A Sanctuary of Orchids

A protected area on Holcim Land, Lebanon
A biodiversity assessment
2014
Credits

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The biodiversity assessment was carried out over a one-year basis spanning from September 2013-September 2014. It provides full recording of the variety of basically floral species that inhabit the land, in addition to whatever could have been recorded of the animal world.

Site survey was intensively conducted from autumn to spring and was more relaxed during the dry season. Apart from the listing of species, the following remarks are integral to appreciate the significance and limitations of the current assessment.

1- Zoologically, the Holcim land is relatively small and topographically open to the extensive neighboring landscape; thus at the level of the zoological diversity, the species are not limited to this land but are shared with all the surrounding. The species could be visitors as transient on their search for food, or on their movement seeking protection, as well as temporary to long-term residents.

2- At the level of the floral diversity, it is very important to realize that the year that this assessment was undertaken was itself characterized with the lowest rainfall level in recent decades. This was also associated with high temperatures that inflicted dryness early in the year.

3- Climatically, the first rain, which came in September 2013, had no effect on floral growth because it was insufficient to initiate the latter. The dry summer of 2013 extended its conditions deeper into autumn to subside with more valuable rainfall starting in November. Similarly, the end of the growth year came early with the cessation of rainfall in February, thus April started revealing signs of the halting of the growth season for 2014 particularly for the flora that demands humidity and allowed for the flora of dry conditions to take hold.

The paucity of rainfall and humidity could have reflected in lack of growth or lack of flowering of some taxa that might exist in the green cover or the soil bank. Shorter growth seasons were evidenced for some flora, for example grasses were short lived and dried sooner than expected.

4- On the range of threats, grazing was active all year round, which could have exacerbated the negative impact of climatic conditions on the vegetation cover.
II - ECOLOGICAL OVERVIEW OF HOLCIM LAND

1- TOPOGRAPHY

The Holcim land comprises of one hill about 40 m high (N 34° 18' 13.9”; E 35° 45' 48.8”). The hill is open on three sides (north, east, south) and interconnected to the west to a series of hills of similar nature and height.

The slopes present gentle inclinations of about 45 degrees; but in limited areas to the northwest the slopes are steeper of about 60 degrees. As the land was used for agricultural purposes, the slopes are almost all leveled into 9 terraces with the exception of the steeper slants.

The northern and western slopes lead to flat plains that are used for annual crop production mainly wheat. The southern slope is marked at base with a series of small undulations leading into a deeper closed valley. A winter watercourse is found on the southwestern face feeding into the closed valley.

Cut roads circulate the base of the hill with two unpaved roads climbing over the southern slopes to the top subjecting an early disturbance to the system.

2- AGRICULTURAL USE

The current vegetation of the terraces indicates that agricultural use was installed for a relatively short period, which did not preclude the natural system from reinvading the terraces.

However, the southern terraces were more heavily utilized most probably in the planting of wheat. Considering their more stringent ecological conditions, the degradation of the vegetation cover is more pronounced. In spite, this does not forbid these terraces from hosting particular floral diversity.

3- SOIL TYPE AND HUMIDITY

The soil type is a characteristic soft calcareous white soil produced from marl dolomitic bedrock. One of the properties of such soil is its low capacity of water infiltration. Thus under heavy rain, inundation is a frequent incident; water requires longer time to percolate through depending on its
amount. This feature is mostly experienced in winter and early spring under proper conditions of rainfall. Due to the same soil characteristics, the lower rainfall of autumn and spring allows humidity to be maintained in the soil to longer period, which makes these ses- sons very important to further vegetation growth. In summer, the soil humidity dries up, this soil type hardly absorbs humidity from the atmosphere and remains very dry during this period, so the slopes wear their brown cover for a long period in the year, easily influenced by not only the level of direct rainfall, but also its annual distribution. Due to intensive grazing and soil type, the organic matter is very low as seen in the above photo. This reflects in lower soil moisture and nourishment as well as higher exposure to sunlight.

4- ORIENTATION

Orientation also plays a significant role in prolonging soil humidity and respectively plant growth. It is easily observed that the southern slope is drier as it is more exposed to sunlight. In comparison, the northern slope is less exposed to direct sunlight and maintains more humidity for longer period. This is reflected in the abundance of more extensive communities of mosses on the northern slope. Similarly, the southern slope is observed to initiate vegetation growth earlier. Plants start flowering earlier on the southern slopes while they bloom later and longer on the northern slopes; they are marked to fall in the range of 15 days of difference for the same species members on both slopes. This is again complemented with earlier die out on the southern slope.

5- PLANT BASE

The vegetation cover is denser on the northern slopes, whereas the southern slopes were burnt several times reducing their cover to ground flora. It is assumed that herdsmen set these fires to allow for more green in the following season. The arborescent flora is basically composed of shrubs about 2m in height. The ground flora witness variation with the seasons, starting with the soft green growing from autumn to spring, to be later invaded with a grassy layer to finally and in a dry cover of basically thorny species. Some of the higher arborescent species are represented in few samples that have been heavily degraded to small bushes.
III- DIVERSITY OF ORCHID SPECIES ON HOLCIM LAND

Lebanon has 86 taxa in the family Orchidaceae. The Holcim land provides habitat to 14 species equivalent to 16% of the orchid diversity, which makes this habitat a site of high significance.

The 14 species are hereby listed according to their flowering succession on this site.

1- Spiranthes spiralis (L.) Chevall.
2- Ophrys israelitica H.Baumann & Künkela
3- Ophrys flavomarginata (Rand) H.Baumann & Künkela
4- Ophrys umbilicata Desf. subsp. umbilicata
5- Ophrys sicula Tiege
6- Ophrys speculum Link
7- Anacamptis morio (L.) R.M.Bateman, Pridgeon & M.W.Chase subsp. champagneuxii (Barnéoud) H.Kreutzschmar, Eccarius & H.Dietr.
8- Orchis italica Poiret
9- Ophrys transylvanica Czermak
10- Anacamptis fragrans (Pollin) R.M.Bateman
11- Neotinea tridentata (Scop.) R.M.Bateman, Pridgeon & M.W.Chase
12- Serapias levantina H.Baumann & Künkela
13- Ophrys apifera Huds.
14- Anacamptis sancta (L.) R.M.Bateman, Pridgeon & M.W.Chase

The field assessment included survey of the orchid species, their flowering period, their distribution on the allocated land, and initiatives for future research toward monitoring of flowering, reproduction and seeding capacity.

Monitoring was facilitated by the placing of markers. The conclusion of this part faced some difficulties with the herdsmen, as is explained below.

The distribution of orchids on the Holcim land was recorded to judge the topographic value at influencing distribution. The hill is exposed from the north, south and east sides, while the western side is connected to the neighboring hill. The hill was used at a point for agriculture, so it was terraced into 10 terraces that are incomplete particularly on the northern side. The southern side seems to be more intensively subject to anthropogenic pressures partly by agriculture and partly by grazing and deliberate fires. Fires are sometimes set by herdsmen to clear the land and allow more green growth in spring.

Following is a representation of the topographic features of the Holcim land.
The species is recorded from 5 samples that attempted flowering this season; three lost their inflorescences when still in bud. The two that reached flowering could put on flowers, but the flowering heads were later lost either to grazing or to a dry heat wave.

*S. spiralis* is the early season orchid that grows after the first rain, which usually comes in September. This past season, it flowered in October at other sites in Lebanon, while at Kfarhazir site it was marked in mid November. This could owe to the dry climatic conditions experienced this season in combination with the type of soil and lack of shade.

Thus, this species is of remarkable value to the site and is worthy of long-term monitoring.
This species is represented in two population clusters of 6-7 individuals each. One population is found on the eastern side and it bloomed earlier around February 1st. The second population is found on terrace level 10 toward the middle of the hilltop, it was marked for monitoring.

- The second population of 5 members bloomed toward mid February to early March.
- One inflorescence carried an inflated ovary.
- All flowers were grazed off by March 20.

*Ophrys israelitica* H.Baumann & Künkele
Israel Bee Orchid
Ophrys d’Israel
This species is mostly spread on the lower terraces though it makes an appearance on the higher levels particularly to the northern side. The first flowering sample was spotted on the southern side of the hill, which is sunnier; however on this side of the hill the samples were noticed to be shorter and frailer. The large exemplary samples are found on the northern side of the hill. The population structure of this species is a random dispersed distribution of individual plants. At some locations, 2-3 stems are observed together. The zone of distribution depicted in the following figure defines the densest zone of occurrence, but does not preclude the occurrence of specimens on other levels.
O. umbilicata is similar to the above species, differing significantly by the white sepals and petals. The first of its flowering samples were recorded later than the above. They share the same habit and range of distribution. The succession of their flowering is scientifically interesting to monitor closely.
O. sicula observes a dispersed distribution in the form of individual specimens. It is mostly concentrated on the lower terraces, but can be spotted all over the terrain. On the southern side of the hill, its stature is quite reduced, obviously due to more heat and lower humidity. In shaded locations, it grows taller and of harder stature. The first flower was spotted on 14 February, and the last bloom was seen no later than March 20.
This species is abundantly distributed all over the hill with high frequency of occurrence. It is found in groups of high density, less likely as individual specimens. The first flowers were seen around February 15. It is strongly pollinated; most the heads would be fertilized in a season.

**Threat**

In spite of its abundance and high fecundity, it would be rare to find a head that would reach the stage of seed setting. The inflorescence is bulky especially when developing seeds which makes a good meal for grazing goats. On March 20, the flowering inflorescences were eaten, but other members of the species were putting new blooms. By April 1st, none of the inflorescences could be seen on site, they were all consumed.

Anacamptis morio (L.) R.M.Bateman, Pridgeon & M.W.Chase

*subsp. champagneuxii* (Barnéoud) H.Kreutzschmar, Eccarius & H.Dietr.

Champagne Orchid
Orchis de Champagneux
This species is densely distributed in a fraction of the terrain. It occurs mostly in clumps that can reach up to 30 individuals.

The level of flower fertilization could not be predicted, which constitutes a question for future research.

It is observed that a good number of the specimens hide in bushes of Sarcopoterium. It is not obvious whether more of the species was stressed out of open areas by grazing and whether more would flower under preservation from threats, or the current distribution pattern is final. There is also the question of humidity versus shade; however, at other sites the species is found to survive well in open areas.

**Ophrys speculum** Link

Mirror Bee Orchid

*Ophrys miroir*
It cannot be denied that the level of rainfall this season was not as favorable for orchid growth as in previous years, and in particular on this site. Usually, *O. italica* on this terrain would form considerable flowering heads of large flowers; this year, they were clearly much reduced. The first flowers came out around March 1. The flowering period phased out by April 1.
Monitoring

O. transhyrcana was one of the species selected for flowering monitoring on this assessment survey.

- The first bloom was recorded in March 10.
- Location A was later marked:
  - On March 20, three clustering stems were found to start flowering.
  - By March 25, one stem had 3 flowers open, the two other stems had four flowers on but the stems were broken possibly by trampling.
  - On April 1, the standing stem put on the fourth flower.
  - On April 8, the stem had 5 flowers open with the 4th and 5th eaten by insects.
  - The 6th flower was near opening.
  - On April 15, this last stem was found broken carrying one maturing ovary.

**Ophyrs transhyrcana Cziernak**

Hyrcanian Orchid

Ophrys de l’Hyrcanie
Two New locations were marked on April 1.

Location B with three stems

- On April 1, Stem 1 and 2 with 4th and 5th flower on
- On April 1, Stem 3 with 4th flower on
- On April 8, stems 1 and 2 were carrying their 6th and 7th flowers to full bloom.
- By April 15, all heads were consumed.

Location C with one stem

- On April 1, its 1st flower to fade in a week, the 2nd flower in glory.
- On April 8, the 2nd flower still on.
- By April 15, all heads were consumed.

No reliable information on fecundity and seeding could be established.
Anacamptis fragrans (Pollini) R.M.Bateman
Fragrant Bug Orchid
Orchis parfumé

A. fragrans joins A. morio in the widespread distribution on this terrain. It grows individually and in small clumps, but the high density shows more close distribution. Flower fertilization rate is high; many heads are observed to develop seeds. Whether seed maturity and dispersal is achieved is not clear due to grazing.
Monitoring
- The first flower was observed on March 10.
- One site of *A. fragrans* was then marked for monitoring.
  - On March 20, the three stems were marked:
    - Stem 1 and 2 had their inflorescence newly showing out of leaf with all flowers in bud.
    - Stem 3 was developed to the stage of having the first bottom flower ready to open its lip.
- On April 1, all the stems were in complete bloom, all the flower buds were open.
- On April 8, two stems had been eaten away. The remaining stem was fully in bloom with all the flowers fertilized.

STAGE 1  STAGE 2  STAGE 3  STAGE 4
Generally, the heads of *N. tridentata* this year were much smaller and less showy than usual. The flowering season was highly contracted; it was reduced down to nearly 20 days.

**Monitoring**
- The first flower was recorded on March 20 on the eastern side.
- One location of *N. tridentata* was used for monitoring of flowering season.
- On April 1, 10 samples was marked, 5 samples surrounded the marking pole and another 5 in the vicinity. They were all in flower with few buds to open still.
- On April 8, all the inflorescences turned to fertilized flowers and the flowers were wilted.
- Rarely plants were coming to bloom after April 8.
Serapias is found in three spots, very well clustered in high density. One of the sites is particular; it is located in a dry watercourse, where the depth possibly offers more humidity in the soil. Here, longer harder stems are observed and is consistent of all stems in comparison with more stunt and thin stems at the other locations on this terrain.
Monitoring

Serapias was monitored at the population found in the watercourse.

- On April 1, the marking pole was placed by a near-flowering stem.
  - Stem one had two of its bottom flowers bulged enough to unfold the labellum, which was still curved upward inside its bud.

- On April 8, most of the population members that sum up to 35 members had their flowers on.
  - The same stem had now 4 flowers fully open and the last two about to revert their labella.

- By April 15, all the populations were eaten away.
This species is the representative of the bee orchids as its name conveys.

Its occurrence on this site is very shy; three samples were in bloom this year. All three of them were hiding inside underbrush, which is not necessarily their habit.

**Ophrys apifera** Huds.

*Ophrys abeille*

**Bee Orchid**
The two marked stems lost to grazing

Fertilized ovaries

Monitoring
- The first bloom was seen on April 8.
- On April 15,
  - The lone sample had two flowers on
  - Of the two closely located samples, one had two flowers in full and they were in bloom.
  - The second had three flowers, one wilted, one old and the third in full bloom.
- On April 24,
  - The two stems were lost to grazing.
  - The solely standing sample had three maturing ovaries indicating fertilization and seed development. This was later lost to grazing.
Anacamptis sancta (L.) R.M.Bateman, Pridgeon & M.W.Chase
Holy Orchid
Orchis sacré

The orchid season on the Kfarhazir hill ends with the Holy Orchid. Two populations are found on this site, both are highly dense comprising about 35 members each.

Monitoring
One population was marked:
- The first flower was observed on April 8.
- On April 15, the whole population put on flowers with 6-7 (10) flowers open per inflorescence.
- On April 24, all the inflorescence was found eaten by goats.
- No record could be established for potential pollination and fertility.
V- ORCHID FLOWER DISTRIBUTION IN THE FLOWERING SEASON

The distribution of the 14 orchid species reveals two peak times where the highest number of different species could be viewed. One peak falls between early to mid March where 7 species would be seen in flowering. The second peak arrives around mid April (8-15 April) with a second set of 6 species to be observed on site. Though a set of species would be viewed at each time, some would be in their best flowering conditions, however, others would be nearing their end.

The results are significant for any future plans for most rewarding visitation periods.

VI- NON-ORCHID FLORA ON THE HOLCIM LAND

A- NON-ORCHID FLORA BY FLOWERING SEASON ON-SITE

Reichardia intermedia
Anemone coronaria
Bellis sylvestris
Anemone coronaria
S. spiralis
O. tenuifolia
O. flavomarginata
O. umbilicata
O. ocula
A. mesembrantheum
O. speculum
O. italica
O. transylvanica
A. fragrans
N. tridentata
S. levantina
O. apifera
MARCH 2014

Mushrooms
Alkanna maleckensis
Cyclamen persicum

Onobrychis cornuta
Asperula arvensis
Galium tricornutum

Astragalus palaestinus
Ajuga chamaepitys
Valantia hispida

Gynandriris sisyrinchium
Anagallis arvensis caerulea
Tordylium aegyptiacum
Alopecurus arundinaceus  Trifolium campestre
Bromus rigidus  Reseda lutea
Stipa bromoides  Helichrysum sanguineum  Bromus lanceolatus  Filago eriocephala
Pallenis spinosa  Trifolium pilulare  Teucrium divaricatum  Briza maxima

APRIL 2014

MAY 2014
Teucrium polium

Eryngium creticum

Lavandula syriaca

Dianthus strictus

Echinops viscosus

Anthemis tinctoria discoidea

Origanum syriacum

Inula viscosa

Cirsium lappaceum

Eryngium glomeratum

Ononis vaginalis

Orion's vaginalis
B- DEGRADED ARBORESCENT FLORA

These species naturally make small trees 2-3 m high even more that would depend on the support of soil type and moisture. On Holcim land, they are reduced to bushes at ground level or less than 1 m high.

- Crataegus monogyna
- Cerasus sp.
- Prunus sp.
- Pistacia terebinthus

JULY - AUGUST 2014

- Carlina involucrata (Iranica)
- Capparis spinosa
- Ephedra foeminea
- Urginea maritima

SEPTEMBER 2014
C - NON-ORCHID FLORA BY FAMILIES

The non-orchid flora is represented in 71 species from 25 families. Four families are most prevalent with 7-10 members in each. They are mostly Mediterranean species. 8 taxa are of limited distribution and can be considered endemic to the region of East Mediterranean.

Only one species is endemic to Lebanon, namely Halimium umbellatum.

<table>
<thead>
<tr>
<th>Family</th>
<th>Species</th>
<th>Distribution</th>
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<tbody>
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<td>ANACARDIACEAE</td>
<td>Pistacia terebinthus L.</td>
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<td>APACEAE</td>
<td>Eryngium creticum Lam.</td>
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<td>Urginea maritima (L.) Baker</td>
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<tr>
<td>PAPAVERACEAE</td>
<td>Linum pubescens Barbo &amp; Sol.</td>
<td>Med &amp; Levant</td>
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<td>POACEAE</td>
<td>Papaver rhoas L.</td>
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<td>Briza minor L.</td>
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<tr>
<td>POACEAE</td>
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<td>Stipa bromoides (L.) Dörfl.</td>
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<td>Avena sterilis L.</td>
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<td>Polypogon monspeliensis (L.) Dest.</td>
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<td>Phleum aquaticum L.</td>
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<td>POACEAE</td>
<td>Alopecurus arundinaceus Poir.</td>
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<td>POACEAE</td>
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<td>Anagalis arvensis L. var. caerulea (L.) Gouan</td>
<td>Levant &amp; Aegian</td>
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<td>Reseda lotus L.</td>
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<td>Sarcopoterium spinosum (L.) Spach</td>
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<td>Galium triflorum Dandy</td>
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<td>RUBACEAE</td>
<td>Asparagus arvensis L.</td>
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</table>

J = Jordan  S = Syria  L = Lebanon  T = Turkey  P = Palestine

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**VII- VIEW ON SOME OF THE ANIMAL WORLD**

**NOVEMBER 2013**

- Fox droppings
  - A predator, most probably a fox, left a sign on his passage in furry material most probably belonging to the rodent family that could have been captured from the investigated land or the surrounding.

**FEBRUARY 2014**

- Millipede predation
  - Two millipedes of different species were noticed with the brown holding the black tightly and sucking up its body juices.

- Frog
  - A sign of fresh water in the vicinity.
Numerously dispersed, this one observed on an orchid rosette.
NOVEMBER TO DECEMBER

The landscape remained clothed in brown for lack of sufficient rainfall.

JANUARY TO FEBRUARY

The vegetation started to establish its elements with the coming of rain.

MARCH

Witnessed the beginning of the flowering season with about third of the recorded flora growing into bloom.

APRIL
April exhibited the highest diversity of flowers with nearly half of the recorded species starting their flowering period. It is important to realize that species that had bloomed earlier in March and other months would be still carrying flowers adding to the charm of the site.

In May, the dry season would start taking its toll on the vegetation and general characteristics of the landscape. The brown color would reinvade the scenery. All the grass family would have dried up by now.

From June onwards, the site enters the least flowering period until the coming of the first rains. The new flowers would be mostly of thorny plants that established their green structures earlier in the season.
IX - THREATS TO BIODIVERSITY ON THE HOLCIM LAND

**Goat grazing**
It is the prime threat to floral diversity on the site. Orchid growth and progress are jeopardized by this activity; as research and monitoring are seriously obstructed. The grazing is continuous all year round.

**Goat grazing**
Orchid leaves as recorded in February, barely any escapes a goat bite.

**MARCH 2014**

**Bird hunting**
It is not a direct threat to the site, but as viewed from the density of cartridges, it is a rampant activity. The municipality might be imposing some regulations; this should be investigated.

**Campfire**
Some people visit the site to picnic on one terrace where they can park. They leave garbage around and apparently make campfires. The spread of a fire, especially in the dry season, would consume the bushy vegetation. Orchids would not be affected.
story of the herdsman for future integration and stakeholder engagement

A – Building Confidence

The first interaction with the herdsmen was on site, I met one of them in November while grazing the herd on the hill. I explained my work and requested that they avoid grazing the hill for the year. He seemed convinced and agreed to spare the lot, as well as to communicate this to his family. But the grazing did not stop.

On 20 February, I placed 120cm-long marking poles at different locations on the terraces of Holcim land, they would be used for reference for the mapping of orchids. Two weeks later, the poles were all pulled out and dropped away. I placed them back; they were again broken and thrown away. Approaching the herdsmen, they confessed that they believed that Holcim company is marking the land for excavation and they would not want to lose the hill. I reassured them of the nature of my work, of the need for yearlong study thus the markings and of the potential to help them maintain greenery in the region for the grazing herds.

I then resorted to using small poles that would be hidden in the vegetation to mark the locations of some investigated orchids. These were also tossed away. Referring to the herdsmen to comfort them again did not carry weight. I still had to drive the goats away from the site and call for the young shepherd who denied knowing of our agreement. Meanwhile, the marked orchids were being eaten away one by one.

The long process of building confidence with the herdsmen continued. Several visits were made to the herdsmen’s home to talk with them, practically with one of the shepherds. Last we reached a level of understanding that would be of better assistance for the future.

B – Provision for Local community Engagement

Three families of herdsmen live on the hill facing the Holcim land. They occupy a farm that was put under their service by a butcher from Kfarhazir called George Jiha for exchange of grazing his herd; their collaboration dates back to 1974. The herdsmen are originally from ‘Tal Ma’ayan’ in Akkar area. Their father and the eldest brother came to Kfarhazir decades ago to graze their herds. This migration was forced by the increased agriculture in Akkar, which drove them out of the grazing land especially in winter. In summer, the left overs of crops would be sufficient to support the herds; however, the winter crops obliged them to keep their herds on a grange and be fed fodder which was more expensive than open grazing. The father found the salvation in Kfarhazir where they used in the beginning to either lease land or graze in the land owned by the cement companies.
XI- RECOMMENDATIONS

1. In recommendation due to the extensive drought witnessed in 2014, it is highly advisable that biodiversity assessments be undertaken over a succession of years in order to build a database of the inhabitants of the land under varying conditions. The data could then become scientifically valuable to determine the influence of climatic factors on floral propagation and growth in this area.

2. Preliminary scientific observations were undertaken with focus on the orchid species. The progress of scientific evaluation was constantly interrupted by the herdsmen as well as by grazing herds. Should scientific evaluations be conducted in the future, it is imperative that a mutually honored understanding be established with the herdsmen, in order to better capitalize on scientific efforts.

3. Campfires and setting fire to the slopes are not rampant but took place; these events should be put under control. Again, the engagement of the herdsmen would minimize these pressures, so would be the handling of side roads.

4. The side roads cut on the southern slopes are of no value except for future excavations. If the hill is to be preserved to its natural state, these roads are recommended to be covered back in soil and might become zones of introduction of orchids from other sites subject to excavations.

5. There is a substantial amount of leftovers and garbage remains thrown on the hill. They do not pose much of a threat but more of a nuisance. It is recommended that effort be made to remove them but outside the growth season in order not to jeopardize or infringe on biodiversity.

6. This biodiversity assessment will be delivered to CBD focal point to integrate the results in the Flora section in the coming country report.

Currently, three of the five brothers still keep herds. They graze them in the open lands of Kfarhazir all year round with the help of two of their children. However, the herd does not all belong to them. The largest sum of 500 heads belong to the butcher and are cared for by one brother, another brother - JamilBahsheek - owns 40 heads, and the third brother keeps 100 heads. The brothers are employed by the butcher to graze his stock along with theirs. In return, he pays them monthly salaries, avails the farm for their needs and that of the livestock, and pays all expenses of electricity and water. Jamil is paid 600,000 L.L. monthly, his son makes 400,000 L.L., and the other brother is also paid 600,000 L.L. Partnering with a person from Kfarhazir permits the family to graze for free unquestioned by the municipality, which refers to the butcher for any implications.

Jamil for example has seven children, 3 boys and 4 girls; one of the sons resented school and engaged in shepherding. Jamil’s children and those of his brothers go to a public school in the neighboring town Amioun. His income is derived from his salary and that of his son, in addition to selling his milk and some of his livestock for meat.

The herdsmen abode and enclosure
XII- REFERENCES

