		<b>Lamiaceae</b>	شفويات	



<i>Ajuga chia</i> Chw	P	Chian bugle	مسيكه	1-2
<i>Ajuga tridactylites</i> JM	P	3-fingered bugle	مسيكه فلسطين	4-11
<i>Calamintha vulgaris</i> JM	P	Common calamint	نعناع الجبل	5-11
<i>Eremostachys laciniata</i> JM	P	Cut-leaved phlomis	هجنبل مشرشر	3-5
<i>Lamium purpureum</i> MG, Aab, Mch	1	Purplr dead-nettle	لميون ارجواني	1-4
<i>Lamium striatum</i> JM. Aab	P	Striate dead-nettle	لميوم مخطط	3-9
<i>Lamium truncatum</i> MG, Chw	P	Truncate dead-nettle	لميوم مقطوم	2-5
<i>Lantana camara</i> ND, Chw	S	Pink-orange Lantana	رعي برتقالي وزهر	1-12
<i>Lavandula stoechas</i> Y-Snobar	S	French lavender	لاوند	1-12
<i>Lycopus europaeus</i> NI	P	Gypsywort	فراسيون الماء	1-12
<i>Marrubium radiatum</i> JM	P	Rayed white-horehound	فراسيون شمسي	4-8
<i>Melissa inodora</i> NI, JM	P	Scentless balm	ترنجان عديم رائحة	5-9
<i>Melissa officinalis</i> Ghbali	P	Common balm	ترنجان طبي	5-9
<i>Mentha aquatica</i> Aab	P	Water minth	نعنع الماء	8-11
<i>Mentha microphylla</i> NI, JM	P	Small-leaved mint	نعنع صغير الورق	6-12
<i>Micromeria barbata</i> JM	P	Bearded savory	شمسية ملتحية	6-1
<i>Micromeria graeca</i> JM	P	Greek savory	شمسية يونانية	5-9
<i>Micromeria graeca laxiflora</i> Aab	P	Lax-flowered savory	شمسية مترهلة	5-9
<i>Micromeria juliana</i> JM	P	Linear-leaved savory	زوفا جوليانا	5-7
<i>Nepeta cilicica</i> JM	P	Cilician catmint	قطرم قليقيا	6-9
<i>Nepeta curviflora</i> JM	P	Syrian catmint	قطرم مقوس الزهر	4-7
<i>Nepeta italic</i> JM	P	Italian catmint	قطرم ايطالي	5-9
<i>Nepeta leucostegia</i> JM	P	White-covered catmint	قطرم ابيض	5-8
<i>Nepeta nuda pubescens</i> JM	P	Downy catmint	قطرم أزغب	6-9
<i>Origanum ehrenbergii</i> Q	P	Ehrenberg's marjoram	زعر رمل	6-10

<i>Origanum libanoticum</i> NI, Snobar	P	Lebanon marjoram	ز عتر لبنان	3-9
<i>Origanum syriacum</i> JM	P	Syrian marjoram	ز عتر منافيش	6-12
<i>Phlomis longifolia</i> JM	S	Long-leaved phlomis	عضينة طويل ورقه	5-7
<i>Prasium majus</i> ND	S	Spanish-hedgenettle	شقال	3-6
<i>Salvia fruticosa libanotica</i> NI, Mch	S	Shrubby sage	قصعين لبنان	1-7
<i>Salvia hierosolymitana</i> Chw	P	Jerusalem sage	قصعين القدس	2-6
<i>Salvia judaica</i> >Chah	P	Judean sage	قويسة اليهودية	5-6
<i>Salvia microstegia</i> Q	P	Fleecy sage	صغيرة الغطاء	5-9
<i>Salvia peyronii</i> JM	P	Peyron's sage	قويسة بيرون	4-6
<i>Salvia sclarea</i> ND	P	Clary	كف الدب	5-7
<i>Salvia tomentosa</i> JM	S	Tomentose sage	قصعين لبدى	5-9
<i>Salvia verbenaca</i> Y, MG	P	Wild clary	قويسة حمامية	11-6
<i>Salvia viscosa</i> Q, JM	P	Viscous sage	قصعين لزج	5-11
<i>Saturea thymbra</i> JM	S	Summer savory	ز عتر دق	1-12
<i>Scutellaria brevibracteata</i> JM	P	Short-bracteate skullcap	هربون قصيرة	5-9
<i>Scutellaria utriculata</i> NI	P	Bladder skullcap	هربون قربي	5-9
<i>Sideritis pullulans</i> NI, Aab	P	Branching ironwort	عشبة القلب	6-8
<i>Stachys annua</i> NI	P	Sandy annual woundwort	قرطوم رملي	2-4
<i>Stachys cretica vacillans</i> JM	P	Cretan woundwort	قرطوم كريت	4-8
<i>Stachys distans</i> Q	P	Distance woundwort	قرطوم متباعد	3-10
<i>Teucrium divaricatum villosum</i> >Ch	S	Spreading germander	جعدة متشعبة	4-7
<i>Teucrium montbretii libanoticum</i> NI	P	Lebanon germander	جعدة لبنان	6-10
<i>Teucrium polium</i> JM	P	Felty germander	جعدة	4-9
<i>Teucrium stachyophyllum</i> JM	P	Woundwort-leaved	جعدة قرطومية	4-6

		germander		
<i>Ziziphora capitata orientalis</i> JM	1	Oriental ziziphora	عنايبية شرقية	3-7
<b>LAURACEAE</b>		<b>Lauraceae</b>	الغار	
<i>Laurus nobilis</i> JM	T	Laurel	غار شانع	3-4
<b>LILIACEAE</b>		<b>Liliaceae</b>	زنبقيات	
<i>Allium affine</i> > Chah	P	Related garlic	ثوم مشابه	7-8
<i>Allium ampeloprasum</i> JM	P	Wild leek	كرات بري	4-7
<i>Allium ampeloprasum leucanthum</i> Q	P	White wild leek	كرات بري ابيض	4-7
<i>Allium chloranthum montanum</i> JM	P	Mountain garlic	ثوم جبلي	7-9
<i>Allium coppoleri</i> Q	P	Coppoler's garlic	ثوم كبولر	6-7
<i>Allium emarginatum</i> Chw	P	Emarginated garlic	ثوم مفوق	5-7
<i>Allium neapolitanum</i> JM	P	White garlic	ثوم ابيض	2-4
<i>Allium nigrum</i> Chw	P	Black garlic	ثوم أسود	3-5
<i>Allium rotundum</i> JM	P	Round garlic	ثوم مدور	5-7
<i>Allium stamineum</i> JM	P	Long-stamened garlic	ثوم طويل الاشدية	4-8
<i>Allium trifoliatum</i> JM, NY, Chw	P	Three-leaved garlic	ثوم ثلاثي الورق	3-5
<i>Asparagus acutifolius</i> Q, Yah, Chw	P	Sharp-leaved asparagus	هليون حاد الورق	8-9
<i>Asphodelus microcarpus</i> JM	P	Common asphodel	اشراس	1-6
<i>Bellevalia flexuosa</i> JM	P	Flexuous bellevalia	بلفلية متلوية	3-6
<i>Bellevalia trifoliata</i> Chw	P	Three-leaved bellevalia	بلفلية ثلاثية الورق	2-4
<i>Colchicum decaisnei</i> JM	P	Decaisne's meadow-saffron	سورنجان دكين	9-11
<i>Colchicum steveni</i> NI	P	Steven's meadow-saffron	سورنجان ستيفن	10-12
<i>Fritillaria acmopetala</i> ND	P	Sharp-petalled fritillary	عرار حاد البتلات	3-5
<i>Fritillaria alfredae</i> Ghini	P	Alfreda's fritillary	عرار الفريدا	3-4

<i>Fritillaria libanotica</i> Mch, ND	P	Lebanon fritillary	عرار لبناني	2-5
<i>Hyacinthus orientalis</i> >Cha, ND	P	Oriental hyacinth	خزام شرقي	1-4
<i>Lilium candidum</i> Chw	P	Madona lily	زنيق مار يوسف	5
<i>Muscari comosum</i> Chw, JM	P	Tassel-hyacinth	حلحل اشعر	3-6
<i>Muscari parviflorum</i> Chw	P	Autumn grape-hyacinth	حلحل صغير الزهر	9-11
<i>Muscari pinardi</i> JM, MG	P	Pinard's grape-hyacinth	حلحل بينار	3-5
<i>Ornithogalum montanum</i> JM	P	Mountain star-of-Bethlehem	صاصل جبلي	12-5
<i>Ornithogalum narbonne</i> Chw	P	Narbonne star-of-Bethlehem	صاصل نربون	4-5
<i>Ornithogalum platyphyllum</i> JM	P	Broad-leaved star-of-Bethlehem	صاصل عريض	3-5
<i>Pushkinia scilloides libanotica</i> JM.	P	Lebanese Pushkinia	بوشكينية لبنان	4-6
<i>Ruscus aculeatus</i> >Chah, Chw	P	Knee-holly	عنا بري	2-4
<i>Scilla cilicica</i> > Cha, Chw	P	Cilician squill	اشقيل كيليكيا	3-6
<i>Tulipa aleppensis</i> > Cha	P	Aleppo tulip	توليب حلب	3-5
<i>Urginea maritima</i> NI	P	Sea squill	ارجينية بحرية	7-10
<b>LINACEAE</b>		<b>Linaceae</b>	كتانيات	
<i>Linum bienne</i> JM	1 P	Pale flax	كتان محول	3-5
<i>Linum pubescens</i> JM	1	Pink flax	كتان أزغب	3-5
<b>LYTHRACEAE</b>		<b>Lythraceae</b>	حنانيات	
<i>Lythrum junceum</i> Q	P	Rushy lythrum	فردنل اسلي	4-6
<b>MALVACEAE</b>		<b>Malvaceae</b>	خبازيات	
<i>Alcea setosa palmata</i> Q	P	Bristly hollyhock	ختمية	5-12
<i>Lavatera cretica</i> Y	2	Cretan tree-mallow	خبيزة نوار	1-5
<i>Lavatera punctata</i> Y, NI, ND	1	Dotted tree-mallow	لفتيرا منقطة	4-7
<i>Malva neglecta</i> Q	1,	Dwarf tree-mallow	خبيزة مهملة	3-9

	2			
<i>Malva sylvestris</i> Q	1	Common mallow	خبيزة للزينة	3-7
<b>MELIACEAE</b>		<b>Meliaceae</b>	ملية	
<i>Melia azedarach</i> NI	T	Persian lilac	زنزلخة	5-6
<b>MORACEAE</b>		<b>Moraceae</b>	التوتيات	
<i>Ficus carica</i> Aabri	T	Common fig	تين شائع	4-7
<i>Morus alba</i> Aabri	T	White mulberry-tree	توت ابيض	3-4
<b>MYRTACEAE</b>		<b>Myrtaceae</b>	آسيات	
<i>Myrtus communis</i> NI	T	Common myrtle	آس شائع	5-10
<b>OLEACEAE</b>		<b>Oleaceae</b>	الزيتون	
<i>Fraxinus ornus</i> JM	T	Manna ash	مران زهري	3-4
<i>Olea europaea</i> (wild) NI	T	Common olive	زيتون بري	3-5
<i>Phillyrea media</i> JM, Aabri	T	Intermediate phillyrea	برزة	2-3
<b>ONAGRACEAE</b>		<b>Onagraceae</b>	أخدریات	
<i>Epilobium hirsutum</i> Q	P	Hairy willow-herb	فرفور	6-9
<i>Epilobium parviflorum menthoides</i> Q	P	Small-flowered willow-herb	ند صغير الزهر	6-9
<i>Epilobium tetragonum</i> Mch	P	Square-stalked willow-herbe	ذنب القط	5-9
<b>ORCHIDACEAE</b>		<b>Orchidaceae</b>	سحلبيات	
<i>Anacamptis pyramidalis</i> JM	P	Pyramidal orchid	سحلب هرمي	3-5
<i>Limodorum abortivum</i> > Kfour	P	Aborted limodore	ليمودورم خديج	3-7
<i>Ophrys attica</i> JM	P	Attic ophrys	حاجبية اتكا	3-4
<i>Ophrys bornmuelleri</i> Ghini	P	Bornmueller's ophrys	حاجبية برنملر	3-5
<i>Ophrys fuciflora</i> JM, Chw	P	Drone ophrys	حاجبية الزنبور	4-6
<i>Ophrys scolopax</i> Cha, JM	P	Woodcock ophrys	العصفور	4-6
<i>Orchis anatolica</i> JM, MG	P	Anatolian orchid	سحلب الاتاضول	3-6

<i>Orchis comperiana</i> JM, >Chah	P	Comper's orchid	سحلب كمبر	5-6
<i>Orchis holocheilos</i> Qih	P	Entire lipped orchid	سحلب صيفي	5-8
<i>Orchis italica</i> Chw	P	Italian orchid	سحلب ايطالي	3-4
<i>Orchis maculata macrostachys</i> Q	P	Spotted orchid	سحلب منقط	5-7
<i>Orchis morio picta libani</i> Gh	P	Green-winged orchid	سحلب مهرج	2-4
<i>Orchis papilionacea</i> NI	P	Butterfly orchid	سحلب فراشي	2-4
<i>Orchis punctulata galilaea</i> JM Chw	P	Galilean orchid	سحلب الجليل	3-4
<i>Orchis simia</i> NI, JM	P	Monkey orchid	سحلب السعدان	3-4
<i>Orchis tridentata</i> JM, MG	P	Three-toothed orchid	سحلب ثلاثي الاسنان	3-5
<i>Serapias vomeracea</i> Q	P	Ploughshare orchid	سربياس محراثي	3-5
<b>OROBANCHACEAE</b>		<b>Orobanchaceae</b>	جعفيليات	
<i>Orobanche aegyptiaca</i> Q, Br	P	Egyptian broomrape	جعفيل مصري	1-12
<i>Orobanche minor</i> Yah	P	Lesser broomrape	جعفيل أبيض	3-5
<i>Orobanche ramosa</i> Q	P	Branching broomrape	جعفيل متفرع	1-12
<b>OXALIDACEAE</b>		<b>Oxalidaceae</b>	حماضيات	
<i>Oxalis articulata</i> Chw	P	Pink wood-sorrel	حماض احمر	4-9
<i>Oxalis pes-caprae</i> NI, Chw	1	Cape-sorrel	حميضة	12-4
<b>PAEONIACEAE</b>		<b>Paeoniacea</b>	ودحيات	
<i>Paeonia kesrouanensis</i> > Cha	P	Kesrouan peony	ودح كسروان	3-4
<i>Paeonia mascula</i> JM	P	Male peony	ودح مرجاتي	3-4
<b>PAPAVERACEAE</b>		<b>Papaveraceae</b>	خشخاشيات	
<i>Fumaria asepala</i> JM	1	White fumitory	شاهترج لاسيلي	2-6
<i>Fumaria densiflora</i> Afqa road	1	Dense-flowered fumitory	زويته	1-6
<i>Fumaria gaillardotii</i> NI, Biout	1	Gaillardot's fumitory	شاهترج غيرده	3-4
<i>Fumaria macrocarpa</i> > Cha	1	Large-fruited fumitory	شاهترج كبير الورق	2-5

<i>Fumaria parviflora</i> MG	1	Small-flowered fumitory	شاهترج صغير	1-7
<i>Hypecoum imberbe</i> JM	1	Beardless hypecoum	هبيقون امرد	2-6
<i>Papaver dubium laevigatum</i> Q	1	Smooth pale-red laevigatum	خشخاش محير	3-7
<i>Papaver libanoticum</i> JM	2, P	Lebanon poppy	خشخاش لبنان	6-9
<i>Papaver subpiriforme</i> > Cha	1, 2	Pear-shaped poppy	خشخاش اجاصي	3-6
<b>PASSIFLORACEAE</b>		<b>Passifloraceae</b>	آلاميات	
<i>Passiflora caerulea</i> ND	1	Blue passiflora	ساعة زرقاء	4-12
<b>PINACEAE</b>		<b>Pinaceae</b>	مخروطيات	
<i>Pinus brutia</i> Aabri	T	Calabrian pine	صنوبر بري	3-6
<i>Pinus pinea</i> Y	T	Stone pine	صنوبر جوي	3-6
<b>PLANTAGINACEAE</b>		<b>Plantaginaceae</b>	فصيلة لسان الحمل	
<i>Plantago lanceolata</i> Q, JM	P	Lanceolate plantain	لسان الحمل سناني	3-9
<i>Plantago major</i> N I, Aa, Q	P	Greater plantain	لسان الحمل كبير	1-12
<b>PLATANACEAE</b>		<b>Platanaceae</b>	دلبيات	
<i>Platanus orientalis</i> ND	T	Oriental plane	دلب شرقي	2-4
<b>PLUMBAGINACEAE</b>		<b>Plumbaginaceae</b>	رصاصيات	
<i>Plumbago europaea</i> Q	P	European leadwort	حشيشة الأسنان	6-12
<b>POACEAE</b>		<b>Gramineae</b>	نجليات	
<i>Aegilops ovata</i> Q, JM	1	Ovate goat-grass	شعير ابليس	3-6
<i>Aegilops triuncialis</i> Q	1	Three-inch goat-grass	شعير طويل	4-6
<i>Agropyron panormitanum</i> JM	P	Palermo couch-grass	سيفون	5-7
<i>Alopecurus myosuroides</i> Q	1	Slender fox-tail	ذيل الثعلب قصير	2-6
<i>Alopecurus utriculatus</i> JM	1	Vernal fox-tail	ذيل الثعلب	2-7
<i>Anthoxanthum odoratum</i> Gh	P	Sweet vernal-grass	زهرة ستي مريم	3-6

<i>Arundo donax</i> ND	P	Giant reed	قصب شائع	7-11
<i>Avena sterilis</i> JM	1	Wild oat	شوفان عقيم	3-5
<i>Brachypodium pinnatum</i> Q	P	Pinnate false-brome	قطبان ريشي	5-7
<i>Briza maxima</i> > May, Q	1	Great quaking-grass	قفة الشبخ	3-6
<i>Bromus lanceolatus macrostachys</i> JM	1	Lanceolate brome	سبل رمحي	4-6
<i>Bromus madritensis purpurascens</i> Q, Aa	1	Purple Madrid brome	سبل ابو الحصين	1-6
<i>Bromus syriacus</i> NI	P	Syrian brome	علف سوري	3-4
<i>Bromus tectorum</i> MG	1	Wall brome	دنكا	4-7
<i>Bromus tomentellus</i> JM	P	Woolly brome	علف ليبيدي	4-6
<i>Cornucopiae cucullatum</i> NI	1	Hooded horn-of-plenty	كرونوبية مقلنسة	3-5
<i>Corynephorus deschampsoides</i> Q	1	Deschampsia club-grass	خرطالية كاذبة	4-6
<i>Cutandia philistaea</i> NI	1	Palestine cutandia	خافور فلسطيني	3-5
<i>Cynodon dactylon</i> Q	P	Bermuda grass	نجيل	1-12
<i>Cynosurus coloratus</i> NI, MG	1	Colored dog's-tail	ساهر ملون	3-5
<i>Cynosurus echinatus</i> Aab	1	Rough dog's tail	ذنب الكلب	4-6
<i>Cynosurus effuses</i> > Chah, JM	1	Spreading dog's-tail	ساهر منبسط	3-6
<i>Dactylis glomerata</i> Q, JM	P	Orchard-grass	اصبعية متجمعة	3-6
<i>Echinochloa colona</i> Q	1	Purple panic	وغل	6-12
<i>Echinochloa crus-gallii</i> Q	1	Cock's spur	ذنيب	6-12
<i>Eleusine indica</i> NI	1	Goose-grass	حشيش الاوز هندي	1-12
<i>Digitaria sanguinalis</i> JM	1	Crab-grass	عنق النخيل	5-11
<i>Holcus lanatus</i> Q	P	Velvet-grass	هلقوس صوفي	5-8
<i>Hordeum bulbosum</i> Q	P	Bulbous barley	شعير بصلي	4-7
<i>Hordeum geniculatum</i> Q	1	Knee-jointed barley	شعير ساجد	2-6



<i>Hyparrhenia hirta pubescens</i> NI	P	Shaggy hyparrhenia	صخبر ازب	1-12
<i>Imperata cylindrica</i> NI	P	Cylindrical hare's tail	حلفاء	3-7
<i>Lolium perenne</i> JM	P	Perennial ray-grass	حشيشة الفرس	4-9
<i>Lycachloa avenacea</i> Baydar eChawk	P	Oat-like lycachloa	شوفان الديب	5-11
<i>Melica angustifolia</i> >Cha	P	Narrow-leaved melick	مليقة ضيقة	4-8
<i>Melica ciliata laxiflora</i> Q	P	Ciliate melick	مليقة مهدبة	4-6
<i>Milium pedicellare</i> > Cha, JM	1	Pedicellate millet	طهف رجلي	4-6
<i>Oryzopsis miliacea</i> Chw, JM	P	Millet Mountain-rice	مكنسة بريّة	1-12
<i>Pennisetum setaceum</i> NI	P	Bristled pennisetum	ثمام	1-12
<i>Phleum montanum</i> JM	P	Mountain timothy	عصوية جبلية	5-9
<i>Phragmites australis</i> Q	P	Southern reed	قصب المكاس	6-10
<i>Poa bulbosa</i> JM	P	Bulbous meadow-grass	بصلية	3-7
<i>Poa compressa</i> Q	P	Flat-stalked meadow-grass	عشبية مضغوطة	6-7
<i>Polypogon monspeliensis</i> NI	1	Annual beard-grass	شعر الفار	3-6
<i>Polypogon semiverticillatus</i> Q	P	Semiwhorled beard-grass	سفوية	1-12
<i>Secale montanum</i> JM	P	Mountain rye	جودر	5-6
<i>Trisetum flavescens</i> >Cha	P	Yellowish oat-grass	ثلاثي الشعرات	5-8
<b>POLYGONACEAE</b>		<b>Polygonaceae</b>	عصا الراعي	
<i>Polygonum cedrorum</i> Q	P	Cedar knotweed	عصا الأرز	6-11
<i>Polygonum salicifolium</i> ND	P	Willow-leaved knotweed	زلفة	1-12
<i>Rumex acetosella</i> Qih	P	Sheep sorrel	حميض صغير	4-6
<i>Rumex bucephalophorus hipporegii</i> Aab	1	Aleppo dock	حميض حلب	2-5
<b>POLYPODIACEAE</b>		<b>Polypodiaceae</b>	بسفايجيات	
<i>Polypodium austral</i> Y, ND, Chw	P	Southern polypody	بسفايج مشط الغول	2-6
<b>PORTULACACEAE</b>		<b>Portulacaceae</b>	رجليات	

<i>Portulaca oleracea</i> NI, Mch	1	Common purslane	بقلة	1-12
<b>PRIMULACEAE</b>		<b>Primulaceae</b>	ربيعيات	
<i>Anagallis arvensis caerulea</i> NI, Aab	1	Field pimpernel	عين العصفورة	1-12
<i>Anagallis arv. phaenicea</i> NI, Aab	1	Pheanician pimpernel	عين عصفورة فينيقي	1-12
<i>Cyclamen coum</i> >Cha	P	Kos cyclamen	بخور مريم جبلي	2-4
<i>Cyclamen libanoticum</i> ND, Chw, Aab	P	Lebanon cyclamen	بخور مريم لبناني	2-3
<i>Cyclamen persicum</i> Gh	P	Persian cyclamen	يا سيدي	10-5
<i>Primula vulgaris</i> Aab, Chw, ND	P	Common primrose	زهرة الربيع	3-6
<i>Samolus valerandi</i> Chw	P	Water pimpernel	لبين الماء	5-9
<b>PTERIDACEAE</b>		<b>Pteridaceae</b>	سرخسيات	
<i>Adiantum capillus-veneris</i> ND Chw	P	True maiden-hair	كزبرة البير	6-9
<i>Anogramma leptophylla</i> ND	1	Jersey fern	انغرمة	3-6
<i>Cheilanthes fragrans</i> Mch	P	Sweet lip-fern	قيعون شذي	3-6
<i>Pteris vittata</i> Chw Aa NI	P	Long brake	بتريس	6-12
<i>Pteridium aquilinum</i> Q, Aa, Chw	P	Eagle fern	خنشار العقاب	6-11
<b>PUNICACEAE</b>		<b>Punicaceae</b>	رمانيات	
<i>Punica granatum</i> Aab	T	Common pomegranate	رمان	5-7
<b>RANUNCULACEAE</b>		<b>Ranunculaceae</b>	حوذانيات	
<i>Anemone coronaria cyanea</i> Mch	P	Blue crown anemone	شقانق زرقاء	11-4
<i>Anemone c. phoenicea</i> Chw, ND	P	Phoenician crown anemone	شقانق حمراء	1-4
<i>Clematis cirrhoza</i> Chw	S	Evergreen virgin's-bower	مرعان	10-2
<i>Clematis flammula</i> JM	S	Sweet virgin's-bower	عنصرة	2-9
<i>Delphinium peregrinum</i> JM	1	Violet-dolphin flower	رجل القنبرة	6-9

<i>Ficaria grandiflora</i> Aab, Chw	P	Great-flowered ficaria	تينية كبيرة الزهر	1-5
<i>Ranunculus arvensis</i> ND	1	Field buttercup	كف الهر	2-6
<i>Ranunculus asiaticus</i> NI	P	Turban buttercup	كف الضبع	3-5
<i>Ranunculus chius</i> NI, Chw	1	Chian buttercup	حوذان خيوس	2-4
<i>Ranunculus cuneatus</i> >Cha	P	Cuneate buttercup	حوذان اسفيني	4-5
<i>Ranunculus hierosolymitanus</i> Q	P	Jerusalem buttercup	حوذان القدس	3-5
<i>Ranunculus millefoliatus</i> Ghi	P	Thousand leaved buttercup	حوذان الف ورقة	3-5
<i>Ranunculus neapolitanus</i> >May	P	Naples buttercup	حوذان نابولي	3-5
<i>Ranunculus paludosus</i> Chw	P	Jersey buttercup	حوذان المناقع	3-4
<i>Ranunculus sericeus</i> NI	P	Silky buttercup	حوذان حريري	4-6
<i>Thalictrum orientale</i> Chw	P	Oriental meadow-rue	سذاب شرقي	3-4
<b>RHAMNACEAE</b>		<b>Rhamnaceae</b>	زفرينات	
<i>Rhamnus alaternus</i> NI, Chw, JM	S	Mediterranean buckhorn	زقرين الجرد	2-4
<i>Rhamnus punctata</i> JM	S	Dotted buckthorn	عجرم	4-7
<b>ROSACEAE</b>		<b>Rosaceae</b>	ورديات	
<i>Cotonoaster nummularia</i> JM	S	Nummular cotoneaster	سفرجلية	5-6
<i>Crataegus azarolus</i> JM	T	Common hawthorn	زعرور شائع	3-5
<i>Crataegus monogyna</i> Chw, JM	T	White hawthorn	زعرور احادي القلم	3-5
<i>Geum urbanum</i> JM	P	Herb-bennet	جيوم الحواضر	5-8
<i>Malus trilobata</i> JM	T	Three-lobed apple	تفاح بري	5-6
<i>Pirus syriaca</i> JM, NI	T	Syrian pear	نجاص بري	2-5
<i>Poterium gaillardoti</i> JM	P	Gaillardot's burnet	بلان غيردو	5-7
<i>Poterium verrucosum</i> MG	P	Warty burnet	زيتة	4-5
<i>Prunus amygdalus</i> JM	T	Common almond	لوز مر بري	1-3

<i>Prunus mahaleb</i> >Chah	T	Mahaleb	محلّب	2-4
<i>Prunus orientalis</i> JM	T	Oriental almond	لؤؤ شرقي	2-3
<i>Prunus ursina</i> JM	T	Bear plume	خوخ الدب	3-5
<i>Rosa canina</i> JM	S	Dog rose	ورد الكلاب	3-6
<i>Rosa dumetorum</i> Yah	S	Thicket rose	ورد الهيشة	3-6
<i>Rosa sicula</i> Q	S	Sicilian rose	ورد صقلية	5-7
<i>Rubus collinus</i> Y	S	Hill blackberry	عليق الروابي	1-12
<i>Rubus hedycarpus</i> NI, ND	S	Edible-fruited blackberry	عليق ماكول الثمر	3-9
<i>Rubus sanctus</i> Aab, Q	S	Palestine blackberry	كبوش عادي	1-12
<i>Rubus tomentosus</i> Q	S	Tomentose blackberry	عليق بلدي	1-12
<i>Sorbus torminalis</i> JM	T	Wild service-tree	غبيراء	4-5
<b>RUBIACEAE</b>		<b>Rubiaceae</b>	فويات	
<i>Asperula breviflora</i> JM	P	Short-flowered woodruff	جويسة قصيرة	5-7
<i>Asperula libanotica</i> JM	P	Lebanon woodruff	أسبرولة لبنانية	4-6
<i>Asperula stricta</i> JM	1	Upright woodruff	أسبرولة قائمة	5-8
<i>Crucianella macrostachya</i> JM, Aa	1	Common crosswort	صليبية شائعة	4-8
<i>Galium canum</i> JM, Q	P	White bedstraw	غاليوم احمر	3-8
<i>Galium constrictum</i> Q	P	Constricted bedstraw	غاليوم نحيف	6-8
<i>Galium divaricatum</i> >May, Q	1	Thin bedstraw	غاليوم رفيع	3-4
<i>Galium hierosolymitanum</i> JM	1	Jerusalem bedstraw	غاليوم القدس	4-6
<i>Galium judaicum</i> NI, JM	1	Judean bedstraw	غاليوم اليهودية	4-7
<i>Galium libanoticum</i> JM	P	Lebanon bedstraw	غاليوم لبنان	6-9
<i>Galium pestalozzae</i> >Cha, JM, MG	P	Pestalozza's bedstraw	غاليوم بستلوزا	4-5
<i>Galium pisiferum</i> NI	1	Pea-bearing bedstraw	غاليوم بسلي الثمر	1-5
<i>Galium prusense</i> Qih, Aab	P	Prusa bedstraw	غاليوم بروسا	1-7

<i>Galium verum</i> Q	P	Ladies bedstraw	غالسيوم حقيقي	6-7
<i>Putoria calabrica</i> > Chah	S	Calabrian putoria	منتنة كلبريا	3-10
<i>Rubia aucheri</i> >Aabr	P	Aucher's madder	فوة أوشيه	4-6
<i>Rubia tenuifolia elliptica</i> MG	S	Elliptic-leaved madder	فوة اهليلجية	3-6
<i>Rubia tenuifolia stenophylla</i> JM	S	Narrow-leaved madder	فوة ضيقة	5-6
<i>Sherardia arvensis</i> Chw	1	Field mader	شرردية الحقول	2-5
<i>Valantia muralis</i> JM	1	Wall valantia	فلنتية الحيطان	2-5
<b>SALICACEAE</b>		<b>Salicaceae</b>	صفصافيات	
<i>Populus nigra</i> Chw	T	Black poplar	حور اسود	2-3
<i>Salix libani</i> Aab	T	Lebanon willow	صفصاف لبنان	1-4
<b>SANTALACEAE</b>		<b>Santalaceae</b>	صندليات	
<i>Osyris alba</i> >Chah, Chw	S	Poet's cassia	صندل ابيض	3-5
<i>Thesium bergeri</i> Qih, JM	P	Berger's thesium	ثيزيوم برغر	4-7
<b>SAXIFRAGACEAE</b>		<b>Saxifragaceae</b>	كاسرات الحجر	
<i>Saxifraga cymbalaria huetiana</i> Chw	1	Cymbale saxifrage	سفرس صنجي	3-4
<i>Saxifraga hederacea</i> >Cha, Chw	1	Ivy-leaved saxifrage	سفرس العمشق	3-6
<i>Saxifraga scotophila</i> ND	1	Shade saxifrage	سفرس الظلال	3-6
<b>SCROPHULARIACEAE</b>		<b>Scrophulariaceae</b>	خنزيريات	
<i>Anarrhinum orientale</i> JM	P	Oriental anarrhinum	سوسل شرقي	5-7
<i>Digitalis ferruginea</i> >Chah	P	Rusty foxglove	دجتال الحديد	6-8
<i>Kickxia spuria</i> Yah	1	Round-leaved fluellen	ككسية الرمل	6-12
<i>Odontites lutea hispidula</i> > NI, Ghb	1	Yellow odotites	عرقون أصفر	7-1
<i>Scrophularia rubricaulis</i> Q, JM	2	Red-stemmed figwort	خنزيرية حمراء	2-8
<i>Scrophularia umbrosa</i> Chah	P	Shade figwort	خنزيرية الماء	3-9

<i>Verbascum berytheum</i> JM	2	Beirut mullein	بوصير بيروت	4-7
<i>Verbascum caesareum</i> JM, Chw	2	Banias mullein	بوصير قيصرية	4-6
<i>Verbascum gaillardotii</i> JM	2	Gailardot's mullein	بوصير غيرده	6-9
<i>Verbascum levanticum</i> NI	1, 2	Levant mullein	بوصير المشرق	3-5
<i>Verbascum libanoticum</i> Q, Aab	2, P	Lebanon mullein	بوصير لبناني	5-7
<i>Verbascum oreophilum joannis</i> Aab, Ya	P	Mountain mullein	بوصير يونس	6-9
<i>Verbascum tripolitanum</i> Aab, Chw	2	Tripoli mullein	بوصير طرابلس	4-8
<i>Veronica cymbalaria</i> Mch, Chw, JM	1	Cymbal speedwell	فيرونيكة صنجية	1-5
<i>Veronica leiocarpa</i> JM	P	Smooth-fruited speedwell	ملساء الثمر	4-5
<i>Veronica orientalis</i> Chw	P	Oiental speedwell	فيرونيكة شرقية	3-8
<i>Veronica persica</i> Q	1	Persian speedwell	فيرونيكة فارسية	1-8
<i>Veronica syriaca</i> Aab, Chw, Mch	1	Syrian speedwell	فيرونيكة سورية	1-5
<b>SELAGINELLACEAE</b>		<b>Selaginellaceae</b>	كفعايات	
<i>Selaginella denticulata</i> NI, Chw	P	Denticulate selaginella	كفعان	3-6
<b>SMILACACEAE</b>		<b>Smilacaceae</b>	فشاغ	
<i>Smilax aspera</i> JM	S	Rough smilax	عمشق	8-11
<b>SOLANACEAE</b>		<b>Solanaceae</b>	باذنجانيات	
<i>Cestrum parquii</i> Chw	P	White cestrum	كولونيا	4-10
<i>Hyoscyamus albus</i> Q	1, 2	White henbane	بنج أبيض	3-8
<i>Solanum dulcamara</i> Q	S	Bittersweet	عنب الديق	6-9
<i>Solanum luteum alatum</i> Q, Chw	1	Red berry nightshade	أفانية حمراء	1-12
<i>Solanum luteum luteum</i> Q, Chw	1	Yellow berry nightshade	أفانية صفراء	1-12
<b>STYRACACEAE</b>		<b>Styraceae</b>	أصطركيات	

<i>Styrax officinalis</i> JM	T	Storax	حوز	3-5
<b>THYMELAEACEAE</b>		<b>Thymelaceae</b>	مازريونيات	
<i>Daphne oleoides</i> JM	S	Olive-liked daphne	دفته	4-9
<b>TILIACEAE</b>		<b>Tiliaceae</b>	زيزفونيات	
<i>Tilia silvestris intermedia</i> Ghbali	T	Wood linden	زيزفون حرجي	6-7
<b>TYPHACEAE</b>		<b>Typhaceae</b>	تيفيات	
<i>Typha australis</i> Q	P	Southern reed mace	تيفة جنوبية	5-9
<b>URTICACEAE</b>		<b>Urticaceae</b>	قراصيات	
<i>Parietaria judaica</i> Q, Chw, Aab	P	Basil-leaved pellitory	حشيشة القزاز	1-12
<i>Urtica dioica</i> Q	P	Great nettle	قريص كبير	4-9
<i>Urtica fragilis</i> ND	P	Brittle nettle	قريص جبلي	1-5
<i>Urtica urens</i> Q	1	Stinging nettle	قريص محرق	3-6
<b>VALERIANACEA</b>		<b>Valerianaceae</b>	ناردنيات	
<i>Centranthus longiflorus latifolius</i> JM	P	Long-flowered spur valerian	عصا الناطور	6-10
<i>Valeriana dioscoridis</i> JM, Aab-Chw	P	Dioscorides' valerian	ناردين	1-5
<i>Valerianella carinata</i> >Chah	1	Keeled cornsalad	خس النعجة	3-4
<i>Valerianella coronata</i> MG	1	Crowned corn salad	سمنة مكلاة	3-5
<i>Valerianella dactyophylla</i> JM	1	Finger-leaved corn salad	سمنة أصعية الورق	4-5
<i>Valerianella discoidea</i> MG	1	Discoïd corn salad	سمنة قرصانية	3-5
<i>Valerianalla vesicaria</i> MG	1	Bladder corn salad	حشيشة الهر	3-4
<b>VERBENACEAE</b>		<b>Verbenaceae</b>	رعي الحمام	
<i>Verbena officinalis</i> Chw, Aab	P	Common vervian	رعي الحمام	1-12
<b>VIOLACEAE</b>		<b>Violaceae</b>	بنفسجيات	
<i>Viola odorata</i> Aab	P	Sweet violet	بنفسج عطر	2-5

<i>Viola parvula</i> >Chah	1	Dwarf violet	بنفسج قزم	4-7
ZYGOPHYLLACEAE		Zygophyllaceae	القلبيات	
<i>Tribulus terrestris</i> Q	1	Small caltrops	حسك الأرض	3-8

### Annex3: List of Mammals

ORDER	FAMILY	SPECIES	ENGLISH NAME	LOCAL NAME
Insectivora	Erinaceidae	<i>Erinaceus europaeus concolor</i>	Hedgehog	Quonfoz
Chiroptera	Rhinolophidae	<i>Rhinolophus euryale judaicus</i>	Mediterranean horseshoe bat	Aamash Saghir
	Molossidae	<i>Tadarida teniotis</i>	European Free-Tailed bat	Watwat Abo Danab Horr
	Vespertilionidae	<i>Pipistrelle kuhli ikhawanius</i>	Kuhl's Pipistrelle	Khaffash kuhli
Carnivora	Canidae	<i>Canis aureus syriacus</i>	Jackal	Ibn A'awa
		<i>Canis lupus pallipe</i>	Wolf	Dib
		<i>Vulpus vulpus palaestina</i>	Red fox	Tha'alab
	Mustelidae	<i>Martes foina syriaca</i>	Stone martin	Nemes
		<i>Mustela nivalis</i>	Weasel	Ibn Ers
		<i>Meles meles canescens</i>	Eurasian badger	Ghrait
	Hyaenidae	<i>Hyaena hyaena syriaca</i>	Striped Hyaena	Daba'a
	Felidae	<i>Felis silvestris</i>	Wild cat	Herr Barree



<i>Hyracoidea</i>	<i>Proviidae</i>	<i>Procavia capensis syriaca</i>	Rock hyrax	Tabsoon
<i>Artiodactyla</i>	<i>Suidae</i>	<i>Sus scrofa lybicus</i>	Wild boar	Khanzeer barri
<i>Rodentia</i>	<i>Sciuridae</i>	<i>Sciurus anomalus syriacus</i>	Persian squirrel	Sinjab
	<i>Hystricidae</i>	<i>Hystrix indica indica</i>	Porcupine	Al-Nees
	<i>Spalacidae</i>	<i>Spalax leucodon ehrenbergi</i>	Mole rat	Kheled
	<i>Muridae</i>	<i>Apodemus mystacinus mystacinus</i>	The broad tooth field mouse	Fa'er Haqel
	<i>Gerbillinae (sub-family)</i>	<i>Gerbillus dasyurus gallagheri</i>	Wagners gerbil	Gerbil

## **Annex4: List of birds**

### **Legend:**

A(1)= Globally threatened species

A(2)= Regionally threatened or declining species

B(3)= Endemic (sub species)

B(4)= Rare breeders +Former breeders (F) + possibly breeding species (P)

B(5)= Localized breeder

B(6)= Localized non breeder

B(7)= Declining breeder

B(8)= Internationally important population passing in Lebanon

B(9)= Nationally threatened or declining species

C(10)= Extinct or probably extinct from Lebanon

C(11)= Introduced species

C(12)= Bio-indicators

C(13)= Economic species

D(14)= Species restricted wholly or largely to the Middle East

D(15)= Species which are mainly concentrated in Europe but with unfavorable conditions

D(16)= Species which are mainly concentrated outside Europe but with unfavorable conditions in Europe

### **Key**

Abbreviations are used to indicate the species status, a question mark indicating uncertain status. Lower case abbreviations (eg r, sb, s, wv and pm) indicate that the species is uncommon or rare at the relevant season.

R Resident with definite breeding records

SB Breeding summer visitor

S Non-breeding summer visitor

WV Winter visitor

PM Passage migrant

FB Formerly bred (no breeding records since 1987)

v Vagrant

The following abbreviations denote threatened species as per the IUCN Red List categories for 2007. (EN): Endangered. (VU): Vulnerable. (NT): Near Threatened.

Priorities	A	A	B	B	B	B	B	B	B	C	C	C	C	D	D	D	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
بجعيات	STATUS																
<b>Pelecanidae</b> Great White Pelican <i>Pelecanus onocrotalus</i>	<input type="checkbox"/>	+	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	+	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	+
<b>Ardeidae</b> Grey Heron <i>Ardea cinerea</i> رمادي مالك حزين	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	+	<input type="checkbox"/>	+	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Little Egret <i>Egretta garzetta</i> بلشون ابيض صغير	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	+	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Ciconiidae</b> White Stork <i>Ciconia ciconia</i> نقلاب ابيض	<input type="checkbox"/>	+	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	+	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	+
Black Stork <i>Ciconia nigra</i> نقلاب اسود	<input type="checkbox"/>	+	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	+	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	+
<b>Accipitridae</b> Honey Buzzard <i>Pernis apivorus</i> حوام العسل	<input type="checkbox"/>	+	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

















<b>Troglodytidae</b>																										
Wren <i>Troglodytes troglodytes</i> * وصع	R																									
<b>Prunellidae</b>																										
Duncock <i>Prunella modularis</i> عصفور الشوك	PM, WV																									
<b>Turdidae</b>																										
Pied Wheatear <i>Oenanthe pleschanka</i> ابو بليق اسود وابيض	FB, pm					F																				
Isabelline Wheatear <i>Oenanthe isabellina</i> ابو بليق رملي	SB, PM, ww																									
Thrush Nightingale <i>Luscinia luscinia</i> عندليب	pm																									
Whinchat <i>Saxicola rubetra</i> قلبي	PM																									
White-throated Robin <i>Irania gutturalis</i> ابو الحن ابيض الزور	sb, pm																									
Blue Rock Thrush <i>Monticola solitarius</i> * شعور أزرق	R, pm, ww																									













<b>Corvidae</b>																										
Hooded Crow	R																									
<i>Corvus corone cornix</i> * قاق غراب *																										
Jay	R																									
<i>Garrulus glandarius</i> * أبو زريق *																										
<b>Passeridae</b>																										
Rock Sparrow	R																									
<i>Petronia petronia</i> ** دوري الصخور **																										
Sparrow	R																									
<i>Passer domesticus</i> * دوري المنزل *																										
Spanish Sparrow	sb, pm, ww																									
<i>Passer hispaniolensis</i> دوري اسباني										P																
<b>Fringillidae</b>																										
Red-fronted Serin	pm, ww																									
<i>Serinus pusillus</i> نعار أحمر الجبهة																										
Syrian Serin	SB, pm, ww																									
<i>Serinus syriacus</i> * نعار سوري *																										
Siskin	WV, s																									
<i>Carduelis spinus</i> نعار شوكي																										



## Annex5: List of Herptiles

A: 1- refers to globally threatened species, 2- refers to regionally and nationally threatened species

B: 3- refers to endemic species, 4- refers to nationally rare species, 5- specific species to Jabal Moussa Biosphere Reserve, 6- persecuted species by local people

C: 7- extinct species from Lebanon, 8- bio-indicator species, 9- economic species

D: 10- widespread species in Lebanon

\*= photographed

\*\*= uncertain presence

	A	A	B	B	B	B	C	C	C	D
	1	2	3	4	5	6	7	8	9	10
<b>AMPHIBIANS</b>										
<b>Salamandridae</b>										
<i>Salamndra infraimmaculata infraimmaculata*</i> سلمندر		+						+		+
<i>Triturus vittatus vittatus*</i> نيوت		+		+				+		
<b>Anura</b>										
<b>Bufo</b>										
<b>Bufo</b>										
<i>Bufo bufo sp.*</i> علجوم		+		+				+		
<i>Bufo viridis *</i> علجوم أخضر		+				+		+		+
<b>Ranidae</b>										
<i>Rana bedriagae levantina*</i> ضفدع شرقي		+				+		+	+	+
<b>Hylidae</b>										

<i>Hyla savignyi</i> *		+				+		+		+
ضفدع الشجر										
<b>REPTILES</b>										
<b>Testudinidae</b>										
<i>Testudo graeca terrestris</i> *	+	+				+			+	+
سلحفاة برية										
<b>Chamaeleonidae</b>										
<i>Chamaeleo chameleon restricta</i> *	+	+	+			+		+		+
حرباء										
<b>Anguidae</b>										
<i>Pseudopus apodus</i> *		+				+				+
<b>Agamidae</b>										
<i>Laudakia stellio stellio</i> **						+				+
حردون										
<b>Geckonidae</b>										
<i>Cyrtopodion kotschy orientalis</i> *		+				+		+		+
أبو بريص الشجر										
<i>Hemidactylus turcicus turcicus</i> *	+	+				+				+
أبو بريص										
<b>Lacertidae</b>										
<i>Peonicolacerta leavis</i> *		+								+
سحلية الحيطان										
<i>Ophiops elegans</i> *		+						+		+
سحلية أنيقة										
<i>Lacerta media wolterstorff</i> *		+						+		+
سحلية خضراء										
<b>Scincidae</b>										

<i>Ablepharus budaki</i> *										+			+
سَقَنقُور صَغِير													
<i>Trachilepis vittata</i> *													+
سَقَنقُور حَيَوِي													
<b>Amphisbenidae</b>													
<i>Blanus strauchi aporus</i> *			+							+			+
<b>Colubridae</b>													
<i>Hierophis jugularis</i> *			+							+			+
أَفْعَى كَرَبَاجِيَّة													
<i>Hemorrhois nummifer</i> *			+							+			+
<i>Platiceps collaris</i> *			+							+			
ثَعْبَان مَطُوق													
<i>Eirenis levantina</i> **			+							+			+
<i>Elaphe hohenakeri</i> **			+							+			+
<i>Malpolon monspessulanus insignitus</i> *			+							+			+
أَفْعَى مُونِبَلِيَّة													
<i>Rynchocalamus malanocephalus</i> *			+							+			+
<i>Natrix tessellata</i> *			+							+		+	+
أَفْعَى الزَّهْر													
<i>Telescopus fallax</i> **			+							+			
<b>Typhlopidae</b>													
<i>Typhlops vermicularis</i> **										+			
ثَعْبَان الأَزْهَار													
<b>Viperidae</b>													
<i>Vipera palestinae</i> *			+							+			+
أَفْعَى فِلَسْطِين													
<i>Macrovipera lebetina</i> **			+							+			+

## **Annex6: List of Insects at Jabal Moussa Biosphere Reserve**

### **Microlepidoptera groups, which are partly or mostly undetermined:**

#### **Tineidae:**

##### **Perissomasticinae:**

*Edosa lardatella* (Lederer, 1858)

Tortricidae

*Cydia fagiglandana* (Zeller, 1841)

#### **Pyralidae (about 75% of the species are determined):**

##### **Pyralinae :**

*Synaphe* sp.

*Hypsopygia incarnatalis* (Zeller, 1847)

*Endotricha flammealis* (Denis & Schiffermüller, 1775)

*Stemmatophora brunnealis* (Treitschke, 1829)

*Actenia* sp.

##### **Galleriinae :**

*Paralipsa gularis* (Zeller, 1877)

##### **Phycitinae :**

*Phycita roborella* (Denis & Schiffermüller, 1775)

*Oxybia transversella* (Duponchel, 1836)

*Acrobasis tumidana* (Denis & Schiffermüller, 1775)

*Acrobasis sodalella* (Zeller, 1848)

*Homoeosoma nimbella* (Duponchel, 1837)

*Phycitodes binaevella* (Hübner, [1813])

*Phycitodes inquinatella* (Ragonot, 1887)

*Ematheudes punctella* (Treitschke, 1833)

#### **Crambidae, Tribus Crambinae:**

*Euchromius bella* (Hübner, 1796)

*Agriphila brioniellus* (Zerny, 1914)  
*Catoptria dimorphellus* (Staudinger, 1881)  
*Catoptria* sp.  
*Ancylolomia pectinatellus* (Zeller, 1847)

**Odontiinae:**

*Epascestria pustulalis* (Hübner, 1823)

**Spilomelinae:**

*Spoladea recurvalis* (Fabricius, 1775)  
*Palpita vitrealis* (Rossi, 1794)  
*Nomophila noctuella* (Denis & Schiffermüller, 1775)  
*Herpetogramma licarsisalis* (Walker, 1859)

**Pyraustinae:**

*Ecpyrrhorhoe diffusalis* (Guenée, 1854)  
*Anania terrealis* (Treitschke, 1829)

---

**So called Macrolepidoptera groups, almost all material determined**

**Lasiocampidae:**

*Pachypasa otus* (Drury, 1773)  
*Lasiocampa grandis* (Rogenhofer, 1891)

**Lycaenidae:**

*Aricia agestis* (Denis & Schiffermüller, 1775)

**Geometridae:**

**Ennominae, Tribus Ennomini:**

*Ennomos freidbergi* Hausmann, 1997

**Ennominae, Tribus Boarmiini:**

*Peribatodes rhomboidaria* (Denis & Schiffermüller, 1775)  
*Selidosema plumaria* (Denis & Schiffermüller, 1775)

*Nychiodes palaestinensis* (F.Wagner, 1919)

**Geometrinae, Tribus Pseudoterpnini:**

*Aplasta ononaria* (Fuessly, 1783)

*Pseudoterpna coronillaria* (Hübner, 1817)

ssp. *halperini* (Hausmann, 1996)

**Sterrhinae, Tribus Sterrhini:**

*Idaea filicata* (Hübner, 1799)

*Idaea distinctaria* (Boisduval, 1840)

*Idaea purpureomarginata* (Bohatsch, 1879)

*Idaea longaria* (Herrich-Schäffer, 1852)

*Idaea dimidiata* (Hufnagel, 1767)

*Idaea camparia* (Herrich-Schäffer, 1852)

*Idaea degeneraria* (Hübner, [1799])

*Scopula submutata* (Treitschke, 1828)

ssp. *submutata* (Treitschke, 1828)

ssp. *taurilibanotica* (Wehrli, 1932)

*Scopula marginepunctata* (Goeze, 1781)

*Scopula luridata* (Zeller, 1847)

*Problepsis ocellata* (Frivaldszky, 1845)

**Sterrhinae, Tribus Rhodometrini:**

*Rhodometra sacraria* (Linnaeus, 1767)

**Larentiinae, Tribus Xanthorhoini:**

*Xanthorhoe pseudogaliata* (Staudinger, 1897)

**Larentiinae, Tribus Eupitheciini:**

*Gymnoscelis rufifasciata* (Haworth, 1809)

*Eupithecia* sp.

**Notodontidae:**

*Stauropus fagi* (Linnaeus, 1758) ‘

*Drymonia querna* (Denis & Schiffermüller, 1775)

*Thaumetopoea solitaria* (Freyer, 1838)



*Thaumetopoea processionea* (Linnaeus, 1758)

*Thaumetopoea wilkinsoni* (Tams)

### **Erebidae:**

#### **Hyphenodinae:**

*Micronoctua karsholti* (Fibiger, 1997)

#### **Eublemminae :**

*Calymma communimacula* (Denis & Schiffermüller, 1775)

*Eublemma parva* (Hübner, 1808)

*Eublemma cochylionides* (Guenée, 1852)

*Eublemma ostrina* (Hübner, 1808)

*Metachrostis velox* (Hübner, 1813)

### **Herminiinae:**

#### **Hypheninae:**

*Hypena lividalis* (Hübner, 1796)

#### **Catocalinae:**

*Catocala conjuncta* (Esper, 1787)

*Catocala weiserti* (Hacker & Kautt, 1999) new to Lebanon

*Lygephila cracca* (Denis & Schiffermüller, 1775)

*Dysgonia algira* (Linnaeus, 1767)

*Plecoptera inquinata* (Lederer, 1857)

#### **Arctiinae, Tribus Lithosiini:**

*Paidia albescens* (Staudinger, 1892)

*Eilema costalis* (Zeller, 1847)

*Eilema caniola* (Hübner, 1808)

*Eilema muscula* (Staudinger, 1899)

#### **Arctiinae, Tribus Syntomini:**

*Dysauxes ancilla* (Linnaeus, 1767)

*Dysauxes famula* (Freyer, 1836)

**Arctiinae, Tribus Arctiini:**

*Phragmatobia placida* (Frivaldszky, 1835)

*Euplagia quadripunctaria* (Poda, 1761)

**Lymantriinae:**

*Lymantria lapidicola* (Herrich-Schäffer, 1851)

**Nolidae:**

*Nola togatualis* (Hübner, 1796)

*Bena bicolorana* (Fuessly, 1775)

**Noctuidae:**

**Acronictinae:**

*Acronicta aceris* (Linnaeus, 1758)

ssp. *judaea* (Staudinger, 1901)

**Plusiinae:**

*Autographa gamma* (Linnaeus, 1758)

*Trichoplusia ni* (Hübner, 1803)

*Thysanoplusia orichalcea* (Fabricius, 1775)

*Chrysodeixis chalcites* (Esper, 1789)

**Eustrotiinae:**

*Thalerastria diaphora* (Staudinger, 1879)

**Metoponiinae:**

*Haemerosia renalis* (Hübner, 1813)

**Cuculliinae:**

*Calophasia platyptera* (Esper, 1788)

**Amphipyrinae:**

*Amphipyra micans* (Lederer, 1857)

**Heliothinae:**

*Heliothis peltigera* (Denis & Schiffermüller, 1775)

*Helicoverpa armigera* (Hübner, 1803-1808)

**Eriopinae:**

*Callopietria latreillei* (Duponchel, 1827)

**Bryophilinae – this group is characterized by their caterpillars which feed on lichens!:**

*Cryphia algae* (Fabricius, 1775) possibly new and needs conf.

*Cryphia amygdalina* (Boursin, 1963)

*Cryphia ochsi* (Boursin, 1940)

*Bryophila rectilinea* (Warren, 1909)

*Bryophila tephrocharis* (Boursin, 1954)

*Bryophila ravula* (Hübner, 1813)

*Nyctobrya amasina* (Draudt, 1931)

*Victrix marginelota* (De Joannis, 1888)

**Xyleninae, Tribus Prodeniini:**

*Spodoptera exigua* (Hübner, 1808)

*Spodoptera cilium* (Guenée, 1852)

*Spodoptera littoralis* (Boisduval, 1833)

**Xyleninae, Tribus Caradrini:**

*Caradrina agrotina* (Staudinger, 1892)

*Caradrina aspersa* (Rambur, 1834)

*Caradrina syriaca* (Staudinger, 1892)

*Caradrina ingrata* (Staudinger, 1897)

**Xyleninae, Tribus Dypterygiini:**

*Anthracia eriopoda* (Herrich-Schäffer, 1851)

*Olivenebula subsericata* (Herrich-Schäffer, 1861)

**Xyleninae, Tribus Phlogophorini:**

*Phlogophora meticulosa* (Linnaeus, 1758)

*Pseudenargia regina* (Staudinger, 1892)

**Xyleninae, Tribus Xylenini:**

*Agrochola gratiosa* (Staudinger, 1881) new to Lebanon

*Dryobota labecula* (Esper, 1788) new to Lebanon

**Xyleninae, Tribus Apameini:**

*Gortyna* sp. probably a new species

*Mesoligia furuncula* (Denis & Schiffermüller, 1775)

**Hadeninae, Tribus Hadenini:**

*Hecatera weissii* (Draudt, 1934) - new to Lebanon, probably mentioned earlier under other species

ssp. *levantina* (Hacker & Zilli, 2001)

*Hecatera dysodea* (Denis & Schiffermüller, 1775)

**Hadeninae, Tribus Leucaniini:**

*Mythimna ferrago* (Fabricius, 1787)

ssp. *argyristis* (Rambur, 1858)

*Mythimna vitellina* (Hübner, 1808)

*Mythimna unipuncta* (Haworth, 1809)

*Leucania punctosa* (Treitschke, 1825)

*Leucania putrescens* (Hübner, 1824)

*Leucania herrichi* (Herrich-Schäffer, 1849)

**Noctuinae, Tribus Agrotini:**

*Agrotis segetum* (Denis & Schiffermüller, 1775)

*Agrotis trux* (Hübner, 1824)

*Agrotis obesa* (Boisduval, 1829)

ssp. *scytha* (Alpheraky, 1889)

*Agrotis ipsilon* (Hufnagel, 1766)

*Peridroma saucia* (Hübner, 1808)

**Noctuinae, Tribus Noctuini :**

*Ochropleura leucogaster* (Freyer, 1831)

*Noctua pronuba* (Linnaeus, 1758)

*Noctua tertia* (Mentzer, Moberg & Fibiger, 1991)

*Epilecta linogrisea* (Denis & Schiffermüller, 1775)

*Xestia c-nigrum* (Linnaeus, 1758)

*Xestia sareptana* (Herrich-Schäffer, 1851)

*Xestia cohaesa* (Herrich-Schäffer, 1849)

## Annex7: Methodology & criteria for the selection of species

A methodology to limit the study of flora and fauna to a number of species that demonstrates the ecological interest of the site was drawn upon literature and existing data surveys, taking into account the needs of on-going conservation programs and the practical availability of biodiversity datasets. It consisted of evaluating the state and trends of biological diversity at the species level. Recognizing the substantial limitations with regard to the current level of information and details of existing Lebanese data at the species-site level, the working research group suggested a methodology, which requires the implementation of three different phases of analysis modules:

- **"Coarse filter"** analysis: this phase selects the species that are globally threatened, regionally threatened, nationally threatened, endemic, rare and noteworthy (keystones, flagship species, indicators, medicinal species, alien invasive species and species of special concern), where:

**Endemic species:** is limited only to the site (endemic to the site), to the country (endemic to Lebanon), to the region (endemic to the Middle East, Levant region or Eastern Mediterranean Region).

**Rare species:** is rare in the area and at national level.

**Noteworthy species:** is a species of special interest: economic value, cultural value for local people, medicinal plants, aromatic plants, fodder plants, wild-relative plants, dominant plants, very abundant species, introduced species (see below Alien), pest species, etc.

**Threatened species:** is threatened according to national, regional and/or international Red lists.

**Alien species:** is exotic or introduced (purposely or accidentally), invasive or potentially invasive (Alien are also considered Noteworthy).

- **"Mid-coarse filter"** analysis: this second phase checks the species that are selected in the previous phase in terms of vulnerability and accessibility. For example, a globally threatened species that is protected in its distribution range and occurs accidentally in a study site is of lower significance than another globally threatened species found to be limited in its distribution to this site. However, it is worth to note that the identification of the species that are in most need of conservation action can also be done by monitoring the numbers and distribution of the species in question. In this phase, it is preferable to only deal with the most endangered, locally or nationally rare, endemic, and noteworthy species.

- **"Fine filter"** analysis: this third phase addresses the requirements of the species of the "mid-coarse filter" that are considered to be of special management significance; mainly in relation to the study site (the hypothesis calling for the need to often protect the species beyond the limits of the site is recognized).

## **Criteria for species selection**

The process used in the filter modules at the first progress level to limit the number of the selected species is based on literature and other collected data, which are far from being sufficient. The selected species are then reviewed in the light of consultant team – management teams meetings, compilation of baseline information on the selected or target species, assessment of threats, information about utility, and verification of their status and their populations' level during the field work. Having in mind that the list of the selected species is not final and recognizing that there may be many species, which would be of high importance and be significantly threatened to warrant inclusion in the project, the target species will remain under a fine tuning process according to the following selection criteria for specific species, which intend to carefully select species that have the highest priority in terms of their value to people and environment, but at the same time considering their amenability to in situ conservation and monitoring with respect to ecosystem approach, representativeness of the study sites, utility and complementarities between the different protected areas:

### **Criterion 1: Status of Threat:**

A list of all species that are threatened at global, regional, national and local levels, as well as the endemic and rare species, is to be drawn up and be a part of the coarse filter.

### **Criterion 2: Environmental Importance:**

A list of all species that are noteworthy, such as the keystones, flagship species, bio-indicators, medicinal, alien invasive species and other species of special or economic importance, is also to be drawn up and be part of the coarse filter.

### **Criterion 1.2: Level of Threat:**

Under this criterion, the list of species derived from the criterion 1 should then be prioritized as follows:

**1.2.1-** International Priority: threatened species of the IUCN Red List from critically endangered to near threatened through endangered and vulnerable are to be given high priority and subsequently included in the mid-coarse filter as the most threatened species.

**1.2.2-** National Priority: threatened species according to country inventories, including endemic species from regional to local through national endemism are to be given highest level of concern and subsequently included in the mid-coarse filter.

**1.2.3-** Human Impacts: species that are impacted by overexploitation, overcollection, over use, persecution, pollution, drainage, overhunting, destruction or degradation of their habitats or lands, etc. are to be classified under second level of threat and be incorporated in the mid-coarse filter.

**1.2.4-** Biotic Factors: all species, which are introduced, non native, alien invasive, heavy predators, pests, etc. are to be given third level of concern and be contained in the mid-coarse filter.

**1.2.5-** Abiotic factors: all species, which are sensitive to habitat changes due to floods, drought, soil movement or erosion, etc. are to be classified under fourth level of threat and then be included in the mid-coarse filter.

**Criterion 2.1: Level of Environmental Importance:**

Under this criterion, the list of species derived from the criterion 2 should then be prioritized as follows:

**2.1.1-** Economic Importance: all species of direct use (single or multipurpose use) for food (edible plants, game birds, etc.), shelter (trees, commensalisms, symbiosis, etc.), firewood, etc. and all species of indirect use (single or multipurpose use) for providing products thereof, such as oil, honey, genetic improvement (wild relatives), medicine, research tool, etc. are to be given highest value and be then incorporated in the mid-coarse filter.

**2.1.2-** Environmental Services: species, which play a key role in the pollination, fixation of soil, forestation (Keystone species), ecological balance, maintenance of trophic chains and webs, providing habitats for other biodiversity, etc. are to be given a second level of priority and be then contained in the mid-coarse filter.

**2.1.3-** Educational Services: all species, which constitute a prominent educational value or attraction for researchers, are to be given a third level of priority and should be included in the mid-coarse filter.

**2.1.4-** Cultural & Traditional Value: species, which constitute a value for local needs such as Flagship species, related species to religion's believes, popular medicinal species, related species to superstitions, etc. are to be given a fourth level of priority and be included in the mid-coarse filter.

**2.1.5-** Bio-indication Value: all species that provide obvious bio-indication character should be given a fifth level of priority and be included in the mid-coarse filter.

**2.1.6-** Socio-economic Value: species, which play a role in generation of incomes through different activities (bird watching, scuba diving, tree adoption, etc.), are to be given a sixth level of priority and be included in the mid-coarse filter.

**2.1.7-** Potential Value: all species that are identified to be of future value for investment, marketing, provision of genes, medicine, etc. are to be considered and given a seventh level in the mid-coarse filter.

**Criterion 3: Conservation Significance:**

All species that are selected using the criteria 1.2 and 2.2 for inclusion in the mid-coarse filter are to be subjected to a scoring approach, in which the species attaining highest scores (points are optional and in correlation with the levels of threats and importance) are to be retained by the fine-filter, provided they respond to the following sub-criteria:

**Criterion 3.1: Global & Regional Strategies:** all species, for which the conservation and monitoring contribute to the global or regional strategies on biodiversity conservation are to be place on the highest rank of priorities.

**Criterion 3.2: Sustainability Consideration:** all species of likelihood of sustainable conservation success are to be ranked at the second level of priorities.



**Criterion 3.3: Uniqueness Consideration:** all species that are strictly limited to the study site are given the third rank of prioritization. Species, which are of conservation value, but covered in other sites are omitted for duplication avoidance.

**Criterion 3.4: Accessibility Consideration:** all species that are of no easy access are to be given the lowest scoring points. They mainly include vagrant, erratic and occasional species; species, for which the conservation is not dependant on the study site, etc. Species of equal qualifications, but of lowest accessibility are of lowest priority.

Finally and due to the complexity of the selection criteria' application to the potential species, the fine-filter species list was preferably drawn up in consultation with relevant stakeholders, mainly the local management teams.

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