



FINAL REPORT

BIODIVERSITY ASSESSMENT AND MONITORING IN THE PROTECTED AREAS/ LEBANON LEB/95/G31

HORSH EHDEN NATURE RESERVE

August 2004

MINISTRY OF ENVIRONMENT

**LEBANESE UNIVERSITY
FACULTY OF SCIENCE**

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FINAL REPORT

BIODIVERSITY ASSESSMENT AND MONITORING IN THE PROTECTED AREAS/ LEBANON LEB/95/G31

INTRODUCTION & EXECUTIVE SUMMARY OF THE PROJECT

The Protected Areas Project (PAP) that is financed by the Global Environment Facility (GEF) through the United Nations Development Program (UNDP) and under the execution of the Ministry of Environment (MOE) in Lebanon has an overall objective to conserve endemic and endangered wildlife and their habitats, incorporate wildlife conservation as an integral part of sustainable human development and strengthen the institutional capacity of government agencies and non-governmental organizations.

The three reserves (Al Chouf Cedar, Horsh Ehden and Palm Islands) which formed the nucleus of the PAP possessed each a management plan. Horsh Ehden and Tyre Coast are currently developing their respective plans. However, the already developed plans have used, in their planning process, two essential steps to begin with "understanding the resources (Vegetation, animals, landscapes, cultural values) and valuing the resources (What is important, what is most important)" and without which the process wouldn't be able to advance one more step. The survey and inventory work conducted by the National Council for Scientific Research (NCSR) on behalf of the Protected Areas Project provided the planners with information on the natural heritage of these sites and prepared the floor to Aammiq and Tyre to launch their process too. Based on the survey and inventory, the Green Line initiated a small monitoring scheme also on behalf of the protected Areas Project in these same sites.

During the last seven years, promising efforts were made in the five sites cited above in order to reach the main objective set by the PAP: several remedial actions were stepped up and many tools of relevance to conservation were tested.

The objective will be achieved more readily if significant additional actions are implemented. More specifically the PAP is intended:

1. to highlight the importance and viability of protection in the five sites,
2. to provide a well-documented scientific database of their natural assets,
3. to establish a baseline for monitoring of key species, key habitats and progress on activities.

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

Being aware of all these positive revenues, the PAP has put, through UNDP, a "request for proposal" (RFP) to develop a biodiversity assessment and monitoring study for each of the following sites: Palm Islands Nature Reserve, Tyre Nature Reserve, Horsh Ehden Nature Reserve, Al-Chouf Cedar Nature Reserve and Aammiq Wetland.

Subsequently, The UNDP engaged the Faculty of Sciences of the Lebanese University on behalf of the MOE in order to perform services in respect of Biodiversity Assessment and

Monitoring in the above 5 sites, in accordance with a Professional Consulting Contract signed between UNDP/MOE and LU on 4/8/03.

On their turn, the Faculty of Sciences and its Team are aware that the development of a biodiversity assessment and monitoring study in the protected areas is a task that increases people's skills, knowledge and awareness about their natural heritage. It develops the necessary expertise to address challenges, fosters attitudes, motivations, and commitments to make informed decisions and take responsible action. 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. Preparation of maps and development of databases which inform the management teams of the protected areas on the available key species and habitats and on how, where and when to see them, appreciate them and monitor them is an effective tool of conservation. In accordance with the above mentioned contract, the Faculty of Sciences submitted to the MOE an **Inception Report** on 19/8/03 that is 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.

The objective of the Inception Report 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 4/11/03, the Faculty submitted to the MOE the **First Progress Report** which aimed at reflecting achievements related to the following activities:

- Revise all the previous biodiversity assessment work/research conducted within these five areas;
- Propose methodology to limit the study to a selected number of species that demonstrates the ecological interest of the site, based on the existing research work and literature;
- Identify the habitats within the sites (physical, biological and quality characteristics) with reference to the classical nomenclature (CORINE, EU Manual of Habitat Interpretation).

Following the submittal of the First Progress Report, the MOE organized a meeting between the consultant team and the local management teams that took place at the Ministry on 18/12/03. At the same day, the Faculty received the comments of the Ministry on both Inception and First Progress Reports. The mentioned comments as well as the outputs of the meeting emphasized the fact that there is a need for:

- field researches to be also conducted in the spring time so that all seasons are covered for the reasons indicated in the methodology of the inception report.
- inclusion of mega-insects such as Dragonflies, Damselflies and Butterflies, etc.
- species-species and species-habitats to be given major attention and consideration.

- more explanation of the reasoning used to select species in the filter phases.
- more information exchange between local management teams and consultant team.

Subsequently, an outcoming consensus consisted in a *sensu lato* agreement upon these raised comments.

The Second Progress Report which is meant to be submitted to MOE on 5/3/04 was instead submitted on 7/6/04. It is supposed to reflect achievements related to the following activities:

- i. Report on the chronology of the selected number of species if literature exists;
- ii. Conduct field assessment within the sites to verify the different status of the selected number of species and document sightings through sampling, photography and/ or other approved scientific procedures;
- iii. Rank the species in terms of priority (Rare, Endemic, Noteworthy, Most Threatened and Invasive species);
- iv. Relate these species to the corresponding habitats;
- v. Identify specific distribution: spatial (zonation/ location) and temporal (seasonal/ activity);
- vi. Identify status of the community: densities/ abundance/ dominance/ dynamics;
- vii. Identify nature and importance of threats on these species;
- viii. Provide detailed information for the selected key species and communities.

This Final Report includes the final outputs of the previous activities, and reflects achievements related to the following activities:

- Based on findings, include the cover in %, the height of layers and the dominant species in each layer with habitat description;
- Determine changing dynamics and the level of sensitivity of the habitats based on findings, field research and literature (natural evolution processes – nature and importance of threats dysfunctions – major human-induced deteriorations);
- Analyze the nature of major gradients, identification of the main mechanisms (soil/vegetation-exploitation relationships, habitat/biocenosis-exploitation relationship, fertility, salinity, erosion capacity, various impacts);
- Develop recommendations for urgent conservation actions and sustainable management practices specific to each site;
- Develop appropriate mitigation measure for the identified impacts on the entire ecosystem;
- Propose site-specific strategies and indicators for monitoring, taking into account previous work conducted (GreenLine, MedWet Coast...);
- Conduct at least two consultation workshops with concerned stakeholders to discuss findings;
- Identify further research profiles based on fieldwork and findings.

A. HORSH EHDEN NATURE RESERVE

A.1 GENERAL PRESENTATION OF THE SITE

A.1.1 Location

Horsh Ehden Nature Reserve is situated on the upper north western slopes of Mount Lebanon, (34° 19' N latitude and 36° 00' E longitude) ranging in altitude from 1200m to 2000m. The area of Horsh Ehden is about 1000 ha of public land, whereas the forested core of the protected reserve covers little more than 450 ha.

A.1.2 Legal status

Government legislation, Law No. 121 of 9 March 1992, declared “The public domain of Horsh Ehden a Nature Reserve”. The domain of Ehden’s woodland has its boundaries as follows:

East: Wadi El Kiama (Resurrection valley) separating the district of Zgharta and Danieh.

West: “jouit fountain” lands in Ehden.

North: ”el bououl” area lands in Ehden.

South: St. Sarkis evergreen cypress in Ehden.

The municipality of Ehden owns the land.

A.1.3 Description

Horsh Ehden is a mountainous ecosystem on the Northern Mount Lebanon chain. It is located 3.5 km north of Ehden and 100km from the capital Beirut. Pampered by mist, prevalent throughout most of the year and the comparatively high precipitation, Horsh Ehden offers a multitude of rare and endemic plants. Extending over four valleys, the forest harbors many endangered mammals and birds, colorful butterflies and insects and most of the tree species naturally found in Lebanon. Stands of cedars are bordered by a mixed forest, including acer, pine, wild plum and pear. The Reserve represents the natural southern limit of the fir tree (*Abies cilicica*) and contains the last remaining forest community of the endemic wild apple of Lebanon. A number of water sources can be found in Horsh Ehden, the most important of which are Ain Al-Baq, Naba Jouit and Ain Al-Baiada.

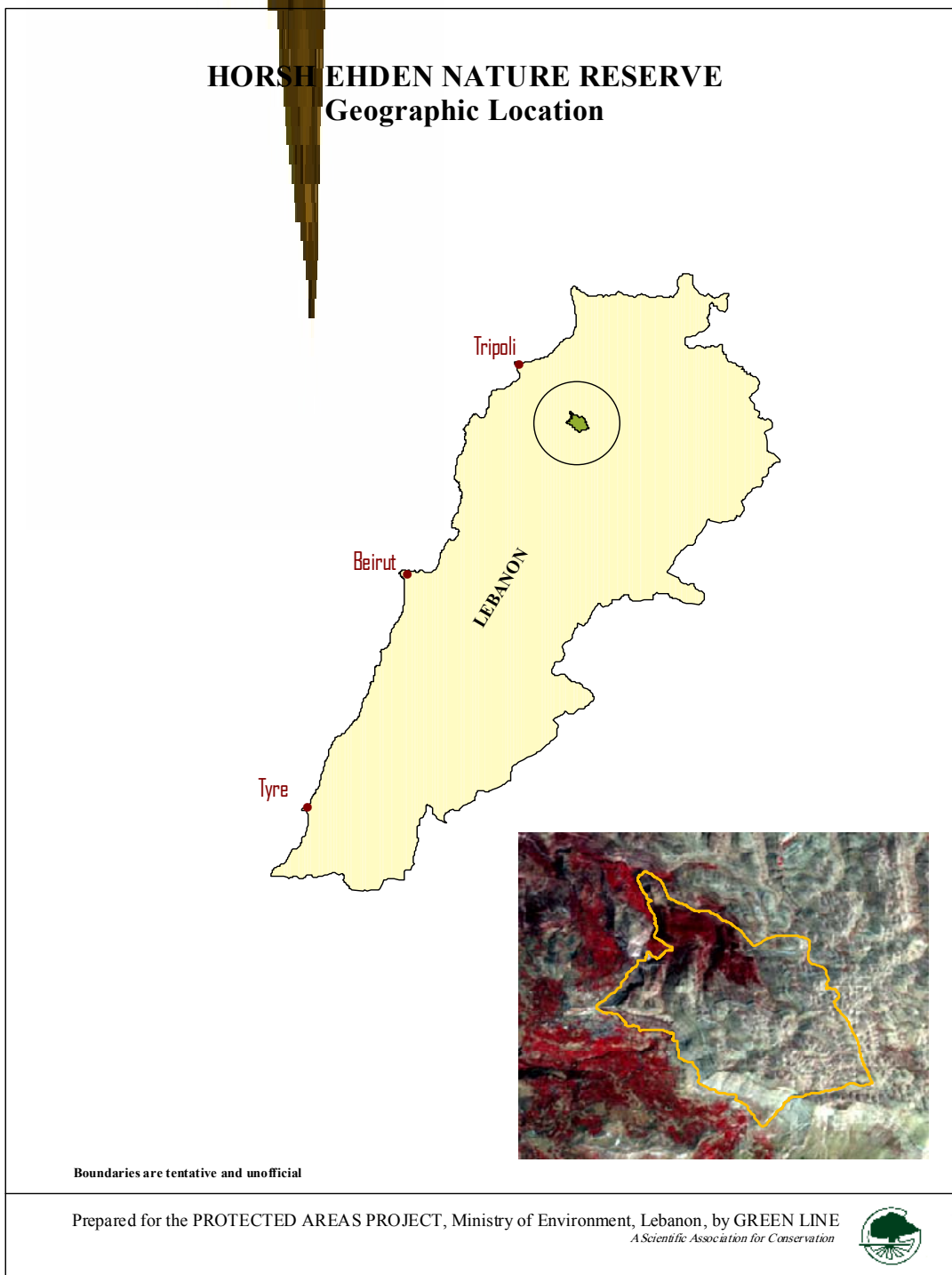


Figure 1: Location of Horsh Ehdén Nature Reserve

A.1.4 Abiotic characteristics

A.1.4.1 Physiographic characteristics

A.1.4.1.1 Geology

The exposed rock in Horsh Ehden is a calcareous rock comprising mainly limestone from the “Cenomanien-Turonien” age with a thickness of 800-1000m.

A.1.4.1.2 Geomorphology

Horsh Ehden Nature Reserve extends over four valleys with slopes ranging from 10% to 80%. One of the most distinctive features is a cliff formation more than 250 meters high and 1500 meters long. There are also areas of karst containing several caves. Given the extent of karst in the reserve it is possible that as yet unexplored caves occur in the reserve. This proposition is supported by the size and number of aquifer discharges in and adjacent to the reserve.

A.1.4.1.3 Hydrology

The steep western slopes of the Mount Lebanon range that includes Horsh Ehden Nature Reserve, ensures that much of the precipitation is gathered by fast flowing surface streams running directly to the Mediterranean. However, the Mount Lebanon range comprises porous and cavernous limestone so that a large proportion of the net precipitation percolates into the substratum to eventually discharge as springs on the lower slopes. These spring discharges are especially important on the western side of North Mount Lebanon where there are few permanent surface streams, including Nebaa Rachine the greatest stream discharge in Lebanon. About 10 such but smaller emergent streams occur within Horsh Ehden Nature Reserve and contribute to local humidity and soil moisture.

A.1.4.1.4 Pedology

A preliminary study of the soils of Horsh Ehden has shown some sites to comprise undisturbed soil, a Mediterranean red soil, with a natural profile. This is rare in the Mediterranean region.

A.1.4.1.5 Climatology

The annual rainfall average is 1060 mm, and the mean annual temperature is 9.3° C. The mean daily maximum temperature is 22.8° C in August whereas the mean minimum temperature in January is -3.4° C. The absolute temperature ranges from -14.6° C in January to 29.8° in August. The mean relative humidity lies around 60% (Service Meteo/ Ministry of Public Work and Transport). There are 95 days of snowfall on more than 50% of the protected area. Snow may accumulate in the reserve up to several meters in depth. Snow drifts can be of sufficient magnitude to cause damage to the forest vegetation in steeper valleys. Precipitation as rainfall and snow on the western slopes is enhanced by atmospheric moisture and mist backing up against the range as a result of on-shore air movement. There is a high incidence of mist above 1000 meter of altitude in all seasons of the year.

The pluviothermic quotient of Emberger at Horsh Ehden is 93.1 and indicates that the site is located in the Temperate Mediterranean Bioclimatic Stage with thermic variant of cool winter.

A.1.5 Biotic characteristics

A.1.5.1 FLORA

The flora of the Horsh Ehden Reserve is partly covered by Mouterde's 1966, 1970 and 1983 flora of Lebanon. The most recent and extensive botanical researches on this site were conducted, on behalf of the Ministry of Environment (Protected Areas Project), by (Georges Tohmé) the National Council for Scientific Research (NCSR) in 1999. Since then extremely few flora reports on this site were published or known. Tohmé continued his field botanical studies at Horsh Ehden Reserve during the last three years in order to obtain confirmation on the status of certain species. His recent new findings are published in Tohmé, G. & Tohmé, H. (2002). Few of them are incorporated here and the others will be added to the final report of the present project. The list of Horsh Ehden Reserve flora species (Annex 1) includes 537 identified species distributed over 70 families. Also it shows that the reserve is habitat to 21 globally and nationally threatened species, 62 endemic to Lebanon or Lebanon and Syria or Lebanon and Turkey, 47 Medicinal species, and 13 rare species whilst 229 species are restricted to the Eastern Mediterranean or Middle East area.

A.1.5.1.1 The floristic species

A.1.5.1.1.1 Selected species

Only 11 species are selected: 1) *Cedrus libani* which is the symbol of Lebanon and one of the main significant component of the reserve, 2) *Abies cilicica* that is here at its southern extension limit, 3) *Juniperus excelsa* that was once of high coverage, 4) *Helichrysum virgineum* which is endemic to north Lebanon from Tannourine to Bcharri through Hadchit and Ehden where it is classified as threatened and highly demanded by collectors of rare plant species, 5) *Crocus kotschyanus*, *Viola libanotica* and *Astragalus ehdenensis* which are considered endemic to Horsh Ehden and searched by collectors of beautiful and rare plant species, 6) *Malus triloba* which is endemic to Horsh Ehden and constitutes the only wild relative to the apple tree (important genetic source), 7) *Orchis romana libanotica* that extends from Ryhan to Ehden and known as one of the most beautiful orchids which merits protection in Lebanon, particularly in Ehden Reserve, 8) *Origanum syriacum*, *Geum urbanum*, *Calamintha origanifolia* and *Digitalis ferruginea* which are of prime economic value as well as highly recommended medicinal plants mainly for heart and pressure issues.

Under abundance:

- 5 : indicate that more than 3/4 of the habitat is covered by the species.
- 4 : indicate that between 1/2 and 3/4 of the habitat is covered by the species.
- 3 : indicate that between 1/2 and 1/4 of the habitat is covered by the species.
- 2 : indicate that 1/20 of the habitat is covered by the species.
- 1 : weak cover.

- + : very weak cover.

- 0 : selected from literature according to the selection criteria but not found during the field surveys.

A.1.5.1.1.1 Rare (4)

Species	English Name	Local Name	Localization		Abundance
			Habitat	GPS	
<i>Helichrysum virgineum</i>	White everlasting	Khalida bayda'a	Rocky 1000-1500 m	Not observed inside this Reserve	+
<i>Crocus kotschyanus</i>	Kotschy's crocus	Zafaran	1560m ±6 Rocky wood lands	N 34° 18' 596'' E 35° 59' 337''	+
<i>Viola libanotica</i>	Lebanon violet	Banafsaj libnani	In barren areas	N 34° 18' 272'' E 35° 85' 720''	+
<i>Astragalus ehdenensis</i>	Ehden milk-vetch		Under <i>Cedrus libani</i> trees	N 34° 18' 169'' E 35° 58' 944''	+

A.1.5.1.1.2 Endemic (7)

Species	English Name	Local Name	Endemism	Localization		Abundance
				Habitat	GPS	
<i>Cedrus Libani</i>	Cedar of Lebanon	Arz	To Lebanon, Syria, Turkey	1200-1900 m calcareous soils	N 34° 18' 169'' E 35° 58' 944''	4,8
<i>Helichrysum virgineum</i>	White everlasting	Khalida bayda	To north Lebanon	Rocky 1000-1500 m	Not observed inside this Reserve	+
<i>Viola libanotica</i>	Lebanon violet	Banafsaj libnani	To Lebanon	In barren areas > Ehden	N 34° 18' 272'' E 35° 85' 720''	+
<i>Astragalus ehdenensis</i>	Ehden milk-vetch		To Ehden	Under <i>Cedrus libani</i> trees	N 34° 18' 169'' E 35° 58' 944''	+
<i>Malus trilobata</i>	Three-lobed apple	Touffah barri	To Lebanon	With <i>Pinus brutia</i>	N 34° 18' 978'' E 35° 58' 862''	1
<i>Orchis romana libanotica</i>	Lebanon orchid	Sahlab libnani	To Lebanon	With <i>Pinus brutia</i>	N 34° 18' 978'' E 35° 58' 862''	4,8
<i>Origanum syriacum</i>	Syrian organum	Zaatar	To Middle East	Various habitats	N 34° 18' 772'' E 35° 58' 894''	2

A.1.5.1.1.3 Noteworthy (9)

Species	English Name	Local Name	Value	Localization		Abundance
				Habitat	GPS	
<i>Cedrus Libani</i>	Cedar of Lebanon	Arz	Flagship, National tree	1200-1900 calcareous soils	N 34° 18' 169'' E 35° 58' 944''	4,8
<i>Abies cilicica</i>	Fir Tree	Chouh	At its southern limit of distribution	1200-1900 calcareous soils	N 34° 18' 169'' E 35° 58' 944''	2
<i>Juniperus excelsa</i>	Juniper Tree	Lizzab	Medicinal Aromatic Bioindicator	Barren areas in higher mountain	N 34° 18' 978'' E 35° 58' 862''	2,8
<i>Malus trilobata</i>	Three-lobed apple	Touffah barri	Endemic wild relative	With <i>Pinus brutia</i>	N 34° 18' 978'' E 35° 58' 862''	1
<i>Orchis romana libanotica</i>	Lebanon orchid	Sahlab libnani	Ornamental	With <i>Pinus brutia</i>	N 34° 18' 978'' E 35° 58' 862''	4,8
<i>Origanum syriacum</i>	Syrian origanum	Zaatar	Economic Medicinal	Various habitats	N 34° 18' 772'' E 35° 58' 894''	2
<i>Geum urbanum</i>	Herb-bennet		Economic Medicinal	Mixt forest	N 34° 18' 474'' E 35° 59' 126''	1
<i>Calamintha origanifolia</i>	Marjoram-leaved calamint	Oshbet el qalb	Economic Medicinal	barren areas, > 1750m	N 34° 18' 272'' E 35° 58' 720''	1
<i>Digitalis ferruginea</i>	Rusty foxglove	Kaf el Thaalab	Economic Medicinal	1300-1600m woodlands	N 34° 18' 295'' E 35° 59' 126''	1

A.1.5.1.1.4 Introduced (Alien invasive) (0)

Species	English Name	Local Name	Origin	Localization		Abundance
				Habitat	GPS	

1.5.1.1.5 Threatened (3)

Species	English Name	Local Name	Level of threat	Localization		Abundance
				Habitat	GPS	
<i>Viola</i>	Lebanon	Banafsaj	National	In barren	N 34° 18'	+


<i>libanotica</i>	violet	libnani		areas	272'' E 35° 85' 720''	
<i>Malus trilobata</i>	Three-lobed apple	Touffah barri	Global	With <i>Pinus brutia</i>	N 34° 18' E 35° 978'' 58' 862''	1
<i>Origanum syriacum</i>	Syrian origanum	Zaatar	National	Various habitats	N 34° 18' 772'' E 35° 58' 894''	2

A.1.5.1.1.6 Specific distribution: spatial (zonation/ location) and temporal (seasonal/ activity) of selected species


R = rare; S = scarce; U = uncommon or localized; C = common; Fl = flowering period (3-5 = March-May); A = annual; V = Perennial (vivace); T = tree or sub-tree; H = herb.

Species	R	S	U	C	Fl	A	V	T	H
<i>Cedrus libani</i>			+		9-11			+	
<i>Abies cilicica</i>				+	6-9			+	
<i>Juniperus excelsa</i>			+		3-6			+	
<i>Helichrysum virgineum</i>	+				5-7	+			+
<i>Crocus kotschyanus</i>	+				9-10	+			+
<i>Viola libanotica</i>	+				5-7	+			+
<i>Astragalus ehdenensis</i>	+				5-6	+		+	
<i>Malus trilobata</i>		+			5-6		+	+	
<i>Orchis romana libanotica</i>		+			2-4	+			+
<i>Origanum syriacum</i>			+		6-12		+		+
<i>Geum urbanum</i>		+			5-8		+		+
<i>Calamintha origanifolia</i>		+			6-9		+		+
<i>Digitalis ferruginea</i>		+			6-8		+		+


A.1.5.1.1.7 Useful information about the selected species

Genus, Latin	<i>Cedrus</i>
Species, Latin	<i>libani</i>
Author	Rich.
	
	Photo: Georges Tohmé
Family	PINACEAE
Common name, English	Cedar of Lebanon
Common name, Arabic	Arz lubnane
Chorotype	Lebanon, Syria and Turkey
Life form Raunkiaer	Perennial phanerophyte
Summer shedding	Tree 40 m high
Succulence	Non-succulent
Salt resistance	Glycophyte
Habitat or affinity to	Calcareous aerated soil, 1200-1900 m above sea level with oak


Vegetation formation	trees, pine, fir in mixed forests.
Synanthropy	It can regenerate naturally but Lebanese citizens and their friends' plant it now where the climate is suitable for it.
Status	It is preserved by law in Natural Reserves
Chronology	The Cedar of Lebanon is cited numerous times in history, religion and mythology. In addition to its significant role in the Epic of Gilgamesh, the Cedar of Lebanon is regarded as a world tree in several mythological passages.
Usage	<i>Medicinally, the Cedar of Lebanon also made its mark. The pitch of the cedar was utilized for easing the pain of toothaches. The sawdust of the cedar puts snakes to flight, and thus makes sleeping under the shade of a cedar a relatively safe siesta. Furthermore, based upon historical analyses, it is believed that the cedar was used in the preservation of the corpses in Egypt. It was also highly prized as incense.</i>
Identification	Solitary cones 7-10 x 4-7 cm, purple-violet than gray-greenish

Genus, Latin	Abies
Species, Latin	<i>cilicica</i>
Author	Ant. & Ky
	
	Photo: Georges Tohmé
Family	PINACEAE
Common name, English	Fir tree
Common name, Arabic	Shouh
Chorotype	Lebanon, Syria and Turkey
Life form Raunkiaer	Perennial phanerophyte
Summer shedding	Tree 35 m high
Succulence	Non-succulent
Salt resistance	Glycophyte
Habitat or affinity to	Non-calcifuges


Vegetation formation	
Synanthropy	It is mixed to Cedar in Sir, Qammou'a and Ehden forests. It may be used in reforestation projects
Status	It is protected
Chronology	In the Old Testament, this tree was one of the chief trees of Lebanon (Isaiah 60:13); one of usefulness (Isaiah 41:19;55:13); associated with the cedar (2 Kings 19:23 ; Psalms 104:17 ; Isaiah 14:8 ; Zechariah 11:2); its boughs were wide and great (Ezekiel 31:8); it was evergreen (Hosea 14:8). This tree was protected by the Roman Emperor Hadrianus (76-138), who declared it State propriety.
Usage	<i>In the past: it could supply boards and timber for doors (1 Kings 6:15,24); beams for roofing the temple (2 Chronicles 3:5); planks for shipbuilding (Ezekiel 27:5). Recently in 1941, it was cut especially from Qammou'a, to use its wood in building the railroad between Tripoli and Haifa.</i>
Identification	Cones 15-25 x 4-6 cm, green yellowish than brown-reddish

Genus, Latin	<i>Juniperus</i>
Species, Latin	
Author	M.B.
	 <p>Photo: Georges Tohmé</p>
Family	CUPRESSACEAE
Common name, English	Juniper tree
Common name, Arabic	Lizzab
Chorotype	Lebanon, Syria, Turkey, Cyprus and Aegean Islands
Life form Raunkiaer	Perennial phanerophyte
Summer shedding	Tree 20 m high
Succulence	Non-succulent
Salt resistance	Glycophyte


Habitat or affinity to Vegetation formation	Non-calcifuges, high mountains, rare south the road Beirut-Damascus
Synanthropy	It can be used in reforestation project but this is difficult.
Status	It can rich 2800 m above sea level, some time it is the only tree in high mountains
Chronology	It is a tree of the Old Testament. Hiram gave Solomon fir-trees according to his desire.
Usage	<i>Juniper was burned in ancient Sumeria and Babylonia in sacrifice to gods and goddesses. It was sacred to Inanna and to her later counterpart Ishtar. In Europe, Juniper branches were smouldered and carried around fields to protect livestock. Juniper was widely used by different Native American groups. In traditional aromatherapy it is used to detoxify the body and as an antiseptic.</i>
Identification	Fruits have 3-6 seeds

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	Rocks, sand stones and near woodlands


Vegetation formation	
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>Crocus</i>
Species, Latin	<i>kotschyanus</i>
Author	Koch
	
	Photo: Georges Tohmé
Family	IRIDACEAE
Common name, English	Kotschy's crocus
Common name, Arabic	Zaafaran Kotschy
Chorotype	Lebanon, Syria and Turkey
Life form Raunkiaer	Geophyte
Summer shedding	Ephemeral
Succulence	Non-succulent
Salt resistance	Glycophyte
Habitat or affinity to	Mountainous slopes in woodlands, supra-Mediterranean level,


Vegetation formation	in rocky places
Synanthropy	Grows in natural habitats
Status	Rare, mentioned from Dimane and Hasroun 125 years ago
Chronology	First cited by Blanche in 1883 between Diman and Hasroun (Mouterde, 1966). Habre and Habre described a variety of this species from Ehden, in the 1990's. Subsequently, it was described by Georges and Henriette Tohmé (<i>pers. comm.</i>) from Horsh Ehden on 24 October 2002. Rare and deserves conservation.
Usage	It can be used in horticulture.
Identification	Perianth violet 4 cm

Genus, Latin	<i>Viola</i>
Species, Latin	<i>libanotica</i>
Author	Boiss.
	
	Photo: Georges Tohmé
Family	VIOLACEAE
Common name, English	Lebanon violet
Common name, Arabic	Banafsaj lubnan
Chorotype	Endemic from Lebanon
Life form Raunkiaer	Perennial chamaephyte and non-aromatic plant, Geophyte (very thick stems, underground)
Summer shedding	Flowers May-July and few leaves
Succulence	Non-succulent
Salt resistance	Glycophyte
Habitat or affinity to Vegetation formation	Rocky soils in high mountain
Synanthropy	Grows in natural habitats. We don't know if it grows in pots
Status	It is found between Kneisseh and Makmel


Chronology	Cited by Mouterde (1970) from above Ehden Reserve. Also mentioned by Georges and Henriette Tohmé (<i>pers. comm.</i>) from the same place in 2002.
Usage	It can be used in horticulture.
Identification	One to two flowering stems arising from among radical leaves

Genus, Latin	<i>Astragalus</i>
Species, Latin	
Author	Mouterde
	
Family	FABACEAE
Common name, English	Ehden milk-vetch
Common name, Arabic	Astraghalous ehden
Chorotype	Endemic to Lebanon
Life form	Perennial phanerophyte


Raunkiaer	
Summer shedding	Woody stem more than 60 cm high
Succulence	Non-succulent
Salt resistance	Glycophyte
Habitat or affinity to Vegetation formation	Woodlands
Synanthropy	Grows in natural habitats
Status	Rare
Chronology	Collected from Horsh Edden by Peyron (1883), Blanche (1883), Samuelsson (undated) and Mouterde (1970) who gave it its final name in accordance to its location. Collected and photographed by Georges and Henriette Tohmé (2002) who attracted the attention to its color, which changes from white to pale violet right after its collection. Rare, localized, endemic to Horsh Edden and stable but it requires special attention.
Usage	
Identification	Pod 9 cm, young flowers are white than it become pale-violet


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 growth 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

Genus, Latin	<i>Orchis</i>
Species, Latin	<i>romana libanotica</i>
Author	Mouterde
	
	Photo: Georges Tohmé
Family	ORCHIDACEAE
Common name, English	Lebanon orchid
Common name, Arabic	Sahlab lubnani
Chorotype	Endemic to Lebanon
Life form Raunkiaer	Geophyte
Summer shedding	Ephemeral
Succulence	Non-succulent
Salt resistance	Glycophyte
Habitat or affinity to Vegetation formation	Woodlands on sandy stones non calcareous, associated generally with pine trees
Synanthropy	Grows only in natural habitats

Status	Not uncommon, Meso and Supra-Mediterranean levels
Chronology	A beautiful plant that was described in 1936 by Mouterde who gave it its subspecies name "libanotica" for the first time from Beit Merry. Recorded by Georges and Henriette Tohmé (2002) from Horsh Ehdén.
Usage	<i>Ornamental plant.</i>
Identification	Flowers white or rose never yellow

Genus, Latin	<i>Origanum</i>
Species, Latin	
Author	L.
	
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 Horsh Ehden 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	<i>Geum</i>
Species, Latin	
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 Horsh Ehden 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	<i>Calamintha</i>
Species, Latin	<i>organifolia</i>
Author	(Labill.) Boiss.
	
	Photo: Georges Tohmé
Family	LAMIACEAE
Common name, English	Marjoram-leaved calamint
Common name, Arabic	‘Aashbat ad-daght
Chorotype	Lebanon and Turkey
Life form Raunkiaer	Perennial aromatic plant 20-40 cm
Summer shedding	Flowering time June-September
Succulence	Non-succulent
Salt resistance	Glycophyte
Habitat or affinity to Vegetation formation	Rocky soils on hill slopes in Supra and Montane-Mediterranean levels
Synanthropy	Grows only in natural habitats
Status	Not uncommon, threatened by collectors for medicinal use
Chronology	First reported from above Horsh Ehdn by Blanche (1883) and from

	the reserve itself by Mouterde (1983). It lives on rocks (Tohmé, <i>pers. comm.</i>).
Usage	<i>Used as infusion to treat heart and pressure diseases.</i>
Identification	Aromatic, pink flowers.

A.1.5.1.2 The vegetal communities

This site is about 1200-2000 m. above sea level. The altitudinal range plays an important role in plant composition. From the bottom of the forest towards its apex the following trees appear respectively: Pine, Oak, Fir and Cedar, Juniper and finally the summit desert. According to Corine Classification (1999), the reserve belongs to three Mediterranean levels: 1) the "Supra-Mediterranean Level" of vegetation which extends over the lower parts of the slopes up to 1500 meters of altitude; 2) the "Montane Mediterranean Level" that covers slopes between 1500 and 1900 meters and 3) the "Oro-Mediterranean level" of vegetation which extends above 1900 meters.

A.1.5.1.2.1 Characteristics

A.1.5.1.2.1.1 Physical: Fog and mist cover Horsh Ehden Reserve for several hours during the days, decreasing as such the intensity of the solar rays and increasing the relative humidity during the dry season. The substratum and the rocks of the reserve are almost made of limestone. In few areas, especially at the pine groves of the lower slopes, the soil is of sandy calcareous nature. The open areas are almost rocky and dry whilst the soil of the forested areas is rich in organic materials.

A.1.5.1.2.1.2 Biotic: wilderness areas that are made of a variety of ecosystems, water sources within and around the reserve, quasi-absence of human activities, together with the different prevailing bioclimatic conditions make of the reserve a real wildlife sanctuary. 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 which is known as one of the richest areas with endemic plant species in Lebanon. The significant impact of humans either derives from hunters at the summit above the forest or from the noisy restaurants that are located at its bottom and which empty the surrounding area not only from wildlife but also from people seeking calmness of the nature.

A.1.5.1.2.1.3 Quality: the initiative to declare Horsh Ehden area a reserve in early nineties constituted the first step towards effective conservation and protection of natural resources. In fact the many oriented activities that are implemented, with difficulty in the beginning, to stop tree cutting, grazing and hunting within the reserve are currently reflected by an improved ecological balance. Despite the fact that the visitor's tours are not guided and controlled as it meant to be, the negative impact of humans may be classified as weak.

A.1.5.1.2.1.4 Habitats & Vegetal formations: Under the three "Corine" levels of vegetation that are mentioned above, Horsh Ehden Reserve encompasses one vegetation formation type (Endemic oro-Mediterranean heaths with gorse) that is represented by the

above tree-line area, mainly at the transition zone between the "Montane" and "Oro" Mediterranean Levels. Thus, the cedar forests of the western slopes and the oak woods of the eastern slopes are not considered in 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 (b & c) below will be described by the author of this section as new to Corine classification.

- a. **"Endemic oro-Mediterranean heaths with gorse"** type (code 4090) of the category "Temperate Heath and Scrub" of the oro-Mediterranean vegetation level. This type is made from primary cushion heaths of the high, dry mountains of the Mediterranean and Irano-Turanian regions, with low, cushion-forming, often spiny shrubs, such as *Acantholimon*, *Astragalus*, *Bupleurum*, etc. In Corine classification, which doesn't incorporate the east Mediterranean corner, there are 15 sub-types with a variety of plant associations where each is specific to an area such as Crete, Italy (Etna, Madonie, Apennine), Greece (Hellenic, Helleno-Balkan), France, etc. This is normal because of the endemism with which the sub-types deal with. Therefore it is reasonable to give a local name to the sub-type found at Horsh Ehdén Reserve such as "Ehdén heaths sub-type" that could be considered as a formation with *Acantholimon libanoticum*, *Astragalus gummifer*, *Berberis libanotica*, *Dianthus karami*, *Juniperus excelsa*, *Prunus prostrata*, *Ranunculus demissus*, *Rosa glutinosa*, *Saponaria pumilio*, *Viola libanotica*. Other species associate with this formation such as: *Allium affine*, *Allium chloranthum montanum*, *Alyssum mouradicum*, *Alyssum repens*, *Asperula glareosa*, *Astragalus cruentiflorus*, *Atriplex lasiantha*, *Bassia monticola*, *Centhranthus longiflorus latifolius*, *Colchicum brachyphyllum*, *Cousinia libanotica*, *Daphne oleoides*, *Doronicum orientale*, *Filago anatolica*, *Gagea circinata*, *Galium incanum*, *Gallium verticillatum*, *Gypsophila frankenioides libanotica*, *Gypsophila mollis*, *Hieracium schmidtii*, *Juniperus oxycedrus*, *Marrubium libanoticum*, *Morina persica*, *Noaea mucronata humilis*, *Ranunculus chionophilus*, *Scabiosa argentea*, *Scariola orientalis*, *Scorzonera libanotica*, *Scorzonera phaeopappa minor*, *Senecio doriiformis*, *Silene album*, *Taraxacum megalorrhizon*, *Taraxacum syriacum*, *Veronica beccabunga*.

- b. **"Mixed Cedrus libani and Abies cilicica forests"** of the "Supra and Montane-Mediterranean Levels" with association of *Acer tauricum*, *Astragalus ehdenensis*, *Coronilla varia libanotica*, *Hedera helix*, *Juniperus excelsa*, *Juniperus oxycedrus*, *Lonicera nummulariifolia*, *Phlomis brevilabris*, *Prangos asperula*, *Quercus cedrorum*, *Quercus pinnatifida*, *Sorbus flabellifolia*. Other plant species found in this formation include mainly: *Abies cilicica*, *Achillea kotschyi*, *Alyssum murale*, *Alyssum sibirnyi*, *Anemone blanda*, *Arabis caucasica*, *Asphodeline brevicaulis*, *Astragalus cruentiflorus*, *Astragalus echinus*, *Astragalus ehdenensis*, *Astragalus emarginatus*, *Astragalus suberosus*,

Asyneuma virgatum, *Campanula cymbalaria*, *Campanula trichopoda*, *Cedrus libani*, *Centaurea eryngioides*, *Cephalorrhynchus tuberosus*, *Cerastium inflatum*, *Cicerbita mulgedioides*, *Cotonoaster nummularia*, *Crepis reuteriana eigiana*, *Erigeron libanoticus*, *Ferulago frigida*, *Ficaria ficaroides*, *Galium libanoticum*, *Galium pruscense*, *Galium verum*, *Gallium canum*, *Gallium jungermannioides*, *Garhadiolus hedyphnois*, *Geum urbanum*, *Inula salicina*, *Lamium striatum*, *Lonicera etrusca*, *Lonicera nummulariifolia*, *Nepeta cilicica*, *Peltaria angustifolia*, *Phlomis brevilabris*, *Prangos asperula*, *Quercus cedrorum*, *Rubia aucheri*, *Senecio doriformis doriformis*, *Sideretis libanotica incana*, *Tanacetum cilicicum*, *Thlaspi brevicaule*, *Thlaspi microstylum*, *Valerianella echinata*, *Veronica polifolia*.

- c. **"Mixed Pinus brutia and Quercus calliprinos forests"** of the "Supra-Mediterranean Level" with the association of: *Juniperus oxycedrus*, *Malus trilobata*, *Orchis romana libanotica*, *Quercus cerris*, *Quercus infectoria* (mainly with *pinus brutia*) and *Astragalus sofarensis*, *Limodorum abortivum*, *Quercus cerris*, *Quercus infectoria*, *Quercus pinnatifida*, *Rosa canina*, *Rosa dumetorum* (mainly with *Quercus calliprinos*). Other plant species found in this formation include mainly: *Achillea kotschyi*, *Aethionema coridifolium*, *Ajuga tridactylites palaestina*, *Amelanchier ovalis*, *Androsace villosa*, *Anthemis tinctoria discoidea*, *Arabis caucasica*, *Aristolochia poecilantha*, *Aristolochia scabridula*, *Asperula arvensis*, *Asperula breviflora*, *Asperula libanotica*, *Astragalus coluteoides*, *Astragalus pinetorum*, *Astragalus sofarensis*, *Astragalus suberosus*, *Asyneuma rigidum*, *Aubrieta libanotica*, *Calamintha rotundifolia*, *Campanula stricta libanotica*, *Campanula strigosa*, *Cardamine uliginosa*, *Centaurea hololeuca*, *Centaurea triumfetti*, *Centranthus longiflorus latifolius*, *Chardinia orientalis*, *Colutea cilicica*, *Consolida hohenackeri*, *Cruciata coronata*, *Cyclamen coum*, *Delphinium ithaburens*, *Epilobium montanum*, *Euphorbia macroclada*, *Euphorbia macrostegia*, *Ferula cassii*, *Fibigia eriocarpa*, *Geranium libani*, *Hesperis kotschyana*, *Hieracium bauhinii*, *Hyoscyamus reticulatus*, *Juniperus oxycedrus*, *Legousia pentagonia*, *Limodorum abortivum*, *Malus trilobata*, *Orchis romana libanotica*, *Origanum libanoticum*, *Ostrya carpinifolia*, *Parentucelia latifolia*, *Polygonum cedrorum*, *Polygonum polycnemoides*, *Prunus mahaleb*, *Prunus ursus*, *Puschkinia scilloides libanotica*, *Quercus calliprinos*, *Quercus cerris*, *Quercus infectoria*, *Quercus pinnatifida*, *Rosa canina*, *Rosa dumetorum*, *Rosa orientalis*, *Salix libani*, *Scorzonera papposa*, *Sedum album*, *Sedum pallidum*, *Silene makmeliana*, *Sorbus flabellifolia*, *Sorbus torminalis*, *Tanacetum cilicium*, *Thesium arvense*, *Thymra spicata*, *Umbilicus erectus*, *Viola siehana*, *Xeranthemum inapertum*.

A.1.5.1.2.1.4.1 Cover and stratification

The table below gives several parameters delimiting the identity of the four communities:

R = rare; S = scarce; U = uncommon or localized; C = common; Fl = flowering period (3-5 = March-May); A = annual; V = Perennial (vivace); T = tree or sub-tree; H = herb; A-D = abundance-dominance.

	Species	R	S	U	C	Fl	A	V	T	H	A-D	Tall ligneous> 2m	Shrub<2 m	Herbaceous	Cover
Pinus brutia	<i>Pinus brutia</i>					3-6		+	+		5	25m			75
	<i>Orchis romana libanotica</i>			+		2-4	+			+	4,8			20-40cm	70
	<i>Quercus infectoria</i>					3-4		+	+		3,4	10m			35
	<i>Juniperus oxycedrus</i>			+		4-8		+		+	2	Up to 10m			5
	<i>Quercus cerris</i>			+		3-6		+	+		1,8	±20m			4
	<i>Malus trilobata</i>		+			5-6		+	+		1	2-5m			1
Quercus calliprinos	<i>Quercus calliprinos</i>					2-4		+	+		4,7	±20m			65
	<i>Quercus cerris</i>				+	3-9		+		+	4	±20m			50
	<i>Quercus infectoria</i>				+	3-9		+		+	2	10m			5
	<i>Quercus pinnatifida</i>		+			3-6		+	+		1,8	±20m			4
	<i>Rosa dumetorum</i>			+		3-6		+	+		1,8		1-2 ½m		4
	<i>Rosa canina</i>			+		3-6		+	+		1		1-2 ½m		3
	<i>Astragalus sofarensis</i>		+			5-7		+	+		+		20-30cm		2
	<i>Limodorum abortivum</i>		+			3-6					+			30-65cm	1
Cedrus libani	<i>Cedrus libani</i>					9-11		+	+		4,8	Up to 40m			70
	<i>Acer tauricolum</i>				+	3-5		+	+		3,4	5-6m			35
	<i>Juniperus oxycedrus</i>				+	7-9	+			+	3	Up to 10m			25

li ba ni	<i>Prangos asperula</i>			+		5-6	+			+	3			80-100cm	25
	<i>Abies cilicica</i>			+		6-9		+	+			Up to 35m			5
	<i>Quercus cedrorum</i>					2-4		+	+		1,8	±20m			4
	<i>Phlomis brevilabris</i>			+		5-8		+	+		1,8		20-60cm		4
	<i>Coronilla varia libanotica</i>			+		5-9		+		+	1			50-100cm	4
	<i>Quercus pinnatifida</i>										+	±20m			3
	<i>Juniperus excelsa</i>			+		3-6		+	+		+	Up to 20m			2
	<i>Sorbus flabellifolia</i>			+		5-7	+			+	+	Up to 5m			2
	<i>Hedera helix</i>			+		9-3		+	+		+	Up to 20m			2
	<i>Astragalus ehdenensis</i>	+				5-6	+		+		+			± 60cm	
Ba rr en	<i>Prunus ursina</i>				+	3-5		+	+		3,9	4-8m			40
	<i>Sambucus ebulus</i>			+		5-7	+			+	3,8			60-100cm	35
	<i>Acantholimon libanoticum</i>					6-9		+	+		3,7		± 30cm		30
Ar ea s	<i>Berberis libanotica</i>				+	5-6		+	+		3		15-50cm		25
	<i>Astragalus gummifer</i>				+	5-8		+	+		3		20-60cm		25
	<i>Juniperus excelsa</i>			+		3-6		+	+		2,8	Up to 20m			20
	<i>Juniperus oxycedrus</i>				+	3-6		+	+		2	Up to 10m			5
	<i>Rosa glutinosa</i>				+	6-7		+	+		1,5		20-50cm		4
	<i>Dianthus karami</i>			+		6-8	+			+	1			10-60cm	3
	<i>Viola libanotica</i>	+				5-7	+			+	+			5-10cm	1

A.1.5.1.2.1.4.2 Qualitative evaluation of the habitats

A.1.5.1.2.1.4.3 Dynamic and ecological succession

The vegetal formations of Horsh Ehdn are at the climax stages (stable) in the forested areas whilst the vegetation of the barren areas is subject to alternation of regressive dynamics when poaching and illegal grazing occur and progressive dynamics when protection is successful.

A.1.5.1.2.1.4.4 Evaluation of the degree of artificialization

The artificialization is observed as a result of the past human intervention (glades created by wood cutting and reduced cover of Juniper trees) and recent human interference (altered lower forest edges by restaurants and tree planting).

A.1.5.1.2.1.4.5 Spatial structure of the communities

The spatial structure of the communities is well projected on the maps.

A.1.5.1.2.1.4.6 Regeneration rate of the high ligneous formations

The main high ligneous formations of the Horsh Ehdn are Cedar and Fir trees. These formations are of very low regeneration rate that is mainly due to the climax reached stage. The other ligneous such as Wild fruit trees are considered of medium regeneration rate.

A.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 seventieth. Between 1980 and 1985, Tohmé, G. and Tohmé, H. produced alone 33% of the known published papers on the Lebanese mammals. Whatsoever, the only documented data of the mammals of Horsh Ehden Reserve apparently appeared in the report of Tohmé, H. that was prepared, on behalf of the Protected Areas Project at the Ministry of Environment, in 1999 by the NCSR. This report, which was based on inventory and surveys as well as brochures and other documents developed by the managing team of the reserve, produced a list of 26 mammal species as shown in the Annex (2) below. It is worthy to state that some of the mammal species are not limited in their habitat to Horsh Ehden. They may live in the surrounding, but they access the reserve as part of their ray 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 *Canis lupus pallipes*, *Hyaena hyaena syriaca*, *Mustella nivalis* and *Dryomys nitedula phrygius*; and all the economic species *Crocidura russula*, *Crocidura suaveolens*, *Erinaceus europaeus concolor*, *Myotis blythi omari*, *Tadarida teniotis* and *Pipistrellus kuhli ikhawanius*. They deserve protection and monitoring for several reasons: the first three which occupy the top or sub-top of the trophic chain are in continuous decline since they are constantly persecuted by people due to lack of awareness. The *Dryomys nitedula phrygius* merits to be monitored for its discovery as new species for Lebanon (Tohmé et al., 1999). As for the *Erinaceus europaeus concolor*, it is an insectivorous of excellence and feeds on eggs and larvae of insects found in the soil. Its role is well known for controlling outbreaks of insects that are harmful to flora and humans. In addition to the 10 species above, the Wild Boar *Sus scrofa lybicus* that is probably introduced or harmful to the reserve in case of increasing numbers is added.

1.5.2.1.1.1 Rare (9)

Species	English Name	Local Name	Localization		Abundance
			Habitat	GPS	
<i>Erinaceus europaeus concolor</i>	Hedgehog	Quonfoz	Dry land of the site.		Low
<i>Crocidura russula</i>	Common White Toothed Shrew	Zoubabat sha'i'at	Wetlands		Very low
<i>Crocidura suaveolens</i>	Lesser White Toothed	Zoubabat al-basatine	Wetlands		Very low

	Shrew				
<i>Tadarida teniotis</i>	European Free-Tailed Bat	Watwat Horr ez-zanab	Mostly all over		Low
<i>Myotis blythi omari</i>	Lesser Mouse-Eared Bat	Watwat omari	Mostly all over		Low
<i>Canis lupus pallipe</i>	Wolf	Dib	Apparently all over		Extremely low
<i>Mustela nivalis</i>	Weasel	Ibn Ers	Apparently all over		Low
<i>Hyaena hyaena syriaca</i>	Striped Hyena	Daba'a	All over		Very low
<i>Dryomys nitedula phrygius</i>	Forest Dormouse	Far el Ghaba	Near restaurants		Extremely low

1.5.2.1.1.2 Endemic (0)

Species	English Name	Local Name	Endemism	Localization		Abundance
				Habitat	GPS	

1.5.2.1.1.3 Noteworthy (7)

Species	English Name	Local Name	Value	Localization		Abundance
				Habitat	GPS	
<i>Erinaceus europaeus concolor</i>	Hedgehog	Quonfoz	Economic Bio-indicator	Dry land of the site		Low
<i>Crocidura russula</i>	Common White Toothed Shrew	Zoubabat sha'i'at	Economic Bio-indicator	Dry land of the site		Very low
<i>Crocidura suaveolens</i>	Lesser White Toothed Shrew	Zoubabat al-basatine	Economic Bio-indicator	All over		Very low

<i>Tadarida teniotis</i>	European Free-Tailed Bat	Watwat Horr ez-zanab	Bio-indicator Economic	All over		Low
<i>Myotis blythi omari</i>	Lesser Mouse-Eared Bat	Watwat omari	Bio-indicator Economic	All over		Low
<i>Pipistrellus kuhli ikhawanius</i>	Kuhl's Pipistrelle	Khaffach	Bio-indicator Economic	All over		Very low
<i>Dryomys nitedula phrygius</i>	Forest Dormouse	Far el Ghaba	Scientific	Near restaurants		Extremely low

1.5.2.1.1.4 Introduced (Alien invasive) (0)

Species	English Name	Local Name	Origin	Localization		Abundance
				Habitat	GPS	

1.5.2.1.1.5 Threatened (3)

Species	English Name	Local Name	Level of threat	Localization		Abundance
				Habitat	GPS	
<i>Canis lupus pallipes</i>	Wolf	Dib	Threatened at all levels	Probably Jabal Barouk		Extremely low
<i>Pipistrellus kuhli ikhawanius</i>	Kuhl's Pipistrelle	Khaffach	Threatened at regional and global levels	All over		Very low
<i>Hyaena hyaena syriaca</i>	Striped Hyaena	Daba'a	Globally and regionally threatened	All over		Extremely low

A.1.5.2.1.1.6 Useful information and details about the selected species

Canis lupus pallipus Grey Wolf

Distribution

The grey wolf lives in North America, once distributed widely in Europe, The species is found most countries of the middle east. Iraq, Jordan, Syria, Saudi Arabia, Kuwait, Yemen, Oman and UAE. This species was extinct from Europe and it ranges widely in the previous USSR, Asia Minor, Iran through to India.

Lebanon: It is highly Endangered in Lebanon due to hunting and poisoning as well as some management practices. Wolves are reported from Anti-Lebanon (Aarsal, Hermel and Ras Baalbak), Harbata, Aammiq, Maaser AlChouf, Qournet Alsawda, Ehden, Karm AlMohr, Niha and Tannourine in the north



Photo: Mounir Abi Saeed

Population:

This species is at high risk in its area of distribution. **In Lebanon:** Highly Endangered

Chronology: First reported from Aammiq by Georges and Henriette Tohmé when two were seen in winter 1973. Ghassan Ramadan-Jaradi and John Marsh found one road kill on 26 October 1997 on the main road bordering the swamp; whilst Mounir Abi Saeed saw another road kill near the swamp in February 2004.

Identification:

The wolves are quite similar to Jackals. They are much larger and heavier. 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 they are shorter. The tail is short and fluffy. It weighs on average 35kgs and measures 1.3m.

Habitat:

Their habitat ranges from dense forests to desertic areas.

Hyaena hyaena syriaca Striped Hyaena
Distribution
The Striped hyaena lives in Africa From Morocco to Kenya and Tanzania. In Asia they are found in India, Nepal, Afghanistan, Iran and the Middle East.
Lebanon: It is threatened in Lebanon due to conflict with humans. Hyaenas are spread in most Lebanese villages. It is found on the coastal areas, Mount Lebanon and Beqaa region.

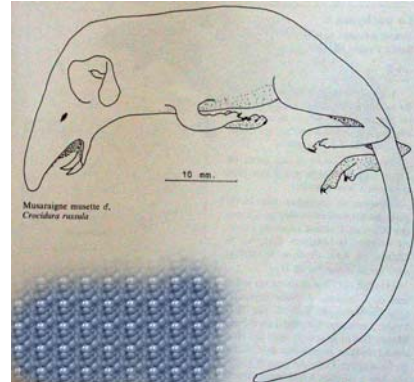
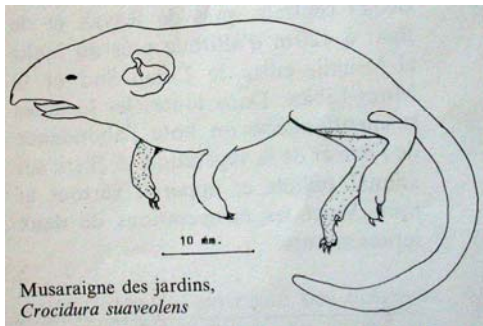
Population:
This species is at high risk in its area of distribution. In Lebanon: Threatened
Identification:
The coat color of the striped hyaena is gray with dark stripes on the body and legs. It has a well developed mane from neck to tail which is erected to enlarge the hyaena's size whenever it feels threatened. The striped hyaena rear legs are less developed than the front ones giving it the appearance of backward inclination. Its weight ranges between 25 and 55kgs; its height from 65 to 80cm and measures approximately 1m.
Habitat
Striped hyaenas are shy animals. They live solitary in dense forest or in rocky cave rich areas.

Genus: *Crocidura*. *Crocidura suaveolens* & *Crocidura russula* Lesser & Common White Toothed Shrew.

Distribution

This species is distributed in Europe, N. Africa, and Asia. In the Middle East they are found in Jordan, Palestine, Syria, Iraq, Saudi Arabia and Yemen.

Lebanon: These shrews are reported in Beqaa and Mount Lebanon.



Drawing by Dr. Tohme.

Population:

It is wide spread in its region. In **Lebanon:** Common

Identification:

This is a medium-sized shrew with a relative long, dark tail that exceeds half the length of the head and body. The pelage is uni-colored with considerable variation in color depending on soil and humidity. They have a blackish brown or gray coat.


Habitat

Its habitat ranges from steppe desert to the high mountains where it lives between cervices of sandstones or between rocks.

<i>Erinaceus europaeus concolor</i> Hedgehog
Distribution
Middle East: The subspecies is Widespread in most countries of the Middle East. The species is also found elsewhere in Africa and Asia and from the central Europe to the Caspian sea.
Lebanon: Common in Lebanon, especially in the coastal plain. Its habitat do not apparently exceed 1300 meters. Reported from Hadath, Kfarchima, Bsaba, Nahr Ibrahim, Saida, Jaj, Laqlouq, Baalbek, Zahleh, Chmistar, Sarafand, Tamnine Tahta, Barouk, Mokhtara, Rihane, Jezzine, Farayya, Koura and Tyre.

Photo: Mounir Abi Saeed
Population
In its areas of distribution, this animal is well represented. In Lebanon: Common.
Chronology
First reported and photographed from Aammiq by Ghassan Ramadan-Jaradi (autumn, 2000; pers. comm.).
Identification
The Hedgehogs have rounded bodies up to 13 in. (33 cm) long, very short tails, and pointed snouts; their backs and sides are covered with stiff spines and their undersides with coarse hair. They are usually brown and yellow in color. When frightened, a hedgehog rolls itself into a tight ball with its spines pointing outward; when rolled up it is invulnerable to almost any predator.
Habitat
The Hedgehog is well represented in cultivated or semi-desert areas. Also found in Pine and olive groves as well as in forest edges, gardens and parks.

<i>Myotis blythii</i> Lesser Mouse-Eared Bat
Distribution
This species ranges from Europe, NW Africa reaching eastern China. In the Middle East they are found in Syria, Palestine, and Iraq.
Lebanon: Lesser Mouse-Eared bat is reported in Aamchit, Harajel, and Faraya.
Population:
This species has an extensive distribution. In Lebanon: At risk due to agricultural practices.
Identification:
This is a large Mouse-eared bat. The tail is relatively long tail; the ears are tall, narrow and their tips bluntly rounded. The feet are short and the thumb is long. The pelage has a rather woolly texture. The hair on the back are longer than that of the belly
Habitat
They inhabits old bridges or holes not deeper than 15 – 20cm.

<p>Genus <i>Pipistrellus</i>. <i>P. pipistrellus</i> & <i>P. kuhlii</i> Common & Kuhl's Pipistrelle</p>
<p>Distribution</p> <p>The Pipistrelle bat is distributed in Europe and Africa. In the Middle East they are found in Jordan, Palestine, West Bank, Iraq, Syria, Kuwait, Saudi Arabia, and UAE.</p>
<p>Lebanon: Common Pipistrelle is reported in Ammiqu swamp, Mashghara while Kuhl's bat is reported throughout the country.</p>

<p>Population:</p> <p>This species is abundant in its area of distribution. In Lebanon: At risk due to agricultural practices.</p>
<p>Identification:</p> <p>These are small Vespertilionid bats. The wings are relatively narrow, only the tip of the tail projects from the interfurcular membrane, the outer border of which is supported by well developed calcar. The pelage is fine, dense and silky.</p>
<p>Habitat</p> <p>They live in crevices in the walls and roofs of buildings.</p>

<i>Tadarida teniotis</i> European Free-Tailed Bat
Distribution
This species from the Canary Islands, Morocco, and the Iberian peninsula, eastwards through N. Africa and Southern Europe to Southern China, Taiwan and Japan. Pipistrelle bat is distributed in Europe and Africa. In the Middle East they are found in Jordan, Palestine, Iraq, and Saudi Arabia
Lebanon: European free-tailed bat is reported in Faraya.
Population:
This species has an extensive distribution. In Lebanon: At risk due to agricultural practices.
Identification:
This is a large Free-tailed bat of robust building, with large ears that are broadly rounded tips and very long narrow wings, The nostrils open ventro-laterally on the outer part of an elevated black pad. The pelage is dense soft and velvet, rather long on the throat.
Habitat
They inhabits narrow and inaccessible rock cervices.

<i>Sus scrofa</i> Wild Boar
Distribution
The Wild boar range from Palaearctic 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.
Lebanon: 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 Alchouf.

Population:
This species is well distributed. In Lebanon: Abundant
Identification:
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. Their weight may reach 250- 300kgs.
Habitat
The wild boars are inhabitant of dense thickest forests, wooded hills and forests and in river valleys.

A.1.5.3 BIRDS

In the Ornithology of Lebanon, Horsh Ehden Reserve wasn't a direct target for ornithologists or birdwatchers of the past. The few cedars that were mentioned in a limited number of bird papers are of unknown localities, and Ehden that was very rarely cited in some manuscripts lies most probably out of the reserve. It was until nineties when Ramadan-Jaradi & Ramadan-Jaradi (1997, 1999) recorded bird species from Ehden Reserve and elsewhere around the reserve. The bird study that was carried out at Horsh Ehden, by Karakira, M. for the NCSR in 1999 on behalf of the Protected Areas Project, produced the first comprehensive list for the birds of this area. Since then, only one ornithological paper has been published by Ramadan-Jaradi & Ramadan-Jaradi (2002) with mention to the features of some avian species of the site. Continuous but scattered visits continued to the reserve and its surroundings by Ramadan-Jaradi & Ramadan-Jaradi and produced new and more significant records (see Annex (3)).

However complete the annexed list may be, it must be kept in mind that there are still some gaps in the information about the species. This is generally due to the effect of variables of the natural processes. The list above may not reflect the exact status of certain species that are for example ranging between extremely rare to uncommon through scarce. Instead, it makes the difference between common and uncommon species.

Striking is that 18% (69 species) of the Lebanese bird species (375 species) do breed in Horsh Ehden Reserve. These make 60% of the Lebanese breeding avifauna. Consequently there is an increase in the number of breeding species since at least 1999 reflecting as such the high diversity of the site but also the partial protection and conservation measures taken here by the managing team. This hypothesis is supported by the fact that most of the passage migrant species are also represented by winterers (resident species between mid-November – mid February).

Whatsoever, there are four globally threatened species *Aegypius monachus*, *Aquila heliaca*, *Falco naummani* and *Crex crex*; nine regionally threatened species: *Ciconia ciconia*, *Pernis apivorus*, *Neophron percnopterus*, *Gyps fulvus*, *Accipiter brevipes*, *Aquila clanga*, *Aquila pomarina*, *Falco cherrug* and *Falco biarmicus*; and five wholly or partially restricted species to the Middle East *Oenanthe finschii*, *Irania gutturalis*, *Hippolais languida*, *Sylvia mystacea* and *Serinus syriacus*. As for the nationally rare, indicator, economic and keystone species, they are six, whereas none of the birds of the list's species is found to be introduced or endemic species.

1.5.3.1 The Bird Species

1.5.3.1.1 Selected species

The used methodology and criteria to limit the study to a certain number of species are indicated in the Annex 7 far below. However, 17 species of birds are selected:

1.5.3.1.1.1 Rare (3)

Species	English Name	Local Name	Localization		Abundance
			Habitat	GPS	
<i>Crex crex</i>	Corncrake	Salwa	Open areas		5-6 individuals/year

<i>Bubo bubo</i>	Eagle Owl	Bouma	Slight forested rocky slopes		4 records
<i>Hippolais linguida</i>	Upcher's Warbler	-	Forested areas		About 13 individuals/ year

1.5.3.1.1.2 Endemic (2)

Species	English Name	Local Name	Endemism	Localization		Abundance
				Habitat	GPS	
<i>Hippolais linguida</i>	Upcher's Warbler	-	To Middle East	Forest		Low 10-12 records
<i>Serinus syriacus</i>	Syrian Serin	Na'ar souri	To Middle East	Bushes, shrubs, scrubs		High Tens

1.5.3.1.1.3 Noteworthy (14)

Species	English Name	Local Name	Value	Localization		Abundance
				Habitat	GPS	
<i>Ciconia ciconia</i>	White Stork	Liqlaq	Birdwatching, pest control	All over, especially meadows		Very High c.2000/ year
<i>Coturnix coturnix</i>	Quail	Firri	Potential gamebird	Open areas		Very Low Possible unnoticed passage
<i>Buteo rufinus</i>	Long-legged Buzzard	-	Birdwatching, pest control	All over, especially at the reserve's entrance		Very Low Maximum 2 pairs
<i>Hieraetus fasciatus</i>	Bonelli's Eagle	Bonelli	Birdwatching, pest control, flagship	All over overhead		Very Low Only one pair
<i>Scolopax rusticola</i>	Woodcock	Djaj el Ard	Gamebird, pest control	Climax forested		Low

				area		7-10 individuals seen
<i>Alectoris chukar</i>	Chukar	Hajal	Gamebird	All over		High Several tens
<i>Cuculus canorus</i>	Cuckoo	Qayqab	Pest control of excellence	All over		Low 11 records only
<i>Streptopelia turtur</i>	Turtle Dove	Tirghal	Gamebird	Open woods		Medium Tens
<i>Turdus philomelos</i>	Song Thrush	Simmon	Gamebird	All over		Medium Tens
<i>Turdus iliacus</i>	Redwing	Simmon	Potential gamebird	All over		Low 10 records
<i>Turdus viscivorus</i>	Mistle Thrush	Simmon	Potential gamebird	All over		Low 14 records
<i>Parus caeruleus</i>	Blue Tit	Sin el Manjal Azrak	Pest control Birdwatching Bioindicator	Mainly western edges of forest		Low But high in the western corner of the reserve
<i>Serinus syriacus</i>	Syrian Serin	Na'ar Soury	Birdwatching Bioindicator	All over		Medium Tens
<i>Corvus cornix</i>	Hooded Crow	Qaq	Bioindicator	All over		High Several tens


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 (6)


Species	English Name	Local Name	Level of threat	Localization		Abundance
				Habitat	GPS	
<i>Crex crex</i>	Corncrake	Salwa	Global	All over		Low 5-6 ind./year
<i>Ciconia ciconia</i>	White Stork	Liqlaq	Regional	All over, especially meadows		High c.2000/year
<i>Serinus syriacus</i>	Syrian Serin	Na'ar Soury	Regional	All over, mainly in glades and forest edges		Medium Tens
<i>Hippolais linguida</i>	Upcher's Warbler		Local	All over		Low 10-12 records
<i>Bubo bubo</i>	Eagle Owl	Bouma	Regional	All over, mainly rocky slopes		Very low Four records
<i>Parus caeruleus</i>	Blue Tit	Sin el Manjal Azrak	Local	All over, mainly western edges		Low But high in the western corner of the reserve

A.1.5.1.1.6 Useful information and details about the selected species

<i>Alectoris chukar</i> Chukar Partridge
Distribution
Middle East: Resident in Middle Eastern Countries.
Lebanon: Common resident breeder over the country with peaks of up to thirty birds after breeding season. Recorded in most Lebanese mountains.

Population
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. In Lebanon , wild Chukars count c.7,000 breeding pairs widespread at higher altitudes but uncommon across low hills and coastal areas.
Identification
Feral birds can increasingly be found in mountains, but are often overlooked. A Middle-eastern species which can be found in much 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.
Habitat
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.

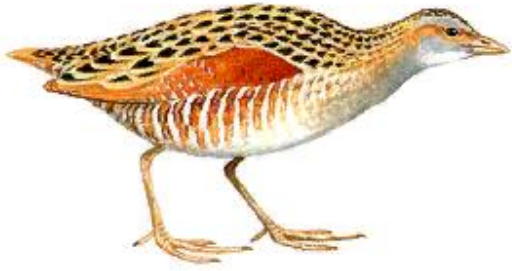
<i>Bubo bubo</i> Eagle Owl
Distribution
Middle East: Resident. Quite widespread in Europe and Middle East but usually scarce and difficult to find.
Lebanon: Has not been proven to occur as a vagrant to Lebanon for over a century, but there are many recent records of calling birds which have taken up territories.

Population
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. In Lebanon , tens of pairs were spotted during the last ten years, mainly in the Beqaa Valley, Barouk and Rihane Mountains.
Identification
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. Their rich, orangey brown 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.
Habitat
Breeds and winters in rocky gorges or ridges, often amidst woodland.


<i>Buteo rufinus</i> Long-legged Buzzard
Distribution
<p>Middle East: 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.</p> <p>Lebanon: Resident and passage migrant breeder in scattered areas of Lebanon and found to breed at the entrance of Horsh and on the eastern slopes of Al-Chouf Cedar Reserve.</p>

Population
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. In Lebanon , About a total of 65 pairs identified in all areas of Lebanon.
Identification
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 carpal patches and a tail which is either unbarred if it's 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.
Habitat
Resident in areas of open country.


<i>Ciconia ciconia</i> White Stork
Distribution
Middle East: Breeding summer visitor and common passage migrant.
Lebanon: Abundant and regular on both passages, over 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 and Tyre.

Drawing: http://www.birdguides.com
Population
The European population is estimated at about 100,000 pairs. Russian population 3500-4000 Turkish population 15000-35000. In Lebanon: Regular on passage with daily peaks between 30-10000 individuals.
Identification
It is unmistakable, with a white body, mostly black wings, red legs and a long red bill.
Chronology: First mentioned at Aammiq by MacFarlane (1978) and NCSR (1999). At least during the last 10 years, the number of individuals is generally constant from year to another (<i>pers. obs.</i>).
Habitat
Feeds mostly in fields and meadows.


<i>Coturnix coturnix</i> Quail
Distribution
Middle East: Breeding summer visitor, widespread on passage and few overwinter.
Lebanon: Uncommon and localised migrant. Common passage migrant over most 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: http://www.birdguides.com
Population
650 000-900 000 breeding pairs common across Europe but rare in the north. In Lebanon: The passing birds are in thousands whilst the winterers are very few and the summer breeders are widely fluctuating due to excessive hunting pressure.
Identification
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'll hear its diagnostic call.
Chronology: 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.
Habitat
Breeds in arable fields and long grass.


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

Population
87-97,000 breeding pairs widespread but uncommon across Europe and rare in the north. In Lebanon: The yearly recorded birds are apparently not exceeding a dozen.
Identification
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.)
Habitat
Found in cultivated lands, meadows and other open grassy lands.




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

Population
More than a million birds widespread throughout Europe and unknown population size in the Middle East. In Lebanon: The yearly recorded birds are apparently not exceeding tens.
Identification
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.
Habitat
Breeds on moorland, wasteground, reedbeds and woodland edges.


<i>Hieraetus fasciatus</i> Bonelli's Eagle
Distribution
Middle East: The adults are very faithful to their breeding sites throughout the year in all Middle Eastern countries
Lebanon: 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_Nahreïn are usually reliable. Young birds move about more and are therefore less predictable.

Population
820-900 breeding pairs. Most of these live in Spain, Portugal, France, Turkey and Greece. In Lebanon: The yearly recorded birds are apparently around ten pairs.
Identification
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.
Habitat
Nests on rocky cliffs and therefore associated with mountains and gorges. In winter, immature birds disperse to lower altitudes and may be seen by marshes.


<i>Hippolais languida</i> Icterine Warbler
Distribution
Middle East: Breeds in hilly areas in southern Turkey such as on the plateau areas above Durnalik and Isikli, near Gaziantep.
Lebanon: Very scarce passage migrant in mid-April–late May and <u>late August–late</u> October, in a wide variety of habitats.

Population
1 000 breeding pairs in southern Turkey, part of a larger population found in the Middle East, and further afield in Afghanistan. In Lebanon: Not less than 200 pairs recorded on yearly basis in a variety of habitats.
Identification
In plumage, there's not much difference between Upcher's and the much commoner Olivaceous Warbler although its worth looking for the darker tail and relatively darker wings of the Upcher's which contrast with the paler upperparts. With care you may also notice that the tips of the tertials are unevenly spaced on an Upcher's Warbler, as if there's one missing. The most obvious difference between the two species is in build, since Upcher's looks distinctly big-headed and bull-necked whereas the Olivaceous is the slimmest most pointed-looking of all the Hippolais Warblers. Also, Upcher's sometimes waves its dark tail around in circular motions, a habit shared with the Olive-tree Warbler but not the Olivaceous.
Habitat
Breeds in rocky, hilly areas with sparse bushes although they also occur lower down in orchards and olive groves.


<i>Parus caeruleus</i> Blue Tit
Distribution
Middle East: Widespread and numerous in most of Europe and in Turkey.
Lebanon: very scarce passage migrant in mid-April–late May and <u>late August–late</u> October, in a wide variety of habitats. At least four pairs resident in Ehden Forest and four fledglings were observed being fed on 17 June 1998. Subsequently, a local inhabitant of the nearby village of Baslouquit reported that Blue Tit had nested in the wall of his house, and showed the hole, which appeared too small for Great Tit <i>P. major</i> . This breeding record fills a gap between the populations in south Turkey (contiguous with main range) and the isolated population of north-west Jordan (Andrews 1995). In addition, one at Jeita Caves in April 2000 was observed repeatedly flying from trees to the underside of a two-storey parking lot overlooking the river (A. Springer pers. comm.).

Population
16-21 million breeding pairs widespread across Europe, including Turkey (representing 75% of this species range). In Lebanon: a small population is found breeding at Horsh Ehden (Apparently, its southern limit of distribution).
Identification
The striking Blue on the wings, tail and especially on the crown make the Blue Tit an easy bird to identify. It is also the only Lebanese tit to have a dark stripe through the eye, a feature by which the yellower juveniles can be identified.
Habitat
Breeds and winters in woods, parks, orchards, hedgerows and gardens.


<i>Scolopax rusticola</i> 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 with preference to Horsh Ehdn.

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 but, of course, owls don't have long pointed bills. 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.

<i>Serinus syriacus</i> Syrian Serin
Distribution
Middle East: Resident, dispersive, migrant to partial migratory and winterer.
Lebanon: 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 Schouf, Mlikh, Ryhan, Tannourine, Tyre and Yammouna.

Population
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).
 identification
Relatively paler and tail slightly longer than in 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.
 habitat
Nests on hill's slopes with shrubs, bushes, cedar or juniper trees. Winters at lower altitudes in bottom of valleys or in cultivated lands.

<i>Streptopelia turtur</i> Turtle Dove
Distribution
Middle East: Chiefly summer breeder and migrant.
Lebanon: Fairly widespread but uncommon summer breeder and very common passage migrant across the country. Recorded at Aammiq, Aichyeh, Aramta, Arz el Chouf, Barouk, Beirut, Damour, Deir el Qamar, Hermel, Kefraya, Kfarhouneh, Khaldeh, Mlikh, Palm Islands, Qaa, Qaraoun, Sit Chawaneh and Tyre.

Drawing: http://www.birdguides.com
Population
About 2 million breeding pairs across most of Europe. Perhaps also as many as 5 000 000 in Turkey alone. In Lebanon: There are about 500 pairs in three localities: Qaa, Hermel and eastern slopes of Jabal Barouk..
Identification
Turtle Doves are similar in size and shape to a Collared Dove although they have a shorter tail, more pointed wings and a more darting agile flight. The chequered black and rufous upper parts are diagnostic and easily seen. Look also for their darker underwing, the narrow white border around the tail and the black and white collar patches like the gill slits of a dog-fish.
Chronology: First recorded at Aammiq by NCSR (1999). There is increase in numbers in recent years, probably due to conservation effort (<i>Pers. obs.</i>).
Habitat
Breeds in young woodlands, copses, hedgerows and scrub.

<i>Turdus iliacus</i> 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 commoner 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.

Population
5-7 million breeding pairs mostly in Scandinavia. The wintering population in Europe and Middle East, however, can reach at least a 1500 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.

<i>Turdus philomelos</i> Song Thrush
Distribution
Middle East: 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.
Lebanon: very common passage migrant in early October–late November and mid-February–early April and an uncommon to scarce winter visitor late November–late February. Recorded in orchards, olive groves, open cedar groves, cultivation, maquis, isolated trees and around Ammiq swamp. Rare on the coast.

Population
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. In Lebanon , the records are not enough to estimate the wintering population.
Identification
Its brown plumage and speckled chest is typical of a thrush. It lacks the white eye stripes of a Redwing and so is 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.
Habitat
Winters in gardens, farmland, woodland and hedges.

<i>Turdus viscivorus</i> Mistle Thrush
Distribution
Middle East: 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.
Lebanon: 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.

Population
2-3 million breeding pairs in Europe extending eastwards to Russia. In Lebanon, the records are not enough to estimate the wintering population but the known breeding population is limited to c.25 pairs.
Identification
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.
Habitat
Breeds in woods, parks, gardens and orchards. Also found in winter in fields and moorland edges.

A.1.5.4 REPTILES AND AMPHIBIANS

Apparently there is no major herpetological work conducted at Horsh Ehden Nature Reserve prior to 1998 when the author of this section established the first prioritized list of Horsh Ehden herpetofauna (Hraoui-Bloquet in Tohmé et al., 1999). In 2002, Hraoui-Bloquet et al. published a comprehensive paper on the distribution of the herpetofauna species over the Lebanese territories (including Ehden). 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).

These works have resulted together with the recent field research undertaken by Souad Hraoui Bloquet in a species list shown in Annex (4) below:

The list of herpetofauna species comprises 28 species distributed over 13 families. Only the *Chamaeleo chamaeleon* is globally threatened whilst the regionally threatened *Salamandra infraimmaculata infraimmaculata*, *Bufo viridis*, *Rana levantina*, *Hyla savignyi*, *Testudo graeca terrestris*, *Hemidactylus turcicus*, *Cyrtopodion kotschy orientalis*, *Chamaeleo chamaeleon*, *Lacerta laevis laevis*, *Platiceps najadum dahlii*, *Malpolon monspessulanus insignatus*, *Hierophis jugularis*, *Natrix tessellata tessellate*, *Vipera bornmuelleri*, *Vipera palestinea* and *Macrovipera lebetina* are limited to 16 species (57% of the Hoersh Ehden Reserve's herpetofauna). Two reptiles *Vipera bornmuelleri* and *Lacerta media wolterstorffi* are endemic but the second is also regionally threatened. The uncertain status of 4 species *Cyrtopodion amictopholis*, *Vipera palestinea*, *Elaphe sauromates* and *Macrovipera lebetina* indicates that further field verification is needed to fill the gaps found in the acquired knowledge.

1.5.4.1 The Herpetofauna Species

1.5.4.1.1 Selected species

The used methodology and criteria to limit the study to a certain number of species are indicated in the Annex 7 far below. However, the fine filter had selected 10 species (one amphibian which belongs to the order of Urodela and nine reptiles which belong to the orders of Chelonia and Squamata). These species that are distributed over eight families share the following categories:

1.5.4.1.1.1 Rare (3)

Species	English Name	Local Name	Localization		Abundance
			Habitat	GPS	
<i>Chameleo chamaeleon restricta</i>	Chameleon	Harbaya or Chakhteba khteh	Trees & Bushes in the forest		Low
<i>Testudo graeca terrestris</i>	Grec Tortoise	Sulhafat arde	Shrubby areas		Low
<i>Salamandra</i>	Fire Salamander	Salamander	Damp woodland		Low

<i>infraimma culata infraimma culata</i>			for juveniles and adults -Aquatic habitat for larva		
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1.5.4.1.1.2 Endemic (2)

Species	English Name	Local Name	Endemism	Localization		Abundance
				Habitat	GPS	
<i>Lacerta media wolverstorffi</i>	Green lizard	Suhliat Khdra'a	Regionally	Moist		Medium
<i>Vipera bornmuelleri</i>	Bornmuelleri's viper	Afa'a Al Jabal	To Lebanon Mountains	Alpine Habitat (Rocky and Jord vegetation)		Medium

1.5.4.1.1.3 Noteworthy (9)

Species	English Name	Local Name	Value	Localization		Abundance
				Habitat	GPS	
<i>Salamandra infraimmaculata infraimmaculata</i>	Fire salanander	Salamander	Pest control	Damp woodland of the forest		Low?
<i>Chameleo chameleon restricta</i>	Chameleon	Harba'a	Pest control	Trees, Bushes in the forest		Low
<i>Lacerta media wolverstorffi</i>	Green lizard	Suhleia Khdra'a	Pest control	In the lower part of the reserve, near the stream and restaurant		High
<i>Cyrtopodion kotschyi orientalis</i>	Tree Gecko	Abou breiss al shajar	Pest control	In all the forest		Medium
<i>Laudakia stellio stellio</i>	Hardun	Hardun	Pest control	Rocky part with oak and pine trees in the lower		High

				part of the reserve and near the restaurant		
<i>Platiceps najadum dahlii</i>	Small whipe snake		Pest control	?		Medium?
<i>Hierophis jugularis</i>	Large whipe snake	Hanash asswad	Rodent control	Principally the lower part of the reserve and its boundaries		Medium
<i>Malpolon monspessulanus insignitus</i>	Montpellier snake	Hayat montpellier	Rodent control	Principally the lower part of the reserve and its boundaries		High
<i>Vipera bornmuelleri</i>	Bornmuelleri's viper	Afa'a Al Jabal	Rodent and lizard control	Rocky and mountainous vegetation		Medium

1.5.4.1.1.4 Introduced (Alien invasive) (0)






Species	English Name	Local Name	Origin	Localization		Abundance
				Habitat	GPS	






1.5.4.1.1.5 Threatened (5)






Species	English Name	Local Name	Level of threat	Localization		Abundance
				Habitat	GPS	
<i>Salamandra infraimmaculata infraimmaculata</i>	Fire salamander	Salamander	Regionally	Damp woodland of the forest		Low
<i>Testudo graeca terrestris</i>	Greek tortoise	Soulhafat	Regionally	In the lower part of the reserve		Medium?
<i>Chameleo chameleon restricta</i>	Chamelon	Harba'a	regionally	Trees & Bushes		Low






<i>Cyrtopodion kotschy orientalis</i>	Tree Gecko	Abou breiss al shajar	Nationally or local	In all the forest (Trees & Rocks)		Medium
<i>Platiceps najadum dahlii</i>	Small whipe snake	Nashabieh	Nationally	In the lower part (rocky with oak and pine trees)?		Medium?
<i>Hierophis jugularis</i>	Large whipe snake	Hanash asswad	Nationally	In the lower part of the forest (Rocky part with oak and pine trees) & the boundaries.		Medium






A.1.5.4.1.1.6 Useful information and details about the selected species






<i>Chameleo chameleon recticrista</i> Common chameleon
 distribution
Middle East: This species is also present in Syria, Jordan, Palestine, Israel, Iraq... where it is common.
Lebanon: The common chameleon is observed in Lebanon from the sea shore to c.1600 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 Jan Van Der Voort
 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.
 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 the 2 sides of the body, placed in 2 rows. Changes color according to mood and background. Adult size 12 cm.
Chronology: Reported from Aammq for the first time by R. Sadek in his list of 1986. Also found in the works done in 1999 by S. Hraoui-bloquet.
 habitat
In agriculture areas, woodlands, orchards and other tree areas. It is arboreal (living on trees, bushes...). It goes on ground for hibernation during cold seasons or to lay eggs on ground during autumn. Its diet is mostly insects.

<i>Laudakia stellio stellio</i> 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 inhabitant. Breed on land in spring. Occurs from sea shore up to 2200 m. of altitude.	
	
Photo by Dr. Riyad Sadek	
 population	
The population size of this species is not well known in the Middle East, In Lebanon: the abundance is high. This arboreal species is persecuted in Lebanon mainly by apiculturists.	
 identification	
The body and head compressed, gular fold, dorsolateral folds, toes compressed, scales of tail arranged in spiny rings. Spiny and keeled dorsal and dorsolateral scales, ventral scales smooth. Color is grey with black and creamy dorso vertebral blotches.	
Chronology: It was cited for the first time at Aammiq by R. Sadek (1986).	
 habitat	
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...).	

<i>Malpolon monspessulanus insignitus</i> Montpellier snake	
 distribution	
Middle East: Common and widespread in Syria, Palestine, Israel, Jordan ... It occurs in North Africa, from Algeria to Egypt, Arabian Peninsula, Southeastern Europe, Turkey and Iran....	
Lebanon: It is very common and widespread in open areas and field edges. Observed from the sea shore to about 1700 m in altitude.	
	
Photo by S> 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 a colubridae but it has a rear fang to inoculate venom, adult size can reach 160 cm or more, Pupil of eye round, dorsal surface of snout with longitudinal concave furrow, color uniformly steel-gray dorsally. During reproduction period the throat of the male becomes red to orange.	
Chronology: First reported from Aammiq in 1986 by R. Sadek and then by S. Hraoui-Bloquet in 1999.	
 habitat	
Field edges, open fields, sunny shrubland. It is diurnal and feeds on birds, lizards and small mammals	






<i>Hierophis jugularis</i> Large whipe snake (Black snake, Hannash asswad)	
 distribution	
Middle East: Common and widespread in Syria, Palestine, Israel, Northern Iraq, Southern Turkey,...	
Lebanon: It is very common and widespread in Lebanon, it is recorded from sea shore to 1800m of altitude	
	
Photo by Dr. Riyad Sadek	
 population	
The population size of this species is not well known in the Middle East. In Lebanon it appears to be abundant.	
 identification	
It is a non venomous colubridae. Adulte size can reach 300 cm, pupil of eye rounded, tail long, adults uniformly black, subadults brownish black, throat and abdomen sometimes salmon red. It is diurnal , its diet is mainly small mammals, lizards, birds.	
Chronology: First reported from Aammiq in 1999 by S. Hraoui-Bloquet and then by S. Hraoui-Bloquet <i>et al.</i> in 2002.	
 habitat	
Wide variety of places.	






<i>Salamandra infraimmaculata infraimmaculata</i> Salamander	
 distribution	
Middle East: Common and widespread in most countries of the Middle East. This species is similar to <i>Salamandra salamandra</i> (fire salamander) living in Europe	
Lebanon: Common and widespread. Reported from most of fresh water bodies (during reproduction period) and from damp woodland out of this period. This species is generally found from 400m to 1800m of altitude.	
	
Photo by R. 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	
This species possesses 2 large parotoid glands that secrete toxic substance. The tail is cylindrical and shorter than the body. The latter is robust and stocky. The color is black with irregularly yellow spots on the back.	
Chronology: First reported from Horsh Ehden in 1999 by S. Hraoui-Bloquet and then by R. Sadek in 2000.	
 habitat	
The Salamander is viviparous. Females in water deliver the larvae at the stage of external gills where they live and achieve metamorphosis. Juveniles and adults leave water bodies to live in damp region. During the daytime, they remain under tree barks, stones, rocks, etc. They are active at night. In autumn and in spring they are also observed active during daytime after rain. Main diet is insects.	






<i>Testudo graeca terrestris</i> Greek terrestrial tortoise	
 distribution	
Middle East: Widespread in most countries of the Middle East (Lebanon, Syria, Jordan, Palestine , Iran, Iraq....).	
Lebanon: Common and widespreade. Reported from sea shore to c.1300 m of altitude.	
	
Photo by S. 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	
Head covered by shields, digits not webbed. Submarginals absent. Tail not flattened . Hindlimbs elephantine. Forefeet with five claws. Supracaudal single. Head uncolored tan or gray.	
Chronology: First reported from Horsh Ehden in 1999 by S. Hraoui-Bloquet and then by R. Sadek in 2000.	
 habitat	
In grasslands, maquis, guarrigue, cultivated areas, semi aride zones (like in some regions of the Bekaa Valley). The species is diurnal, oviparous and vegetarian. Many individuals from Syria are sold in Lebanon.	

<i>Lacerta media wolterstorffi</i> green lizard
 distribution
Middle East: Also common in Syria, Palestine, Israel, Jordan
Lebanon: Common and widespread in Lebanon. It is the largest among the lacertidae of the country. Recorded between 500 and 1800 m of altitude in moist zones.

Photo by S. 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, collar well developed and strongly serrated, femoral pores present. Tail very long. Ventral plates trapezoidal, with notches between plates. Adults are green with small black blotches on back and laterally; young and juveniles are green with four longitudinal brown lines.
Chronology: First reported from Horsh Ehden in 1999 by S. Hraoui-Bloquet and then by R. Sadek in 2000.
 habitat
In moist zones, cultivated and agriculture lands, forests, grasslands, near streams or rivers. It climbs trees and bushes. It is diurnal and its diet is made from insects.

<i>Vipera bornmuelleri</i> Bornmuelleri's Viper
 distribution
Middle East: Recorded from Mount Hermon
Lebanon: This species is apparently endemic to Lebanese mountains

Photo by S. Hraoui-Bloquet
 population
The population size of this species is not well known. This species which is endemic to Lebanese Mountains is found at c.1800m, namely from Sannine, Ayoun El Siman, Ehden and Bcharry.
 identification
Venomous, 50cm length, pupil of eye vertically elliptic, tail very short, the color is light brown with dark alternated mediodorsals patterns, it is active in evening and feeds mainly on lizards and small mammals.
Chronology: First reported from Horsh Ehden in 1999 by S. Hraoui-Bloquet and then by R. Sadek in 2000.
 habitat
Rocky and mountainous vegetation of the Alpine habitat

<i>Cyrtopodion kotschy orientalis</i> Tree Gecko	
 distribution	
Middle East: Recorded in Jordan and Palestine	
Lebanon: common and widespread in the Lebanon from the littoral to c.1500m altitude.	
	
Photo by R. Sadek	
 population	
The population size of this species is not well known but is qualified abundant at least in Horsh Ehden	
 identification	
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.	
Chronology: First reported from Horsh Ehden in 1999 by S. Hraoui-Bloquet and then by R. Sadek in 2000.	
 habitat	
Lives in trunks and branches of trees. The body matches their colour of the barks or other supports as a mean of camouflage. This nocturnal insectivorous is also found in rocky areas and on house walls.	

<i>Platiceps najadum dahlia</i> small whip snake	
 distribution	
Middle East: Occurs in Syria, Iraq, Cyprus, east through Turkey, south through Balkans, Yougoslavia and Bulgaria.	
Lebanon: Uncommon and limited to high altitudes, mainly above 1200 meters.	
	
Photo by S. Hraoui-Bloquet	
 population	
The population size of this species is not well known but seems to be low.	
 identification	
This snake reaches 50cm, no venomous, pupil of eye rounded, coloration more or less uniform except for neck region that may bear ocellae that become smaller in size posteriorly, no dark strip through eye, no collar band.	
Chronology: First described by S. Hraoui-Bloquet in 1999 and then by R. Sadeq in 2000.	
 habitat	
Lives in a wide variety of habitats.	



A.1.5.6 The terrestrial insects




This part concerns the terrestrial insects or others, which are at their terrestrial stage of life, with particular attention given to the mega-insects. Mr. Bashar Merheb who was guided by several entomologists, mainly Dr.Hani Abdul Noor and Dr. Ali Bayan, carried out the field study in the Horsh Ehden site. Mr. Bashar Merheb takes all photos of insects whereas some of the observed specimens (marked with [*]) were examined in the Entomology museum-Lebanese university-Section II.



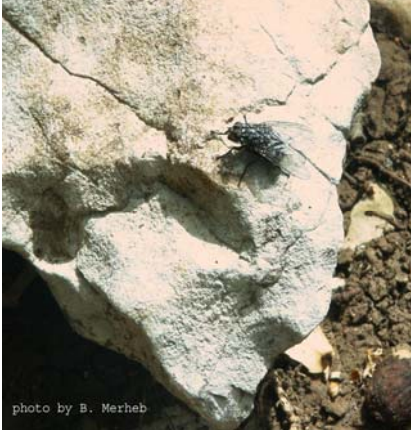

The encountered insects at Horsh Ehden figure in the Annex 5 where the identification of insects is sometimes limited to the family level only. This is due to lack of specialized experts. However, the species identification is compensated here by photos taken from the studied site.




Summary status of the observed insect specimens at Horsh Ehden.




* denotes verified specimen through comparison with the Lebanese University collections.





Order	Family	Scientific name	density	abundance
Coleoptera	Cicindellidae Length: 1.5 mm.	 <i>Cicindella sp</i>	low	Rare
Coleoptera	Carabidae Length: 1.6 mm.	 <i>Nebria hemprichi</i> (klug1832)	low	Rare
Coleoptera	Cerambycidae Length: 1 mm.		*	

		 photo by B. Merheb		
		<i>Calamobius filum</i> (Rossi,1790)		
Coleoptera	Cerambycidae	<i>Phytoecia virgule</i> (Charpentier,1825)	*	
Coleoptera	Scarabeidae	<i>Oruceus nasicornis</i> (Linnaeus1758)	*	
Coleoptera	Scarabeidae Length: 1.9 mm.	 Photo by B. Merheb	*	
		<i>Netocia vidua</i> (Gorg et Percheron)		
Coleoptera	Chrysomellidae Length: 7 mm.	 photo by B. Merheb	*	
Coleoptera	Hydrophilidae	<i>Haccobius syriacus</i> ()Guill	*	

Diptera	Syrphidae Length: 1.5 mm.	 <p>Photo by B. Merheb</p>	medium	common
Diptera	Bombyliidae Length: 5-10 mm.	 <p>Photo by B. Merheb</p>	medium	common
Diptera	Calliphoridae Length: 1 cm.	 <p>photo by B. Merheb</p>	medium	common
Dictioptera	Blattidae Length: 7 mm.	 <p>Photo by B. Merrheb</p>	low	common

Hemiptera	Lygaidae Length: 7 mm.	 <small>Photo by B. Merheb</small>	low	Rare
Hemiptera	Lygaidae	<i>Lygaeus equestris</i> (Linnaeus1758)	*	
Hemiptera	Miridae	<i>Grypocoris</i> (<i>Turciocoris</i>) <i>syriacus</i> (Reuter, 1896)	*	
Hemiptera	Miridae	<i>Closterotomus putomi</i> (Horvath, 1888)	*	
Hemiptera	Miridae	<i>Lepidargyrus seidenstueckeri</i> (Wanger1956)	*	
Hemiptera	Miridae	<i>Dereocoris</i> (<i>Camptobrochis</i>) <i>serenus</i> (Douglas & Scott,1868)	*	
Hemiptera	Miridae	<i>Pachyxyhus lineellus</i> (Mulsant & Rey 1852)	*	
Hemiptera	Lygaidae	<i>Lethaeus cribratissimus</i> (Stal,1858)	*	
Hemiptera	Miridae	 <small>photo by B. Merheb</small> <i>Euryopcoris nitidus</i> (Meyer-Dur,1843)	*	
Hemiptera	Scutellaridae	 <small>photo by B. Merheb</small> <i>Graphosoma italicum</i> (Mull)	*	

Hemiptera	Scutellaridae	 photo by B. Merheb <i>Graphosoma melanoxanthum</i> (Horvath, 1903)	*	
Hemiptera	Pentatomidae	<i>Raphigaster nebulosa</i> (Poda,1761)	*	
Hemiptera	Pentatomidae	<i>Acrosternum</i> sp	*	
Hemiptera	Coreidae	<i>Camptotus lateralis</i> (Germar,1817)	*	
Hemiptera	Reduviidae	<i>Rhynocoris iracundus</i> (Poda,1761)	*	
Hemiptera	Reduviidae	<i>Sphedanolestes pulchelus</i> (Klug1830)	*	
Hemiptera			*	
Homoptera	Cicadidae	<i>Cercopis intermedia kirschbaum</i>	*	
Hymenoptera	Apidae Length: 1.3 mm	 Photo by B. Merheb	high	common
Hymenoptera	Apidae Length: 1.8 mm	 Photo by B. Merheb	medium	common

Hymenoptera	Apidae Length: 1 cm	 <p>photo by B. Merheb</p>	medium	common
Hymenoptera	Vespididae Length: 1 cm	 <p>photo by B. Merheb</p>	Medium	Common
Hymenoptera	Vespididae Length: 1 cm	 <p>photo by B. Merheb</p>	Medium	Common
Orthoptera	Acrididae Length: 2.5 cm	 <p>Photo by B. Merheb</p>	Low	Rare

Orthoptera	Acrididae Length: 2.0 cm	 <p data-bbox="582 667 758 689">Photo by B. Merheb</p>	low	Rare
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A.1.5.6.3 The butterflies

The determination of the butterflies of Horsh Ehdén is the output of a combined effort that was exerted by all members of the team of experts when every time one butterfly is seen, photographed or described it was compared to the content of the plates that are offered by T. Larsen in his book “Butterflies of Lebanon” (1974). The list of the butterflies of Horsh Ehdén figures in the Annex 6.

A.1.6 Ecological interest of the site

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

Its uniqueness derives from the fact that:

-It is the only significant mixed cedar and fir trees forest in the country and that the fir in it is at its southern distribution limit.

-It is extremely diversified over a relatively small area not exceeding 10 square kms.

-Despite its small size, it has offered habitat to 60% of the national breeding avifauna.

-Absolutely, it is the richest area in the country with endemic (more than 50) plant species.

-It is a frequent refuge to threatened species at both national and international levels such as Hyaena, Polecat, Wolf, Corncrake, Black Vulture, Imperial Eagle, etc. which find in the site the necessary elements of their ecological niche.

A.1.7 Impact on the site by each exploitation/ production system

A.1.7.1 Agriculture

N/A

A.1.7.2 Pasture

Pasture activity is very seldom practiced in some areas of the site such as above the forested area but practically not within the cedar-fir groves. It is difficult to pretend that there is an overgrazing in the area. Instead, one may suggest that the feet of goats and sheep can less or more crash down the new shoots of the wild rare plant species or can have an effect on the microfauna and on the populations of the land nesting bird species such as larks, pipits, quails, etc. However, the pasture activity can't be qualified as an overgrazing not only because of its limitation in time and space but also because of the weak numbers of livestock involved at Horsh Ehden.

A.1.7.3 Fishing and frogging

N/A

A.1.7.4 Eco-tourism

The eco-tourism is presently limited to some birdwatching activities, hicking and few educational visits by students or others, mainly from the surrounding schools. 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.

A.1.7.5 Exploitation of the 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 in a 500 meters belt around reserves, some hunting activities are observed during the

autumn migration seasons on the hills immediately above the forest areas. However, poaching is still occurring and the efforts done to reduce it are active.

- the cutting of wood for combustion is not today exercised within the site and people are satisfied with the illegal collection of dead branches from the reserve's area.

- the collection by individuals of medicinal and other economically wild plant species for personal use is not well controlled at Horsh Ehdén and therefore its impact over the site is difficult to assess.

A.1.7.6 Industrialization - urbanisation

The only identified urbanization is vestigial and located at the western edges of the site. It consists of few restaurants generating in summer high and abnormal music sound. The ecological integrity of the Horsh Ehdén doesn't seem to be affected by these restaurants, which need to be however subjected to an EIA study.

The Horsh Ehdén is virtually free from any human agglomeration.

A.1.7.7 Water management

N/A

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

HABITAT	KEY SPECIES	SENSITIVITY	THREATS
<i>Pinus brutia</i>	<i>Pinus brutia</i> <i>Orchis romana libanotica</i> <i>Quercus infectoria</i> <i>Juniperus oxycedrus</i> <i>Quercus cerris</i> <i>Malus trilobata</i> <i>Canis lupus pallipe</i> <i>Hyaena hyaena syriaca</i> <i>Mustella nivalis</i> <i>Dryomys nitedula phrygius</i> <i>Sus scrofa lybicus</i> <i>Ciconia ciconia</i> <i>Pernis apivorus</i> <i>Aquila pomarina</i> <i>Accipiter brevipes</i> <i>Falco subbuteo</i> <i>Scolopax rusticola</i> <i>Cuculus canorus</i> <i>Turdus philomelos</i> <i>Turdus iliacus</i> <i>Turdus viscivorus</i> <i>Hippolais languida</i> <i>Corvus corone cornix</i>	Sensitivity index=high - High specific richness - Diversified micro-habitats - Presence of threatened species - Refuge for certain species	Barbecuing Decreased food availability, Degradation Deliberate killing Destruction by fire Extension of recreational areas Fragmentation Garbage Hunting pesticides Picking Pollution Sensitivity to human disturbance Trapping
<i>Quercus calliprinos</i>	<i>Quercus calliprinos</i> <i>Quercus cerris</i>	Sensitivity index=Medium	- Crushing by cars

	<p><i>Quercus infectoria</i> <i>Quercus pinnatifida</i> <i>Rosa dumetorum</i> <i>Rosa canina</i> <i>Astragalus sofarensis</i> <i>Limodorum abortivum</i> <i>Canis lupus pallipe</i> <i>Hyaena hyaena syriaca</i> <i>Mustella nivalis</i> <i>Dryomis nitedula phrygius</i> <i>Sus scrofa lybicus</i> <i>Ciconia ciconia</i> <i>Pernis apivorus</i> <i>Aquila pomarina</i> <i>Accipiter brevipes</i> <i>Falco subbuteo</i> <i>Scolopax rusticola</i> <i>Cuculus canorus</i> <i>Turdus philomelos</i> <i>Turdus iliacus</i> <i>Turdus viscivorus</i> <i>Hippolais languida</i> <i>Corvus corone cornix</i></p>	<p>- High specific richness - Vital habitats for the survival of hygrophilic species - Presence of threatened species - Refuge for certain species</p>	<p>Decreased food availability Deliberate hunting and trapping Persecution by man Barbacuing Degradation Destruction by fire Fragmentation Garbage organic pollution Hunting Persecution Plucking Pollution and pesticides Sensitivity to human disturbance Trapping Water overexploitation</p>
<p><i>Cedrus libani</i> & <i>Abies cilicica</i></p>	<p><i>Cedrus libani</i> <i>Acer tauricum</i> <i>Juniperus oxycedrus</i> <i>Prangos asperula</i> <i>Abies cilicica</i> <i>Quercus cedrorum</i> <i>Phlomis brevilabris</i> <i>Coronilla varia libanotica</i> <i>Quercus pinnatifida</i> <i>Juniperus excelsa</i> <i>Sorbus flabellifolia</i> <i>Hedera helix</i> <i>Astragalus ehdenensis</i> <i>Canis lupus pallipe</i> <i>Hyaena hyaena syriaca</i> <i>Mustella nivalis</i> <i>Dryomis nitedula phrygius</i> <i>Sus scrofa lybicus</i> <i>Ciconia ciconia</i> <i>Pernis apivorus</i> <i>Aquila pomarina</i> <i>Accipiter brevipes</i> <i>Falco subbuteo</i></p>	<p>Sensitivity index=very high - Presence of threatened or rare species - Refuge for certain species</p>	<p>Decreased food availability Deliberate killings Habitat destruction Pollution and pesticides Sensitivity to human disturbance Barbecuing Degradation Destruction by feet of hunters Destruction by fire Fragmentation Garbage Grazing Hunting Plant collection Trapping</p>

	<i>Parus coeruleus</i> <i>Scolopax rusticola</i> <i>Cuculus canorus</i> <i>Turdus philomelos</i> <i>Turdus iliacus</i> <i>Turdus viscivorus</i> <i>Hippolais languida</i> <i>Corvus corone cornix</i> - <i>Lacerta media</i> <i>wolterstorffi</i> - <i>Laudakia stellio stellio</i>		
Barren areas Glades Forest edges	<i>Prunus ursina</i> <i>Sambucus ebulus</i> <i>Acantholimon libanoticum</i> <i>Berberis libanotica</i> <i>Astragalus gummifer</i> <i>Juniperus excelsa</i> <i>Juniperus oxycedrus</i> <i>Rosa glutinosa</i> <i>Dianthus karami</i> <i>Viola libanotica</i> <i>Erinaceus europaeus</i> <i>concolor</i> <i>Canis lupus pallipe</i> <i>Hyaena hyaena syriaca</i> <i>Tadarida teniotis</i> <i>Myotis blythi omari</i> <i>Pipistrellus kuhli</i> <i>ikhawanius</i> <i>Buteo rufinus</i> <i>Hieraaetus fasciatus</i> <i>Falco subbuteo</i> <i>Coturnix coturnix</i> <i>Parus coeruleus</i> <i>Crex crex</i> <i>Alectoris chukar</i> <i>Cuculus canorus</i> <i>Bubo bubo</i> <i>Eremophila alpestris</i> <i>Oenanthe finschii</i> <i>Hippolais languida</i> <i>Serinus syriacus</i> <i>Carduelis cannabina</i> <i>Corvus cornix</i> - <i>Salamandra</i>		Barbecuing Degradation Destruction by feet of hunters Destruction by fire Fire Fragmentation Garbage Grazing Hunting Plucking Pollution

	<i>infraimmaculata</i> <i>infraimmacula</i> - <i>Testudo graeca terrestris</i> - <i>Chameleo chameleon restricta</i> - <i>Cyrtopodion kotschy orientalis</i> - <i>Hierophis jugularis</i> - <i>Malpolon monspessulanus insignitus</i> - <i>Platiceps najadum dahlii</i> - <i>Vipera bornmuelleri</i>		
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A.1.9 Constraints and opportunities for the conservation

A.1.9.1 Main constraints

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

A.1.9.2 Main opportunities

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

A.1.10 Socio-economic impacts of taken measures

A.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

A.1.10.2 Socially

- Deprive locals from free access rights
- Deprive shepherders from pasture areas
- Provide locals with work opportunities

A.1.11 Proposed conservation management actions

A.1.11.1 Short term

A.1.11.1.1 Protection:

- Put in place a responsible and wise use measures in the site;
- Protect the economic plants from over-exploitation;
- Prohibit the access of excursionists to fragile spots;
- Stop any additional restaurant activities, especially in the Joueit area;
- Limit and canalize the access to the sensitive places of the site.
- Ban the hunting within a 500m belt around the site even during the hunting season.

- Stop the plant picking activities.
- Stop unregulated and regulated activities from generating garbage in the area.
- Keep the site clean from solid waste and other garbage.
- Ban illegal taking and poaching.

A.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 Horsh Ehdén use the whole area for breeding or refuging and resting or roosting.

A.1.11.1.3 Valorisation/ Added value

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

A.1.11.2 Mid term

A.1.11.2.1 Protection:

- Sensitise visitors and local communities
- Regulate pastoral activities.
- Rationalize the exploitation of natural resources.
- Control the commercialization of threatened species and their product thereof.

A.1.11.2.2 Rehabilitation

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

A.1.11.2.3 Valorisation/ Added value:

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

A.1.12 Zonation of the space

A.1.12.1 Strictly protected zones

- . The core areas of each of the four habitats identified.
- . The heavy slopes (soil erosion avoidance)
- . The glades.

A.1.12.2 Zones with limited access

- . All zones outside existing trails.
- . The Fir-Cedar Habitat

A.1.12.3 Zones with free access

- . The trails (unpaved tracks).

A.1.13 Site-specific strategies and indicators for monitoring

A.1.13.1 Site-specific strategies

The technology that is used in biodiversity monitoring varies from plants to animals and from 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 Horsh Ehdén.

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	Follow up 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	Use the present study as study/reference. It could be handled to members of the management team to insure monitoring sustainability
Sampling	Count species and individual on trimestrial basis and increase the effort of observation during breeding/multiplication season.
Sample analysis	Elaborate matrix to express results Project data (species/ individuals) on maps of habitats.
Report preparation	Analyze data at the end of each annual cycle and compare them with previous data (study/reference). Discuss the reasons of variations in relation to different parameters (mainly management measures).
Management actions and project evaluation	Evaluate the outputs of monitoring and formulate appropriate conservation measures

A.1.13.2 Ecological monitoring - Indicators

Target group for monitoring	Key elements	Indicators	Method	Means
Mammals	<i>Canis lupus pallipe</i> <i>Hyaena hyaena syriaca</i> <i>Mustella nivalis</i> <i>Dryomys nitedula phrygius</i> <i>Sus scrofa lybicus</i> <i>Erinaceus europaeus concolor</i>	<ul style="list-style-type: none"> • Population size • Area of the available appropriate 	<ul style="list-style-type: none"> - Trimestrial surveys - These mammals are mainly nocturnal and therefore difficult to see. However, 	<ul style="list-style-type: none"> . Binoculars are very helpful. They allow you to watch from a distance, without disturbing the animals. . Use a torch, if

	<p><i>Tadarida teniotis</i> <i>Myotis blythi omari</i> <i>Pipistrellus kuhli</i> <i>ikhawanius</i></p>	<p>habitat</p> <ul style="list-style-type: none"> • Size of the specific ecological niche available • Number of burrows • Habitats occupied by each species • Species movement • Distribution areas 	<p>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 getting home late, perhaps a wolf or a wild cat. This goes equally for the more elusive carnivores, like otter. The small rodents like the Levant vole are particularly</p>	<p>possible with a red glass.</p> <ul style="list-style-type: none"> . 4x4 vehicle . Night camera . Mammal traps .Light projector
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			<p>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. Voles can sometimes be found under logs (which should always be carefully replaced).</p> <p>- Questioning of villagers and shepherders, etc.</p>	
Birds	<p><i>Ciconia ciconia</i> <i>Pernis apivorus</i> <i>Aquila pomarina</i> <i>Accipiter brevipes</i> <i>Falco subbuteo</i> <i>Scolopax rusticola</i> <i>Cuculus canorus</i> <i>Turdus philomelos</i> <i>Turdus iliacus</i> <i>Turdus viscivorus</i> <i>Hippolais languida</i> <i>Corvus cornix</i> <i>Parus coeruleus</i> <i>Buteo rufinus</i> <i>Hieraetus fasciatus</i> <i>Falco subbuteo</i> <i>Coturnix coturnix</i> <i>Parus coeruleus</i> <i>Crex crex</i> <i>Alectoris chukar</i></p>	<p>- Diversity index - Number of nesting couples - Size of populations - Number of wintering individuals - Number of passing birds - Frequency of roosting birds</p>	<p>- Surveys every 15 days mainly from March to May.</p> <p>-To monitor birds there are several techniques which differ with the species and habitats. But certain techniques are necessary to achieve success. Birds are most active in the morning and evening, and may rest or shelter from the heat of the sun during</p>	<p>Binoculars 10x50 or 7x48 - Telescope 20-60 x 80 - Note book - Tape recorder - 4x4 vehicle - Camera. - Field guide book</p>

	<p><i>Cuculus canorus</i> <i>Bubo bubo</i> <i>Eremophila alpestris</i> <i>Oenanthe finschii</i> <i>Hippolais languida</i> <i>Serinus syriacus</i> <i>Carduelis cannabina</i></p>	<ul style="list-style-type: none"> - Distribution per habitat - Sectorial geographic distribution - Density 	<p>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. 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. Birds should not be alerted to the observer's presence at all.</p>	
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			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	<ul style="list-style-type: none"> -<i>Lacerta media wolterstorffi</i> -<i>Laudakia stellio stellio</i> -<i>Salamandra infraimmaculata infraimmacula</i> -<i>Testudo graeca terrestris</i> -<i>Chameleo chameleon restricta</i> -<i>Cyrtopodion kotschyi orientalis</i> -<i>Hierophis jugularis</i> -<i>Malpolon monspessulanus insignitus</i> -<i>Platiceps najadum dahlii</i> -<i>Vipera bornmuelleri</i> 	<ul style="list-style-type: none"> - Density of populations - Evolution of numbers -Species localization - Number of individuals - Density of populations - Distribution of species 	<ul style="list-style-type: none"> - 4 spring census - 4 summer census - 4 autumn census <p>-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</p>	<ul style="list-style-type: none"> - Bino cular 8x40 - Broa d bea med lamp - Soft force ps - 4x4 vehi cle - ¼ litre glass jars - vine gar - net "fau choir"

			<p>reptiles, for example, tends 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 searching with a broad-beamed lamp: rainy evenings are best for this. At spring time, especially frogs and toads can be located by</p>	
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			<p>their voices. Each species has its own distinctive call, ranging from 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 damage 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</p>	
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			<p>hands to protect their soft, usually moist skins. It goes without saying that venomous snakes should not be handled in any circumstances.</p> <p>Monitoring with the quadrat method or surveying at night are two rewarding methods implicating the search under stones and the use of traps.</p>	
Entomological groups	<p>Scarabeidae Carabidae Staphylinidae Tenebrionidae Tipulidae Pentatomidae Pyrrhocoridae Acrididae Gryllidae Tetrigidae Meloidae Cantharidae Oedemeridae</p>	<p>- Diversity of taxonomic groups - Density of populations - Abundance and larva quality</p>	<p>- Three sampling per year: Spring/ Summer and Autumn Use of Barber traps in different habitats.</p> <p>Threshing or beating branches of trees and shrubs to collect insects underneath.</p> <p>Mowing of herbaceous layer.</p> <p>Surveys on monthly basis from March to June and in the beginning of November.</p>	<p>- 4x4 vehicle - Soft forceps - Insect aspirator - ¼ liter glass jars. - Net fauchoir</p>
Flora	<p><i>Abies cilicica</i> <i>Acantholimon libanoticum</i> <i>Acer tauricum</i> <i>Astragalus ehdenensis</i> <i>Astragalus gummifer</i> <i>Astragalus sofarensis</i></p>	<p>-Study of dynamic of change - Locality of the species - Distribution of the species</p>	<p>Transect method involving 4 seasonal missions per year or trimestrial</p>	<p>4x4 vehicle GPS Topographic map Aerial photo Digital camera</p>

	<i>Berberis libanotica</i> <i>Cedrus libani</i> <i>Coronilla varia libanotica</i> <i>Dianthus karami</i> <i>Hedera helix</i> <i>Juniperus excelsa</i> <i>Juniperus oxycedrus</i> <i>Limodorum abortivum</i> <i>Malus trilobata</i> <i>Orchis romana libanotica</i> <i>Phlomis brevilabris</i> <i>Pinus brutia</i> <i>Prangos asperula</i> <i>Prunus ursina</i> <i>Quercus calliprinos</i> <i>Quercus cedrorum</i> <i>Quercus cerris</i> <i>Quercus infectoria</i> <i>Quercus pinnatifida</i> <i>Rosa canina</i> <i>Rosa dumetorum</i> <i>Rosa glutinosa</i> <i>Sambucus ebulus</i> <i>Sorbus flabellifolia</i> <i>Viola libanotica</i>	- Density - Density of the vegetal community - Occupied area - Cover% - Stratification	inspection all year round	
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A.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

A.1.14 Favorable and unfavorable elements to biodiversity

Favorable elements to biodiversity	Unfavorable elements to biodiversity
<p>Vegetal biodiversity</p> <ul style="list-style-type: none"> • Endemic 62 • Rare 13 • Threatened 21 • Notworthy 75 • Biotopes 4 <p>Animal biodiversity</p> <ul style="list-style-type: none"> • Endemic 2 (reptiles) • Rare 103 • Threatened 23 • Notworthy 37 • Biocenosis 6 	<p>Collection</p> <p>Grazing</p> <p>Fire</p> <p>Loss of wilderness</p> <p>Habitat transformation</p> <p>Lack of infrastructure allowing local community participatory approach</p> <p>Lack of job in domains other than the exploitation of natural resources</p> <p>Frequentation</p> <p>Fire</p> <p>Pollution</p> <p>Poaching</p> <p>Hunting</p>

A.1.15 Identified Environmental values

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

A.1.16 Management measures and threat/ hazard mitigation

Target	Management measures/ threat mitigation
<p>Phyto-ecology</p> <ul style="list-style-type: none"> - Protect the economically important wild plant species (medicinal, aromatic, culinary, wild relatives, etc. - Protect the unique association Fir-Cedar - Protect the heavy slopes from 	<p>Management actions</p> <p>Protection</p> <ul style="list-style-type: none"> - Raise awareness of visitors - Reduce poaching - Regulate pasture - Regulate dead wood collecting - Update the law of the reserve <p>Rehabilitation</p>

<p>erosion</p> <ul style="list-style-type: none"> - Protect the edges of the forest from urban encroachment (restaurants). 	<ul style="list-style-type: none"> - Protect seedlings from pedestrians <p>Valorisation</p> <ul style="list-style-type: none"> - Promote eco-tourism through improved access to micro hotspots, managed recreational zones, equestrian surveillance patrols, and development of trails for pedestrians, etc. - Create neighboring or bordering areas as alternative places for camping and barbecuing.
<p><i>Entomofauna</i></p>	<p><i>Management actions</i></p> <p>Protection</p> <ul style="list-style-type: none"> - Raise awareness of visitors - Protect from collectors <p>Rehabilitation</p> <ul style="list-style-type: none"> - Stop generating solid waste on the site <p>Valorisation</p> <ul style="list-style-type: none"> - Promote eco-tourism through improved access to micro hotspots, managed recreational zones, equestrian surveillance patrols, development of trails for pedestrians, etc. - Create neighboring or bordering areas as alternative places for camping and barbecuing.
<p><i>Herpetofauna</i></p>	<p><i>Management actions</i></p> <p>Protection</p> <ul style="list-style-type: none"> - Raise awareness of visitors - Reduce poaching - Regulate pasture - Protect the association fir-cedar - Protect the forest edges mainly for integrity of ecosystems - Update the law of the reserve <p>Rehabilitation</p> <ul style="list-style-type: none"> - Keep the forest clean from visitor's garbage <p>Valorisation</p> <ul style="list-style-type: none"> - Promote eco-tourism through improved access to micro hotspots,

	<p>managed recreational zones, equestrian surveillance patrols, development of trails for pedestrians, etc.</p> <ul style="list-style-type: none"> - Create neighboring or bordering areas as alternative places for camping and barbecuing.
<i>Avifauna</i>	<p>Management actions</p> <p>Protection</p> <ul style="list-style-type: none"> - Raise awareness of visitors - Reduce poaching and illegal taking - Regulate or canalize grazing - Based on the fact that Horsh Ehdén is already declared protected area, impose when necessary a wise use of resources and protection of threatened species. - Ban hunting activities within the Horsh Ehdén area and in a belt of 500 meters around the site. <p>Rehabilitation</p> <p>Valorisation</p> <ul style="list-style-type: none"> - Promote eco-tourism through improved access to micro hotspots, managed recreational zones, equestrian surveillance patrols, development of trails for pedestrians; - Create neighboring or bordering areas as alternative places for camping and barbecuing; - Build a Birdwatching tower or birdwatching hides
<i>Mammals</i>	<p>Management actions</p> <p>Protection</p> <ul style="list-style-type: none"> - Raise awareness of visitors - Reduce poaching and illegal taking - Regulate or canalize grazing - Based on the fact that Horsh Ehdén is already declared protected area, impose when necessary a wise use of resources and protection of threatened species.

	<ul style="list-style-type: none"> - Ban hunting activities within the Horsh Ehdén area and in a belt of 500 meters around the site. <p>Rehabilitation</p> <p>Valorisation</p> <ul style="list-style-type: none"> - Promote eco-tourism through improved access to micro hotspots, managed recreational zones, equestrian surveillance patrols, development of trails for pedestrians; - Create small patches of bushy areas to facilitate a safe mammal movement; - Create neighboring or bordering areas as alternative places for camping and barbecuing; - Build an elevated hide to watch nocturnal mammal species
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A.1.17 Needs for Complementary studies

A.1.17.1 Ecological studies

- Monitor the dynamism of the different vegetal communities.
- Localization, estimation of numbers and dynamism of *Hyaena hyaena*, *Canis lepus*, *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 Tit, 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.

A.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.

ANNEXES

ANNEX 1: List of plants of Horsh Ehden Nature Reserve. Arabic names are mainly extracted from the "Dictionnaire étymologique de la flore du Liban" (Nehmé, 2000).

- (1) refers to globally and nationally threatened species
 (2) refers to endemic species
 (3) refers to nationally rare species
 (4) refers to wholly or partially restricted species to East Mediterranean area.

FILICINAE	Ferns	السرخسيات
<i>Adiantum capillus-veneris</i>	True maidenhair	كزبرة البئر
<i>Asplenium trichomanes</i>	Common spleenwort	لحية الغول
<i>Cheilanthes pteridioides</i>	Lip-fern	قيعون
<i>Cystopteris filix-fragilis</i>	Brittle bladder-fern	سيستوبترس قصف
PINACEAE	Pinaceae	مخروطيات
<i>Abies cilicica</i> (4)	Cilician fir	شوح
<i>Cedrus libani</i> (4)	Cedar of Lebanon	أرز لبنان
<i>Pinus brutia</i> (4)	Calabrian pine	صنوبر بري
CUPRESSACEAE	Cupressaceae	سرويات
<i>Cupressus sempervirens</i>	Evergreen cypress	شربين، سرو
<i>Juniperus excelsa</i> (4)	Grucian juniper	لزاب
<i>Juniperus oxycedrus</i>	Prickly juniper	دفران
POACEAE (GRAMINEAE)	Gramineae	نجليات
<i>Agropyron panormitanum</i>	Palermo couch-grass	سيفون بالرمو
<i>Agrostis stolonifera eu-alba</i>	Creeping bent-grass	عروة
<i>Arrhenatherum palaestinum</i> (4)	Palestine false-oat	أرينثارم فلسطيني
<i>Brachiaria eruciformis</i>	Rocket signal-grass	زريقة
<i>Bromus danthoniae</i> (4)	Danthoine's brome	سنيسلة
<i>Bromus intermedius</i> (3)	Intermediate brome	ثرغول متوسط
<i>Bromus squarrosus</i>	Open-awned brome	ثرغول شانك
<i>Catabrosa aquatica</i>	Water whorl-grass	كتبروزة مائية
<i>Cynosurus echinatus</i>	Rough dog's-tail	ذيل الكلب
<i>Echinochloa crus-galli</i>	Cock's spur	ذنيب رجل الديك
<i>Glyceria plicata</i>	Folded sweet-grass	عشبة المن
<i>Hordeum leporinum</i>	Wall barley	شعير الديب
<i>Melica angustifolia</i> (4)	Narrow-leaved melick	مليقة ضيقة الورق
<i>Milium montianum</i>	Monti's millet	طهف منتي
<i>Phalaris bulbosa</i>	Bulbous Canary-grass	بشنة بصالية

<i>Poa compressa</i>	Flat-stalked meadow-grass	تف بصلي
<i>Poa diversifolia</i> (4)	Diversely-leaved meadow-grass	تف مختلف الورق
<i>Poa pratensis</i>	Great meadow-grass	تف المروج
<i>Sesleria anatolica peyronii</i> (4)	Peyron's sesleria	بيد
CYPERACEAE	Cyperaceae	سعديات
<i>Carex distans</i>	Loose sedge	سعدى متباعد
<i>Carex flacca</i>	Glaucus sedge	سعدى مترهل
ARACEAE	Araceae	قلقاسيات
<i>Arum hygrophilum</i> (4)	Green arum	لوف أخضر
JUNCACEAE	Juncaceae	اسليات
<i>Juncus articulatus</i>	Jointed rush	أسل مفصلي
<i>Juncus gerardi</i>	Black grass	أسل أسود
<i>Juncus inflexus</i>	Inflexed rush	أسل ملو
LILIACEAE	Liliaceae	زنبقيات
<i>Allium affine</i> (4)	Related garlic	ثوم مشابه
<i>Allium cassium</i> (4)	Cassius garlic	ثوم الأقرع
<i>Allium chloranthum montanum</i> (2)	Mountain garlic	ثوم جبلي
<i>Allium staminium</i> (4)	Long-stamened garlic	ثوم طويل الأسدية
<i>Allium trifoliatum</i>	Three-leaved garlic	ثوم ثلاثي الورق
<i>Asphodeline brevicaulis</i> (4)	Short-stemmed asphodeline	عطاط قصير الساق
<i>Asphodeline liburnica</i>	Liburnian asphodeline	عطاط لبرنيا
<i>Bellevalia flexuosa</i> (4)	Flexuous bellevalia	بلفالية ملتوية
<i>Colchicum brachyphyllum</i> (4)	Short-leaved meadow-saffron	سورنجان قصير الورق
<i>Colchicum decaisnei</i> (4)	Decaine's meadow-saffron	سورنجان دكان
<i>Eremurus spectabilis</i> (4)	Spectacular foxtail-lily	ذنبان رائع
<i>Fritillaria acmopetala</i> (4)	Sharp-petalled fritillary	عرار حاد البتلات
<i>Gagea circinnata</i> (4)	Circinate gagea	غاجية محلقة
<i>Gagea gageoides</i>	Gagea	غاجية
<i>Gagea reticulata</i>	Netted gagea	شحوم
<i>Hyacinthus orientalis</i> (4)	Oriental hyacinth	خزام شرقي
<i>Lloydia rubroviridis</i> (4)	Red and green lloydia	لودية خضراء وحمراء
<i>Muscari comosum</i>	Tassel-hyacinth	حلحل أشعر
<i>Muscari pinardi</i>	Pinard's grape-hyacinth	حلحل بينار
<i>Muscari racemosum</i>	Clustered grape-hyacinth	حلحل عنقودي
<i>Ornithogalum divergens</i>	Diverging star-of-Bethlehem	صاصل منفرج
<i>Ornithogalum libanoticum</i> (2)	Lebanon star-of-Bethlehem	صاصل لبناني
<i>Ornithogalum narbonense</i>	Narbonne star-of-Bethlehem	صاصل نربون

<i>Ornithogalum neurostegium</i>	Nerved-covered star-of-Bethlehem	صاصل معرق الغطاء
<i>Puschkinia scilloides libanotica</i> (2)	Lebanese striped squill	بشكنية لبنان
<i>Tulipa agenensis</i>	Agen tulip	توليب أجان
<i>Tulipa aleppensis</i> (2)	Aleppo tulip	توليب حلب
<i>Tulipa aucheriana westii</i> (2)	Aucher's tulip	توليب وست
<i>Tulipa montana</i> (4)	Mountain tulip	توليب الجبل
AMARYLLIDACEAE	Amaryllidaceae	نرجسيات
<i>Ixiolirion tataricum</i>	Mountain lily	زنبق تترى
<i>Sternbergia clusiana</i> (4)	Clusius' sternbergia	سترنبرجيا كلوزيوس
<i>Sternbergia pulchella</i> (2)	Pretty sternbergia	سترنبرجية ظريفة
IRIDACEAE	Iridaceae	سوسنيات
<i>Crocus cancellatus cilicicus</i> (4)	Netted crocus	زعفران شبكي
<i>Crocus kotschyanus</i> (2)	Kotschy's crocus	زعفران كتشي
<i>Crocus ochroleucus</i> (3) (4)	Ream-colored crocus	زعفران مصفر
<i>Gladiolus segetum</i>	Field gladiolus	ديك الزرع
<i>Iris cedreti</i> (1) (2) (3)	Cedar iris	سوسن الأرز
<i>Iris histrio</i> (4)	Histrio iris	مكحلة الغولة
<i>Romulea nivalis</i> (2)	Snow romulea	رومولية الثلوج
ORCHIDACEAE	Orchidaceae	سحلبيات
<i>Cephalanthera longifolia</i> (1)	Long-leaved hellaborine	سفلنترة طويلة الورق
<i>Epipactis latifolia</i> (1)	Broad-leaved epipactis	ايببكتس عريض الورق
<i>Limodorum abortivum</i> (1)	Aborted limodore	ليمدورم خديج
<i>Ophris bornmuelleri</i> (1) (4)	Bornmueller's ophrys	حاجبية برنملر
<i>Ophris fuciflora</i> (1)	Drone ophris	حاجبية زنبور
<i>Ophris scolopax</i> (1)	Woodcock ophrys	حاجبية دجاج الأرض
<i>Ophris coriophora fragans</i> (1)		
<i>Orchis anatolica</i> (1) (4)	Anatolian orchid	سحلب الأناضول
<i>Orchis comperiana</i> (1) (4)	Compere's orchid	سحلب كمبير
<i>Orchis coriophora fragrans</i>	Bug orchid	سحلب بقي
<i>Orchis holocheilos</i> (1) (4)	Entire-lipped orchid	سحلب الشفيفة
<i>Orchis iberica</i> (1)	Iberian orchid	سحلب إيبيريا
<i>Orchis maculata macrostachys</i> (1)	Spotted orchid	سحلب مبقع
<i>Orchis patens</i> (1)	Green-spotted orchid	سحلب منبسط
<i>Orchis romana libanotica</i> (2)	Lebanon orchid	سحلب لبناني
<i>Orchis tridentata commutata</i> (1) (4)	Three-toothed orchid	سحلب ثلاثي الأسنان

SALICACEAE	Salicaceae	صفصافيات
<i>Salix libani</i> (4)	Lebanon willow	صفصاف لبنان
CORYLACEAE	Corylaceae	بندقيات
<i>Ostrya carpinifolia</i>	Hop-hornbeam	مران
FAGACEAE	Fagaceae	بلوطيات
<i>Quercus calliprinos</i>	Kermes oak	سنديان
<i>Quercus cedrorum</i> (3) (4)	Cedar oak	بلوط
<i>Quercus cerris</i> (Lebanese var.) (2)	Turkey oak	عزر
<i>Quercus infectoria</i> (4)	Cyprus oak	بلوط
<i>Quercus pinnatifida</i> (3)	Pennatifid	بلوط ريشي التخريم
SANTALACEAE	Santalaceae	صندليات
<i>Thesium arvense</i>	Field thesium	تيزيوم الحقول
<i>Thesium bergeri</i>	Berger's thesium	تيزيوم برغر
URTICACEAE	Urticaceae	قراصيات
<i>Parietaria judaica</i>	Basil-leaved pellitory	حشيشة القزاز
LORANTHACEAE	Loranthaceae	دبقيات
<i>Arceuthobium oxycedri</i>	Juniper mistletoe	ارسو تبيوم العرعر
ARISTOLOCHIACEAE	Aristolochiaceae	زرونديات
<i>Aristolochia poecilantha</i> (4)	Party-colored birthwort	خيار الغنم
<i>Aristolochia scabridula</i> (2)	Roughish birthwort	زراوند أخيرش
POLYGONACEAE	Polygonaceae	فصيلة عصا الراعي
<i>Polygonum cedrorum</i> (2)	Cedar knotweed	قردب الأرز
<i>Polygonum cognatum</i>	Related knotweed	قردب قريب
<i>Polygonum kitaibelianum</i> (4)	Kitaibel's knotweed	قردب كنيبل
<i>Polygonum polycnemoides</i> (4)	Polycnenum knotweed	قردب
<i>Polygonum salicifolium</i>	Willow-leaved knotweed	قردب صفصافي الورق
<i>Rumex nepalensis</i>	Nepal sorrel	حميض نيبال
<i>Rumex patientia orientalis</i> (4)	Spinach dock	حميض شرقي

<i>Rumex pulcher</i>	Fiddle dock	حميض ظريف
CHENOPODIACEAE	Chenopodiaceae	سرمقيات
<i>Atriplex lasiantha</i>	Woolly-flowered orache	سرمق وبر الزهر
<i>Atriplex rosea</i>	Red orache	سرمق زهري
<i>Bassia monticola</i> (4)	Mountain bassia	بسية جبلية
<i>Chenopodium album</i>	White goosefoot	ركب الجمل
<i>Noaea mucronata humilis</i>	Mucronate noaea	شوك الحنش
AMARANTHACEAE	Amaranthaceae	قطيفيات
<i>Amaranthus hybridus erythrostrachys</i>	Hybrid amaranth	رعاف
<i>Amaranthus retroflexus</i>	Hairy amaranth	دلاق
CARYOPHYLLACEAE	Caryophyllaceae	قرنفليات
<i>Agrostemma githago</i>	Bastard nigella	خرم الحنطة
<i>Arenaria deflexa</i> (4)	Deflexed sandwort	رملية منتحية
<i>Cerastium brachypetalum</i>	Short-petalled mouse-ear-chickweed	قرناء قصيرة البتلات
<i>Cerastium comatum</i> (4)	Hairy mouse-ear-chickweed	قرناء شعراء
<i>Cerastium dichotomum</i>	Dichotomus mouse-ear-chickweed	قرناء ثنائية التشعب
<i>Cerastium glomeratum</i>	Clustered mouse-ear-chickweed	قرناء متجمعة
<i>Cerastium inflatum</i> (4)	Bladdery mouse-ear-chickweed	قرناء منتفخة
<i>Dianthus karami</i> (2)	Karam's pink	قرنفل كرم
<i>Dianthus orientalis brevifolius</i> (4)	Oriental pink	قرنفل شرقي
<i>Dianthus pendulus</i> (2)	Pendulous pink	قرنفل متدل
<i>Gypsophila frankenioides libanotica</i> (2)	False frankenia	رقيفة فرنكينية
<i>Gypsophila mollis</i> (2)	Soft gypsophila	رقيفة لينة
<i>Herniaria glabra microcarpos</i>	Glabrous rupturewort	نبات الشبخ
<i>Minuartia meyeri</i> (4)	Meyer's sandwort	منورتية مير
<i>Saponaria pumilio</i> (4)	Dwarf soapwort	صابونية قزمة
<i>Silene alba</i>	White campion	سيلينة بيضاء
<i>Silene astartes</i> (2)	Astarte's catchfly	سيلينة عشروت
<i>Silene conoidea</i> (2)	Conoid catchfly	سيلينة مخروطية الزهر
<i>Silene conoidea obcordata</i>	Conoid catchfly	سيلينة مخروطية الزهر
<i>Silene grisea</i> (2)	Grey catchfly	سيلينة شهباء
<i>Silene italica</i>	Italian catchfly	سيلينة ايطالية
<i>Silene makmeliana</i> (2)	Makmel catchfly	سيلينة المكمل
<i>Silene vulgaris</i>	Common campion	سيلينة شائعة

<i>Stellaria cilicica neglecta</i> (2)	Cilician starwort	نجمية قبايقية
<i>Vacaria oxyodonta</i> (4)	Sharp-toothed cow-basil	بقرية حادة الأسنان
LAURACEAE	Lauraceae	فصيلة الغار
<i>Laurus nobilis</i>	Laurel	غار
BERBERIDACEAE	Berberidaceae	بربريسيات
<i>Berberis libanotica</i>	Lebanon barberry	بربريس لبناني
RANUNCULACEAE	Ranunculaceae	حوذانيات
<i>Adonis flammea</i>	Scarlet pheasant's-eye	أدونيس لهبي
<i>Anemone blanda</i> (4)	Mountain anemone	شفار جبلي
<i>Clematis flammula</i>	Sweet Virgen's-bower	عنصرة
<i>Consolida hohenackeri</i> (4)	Hohenacker's larkspur	قتصليدة هونكر
<i>Delphinium ithaburens</i> (4)	Tabor dolphin-flower	عايق الطور
<i>Delphinium peregrinum</i> (4)	Violrt delphin-flower	عايق رحال
<i>Ficaria ficarioides</i> (4)	Ficaria	تينية
<i>Nigella ciliaris</i> (4)	Ciliate nigella	شونيز مهدب
<i>Nigella oxypetala</i> (4)	Sharp-petalled nigella	شونيز حاد البتلات
<i>Ranunculus arvensis</i>	Field buttercup	كف الهر
<i>Ranunculus chionophilus</i> (2)	Snow buttercup	حودان الثلوج
<i>Ranunculus cuneatus</i> (4)	Cuneate buttercup	حودان اسفيني
<i>Ranunculus demissus</i>	Dwarf buttercup	حودان صغير
<i>Ranunculus hierosolymitanus</i> (4)	Jerusalem buttercup	حودان القدس
PAPAVERACEAE	Papaveraceae	خشخاشيات
<i>Corydalis solida brachyloba</i> (4)	Solid corydalis	قبرية مليئة
<i>Fumaria kralikii</i> (4)	Kralik's fumitory	شاهترج كرليك
<i>Glaucium leiocarpum</i> (4)	Yellow horned-poppy	ماميثا صفراء
<i>Hypocoum imberbe</i> (4)	Horned cumin	هبيقون أمرد
<i>Papaver rhoeas</i>	Corn poppy	خشخاش منثور
BRASSICACEAE (CRUCIFERAE)	Cruciferae	صليبيات
<i>Aethionema coridifolium</i> (4)	Lebanon candy-tuft	اثيونيمة لبنان
<i>Alyssum contemptum</i> (4)	Dwarf madwort	الوسن قزم
<i>Alyssum mouradicum</i> (4)	Murada madwort	الوسن مرادة
<i>Alyssum murale</i>	Wall madwort	الوسن الحيطان
<i>Alyssum repens</i> (4)	Creeping madwort	الوسن زاحف

<i>Arabis caucasica</i> (4)	Caucasian rock-cress	اربيس قفقاسي
<i>Arabis montbretiana</i>	Montbret's rock-cress	اربيس مونبريه
<i>Aubrietia libanotica</i> (4)	Lebanon aubrieta	اويريتية لبنانية
<i>Cardamine uliginosa</i>	Bog bitter-cress	صناب المناقع
<i>Clypeola jonthlaspi</i>	Disk-cress	ثريس قرصي
<i>Erophila setulosa</i> (4)	Bristly faverel	اروقيلة شويكية
<i>Erysimum goniocaulon</i> (4)	Angled-stemmed erysimum	اريسموم زاوي الساق
<i>Erysimum repandum rigidum</i>	Small-flowered erysimum	اريسموم منبسط
<i>Fibigia eriocarpa</i> (4)	Wooly-fruited fibigia	فبيجية صوفية الثمر
<i>Hesperis kotschyana</i> (4)	Kotschy's dame's-violet	مسائية كوتشي
<i>Lepidium latifolium</i>	Dittander	حرفوف
<i>Lepidium spinescens</i> (4)	Wild pepperwort	عصاب شوينك
<i>Nasturium officinale</i>	Common water-cress	قره
<i>Peltaria angustifolia</i> (4)	Shieldwort	هريرة
<i>Rapistrum rugosum</i>	Rapistrum	حارة
<i>Thlaspi brevicale</i> (2)	Short-stemmed penny-cress	تلسبي قصير الساق
<i>Thlaspi microstylum</i> (4)	Small-styled penny-cress	تلسبي صغير القلم
CRASSULACEAE	Crassulaceae	مخلدات
<i>Sedum album</i>	White stonecrop	حيون ابيض
<i>Sedum hispanicum</i>	Spanish stonecrop	حيون اسباني
<i>Sedum pallidum</i>	Pale stonecrop	حيون شاحب
<i>Sedum tenuifolium</i>	Slender-leaved stonecrop	حيون نحيل الورق
<i>Umbilicus erectus</i> (4)	Yellow nevelwort	سرة منتصبة
<i>Umbilicus intermedius</i>	Intermediate nevelwort	سرة متوسطة
GROSSULARIACEAE	Grossulariaceae	كشمش
<i>Ribes orientale</i>	Oriental currant	كشمش شرقي
PLATANACEAE	Platanaceae	دلبيات
<i>Platanus orientalis</i>	Oriental plane	دلب
ROSACEAE	Rosaceae	ورديات
<i>Agrimonia eupatoria</i>	Liverwort	غافت
<i>Amelanchier ovalis</i>	Oval serviceberry	مكرة
<i>Cotoneaster numularia</i>	Nummular cotoneaster	سرح
<i>Geum urbanum</i>	Herb-benet	جيوم
<i>Malus trilobata</i> (1) (2)	Three-lobed apple	تفاح لبنان
<i>Pirus syriaca</i> (4)	Syrian pear	نجاص بري
<i>Potentilla geranioides syriaca</i> (2)	Syrian cran's-bill	مقوية سورية

<i>Potentilla libanotica</i> (4)	Lebanon cinquefoil	مقوية لبنانية
<i>Poterium polygamum</i>	Polygamous burnet	بلان متعدد الأمشاط
<i>Poterium verrucosum</i>	Warty burnet	زيتته
<i>Prunus mahaleb</i>	Mahaleb	محلّب
<i>Prunus prostrata</i>	Prostrate cherry	حيجون
<i>Prunus ursina</i> (4)	Bear plum	برقوق
<i>Rosa canina andagevensis</i> (4)	Dog rose	نسرين
<i>Rosa dumetorum</i>	Thicket rose	ورد الهيشة
<i>Rosa glutinosa</i>	Mediterranean sweet briar	ورد دبق
<i>Rosa micrantha</i>	Small-flowered rose	ورد صغير الزهر
<i>Rosa orientalis</i> (4)	Oriental rose	ورد شرقي
<i>Rubus hedycarpus</i>	Edible-fruited blackberry	عليق مأكول الثمر
<i>Rubus tomentosus</i>	Tomentose blackberry	عليق لبدي
<i>Sorbus flabellifolia</i> (4)	Fan-leaved service-tree	غبيراء مروحية الورق
<i>Sorbus torminalis</i>	Wild service-tree	غبيراء المغص
CAESALPINACEAE	Caesalpinaceae	فصيلة زمزيق
<i>Cercis siliquastrum</i>	Judas tree	زمزيق
FABACEAE (PAPILIONACEAE)	Fabaceae	فراشيات
<i>Astragalus coluteoides</i> (2)	Bladder-senna milk-vetch	اسطراغالس قنصوري
<i>Astragalus cruentiflorus</i> (2)	Red-flowered milk-vetch	اسطراغالس احمر
<i>Astragalus echinus</i> (4)	Hedgehog milk-vetch	اسطراغالس كبابة الشوك
<i>Astragalus ehdenensis</i> (2) (3)	Ehden milk-vetch	اسطراغالس اهدن
<i>Astragalus emarginatus</i> (2)	Emarginate milk-vetch	اسطراغالس مفوق
<i>Astragalus gummifer</i>	Gum milk-vetch	كثيراء
<i>Astragalus pinetorum</i> (4)	Pinewood milk-vetch	اسطراغالس الصنوبر
<i>Astragalus sofarensis</i> (2)	Sawfar milk-vetch	اسطراغالس صوفر
<i>Astragalus suberosus</i> (4)	Corky milk-vetch	اسطراغالس فلبني
<i>Astragalus trichopterus</i> (2)	Hairy-winged milk-vetch	اسطراغالس ثلاثي الوريقات
<i>Biserrula pelecinus</i>	Bastard hatchet-vetch	منشارية
<i>Colutea cilicica</i> (4)	Cilician bladder-sinna	سنا كاذب
<i>Coronilla emeroides</i> (4)	Scorpion-vetch	أكيليل أمروسي
<i>Coronilla varia libanotica</i> (4)	Axseed	أكيليل مبرقش لبناني
<i>Genista libanotica</i> (2)	Lebanon greenweed	جنسته لبنانية
<i>Hymenocarpus circinatus</i>	Circular medick	هيمنوكربوس
<i>Lathyrus aphaca</i>	Yellow vetchlink	جلبان افاق
<i>Lathyrus digitatus ovalifolius</i> (4)	Fingered vetchlink	جلبان اصبعي
<i>Lathyrus inermis</i> (4)	Unarmed vetchlink	جلبان أمرط
<i>Lathyrus libani</i> (2) (3)	Lebanon vetchlink	جلبان لبنان
<i>Lotus corniculatus alpinus</i>	Horned birdsfoot-trefoil	قرن الغزال
<i>Lotus gebelia libanoticus</i>	Lebanon birdsfoot-trefoil	لوطس لبنان
<i>Medicago falcata</i>	Falcate medick	فصة منجلية

<i>Medicago lupulina</i>	Black medick	فصة سوداء
<i>Medicago minima</i>	Least medick	فصة قرمة
<i>Medicago sativa</i> (1)	Lucerne	قتات
<i>Onobrychis cornuta</i> (4)	Horned sainfoin	عرن قرني
<i>Ononis natrix</i>	Shrubby restharrow	شبرق ثعباني
<i>Psoralea bituminosa</i>	Bitumen pea	حومان حمري
<i>Spartium junceum</i>	Spanish broom	وزال
<i>Trifolium arvense</i>	Hare's foot trefoil	نفل الحقول
<i>Trifolium boissieri</i> (4)	Boissier's clover	نفل بواسيه
<i>Trifolium clusii</i>	Clusius' clover	نفل كلوزيوس
<i>Trifolium echinatum</i>	Prickly clover	نفل مقتفد
<i>Trifolium lagrangei</i> (4)	Lagrange's clover	نفل لجرنج
<i>Trifolium modestum</i> (2)	Modest clover	نفل متواضع
<i>Trifolium physodes</i> (1)	Bladder clover	نفل مثاني
<i>Trifolium plebium</i> (2)	Common clover	نفل شائع
<i>Trifolium repens</i>	White clover	نفل ابيض
<i>Trifolium stellatum</i> (4)	Stellate clover	نفل نجمي
<i>Trigonella filipes</i> (4)	Slender-stalked fenugreek	حلبة خيطية الزند
<i>Trigonella hierosolymitana</i> (4)	Jerusalem fenugreek	حلبة القدس
<i>Trigonella spicata</i>	Spiked fenugreek	حلبة سنبلية
<i>Vicia palaestina</i> (4)	Palestine vetch	بيقية فلسطينية
<i>Vicia peregrina</i>	Broad-podded vetch	بيقية رحالة
<i>Vicia tenuifolia</i>	Slender-leaved vetch	بيقية نحيلة الورق
GERANIACEAE	Geraniaceae	غرنوقيات
<i>Erodium acaule</i>	Stemless stork's-bill	جزاب لاساقي
<i>Geranium crenophilum</i> (4)	Spring geranium	غرنوقي الينابيع
<i>Geranium libani</i> (4)	Lebanon geranium	غرنوقي لبنان
<i>Geranium robertianum</i>	Lebanese geranium	غرنوقي لبناني
<i>Geranium tuberosum</i>	Tuberous geranium	غرنوقي عسقولي
POLYGALACEAE	Polygalaceae	مستدرات
<i>Polygala supine</i> (4)	Trailing milkwort	مستدرة مفترشة
ACERACEAE	Aceraceae	قيقيات
<i>Acer tauricum</i> (4)	Taurus maple	قيقب طوروس
EUPHORBIACEAE	Euphorbiaceae	فربينييات
<i>Andrachne telephioides</i>	Bastard orpine	كماش
<i>Euphorbia aleppica</i>	Aleppo spurge	فربيون حلب
<i>Euphorbia aulacosperma</i> (4)	Furrowed-seeded spurge	فربيون مثلث البزرة

<i>Euphorbia falcata</i>	Falcate spurge	فربيون منجلي
<i>Euphorbia macroclada</i> (4)	Large-branched spurge	فربيون كبير السوق
<i>Euphorbia macrostegia</i> (4)	Large-decked spurge	فربيون كبير الغطاء
<i>Mercurialis annua</i>	Annual mercury	حلوب حولي
MALVACEAE	Malvaceae	خبازيات
<i>Alcea acaulis</i> (4)	Stemless hollyhock	خسمية لا ساقية
<i>Alcea apterocarpa</i> (4)	Wingless-fruited hollyhock	خسمية لا مجنحة الثمر
<i>Alcea setosa</i> (4)	Bristly hollyhock	ختمية
<i>Malvella sherardiana</i>	Sherard's malvella	خببيرة شررد
GUTTIFERAE	Guttiferae	هيوفاريفون
<i>Hypericum lanuginosum</i>	Woolly St John's-wort	داذي صوفي
<i>Hypericum lydiium</i>	Lydian St John's-wort	داذي ليديا
<i>Hypericum perforatum</i>	Common St John's-wort	حشيشة القلب
<i>Hypericum scabrum</i>	Rugged St John's-wort	داذي احرش
<i>Hypericum tetrapterum</i>	Square-stalked St John's-wort	داذي رباعي الأجنحة
DATISCEAE	Datisceae	داتسكات
<i>Datisca cannabina</i>	Smooth-stalked bastard hemp	داتسكة قنابية
VIOLACEAE	Violaceae	بنفسجيات
<i>Viola ebracteolata</i> (4)	Unbracteolate violet	بنفسج لا قنبيبي
<i>Viola libanotica</i> (2)	Lebanon violet	بنفسج لبناني
<i>Viola siehana</i> (4)	Siehe's violrt	بنفسج سيهي
CISTACEAE	Cistaceae	لادانيات
<i>Cistus creticus</i>	Cretan cistus	لاذن
<i>Fumana arabica</i>	Arabian fumana	دخانية عربية
<i>Helianthemum ledifolium</i>	Ledum-leaved sunrose	رقروق
RHAMNACEAE	Rhamnaceae	سدريات
<i>Rhamnus cathartica</i>	Purging buckthorn	شجرة الدكن
<i>Rhamnus libanotica</i> (4)	Lebanon buckthorn	تفاح بري
LYTHRACEAE	Lythraceae	حنانيات
<i>Lythrum junceum</i>	Rushy lythrum	فرنندل أسلي

ONAGRACEAE	Onagraceae	أخدریات
<i>Epilobium angustifolium</i>	Fireweed	ند ضيق الورق
<i>Epilobium montanum</i>	Mountain willow-herb	ند جبلي
<i>Epilobium parviflorum</i>	Small-flowered willow-herb	ند صغير الزهر
THYMELAEACEAE	Thymelaeaceae	مازيونيات
<i>Daphne oleoides</i>	Olive-like daphne	عود الخل
<i>Lygia aucheri</i> (4)	Aucher's lygia	ليجية اوشيه
ARALIACEAE	Araliaceae	لبلايات
<i>Hedera helix</i>	Common hvy	حبل المساكين
APIACEAE (UMBELLIFERAE)	Umbelliferae	خيميات
<i>Anthriscus lamprocarpa</i> (4)	Bright-fruited beakchervil	انترسكوس لامع الثمر
<i>Bunium elegans</i> (4)	Elegant earthnut	الكتار انيق
<i>Bunium pestalozzae</i> (4)	Pestalozza's earthnut	الكتار بستلوزا
<i>Bupleurum gerardii</i>	Gerard's hare's-ear	حلبلاب جيرار
<i>Bupleurum lancifolium</i>	Lance-leaved hare's-ear	حلوان
<i>Bupleurum linearifolium</i> (4)	Linear-leaved hare's-ear	حلبلاب خطي الورق
<i>Cnidium orientale</i> (4)	Oriental cnidium	بادجان شرقي
<i>Conium maculatum</i>	Poison hemlock	شوكران مبقع
<i>Danaa cornubiensis</i>	Cornish lovage	دناية كرنوبيا
<i>Eryngium glomeratum</i> (4)	Clustered eryngo	شنداب متجمع
<i>Ferula cassia</i> (4)	Cassius giant-fenel	انجذان الأقرع
<i>Ferulago frigida</i> (2)	Mountain ferulago	أنيجذان الصقيع
<i>Lecoquia cretica</i> (4)	Cretean lecoquia	لككية كريت
<i>Malabaila secacul</i> (4)	Arabian hartwort	سقفول
<i>Orlaya platycarpus</i>	Flat-fruited orlaya	أرلاية مفلطحة الثمر
<i>Peucedanum depauperatum</i> (4)	Stunted sulphurwort	بوسيدنوم مفقر
<i>Pimpinella anthriscoides</i> (4)	Beakchervil burnet-saxifrage	بمبيلة انترسكوسية
<i>Prangos asperula</i>	Rough prangos	فرش الضبع
<i>Scandix pecten-veneris</i>	Venus'-comb	مشط الزهرة
<i>Siler trilobum</i>	Colombine-leaved laser-wort	سيلر ثلاثي الفصوص
<i>Smyrniopsis syriaca</i> (2)	Syrian smyrniopsis	سمرنيوبسيس سوري
<i>Torilis chrysocarpa</i> (4)	Golden-fruited hedge-parsley	توريلس متجانس الورق
<i>Torilis leptophylla</i>	Slender-leaved hedge-parsley	توريلس نحيل الورق
<i>Turgenia latifolia</i>	Broad-leaved but-parsley	ترجينية عريضة الورق
<i>Turgeniopsis foeniculacea</i> (4)	Fennel turgeniopsis	ترجنسيس شماري
CORNACEAE	Cornaceae	قرانيات

<i>Cornus australis</i> (4)	Southern dogwood	قرانية جنوبية
PRIMULACEAE	Primulaceae	ربيعيات
<i>Anagallis arvensis</i>	Field pimpernel	عشبة العلق
<i>Androsace villosa</i>	Shaggy androsace	اندروساقس وبر
<i>Asterolinon linum-stellatum</i>	Small loosestrife	استيرولينون نجمي
<i>Cyclamen coum</i> (4)	Kos cyclamen	بخور مريم كوس
<i>Primula vulgaris</i>	Common primrose	رعدة شائعة
<i>Samolus valerandi</i>	Water pimpernel	لبين الماء
PLUMBAGINACEAE	Plumbaginaceae	رصاصيات
<i>Acantholimon libanoticum</i> (2)	Gorse prickly-thrift	كبابة
STYRACACEAE	Styracaceae	إصطركيات
<i>Styrax officinalis</i> (4)	Storax	حوز
OLEOIDEAE	Oleoidea	زيتونيات
<i>Fraxinus ornus</i>	Flowering ash	مران زهري
APOCYNACEAE	Apocynaceae	دفليات
<i>Vinca libanotica</i> (4)	Lebanon periwinkle	قصاب
GENTIANACEAE	Gentianaceae	جنطياتيات
<i>Blackstonia perfoliata</i>	Perfoliate blackstonia	بلكستونيا مخروقة
<i>Centaurium erythraea</i>	Common centaury	قنطريون صغير شائع
CONVOLVULACEAE	Convolvulaceae	محموديات
<i>Calystegia sepium</i>	Hedge bindweed	كلستيجية السياج
<i>Convolvulus arvensis</i>	Field bindweed	لفلافة
<i>Convolvulus cantabrica</i>	Cantabrian bindweed	لبلاب قنطيري
<i>Convolvulus scammonia</i> (4)	Syrian bindweed	سقمونيا
<i>Convolvulus stachydifolius</i> (4)	Woundwort-leaved bindweed	خويطمة
<i>Convolvulus stenophyllus</i> (1) (3)	Narrow-leaved bindweed	لبلاب ضيق الورق
CUSCUTACEAE	Cuscutaceae	فصيلة كسوث

<i>Cuscuta balansae</i> (4)	Balansa's dodder	كشوت بلنسا
<i>Cuscuta europaea</i>	Large dodder	كشوت اوروبه
BORAGINACEAE	Boraginaceae	حمحميات
<i>Alkanna prasinophylla</i> (2) (3)	Leek-green alkanet	كنهان أخضر الورق
<i>Anchusa azurea</i>	Sky-blue bugloss	ذنب القط
<i>Anchusa hybrida</i>	Hybrid bugloss	انشوزة هجينة
<i>Brunnera orientalis</i> (4)	Oriental brunnera	برنيرة شرقية
<i>Cynoglossum nebrodense</i>	Monti Nebrodi hound's-tongue	لسان الكلب النبرودي
<i>Echium glomeratum</i> (4)	Clustered viper's-bugloss	اخيوم متجمع
<i>Lithospermum incrassatum</i>	Thickened gromwell	شنجبار ثخين
<i>Mattiastrum lithospermifolium</i> (4)	Gromwell-leaved mattiastrum	متيستروم شنجباري الورق
<i>Myosotis refracta</i>	Reflexed forget-me-not	ميوزوتيس منحرف
<i>Myosotis stricta</i>	Upright forget-me-not	ميوزوتيس قائم
<i>Nonea obtusifolia</i> (4)	Blunt-leaved nonea	نونية كليلة الورق
<i>Onosma aucherana</i> (4)	Aucher's golden-drop	شنجار اوشيه
<i>Onosma sericea</i> (4)	Silky golden-drop	شنجار حريري
<i>Rochelia disperma</i>	Two-seeded rochelia	روشلية ذات بزرئين
<i>Solenthatius stamineus</i>	Long-steamed hound's tongue	صوملة
LAMIACEAE (LABIATAE)	Lamiaceae	شفوويات
<i>Ajuga tridactylites</i> (4)	Three-fingered bugle	عرصف ثلاثي الأصابع
<i>Calamintha organifolia</i> (4)	Marjoram-leaved calamint	عشبة الضغط
<i>Calamintha vulgaris</i>	Common calamint	كلمنتة عادية
<i>Eremostachys laciniata</i> (4)	Desert spike	هجنبل
<i>Lamium striatum minus</i> (4)	Striate dead-nettle	لميوم مخطط صغير
<i>Lamium truncatum</i> (4)	Truncate dead-nettle	لميوم مقطوم
<i>Marrubium libanoticum</i> (4)	Lebanon white-horehound	فراسيون لبنان
<i>Marrubium radiatum</i> (4)	Rayed white-horehound	فراسين شعاعي
<i>Mentha microphylla</i>	Small-leaved mint	نعنع صغير الورق
<i>Micromeria amana</i> (4)	Amanus savory	شميسة اللكام
<i>Micromeria barbata</i> (4)	Bearded savory	شميسة ملتحية
<i>Micromeria graeca</i>	Greek savory	شميسة يونانية
<i>Micromeria libanotica</i> (2)	Lebanon savory	شميسة لبنان
<i>Micromeria nummulariifolia</i> (2) (3)	Nummular-leaved savory	شميسة نقدية الورق
<i>Molucella spinosa</i>	Spiny Molucca-balm	مصيص
<i>Nepata cilicica</i> (4)	Cilician catmint	قطرم قيليقيا
<i>Nepata curviflora</i> (4)	Syrian catmint	قطرم سوري
<i>Nepata glomerata</i> (4)	Clustered catmint	قطرم متجمع
<i>Nepata italica</i>	Italian catmint	قطرم ايطالي

<i>Nepata nuda</i>	Naked catmint	قطرم عطر
<i>Origanum libanoticum</i> (2)	Lebanon marjoram	زعر لبنان
<i>Origanum syriacum</i> (1) (4)	Origanum syriacum	زعر
<i>Phlomis brevilabris</i> (2)	Short-lipped phlomis	عيزارة قصيرة الشفة
<i>Phlomis chrysophylla</i> (4)	Golden-leaved phlomis	معصوص
<i>Prunella vulgaris</i>	Common self-heal	قلاع ميذول
<i>Salvia multicaulis</i> (4)	Shell-flower sage	شافية كثيرة السوق
<i>Salvia sclarea</i>	Clary	كف الدب
<i>Salvia tomentosa</i> (4)	Tomentose sage	شافية لبديية
<i>Satureia cuneifolia</i>	Wedge-leaved savory	ندغ اسفيني الورق
<i>Scutellaria brevibracteata</i> (4)	Short-bracteate skullcap	هربون قصير القنابات
<i>Scutellaria utriculata</i> (2)	Bladder skullcap	هربون قربي
<i>Sideritis libanotica incana</i> (4)	Lebanon ironwort	فقاح لبنان
<i>Sideritis perfoliata</i> (4)	Perfoliate ironwort	طرنجان
<i>Stachys distans</i> (4)	Distant woundwort	قرطوم متباعد
<i>Stachys ehrenbergi</i> (2)	Ehrenberg's woundwort	قرطوم اهرنبرغ
<i>Stachys viticina</i> (4)	Chaste-tree woundwort	قرطوم ارتدي
<i>Teucrium divaricatum</i> (4)	Spreading germander	جعدة متشعبة
<i>Teucrium orientale</i> (4)	Oriental germander	جعدة شرقية
<i>Teucrium polium</i>	Poley	جعدة
<i>Teucrium stachyophyllum</i> (4)	Woundwort-leaved germander	جعدة قرطومية الورق
<i>Thymbra spicata</i> (4)	Spiked thymbra	زعر سبل
SOLANACEAE	Solanaceae	باذنجانيات
<i>Mandragora automnalis</i>	Love apple	بيض الجن
<i>Solanum luteum alatum</i>	Yellow nightshade	حيصل اصفر
SCROPHULARIACEAE	Scrophulariaceae	خنزيريات
<i>Anarrhinum orientale</i> (4)	Oriental anarrhinum	سوسل شرقي
<i>Digitalis ferruginea</i>	Rusty foxglove	قمعية صديئة
<i>Linaria aucheri</i> (2)	Aucher's toadflax	كتانية اوشيه
<i>Odontites aucheri</i> (4)	Aucher's odontites	ضرسية اوشيه
<i>Parentucellia latifolia</i> (4)	Broad-leaved eyebright	برنتوشيلية عريضة الورق
<i>Scrophularia peyronii</i> (4)	Peyron's figwort	خنازيرية بيرون
<i>Scrophularia umbrosa</i>	Shade figwort	خنازيرية الظلال
<i>Verbascum gaillardotii</i> (4)	Gaillardot's mullein	بوصير غيردوه
<i>Verbascum leptostachyum</i> (2)	Slender-spiked mullein	بوصير نحيل السنبله
<i>Verbascum sinuatum</i>	Sinuate mullein	داعوق
<i>Verbascum tripolitanum</i> (4)	Tripoli mullein	بوصير طرابلس
<i>Veronica anagallis-aquatica</i>	Water pimpernel	فيرونيكة حبق الماء
<i>Veronica anagalloides</i>	Pimpernel speedwell	فيرونيكة عين القط
<i>Veronica beccabunga</i> (3)	Brooklime	فيرونيكة قرة العين

<i>Veronica caespitosa leiophylla</i> (2)	Tufted speedwell	فيرونيكة خضيرية
<i>Veronica orientalis</i> (4)	Oriental speedwell	فيرونيكة شرقية
<i>Veronica polifolia</i> (4)	Polium-leaved speedwell	فيرونيكة جعدية الورق
<i>Veronica polita</i>	Grey speedwell	فيرونيكة جعدية الورق
<i>Veronica syriaca</i>	Syrian speedwell	فيرونيكة سورية
OROBANCHACEAE	Orobanchaceae	جعفليات
<i>Orobanche ramosa</i>	Branching broomrape	جعفيل متفرع
<i>Orobanche schultzei</i>	Schultz' broomrape	جعفيل شلتس
PLANTAGINACEAE	Plantaginaceae	حمليات
<i>Plantago lanceolata</i>	Lanceolate plantain	أذان الكباش
RUBIACEAE	Rubiaceae	فويات
<i>Asperula arvensis</i>	Field woodruff	اسبرولة الحقول
<i>Asperula breviflora</i> (2)	Short-flowered woodruff	اسبرولة قصيرة الزهر
<i>Asperula glareosa</i> (4)	Scree woodruff	اسبرولة الركام
<i>Asperula libanotica</i> (2)	Lebanon woodruff	اسبرولة لبنان
<i>Asperula setosa</i> (4)	Bristly woodruff	اسبرولة شوكية
<i>Asperula stricta</i> (4)	Upright woodruff	اسبرولة قائمة
<i>Callipeltis cucullaris</i>	Hooded croowort	كليبتس مقلنس
<i>Cruciata coronata</i> (4)	Crowned mugwort	مصلبة مكللة
<i>Galium canum</i> (4)	White bedstraw	غاليوم ابيض
<i>Galium canum musciforme</i> (4)	White bedstraw	غالسيوم ابيض ذبابي
<i>Galium jungermannioides</i> (4)	Jungermania bedstraw	غاليم جنجرماني
<i>Galium libanoticum</i> (4)	Lebanon bedstraw	غالسيوم لبنان
<i>Galium prusense</i> (4)	Prusa bedstraw	غاليم بروسا
<i>Galium verticillatum</i>	Whorld bedstraw	غالسيوم كمكبي
<i>Galium verum</i>	Ladies bedstraw	قيطوم
<i>Putoria calabrica</i>	Calabrian putoria	منتنة كليرية
<i>Rubia aucheri</i> (4)	Aucher's madder	فوة اوشيه
<i>Rubia tenuifolia stenophylla</i> (4)	Slender-leaved madder	فوة نحيلة الورق
CAPRIFOLIACEAE	Caprifoliaceae	بلسانيات
<i>Lonicera etrusca</i>	Etruscan honeysuckle	لونيسرة اتوريا
<i>Lonicera nummulariifolia</i>	Nummular-leaved honeysuckle	لونيسرة نقدية الورق
<i>Sambucus ebulus</i>	Dwarf elder	دمدمون
VALERIANACEAE	Valerianaceae	ناردينيات

<i>Centranthus longiflorus latifolius</i> (4)	Long-flowered sput-valerian	عصاية الناطور
<i>Valeriana dioscoridis</i> (4)	Dioscorides' valerian	ناردين، أصابع الراعي
<i>Valerianella coronata</i>	Crowned cornsalad	سمنه مكللة
<i>Valerianella dactylophylla</i> (4)	Finger-leaved cornsalad	سمنة أصبعية الورق
<i>Valerianella muricata</i>	Muricate cornsalad	سمنة مريقية
<i>Valerianella vesicaria</i> (4)	Bladder cornsalad	حشيشة الهر
DIPSACACEAE	Dipsacaceae	دبساسيات
<i>Cephalaria syriaca</i>	Syrian scabious	سيوان سوري
<i>Morina persica</i> (4)	Persian whorlflower	مريئة فارسية
<i>Pterocephalus plumosus</i> (4)	Annual winghead	عقس ريثي
<i>Scabiosa argentea</i>	Silvery scabious	جربية فضية
CUCURBUTACEAE	Cucurbitaceae	قرعيات
<i>Bryonia multiflora</i> (4)	Many-flowered bryony	فاشرا كثيرة الزهر
CAMPANULACEAE	Campanulaceae	بوقيات
<i>Asyneuma rigidum</i> (4)	Rigid asyneuma	اسينمة قاسية
<i>Asyneuma virgatum</i> (4)	Twiggy asyneuma	اسينمة قضيبية
<i>Campanula cymbalaria</i> (4)	Cymbal bellflower	جريس صنجي
<i>Campanula peregrine</i> (4)	Foreign bellflower	جريس رحال
<i>Campanula stricta libanotica</i> (4)	Lebanon upright bellflower	جريس قائم لبناني
<i>Campanula strigosa</i> (4)	Strigosa bellflower	جريس شائك الزغب
<i>Campanula trichopoda</i> (2)	Capillary-steamed bellflower	جريس شعري السوق
<i>Legousia pentagonia</i> (4)	Large Venus'-looking-glass	لغوزية خماسية
ASTERACEAE (COMPOSITAE)	Asteraceae	مركبات
<i>Achillea falcata</i> (4)	Falcate milfoil	قيسون
<i>Achillea kotschyi</i>	Kotschy's milfoil	اخيلية كوتشي
<i>Anthemis cotula</i>	Fetid chamomile	فحوان
<i>Anthemis cretica cassia</i> (4)	Cretean chamomile	بهار كريت
<i>Anthemis hyaline</i> (4)	Transparent chamomile	بهار شفاف
<i>Anthemis tinctoria</i>	Yellow chamomile	بابونج اصفر
<i>Atractylis comosa</i> (4)	Beautiful distaff-thistle	شوك الغزال
<i>Bellis perennis</i>	Perennial daisy	بليس معمر
<i>Carduus pycnocephalus</i>	Italian thistle	لسان الكلب
<i>Centaurea cheirolopha</i> (4)	Palmate-pappused knapweed	قنطريون كفي القنزعة
<i>Centaurea cyanoides</i> (4)	Syrian corn-flower	شبة
<i>Centaurea eryngioides</i> (4)	Eryngo knapweed	بمرار

<i>Centaurea hololeuca</i> (2)	White knapweed	قنطريون ابيض
<i>Centaurea iberica meryonis</i> (4)	Iberian knapweed	قنطريون ايبيريا
<i>Centaurea solstitialis solstitialis</i>	St Barnaby's-thistle	قنطريون صيفي
<i>Cephalorrhynchus tuberosus</i> (4)	Tuberous cephalorrhynchus	سفورنشس عسقولي
<i>Chardinia orientalis</i> (4)	Oriental chardinia	شردينية شرقية
<i>Cirsium lappaceum hermonis</i> (2)	Hermon bur thistle	قصوان حرمون
<i>Cirsium phyllocephalum</i> (4)	Leaved-headed thistle	شرشار
<i>Cousinia libanotica</i> (2)	Lebanon cousinia	كوزينية لبنان
<i>Crepis foetida</i>	Fetid hawkweed	سراغة نتنة
<i>Crepis pulchra</i> (3)	Pretty hawkweed	سراغة ظريفة
<i>Crepis reuteriana eigiana</i> (4)	Reuter's hawkweed	سراغة روتر
<i>Crupina crupinastrum</i>	False saw-wort	زحافة
<i>Doronicum orientale</i>	Oriental leopard's-bane	درونق شرقي
<i>Echinops viscosus</i>	Viscous globe-thistle	قرقفان
<i>Erigeron libanoticus</i> (2)	Lebanon fleabane	ارباغرون لبناني
<i>Garhadiolus hedyphnois</i> (4)	False hedyphnois	غرهدبولس
<i>Gundelia tournefortii</i>	Tournefort's gundelia	عكوب
<i>Helichrysum sanguineum</i> (4)	Blood-red everlasting	بزاز العدرا
<i>Helichrysum virgineum</i> (2)	White everlasting	خالدة بيضاء
<i>Hieracium bauhinii</i>	Bauhin's hawkweed	صقرية بوهان
<i>Hieracium schmidtii</i> (4)	Schmidt's hawkweed	صقرية شمت
<i>Inula salicina</i>	Willow-leaved inula	طيون صفصافي
<i>Lactuca saligna</i>	Least lettuce	لبين
<i>Lactuca serriola</i>	Prickly lettuce	خس الزيت
<i>Lapsana communis ramosissima</i>	Common nipplewort	خفج شائع
<i>Leontodon asperrimus</i> (4)	Rough dandelion	يعضيض جاسي
<i>Leontodon libanoticus</i> (2)	Lebanon dandelion	يعضيض لبنان
<i>Matricaria aurea</i>	Golden matricary	بابونج ذهبي
<i>Onopordum carduiforme</i> (4)	False plumed-thistle	راس الشيخ
<i>Pallenis spinosa</i>	Spiny pallenis	زباد
<i>Phagnalon kotschyi</i> (4)	Kotschy's phagnalon	صوفان كتشي
<i>Phagnalon rupestre</i>	African fleabane	قذي
<i>Picris echioides</i>	Bristly ox-tongue	مرير أخيومي
<i>Ptilostemon diacantha diacantha</i> (2)	Two-spined ptilostemon	بتيلاستمون ذو شوكتين
<i>Reichardia glauca</i> (4)	Glaucus reichardia	ريخردية حواء
<i>Rhagadiolus edulis</i>	Edible hawkbit	رغديولس مأكول
<i>Scariola orientalis</i>	Oriental scariola	سكربولة شرقية
<i>Scorzonera libanotica</i> (2)	Lebanon viper's-grass	دبح لبناني
<i>Scorzonera mollis</i>	Wave-leaved viper's-grass	دبح لين
<i>Scorzonera papposa</i> (4)	Pappose viper's-grass	دبح مقنزع
<i>Scorzonera phaeopappa minor</i> (4)	Gry-papposed viper's-grass	دبح رمادي القنزعة

<i>Senecio doriiformis</i> (4)	Doria-like groundsel	شرونة دورية كاذبة
<i>Senecio vernalis</i>	Spring groundsel	شرونة ربيعية
<i>Serratula cerinthifolia</i> (4)	Honeywort-leaved saw-wort	وريقة
<i>Serratula pusilla</i> (4)	Dwarf saw-wort	ورخة قزمة
<i>Stachelina lobelia</i> (4)	Lobelius' stachelina	كفة العجوز
<i>Steptorhamphus tuberosus</i> (4)	Tuberous steptorhamphus	ستبتورمفوس
<i>Tanacetum cilicium</i> (4)	Cilician tansy	تناستوم فضي
<i>Taraxacum megalorrhizon</i>	Large-rooted dandelion	طرخشقون كبير الجذر
<i>Taraxacum syriacum</i>	Syrian dandelion	طرخشقون سوري
<i>Tragopogon bupthalmoides</i> (4)	Bull's-eye goat-beard	ذنب الفرس
<i>Tussilago farfara</i>	Coltsfoot	سعالى
<i>Xeranthemum cylindraceum</i>	Cylindrical xeranthemum	حنوة اسطوانية
<i>Xeranthemum inapertum</i>	Closed xeranthemum	حنوة مغلقة

ANNEX 2: List of mammals at Horsh Ehdn Reserve.

- (1) refers to globally threatened species
 (2) refers to locally threatened species
 (3) refers to endemic species
 (4) refers to wholly or partially restricted species to East Mediterranean area
 (5) rare species

<i>SCIENTIFIC NAME</i>	English Name	Arabic Name
ERINACEIDAE		
<i>Erinaceus europaeus concolor</i> (4)	Hedgehog	كبابة الشوك
SORICIDAE		
<i>Crocidura russula</i> (5)	Common White Toothed Shrew	زبابة شائعة
<i>Crocidura suaveolens</i> (5)	Lesser White Toothed Shrew	زبابة البساتين
MOLOSSIDAE		
<i>Tadarida teniotis</i> (5)	European Free-Tailed Bat	وطواط ابو ذنب حر
VESPERTILIONIDAE		
<i>Myotis blythi omari</i> (4) (5)	Lesser Mouse-Eared Bat	وطواط عمري
<i>Pipistrellus kuhli ikhawanius</i> (1) (4)	Kuhl's Pipistrelle	خفاش كوهلي
CANIDAE		
<i>Canis aureus syriacus</i> (4)	Jackal	ابن اوى
<i>Canis lupus pallipes</i> (1) (2) (4) (5)	Wolf	ذئب
<i>Vulpus vulpus palaestina</i> (4)	Red Fox	الثعلب
MUSTELIDAE		
<i>Martes foina syriaca</i> (4)	Stone Martin	النمس
<i>Vormela peregusna syriaca</i> (1, 4)	Marbled Polecat	الظربان

<i>Mustela nivalis</i> (5)	Weasel	ابن عرس
<i>Meles meles canescens</i> (1)	Badger	الغريب
<i>Hyaena hyaena syriaca</i> (1) (4)	Striped Hyena	الضبع
ARTIODACTYLA		
<i>Sus scrofa lybicus</i> (4)	Wild Boar	الخنزير البري
LEPORIDAE		
<i>Lepus capensis syriacus</i> (4)	Cape Hare	ارنب بري
SCIURIDAE		
<i>Sciurus anomalus syriacus</i> (1) (4)	Squirrel	السنجاب
HYSTRICIDAE		
<i>Hystrix indica indica</i>	Porcupine	القنفضة ، النيص
MUSCARDINIDAE		
<i>Eliomys melanurus</i> (1) (4)	Black Tailed Dormouse	فأر البستان
<i>Dryomys nitedula phrygius</i>	Forest Dormouse	فأر الغابة
SPALACIDAE		
<i>Spalax leucodon ehrenbergi</i> (4)	Mole-Rat	الخلد
MURIDAE		
<i>Apodemus mystacinus mystacinus</i> (4)	Field Mouse	فأر الحقل
<i>Apodemus sylvaticus</i>	Common Field Mouse	فأر الحرج
CRICETIDAE		
<i>Cricetulus migratorius cinerascens</i> (1)	Grey Hamster	القداد

<i>Microtus nivalis hermonis</i> (4)	Snow Vole	عكبر تلج حرمون
<i>Microtus guentheri guentheri</i> (4)	Levant Vole	عكبر الحقل

ANNEX (3): List of bird species at Horsh Ehden Reserve (Ramadan-Jaradi & Ramadan-Jaradi, in lit.).

Dates and names of observers are given for vagrants and species that were known in the past or discovered recently by the author of this ornithological section. The following abbreviations are used to indicate the species status. A question mark indicates uncertain status. Three stars (***) denote threatened species at global level, two stars (**) indicate threatened species at regional level and one star (*) indicates species that are wholly or largely restricted to the Middle East (after Evans 1994). Lower case abbreviations, e.g. r, sb, s, wv and pm indicate that the species is uncommon or rare at the relevant season in Horsh Ehden Reserve.

- 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 records within the last 20 years)
V =Vagrant
E =Extinct in Lebanon

Species name is followed by the species' present status at Horsh Ehden only.

1. **White Pelican** *Pelecanus onocrotalus* **PM**
2. **Black Stork** *Ciconia nigra* **pm**
3. **White Stork** *Ciconia ciconia*** **PM**
4. **Honey Buzzard** *Pernis apivorus*** **PM**
5. **Black Kite** *Milvus migrans* **pm**
6. **Red Kite** *Milvus milvus* **v**
7. **Egyptian Vulture** *Neophron percnopterus*** **pm**
8. **Griffon Vulture** *Gyps fulvus*** **pm**
9. **Black Vulture** *Aegyptius monachus**** **v**
10. **Short-toed Eagle** *Circaetus gallicus* **sb, PM**
11. **Marsh Harrier** *Circus aeruginosus* **PM**
12. **Hen Harrier** *Circus cyaneus* **pm**
13. **Pallid Harrier** *Circus macrourus* **pm**
14. **Montagu's Harrier** *Circus pygargus* **pm**
15. **Goshawk** *Accipiter gentilis* **pm**
16. **Sparrowhawk** *Accipiter nisus* **pm**
17. **Levant Sparrowhawk** *Accipiter brevipes*** **PM**
18. **Common Buzzard & Steppe Buzzard** *Buteo buteo* **PM**
19. **Long-legged Buzzard** *Buteo rufinus* **r, pm, wv**
20. **Lesser Spotted Eagle** *Aquila pomarina*** **PM**
21. **Greater Spotted Eagle** *Aquila clanga*** **pm**
22. **Steppe Eagle** *Aquila nipalensis* **pm**
23. **Imperial Eagle** *Aquila heliaca**** **pm**
24. **Golden Eagle** *Aquila chrysaetos* **pm**

25. **Booted Eagle** *Hieraaetus pennatus* ?sb, pm
26. **Bonelli's Eagle** *Hieraaetus fasciatus* r, pm
27. **Osprey** *Pandion haliaetus* pm
28. **Lesser Kestrel** *Falco naumanni**** pm
29. **Kestrel** *Falco tinnunculus* R, PM, wv
30. **Red-footed Falcon** *Falco vespertinus* pm
31. **Merlin** *Falco columbarius* pm, wv
32. **Hobby** *Falco subbuteo* ?sb, PM, wv
33. **Lanner** *Falco biarmicus*** pm
34. **Eleonora's Falcon** *Falco eleonora* pm
35. **Saker Falcon** *Falco cherrug*** pm
36. **Peregrine Falcon** *Falco peregrinus* pm, wv
37. **Chukar Partridge** *Alectoris chukar* R
38. **Quail** *Coturnix coturnix* ?sb, PM, wv
39. **Corncrake** *Crex crex**** pm
40. **Crane** *Grus grus* PM
41. **Woodcock** *Saxicola rusticola* pm, WV
42. **Stock Dove** *Columba oenas* v
43. **Woodpigeon** *Columba palumbus* PM, WV
44. **Turtle Dove** *Streptopelia turtur* PM
45. **Great Spotted Cuckoo** *Clamator glandarius* ?sb, pm
46. **Cuckoo** *Cuculus canorus* SB, pm
47. **Barn Owl** *Tyto alba* R
48. **Scops Owl** *Otus scops* sb, PM, wv
49. **Eagle Owl** *Bubo bubo* r
50. **Little Owl** *Athene noctua* r
51. **Tawny Owl** *Strix aluco* R
52. **Long-eared Owl** *Asio otus* ?r, pm, wv
53. **Short-eared Owl** *Asio flammeus* wv, ?pm
54. **Nightjar** *Caprimulgus europaeus* PM
55. **Swift** *Apus apus* sb, PM
56. **Pallid Swift** *Apus pallidus* pm
57. **Alpine Swift** *Apus melba* sb, PM
58. **Little Swift** *Apus affinis* pm
59. **European Bee-eater** *Merops aptaster* PM
60. **Roller** *Coracias garrulus* pm
61. **Hoopoe** *Upupa epops* R, sb, PM, wv
62. **Wryneck** *Jynx torquilla* pm
63. **Bimaculated Lark** *Melanocorypha bimaculata* ?sb, pm, wv
64. **Greater Short-toed Lark** *Calandrella brachydactyla* ?sb, PM
65. **Lesser Short-toed Lark** *Calandrella rufescens* pm
66. **Crested Lark** *Galerida cristata* R
67. **Wood Lark** *Lullula arborea* R
68. **Skylark** *Alauda arvensis* PM, wv
69. **Shore Lark** *Eremophila alpestris* R
70. **Sand Martin** *Riparia riparia* PM, WV

71. **Crag Martin** *Ptyonoprogne rupestris* **sb, pm**
72. **Swallow** *Hirundo rustica* **?sb, PM, wv**
73. **Red-rumped Swallow** *Hirundo daurica* **pm**
74. **House Martin** *Delichon urbica* **sb, PM**
75. **Tawny Pipit** *Anthus campestris* **sb, PM**
76. **Long-billed Pipit** *Anthus similis* **r**
77. **Tree Pipit** *Anthus trivialis* **pm, wv**
78. **Meadow Pipit** *Anthus pratensis* **pm, wv**
79. **Yellow Wagtail** *Motacilla flava* **SB, pm**
80. **Grey Wagtail** *Motacilla cinerea* **sb, pm**
81. **White Wagtail** *Motacilla alba* **PM, wv**
82. **Dipper** *Cinclus cinclus* **R**
83. **Wren** *Troglodytes troglodytes* **R**
84. **Dunnock** *Prunella modularis* **pm, wv**
85. **Rufous Bush Robin** *Cercotrichas galactotes* **sb, pm**
86. **Robin** *Erithacus rubecula* **pm, WV**
87. **Thrush Nightingale** *Luscinia luscinia* **pm**
88. **Nightingale** *Luscinia megarhynchos* **pm**
89. **Bluethroat** *Luscinia svecica* **pm, wv**
90. **White-throated Robin** *Irania gutturalis** **pm**
91. **Black Redstart** *Phoenicurus ochruros* **SB, pm, WV**
92. **Redstart** *Phoenicurus phoenicurus* **PM**
93. **Whinchat** *Saxicola rubetra* **PM**
94. **Stonechat** *Saxicola torquata* **PM**
95. **Isabelline Wheatear** *Oenanthe isabellina* **sb, pm**
96. **Wheatear** *Oenanthe oenanthe* **SB, PM, wv**
97. **Pied Wheatear** *Oenanthe pleschanka* **pm**
98. **Black-eared Wheatear** *Oenanthe hispanica* **SB, PM**
99. **Desert Wheatear** *Oenanthe deserti* **pm**
100. **Finsch's Wheatear** *Oenanthe finschii** **sb, pm, wv**
101. **Rock Thrush** *Monticola saxatilis* **sb, pm**
102. **Blue Thrush** *Monticola solitarius* **R, pm, wv**
103. **Ring Ouzel** *Turdus torquatus* **pm, wv**
104. **Blackbird** *Turdus merula* **R, pm, wv**
105. **Fieldfare** *Turdus pilaris* **PM, wv**
106. **Song Thrush** *Turdus philomelos* **pm, WV**
107. **Redwing** *Turdus iliacus* **pm, WV**
108. **Mistle Thrush** *Turdus viscivorus* **pm, WV**
109. **Cetti's Warbler** *Cettia cetti* **r (localized)**
110. **Great Reed Warbler** *Acrocephalus arundinaceus* **PM**
111. **Olivaceous Warbler** *Hippolais pallida* **sb, PM**
112. **Upcher's Warbler** *Hippolais languida** **sb, pm**
113. **Olive-tree Warbler** *Hippolais olivetorum* **sb, pm**
114. **Icterine Warbler** *Hippolais icterina* **pm**
115. **Spectacled Warbler** *Sylvia conspicillata* **R**
116. **Subalpine Warbler** *Sylvia cantillans* **pm**

117. **Ménétries's Warbler** *Sylvia mystacea** pm
 118. **Sardinian Warbler** *Sylvia melanocephala* R, ?sb, PM, wv
 119. **Rüppell's Warbler** *Sylvia rueppelli* pm
 120. **Orphean Warbler** *Sylvia hortensis* sb, PM
 121. **Barred Warbler** *Sylvia nisoria* pm
 122. **Lesser Whitethroat** *Sylvia curruca* sb, PM
 123. **Whitethroat** *Sylvia communis* sb, PM
 124. **Garden Warbler** *Sylvia borin* pm
 125. **Blackcap** *Sylvia atricapilla* sb, PM, WV
 126. **Bonelli's Warbler** *Phylloscopus bonelli* SB, PM
 127. **Wood Warbler** *Phylloscopus sibilatrix* PM
 128. **Chiffchaff** *Phylloscopus collybita* SB, PM, wv
 129. **Willow Warbler** *Phylloscopus trochilus* PM
 130. **Goldcrest** *Regulus regulus* wv
 131. **Spotted Flycatcher** *Muscicapa striata* SB, PM
 132. **Red-breasted Flycatcher** *Ficedula parva* pm
 133. **Semi-collared Flycatcher** *Ficedula semitorquata* pm
 134. **Collared Flycatcher** *Ficedula albicollis* pm
 135. **Pied Flycatcher** *Ficedula hypoleuca* pm
 136. **Sombre Tit** *Parus lugubris* R
 137. **Coal Tit** *Parus ater* R
 138. **Great Tit** *Parus major* R
 139. **Blue Tit** *Parus caeruleus* R
 140. **Western Rock Nuthatch** *Sitta neumayer* R
 141. **Golden Oriole** *Oriolus oriolus* pm
 142. **Isabelline Shrike** *Lanius isabellinus* pm, wv
 143. **Red-backed Shrike** *Lanius collurio* SB, PM
 144. **Woodchat Shrike** *Lanius senator* sb, PM
 145. **Masked Shrike** *Lanius nubicus* sb, PM
 146. **Jay** *Garrulus glandarius* R
 147. **Hooded Crow** *Corvus corone cornix* R
 148. **Starling** *Sturnus vulgaris* wv
 149. **Sparrow** *Passer domesticus* R
 150. **Spanish Sparrow** *Passer hispaniolensis* sb, pm
 151. **Rock Sparrow** *Petronia petronia* R
 152. **Chaffinch** *Fringilla coelebs* R, PM, WV
 153. **Brambling** *Fringilla montifringilla* pm, WV
 154. **Red-fronted Serin** *Serinus pusillus* PM
 155. **Serin** *Serinus serinus* pm, WV
 156. **Syrian Serin** *Serinus syriacus** R, pm, wv
 157. **Greenfinch** *Carduelis chloris* SB, PM, WV
 158. **Goldfinch** *Carduelis carduelis* r, WV, pm
 159. **241. Siskin** *Carduelis spinus* pm, wv
 160. **Linnet** *Carduelis cannabina* R, WV, PM
 161. **Crimson-winged Finch** *Rhodopechys sanguinea* r
 162. **Hawfinch** *Coccothraustes coccothraustes* pm, wv

163. **Yellowhammer** *Emberiza citrinella* **WV**
164. **Rock Bunting** *Emberiza cia* **R**
165. **Ortolan Bunting** *Emberiza hortulana* **sb, PM**
166. **Cretzschmar's Bunting** *Emberiza caesia* **sb, pm**
167. **Black-headed Bunting** *Emberiza melanocephala* **SB, PM**
168. **Corn Bunting** *Miliaria calandra* **r, PM**

ANNEX 4: List of herpetofauna of Horsh Ehdn.

1. refers to globally threatened species
2. refers to regionally threatened species
3. refers to endemic species
4. refers to nationally rare species

<i>SCIENTIFIC NAME</i>	English Name	Arabic Name
SALAMANDRIDAE		
<i>Salamandra infraimmaculata</i> <i>infraimmaculata</i> (2)	Fire Salamander	سلمندر
BUFONIDAE		
<i>Bufo viridis</i> (2)	Green toad	علجوم أخضر
RANIDAE		
<i>Rana levantina (Bedriagae)</i> (2)	Levant frog	ضفدع شرقي
HYLIDAE		
<i>Hyla savignyi</i> (2)	Common tree-frog	ضفدع الشجر
TESTUDINIDAE		
<i>Testudo graeca terrestris</i> (2)(4)	Tortoise	سلحفاة برية
GEKKONIDAE		
<i>Hemidactylus turcicus turcicus</i> (2)	Turkish gecko	أبو بريص
<i>Cyrtopodion kotschy orientalis</i> (2)	Tree gecko	أبو بريص الشجر
<i>Cyrtopodion amictopholis?</i> (4)	?	?
CHAMAELEONIDAE		
<i>Chamaeleo chamaeleon restricta</i> (1) (2) (4)	Chameleon	حرباء
AGAMIDAE		
<i>Laudakia stellio stellio</i>	Agama	حرذون

LACERTIDAE		
<i>Lacerta laevis laevis</i> (2)	Wall lizard	سحلية الحيطان
<i>Lacerta media wolterstorffi</i> (3)	Green lizard	سحلية خضراء
<i>Ophisops elegans</i>	Snake-eyed lizard	سحلية أنيقة
SCINCIDAE		
<i>Ablepharus budaki budaki</i>	Little skink	سقتفور صغير
<i>Mabuya vittata</i>	Vital's skink	سقتفور حيوي
TYPHLOPIDAE		
<i>Typhlops vermicularis</i>	typhlops	ثعبان الأزهار
COLUBRIDAE		
<i>Platiceps najadum dahlii</i> (2)	Small whipe snake	أفعى نشايبه
<i>Eirenis lineomaculatus</i>	?	?
<i>Elaphe hohenackeri</i>	?	?
<i>Elaphe sauromates</i> ? (4)	?	?
<i>Hierophis jugularis</i> (2)	Large whipe snake	أفعى كرابجية
<i>Eirenis levantinus</i>		
<i>Malpolon monspessulanus insignatus</i> (2)	Montpellier snake	أفعى مونبلييه
<i>Natrix tessellata tessellata</i> (2)	Dice snake	أفعى الزهر
<i>Platiceps collaris</i>	Collar snake	ثعبان مطوق

Viperidae		
<i>Vipera palestinea?</i> (2)		
<i>Vipera lebetina?</i> (2)		
<i>Vipera bornmuelleri</i> (2) (3)		

ANNEX 5: List and summary status of the observed insect specimens at Horsh Ehdn.

* denotes verified specimen through comparison with the Lebanese University collections.

Order	Family	Scientific name	density	abundance
Coleoptera	CicindellidaeFig32	<i>Cicindella sp</i>	low	Rare
Coleoptera	CarabidaeFig12	<i>Nebria hemprichi</i> (klug1832)	low	Rare
Coleoptera	CerambycidaeFig29	<i>Calamobius filum</i> (Rossi,1790)	*	
Coleoptera	Cerambycidae	<i>Phytoecia virgule</i> (Charpentier,1825)	*	
Coleoptera	Scarabeidae	<i>Oructeus nasicornis</i> (Linnaeus1758)	*	
Coleoptera	ScarabeidaeFig23	<i>Netocia vidua</i> (Gorg et Percheron)	*	
Coleoptera	ChrysomellidaeFig42		*	
Coleoptera	Hydrophilidae	<i>Haccobius syriacus</i> ()Guill	*	
Diptera	SyrphidaeFig46		medium	common
Diptera	BombyliidaeFig48		medium	common
Diptera	CalliphoridaeFig49		medium	common
Dictioptera	BlattidaeFig79		low	common
Hemiptera	LygaidaeFig51		low	Rare
Hemiptera	Lygaidae	<i>Lygaeus equestris</i> (Linnaeus1758)	*	
Hemiptera	Miridae	<i>Grypocoris</i> (<i>Turciocoris</i>) <i>syriacus</i> (Reuter, 1896)	*	
Hemiptera	Miridae	<i>Closterotomus putomi</i> (Horvath, 1888)	*	
Hemiptera	Miridae	<i>Lepidargyrus seidenstueckeri</i> (Wanger1956)	*	
Hemiptera	Miridae	<i>Dereocoris</i> (<i>Camptobrochis</i>) <i>serenus</i> (Douglas & Scott,1868)	*	
Hemiptera	Miridae	<i>Pachyxyhus lineellus</i> (Mulsant & Rey 1852)	*	
Hemiptera	Lygaidae	<i>Lethaeus cribratissimus</i> (Stal,1858)	*	
Hemiptera	MiridaeFig60	<i>Euryopicoris nitidus</i> (Meyer-Dur,1843)	*	
Hemiptera	ScutellaridaeFig58	<i>Graphosoma italium</i> (Mull)	*	
Hemiptera	ScutellaridaeFig59	<i>Graphosoma melanoxanthum</i> (Horvath, 1903)	*	
Hemiptera	Pentatomidae	<i>Raphigaster nebulosa</i> (Poda,1761)	*	
Hemiptera	Pentatomidae	<i>Acrosternum sp</i>	*	
Hemiptera	Coreidae	<i>Camptotus lateralis</i> (Germar,1817)	*	
Hemiptera	Reduviidae	<i>Rhynocoris iracundus</i> (Poda,1761)	*	
Hemiptera	Reduviidae	<i>Sphedanolestes</i>	*	

		<i>pulchelus</i> (Klug1830)		
Hemiptera			*	
Homoptera	Cicadidae	<i>Cercopis intermedia</i> <i>kirschbaum</i>	*	
Hymenoptera	Apidae Fig62		high	common
Hymenoptera	Apidae Fig63		medium	common
Hymenoptera	Apidae Fig64		medium	common
Hymenoptera	VespidaeFig67		Medium	Common
Hymenoptera	VespidaeFig68		Medium	Common
Orthoptera	Acrididae Fig72		Low	Rare
Orthoptera	Acrididae Fig73		low	Rare

ANNEX 6: The determination of the butterflies of Horsh Ehden Reserve is the output of a combined effort that was exerted by all members of the team of experts when every time one butterfly is seen, photographed or described it was compared to the content of the plates that are offered by T. Larsen in his book “Butterflies of Lebanon” (1974).

The table below lists 51 species that were also reported from somewhere else.

Butterflies of Horsh Ehden Reserve					
No	Scientific Name	English Name	Sub-Family	Family	Place
1	<i>Papilio alexanor maccabaeus</i>	Tiger Swallowtail	Papilioninae	PAPILIONIDAE	Ehden
2	<i>Allancastrias (Zerynthia) cerisyi speciosa</i>	Eastern Festoon	Parnassiinae	PAPILIONIDAE	Ehden , Jisr el-Qadi, Aammiq
3	<i>Allancastrias deyrollei eisneri</i>	Libanese Festoon	Parnassiinae	PAPILIONIDAE	Ehden , Ctoura
4	<i>Parnassius mnemosyne syra</i>	Clouded Apollo	Parnassiinae	PAPILIONIDAE	Faraya, Ehden
5	<i>Pieris napi dubiosa</i>	Green-veined White	Pierinae	PIERIDAE	Ehden , Hammana , Antelias , sea level, Jbeil, Cedar Mountain, Hazmiye, Beirut
6	<i>Pieris ergane detersa</i>	Mountain Small White	Pierinae	PIERIDAE	Ehden , Barouk Cedar , Cedar Mountain ,
7	<i>Colias aurorina libanatica</i>	Dawn Clouded Yellow	Coliadiinae	PIERIDAE	Cedar Mountain, Jabal Knisse, Ehden
8	<i>Gonepteryx rhamni meridionalis</i>	Brimstone	Coliadiinae	PIERIDAE	Ehden, Aammiq
9	<i>Gonepteryx farinosa farinosa</i>	Powdered Brimstone	Coliadiinae	PIERIDAE	Jabal Aitou
10	<i>Leptidea duponcheli xanthochroa</i>	Eastern Wood White	Dismorphiinae	PIERIDAE	Cedar Mountain, Jabal Aitou
11	<i>Fabriciana niobe philistra</i>	Niobe Fritillary	Nymphalinae	NYMPHALIDAE	Jabal Ijbeh
12	<i>Issoria lathonia lathonia</i>	Queen of Spain Fritillary	Nymphalinae	NYMPHALIDAE	Cedar Mountain, Ehden

Butterflies of Horsh Ehden Reserve					
No	Scientific Name	English Name	Sub-Family	Family	Place
13	<i>Melitaea cinxia clarissa</i>	Glanville Fritillary	Nymphalinae	NYMPHALIDAE	Ehden, Aammiq
14	<i>Melitaea collina collina</i>	Lederer's Fritillary	Nymphalinae	NYMPHALIDAE	Maaser es Chouf, Ehden
15	<i>Melitaea didyma libanotica</i>	Toadflax Fritillary	Nymphalinae	NYMPHALIDAE	Ain Zhalta Cedars, Dahr el-Baidar, Ehden, Nabi Sbat, Antiliban, Aammiq
16	<i>Melanargia titea titea</i>	Levantine Marbled White	Satyrinae	NYMPHALIDAE	Nahr Ibrahim, Jabal Kesrouan, Aammiq, Ehden
17	<i>Hipparchia alcyone syriaca</i>	Syrian Grayling	Satyrinae	NYMPHALIDAE	Barouk Cedars, Ehden
18	<i>Neohipparchia fatua sichaea</i>	Freyer's Grayling	Satyrinae	NYMPHALIDAE	Ehden
19	<i>Pseudochazara telephassa telephassa</i>	Telephassa Grayling	Satyrinae	NYMPHALIDAE	Jabal Qammoua, Ain Zhalta, Ehden
20	<i>Pseudochazara pelopea pelopea</i>	Pelopea Grayling	Satyrinae	NYMPHALIDAE	Jabal Aitou, Aammiq
21	<i>Satyrus ferula makmal</i>	Great Sooty Satyr	Satyrinae	NYMPHALIDAE	Jabal Ijbeh, Aammiq
22	<i>Hyponephele lycaon libanotica</i>	Dusky Meadow Brown	Satyrinae	NYMPHALIDAE	Ain Zhalta Cedars, Aammiq, Ehden
23	<i>Hyponephele lupinus centralis</i>	Oriental Meadow Brown	Satyrinae	NYMPHALIDAE	Ain Zhalta Cedars, Jabal Aitou
24	<i>Kirinia roxelana roxelana</i>	Lattice Brown	Satyrinae	NYMPHALIDAE	Ehden
25	<i>Callophrys rubi intermedia</i>	Green Hairstreak	Theclinae	LYCAENIDAE	Ain Zhalta Cedars, Aammiq, Ehden
26	<i>Strymonidia ilicis bischoffi</i>	Ilex Hairstreak	Theclinae	LYCAENIDAE	Ehden
27	<i>Fixsenia ledereri nazeri</i>	Orange-banded Hairstreak	Theclinae	LYCAENIDAE	Ehden
28	<i>Quercusia quercus quercus</i>	Purple Hairstreak	Theclinae	LYCAENIDAE	Cedar Mountain, Ehden

Butterflies of Horsh Ehden Reserve					
No	Scientific Name	English Name	Sub-Family	Family	Place
29	<i>Tomares nogelii aurantiaca</i>	Turkish Vernal Copper	Theclinae	LYCAENIDAE	Ehden
30	<i>Tomares nesimachus nesimachus</i>	Syrian Vernal Copper	Theclinae	LYCAENIDAE	Ehden
31	<i>Lycaena (Lycaena) phlaeas timeus</i>	Small Copper	Lycaeninae	LYCAENIDAE	Jabal Barouk, Aammiq, Ehden
32	<i>Lycaena (Thersamonia) asabinus asabinus</i>	Lesser Purple-shot Copper	Lycaeninae	LYCAENIDAE	Ain Zhalta Cedars, Jabal Barouk, Barouk Cedars, Ehden
33	<i>Lycaena (Thersamonia) ochimus ochimus</i>	Golden Copper	Lycaeninae	LYCAENIDAE	Barouk Cedars, Jabal Barouk, Ehden
34	<i>Lycaena (Thersamonia) thetis zahaltensis</i>	Fiery Copper	Lycaeninae	LYCAENIDAE	Ain Zhalta Cedars, Cedar Mountain, Jabal Aitou
35	<i>Lycaeides idas selda</i>	Idas Blue	Plebejinae	LYCAENIDAE	Jabal Kesrouan, Cedar Mountain, Ehden
36	<i>Plebejus pylaon nichollae</i>	Zephyr Blue	Plebejinae	LYCAENIDAE	Ain Zhalta Cedars, Cedar Mountain, Ehden
37	<i>Eumedonia eumedon mylitta</i>	Geranium Argus	Plebejinae	LYCAENIDAE	Cedar Mountain, Ehden
38	<i>Aricia isaurica dorsumstellae</i>	Isaurica Blue	Plebejinae	LYCAENIDAE	Faraya Mzar, Ehden, Cedar Mountain
39	<i>Aricia ? Crassipuncta bassoni</i>	Steely Argus	Plebejinae	LYCAENIDAE	Jabal Qammoua, Ehden
40	<i>Cyaniris antiochena antiochena</i>	Eastern Mazarine Blue	Plebejinae	LYCAENIDAE	Mdairej, Ehden, Jabal Qammoua, Aammiq
41	<i>Lysandra isauricoides isauricoides</i>	Baby Blue	Plebejinae	LYCAENIDAE	Cedar Mountain, Ehden
42	<i>Lysandra ellisoni ellisoni</i>	Cedar Mountain	Plebejinae	LYCAENIDAE	Cedar Mountain

Butterflies of Horsh Ehdn Reserve					
No	Scientific Name	English Name	Sub-Family	Family	Place
		Blue			
43	<i>Lysandra thersites gravesi</i>	Chapman's Blue	Plebejinae	LYCAENIDAE	Cedar Mountain, Ehdn
44	<i>Lysandra (Plejus) loewii antilibanotica</i>	Loew's Blue	Plebejinae	LYCAENIDAE	Ain Zhalta Cedars, Cedar Mountain, Aammiq, Ehdn
45	<i>Lysandra syriaca syriaca</i>	Lebanese Adonis Blue	Plebejinae	LYCAENIDAE	Jabal Qammoua, Naba el-Aasal, Ehdn
46	<i>Glaucopsyche alexis aeruginosa</i>	Green Underwing Blue	Glaucopsychinae	LYCAENIDAE	Ehdn
47	<i>Turanana panagaea panagaea</i>	Odd-spot Blue	Glaucopsychinae	LYCAENIDAE	Jabal Aitou
48	<i>Pyrgus armoricanus philonides</i>	Oberthur's Grizzled Skipper	Pyrginae	HESPERIIDAE	near Faraya, Faraya Mzar, Ainata, Aammiq, Ehdn
49	<i>Spialia phlomidis kiki</i>	Kiki's Skipper	Pyrginae	HESPERIIDAE	Jabal Kesrouan, Cedar Mountain, Ehdn
50	<i>Carcharodus stauderi ambigua</i>	North African Skipper	Pyrginae	HESPERIIDAE	Cedar Mountain, Ehdn
51	<i>Pelopidas thrax thrax</i>	Millet Skipper	Hesperiinae	HESPERIIDAE	Ehdn

ANNEX 7 Methodology and 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 species 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 East 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 data lists.

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

- **"Mid-coarse filter"** analysis: this second phase checks the species that are selected in the previous phase in term 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 is 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).

A.1.5.1.2 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 on 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 select species carefully 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 over exploitation, over collection, over use, persecution, pollution, drainage, over hunting, 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 those 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 placed 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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