

## Cyclamen libanoticum field study, March 2014

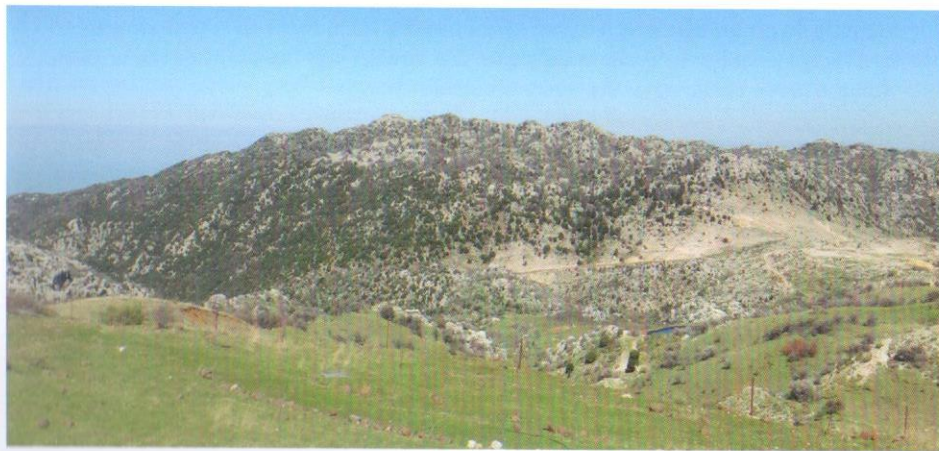
Martyn Denney, Richard Bailey and Keith Fry

*Cyclamen libanoticum* was first described by the German botanist Friedrich Hildebrand in 1898 from plants collected in 1895 by E Hartmann between Laessa (Lassa) and Amis (Qehmez) in the valley of the Nahr Ibrahim, northeast of Beirut in the Lebanon. By June 1899 the plant was in cultivation in the Netherlands and, writing in the *The Garden*, John Hoog said "The tubers were found embedded deeply among the rocks between the roots of shrubs and trees, the plants occurring only in heavily shaded places, where during the winter continuously for nearly three months the temperature ranged more or less below freezing-point." He also referred to the fact that it was flowering in March in M van Tubergen's nursery at Haarlem. His article was accompanied by a photograph which showed a plant typical of most plants in cultivation today with robust flowers with wide petals.

In spite of the enthusiasm with which the plant was greeted by gardeners it seems that it was

'lost' in the wild until rediscovered by Eliot Hodgkin and Pere Mouterde in 1962. In 1996 Jim Archibald offered seed originating from their collection, saying that it was 'Distinct from the long-cultivated form in its elegant, longer-petalled, deeper-pink flowers & in its more distinctly marked leaves, often pink-tinted as they unfold'. Also in the 1990s two sites near Mchati were visited by Erna and Ronald Frank, with Manfred Koenen in 1997 (Frank, 1998), and with Bob and Rannveig Wallis in 1999. Otherwise very little new had been written about *C. libanoticum* until the excellent account by Ricardus Haber and Myrna Semaan in the Society's book *Genus Cyclamen*.

Against this back-drop the aim of the field study in March 2014 was to find out more about the habitat in which *C. libanoticum* grows, find out how variable the plant is in the wild, to map its current distribution and establish the extent to which it is threatened. In May 2012, Lebanon became a party to CITES (The International Convention on Trade in Endangered Species) and with the assistance of Myrna Semaan the team was fortunate to obtain permission from the Lebanese Ministry of Agriculture to collect herbarium specimens and dried leaf material for DNA analysis.



Jabal Moussa from the south. Photographs by Martyn Denney.

*Cyclamen libanoticum* grows on and around Jabal Moussa, a mountain some 30km (19 miles) northeast of Beirut, that in 2009 was designated a biosphere reserve by UNESCO. It is composed of Kesrouane limestone from the Middle to Upper Jurassic period, a more or less horizontal strata around 1,500m (4,900ft) thick which has layers of chert and is also locally dolomitized and in parts has dramatic 'karstic' outcrops. The Biosphere Reserve is approximately 6,500 hectares (25 sq miles) in area and comprises a core conservation zone, a buffer zone and an outer development zone. All populations of *C. libanoticum* found during the field study were within these three zones. We received a warm and enthusiastic welcome from the Association for the Protection of Jabal Moussa (APJM) ([www.jabalmoussa.org](http://www.jabalmoussa.org)) and we received support and guiding on the mountain from their staff during our four principal days in the reserve's core area.

This was to be a short trip. We arrived in Lebanon on Friday 14 March 2014 and left on Sunday 23 March. Six days were allocated to *C. libanoticum* and one each to *C. coum* and *C. persicum*. Accounts of these last two species will appear in the *Journal* in December 2014.

On Saturday morning we met Myrna Semaan and then Joelle Barakat (ecologist) and Roman Bruder (forester) from APJM before driving to meet Pierre Doumet, President of APJM. Pierre has a large area of private land south of Jabal Moussa – part given over to orchards and part left in its natural state. Pierre had cleared a path down through an area of limestone outcrops so that he could show us a population of *C. coum*. On the way down we passed a number of significant populations of *Paeonia kesrouanensis* just coming into flower amongst patches of snow. However the highlight of the morning was finding a small previously unknown population of *C. libanoticum* on the



*Paeonia kesrouanensis* on Jabal Moussa.

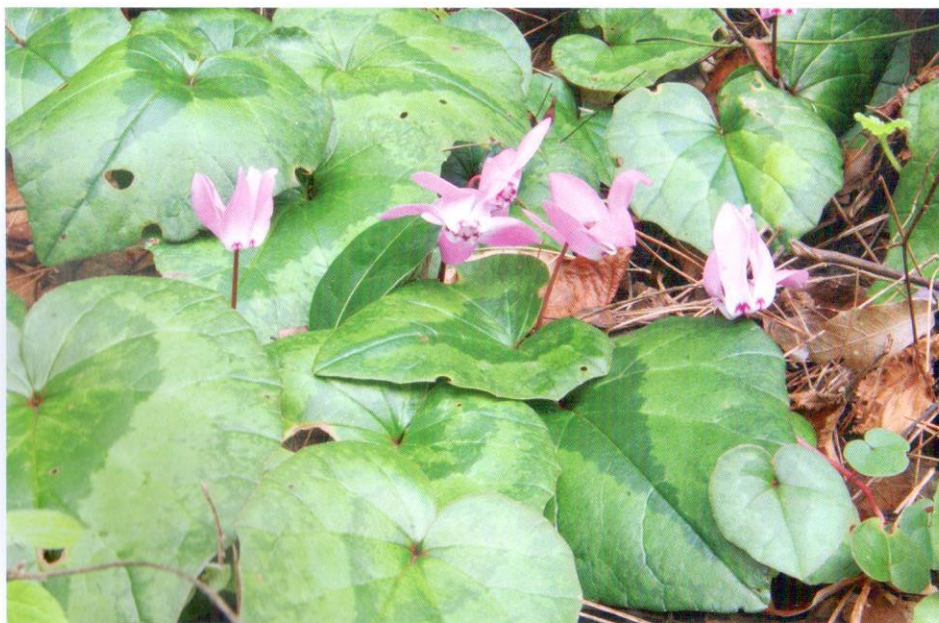
north side of a series of limestone outcrops – an excellent start to the week. The afternoon was spent checking the roadside areas around and between the villages of Mchati and Nahr Ed Dahab and visiting a location given to us by Bob and Rannveig Wallis.

On Sunday 16 March, we again met Myrna and Joelle in order to visit a couple of sites that they knew. The first was an area of north-facing *Quercus infectoria* and *Q. coccifera* forest below the road above Joelle's village of Yahchouch. When Myrna first visited the site some years ago it was an area of mature trees with a thriving population of *C. libanoticum* underneath. Unfortunately the mature trees have been cut for wood and the result is an area of dense scrub on the abandoned terraces with sapling and coppiced *Quercus*, *Styrax*



*officinalis*, *Crataegus monogyna* and *Laurus nobilis*, and a dense herbaceous layer with scrambling *Smilax aspera*. The cyclamen were still there and although there was evidence of regeneration the population was much reduced.

We moved on to the north side of Jabal Moussa driving past roadsides carpeted with *Cyclamen persicum* in a diversity of colours, to study populations of *C. libanoticum* in the bottom of the Nahr Ibrahim gorge. These are mixed populations with a smaller number of *C. persicum* at the base of north-facing cliffs and almost vertical woodland which suggested that the plants may have a far wider distribution on the mountainside above. Some of the plants here had very large leaves in excess of 13cm (5in) in both length and width and the majority had a distinct hastate pattern that wouldn't look out of place on many Greek *C. hederifolium*. Many of the leaves were badly damaged by being eaten by slugs or caterpillars.



*C. libanoticum* in the Nahr Ibrahim Gorge.

Monday 17 March was a very productive day. First we returned to the south side of Jabal Moussa and a site (14/04) above the village of Nahr Ed Dahab that had been pointed out to us by Joelle on Saturday but in fading light. This had a thriving population of *C. libanoticum* in a quite contained north-facing area surrounded by outcrops of Kesrouane limestone. Unfortunately the *Quercus coccifera* and other young trees that provided shade for the cyclamen had recently been cut for wood – a change of habitat that may have an impact on the health of the population. In spite of this, the site remained fairly damp and continued to support *Primula vulgaris*, *Anemone coronaria*, *Orchis galilaea* (syn. *O. punctulata* var. *galilaea*) and the rather attractive *Lamium truncatum*.

Continuing to Mchati we were successful in locating a site quite close to the village on the south side of the river which was noticed by Manfred Koenen and recorded by Erna

Frank in her diary of 24 April 1997 as "A notable find!" The population is spread thinly along several hundred metres (or yards) in an apparently narrow band at the edge of the trees and upwards through a tangle of *Rubus* and *Smilax aspera*.

Attempting to extend the range of *C. libanoticum*, we headed south-west by the back road towards Chahtoul, a village with a camping resort on the mountain above. Chahtoul is mentioned as a location by G and H Tohmé (2007). We found a small population along the road and then, on entering the village of Jouret Mghad, another population at the bottom of a patch of woodland. Higher, by the church and camping resort, *C. libanoticum* grows extensively through an area of very gently sloping *Quercus coccifera* woodland with a largely northerly and westerly aspect. We thought it likely that the population extended down the hillside to the location we had spotted earlier. The leaves were again large and

most had a distinct hastate pattern and at the time of our visit there were few flowers.

On Tuesday 18 March we were to meet Roman in Yahchouch for him to guide us along a new trail on the north side of Jabal Moussa between the villages of Chouwan and Al iibré. This trail initially passes through a population of *C. persicum* and then traverses the mountainside in an easterly direction as it climbs towards Al iibré. As it does this it passes through a small but dense population of *C. libanoticum* growing in mixed woodland of *Quercus coccifera*, *Ostrya carpinifolia*, *Arbutus andrachne* and *Acer syriacum* and then through a succession of individual and groups of plants all the way to the upper village. Putting together the data from this path and the observations down in the gorge it is possible to extrapolate that *C. libanoticum* grows through a large part of the wooded slopes along the eastern end of the north side of Jabal Moussa. During the field study we saw quite a variance from the usual 'seagull' shaped



*C. libanoticum* habitat on the trail to Al iibré on the north side of Jabal Moussa.



blotch at the base of the corolla lobes (petals). The population towards the lower end of the trail was particularly interesting in this regard as the blotch was quite minimalist and more 'Y' shaped (see picture, right).

In the afternoon we drove north of the Nahr Ibrahim gorge in an attempt to extend the range of *C. libanoticum* further in that direction. Once over the top of the gorge the area is extensively cultivated and although the underlying rock is still Kesrouane limestone, at the surface the soil seems significantly different, the habitat is generally wrong even on north-facing slopes and no cyclamen were found. One can speculate whether this is due to the differing habitat, human influences, the natural barrier provided by the depth and near-vertical sides of the gorge, or a combination of all three.

The following day we moved to the south side of Jabal Moussa to meet Elie Khalil from APJM and to walk a trail that initially rises from Baydar el-shawk, near Qehmez,



*Orchis galilaea* at site 14/04



*C. libanoticum* flower on the trail to Al Iibré, showing the minimal blotch at the base of the corolla lobes.

before following the mountainside in a westerly direction towards some old ruined houses at El-byut where it meets a roughly north-south trail that descends from El-salib, the cross at the western end of the ridge to the village of Mchati. This is a pleasant undulating walk that passes populations of *Paeonia kesrouanensis*, *Anemone coronaria*, *A. blanda*, *Bellevia flexuosa*, *Scilla cilicica*, *Gagea* sp. and *C. coum*. Along the way, the trail passes the 18th century well and underground reservoir at El-masbek, near which there was still snow at the bottom of some limestone outcrops. Two populations of *C. libanoticum* were found in the area of El-byut and El-salib, in both cases the plants were in deep north-facing shade with (amongst other plants) *Corydalis solida* subsp. *brachyloba*, *Primula vulgaris*, and *Paeonia kesrouanensis*. On the steep path down to Mchati we passed more *Cyclamen coum* leaves and a number of plants of *C. persicum* in full flower.

On Friday 21 March we returned to Baydar el-shawk and started searching for *C. libanoticum* east of Jabal Moussa, hoping to find it in the

area where Hartmann first collected it, between Qehmez and Lassa. We soon found a small population high on a north-facing bank above the road under *Quercus cerris* and *Ostrya carpinifolia*. There were further populations along the road to Qehmez growing in mosses on, and at the base of, the north facing roadside limestone cliff. We also found a few isolated plants just east of Qehmez – technically therefore between Qehmez and Lassa, though barely. The rest of the day was spent exploring the area further east of Qehmez, between the road through Bhassis, Chouata and Lassa, and the Nahr Ibrahim River to the north, but although some promising habitats were found, the only cyclamen we saw were plants of *C. persicum* north of Lassa.

## Results

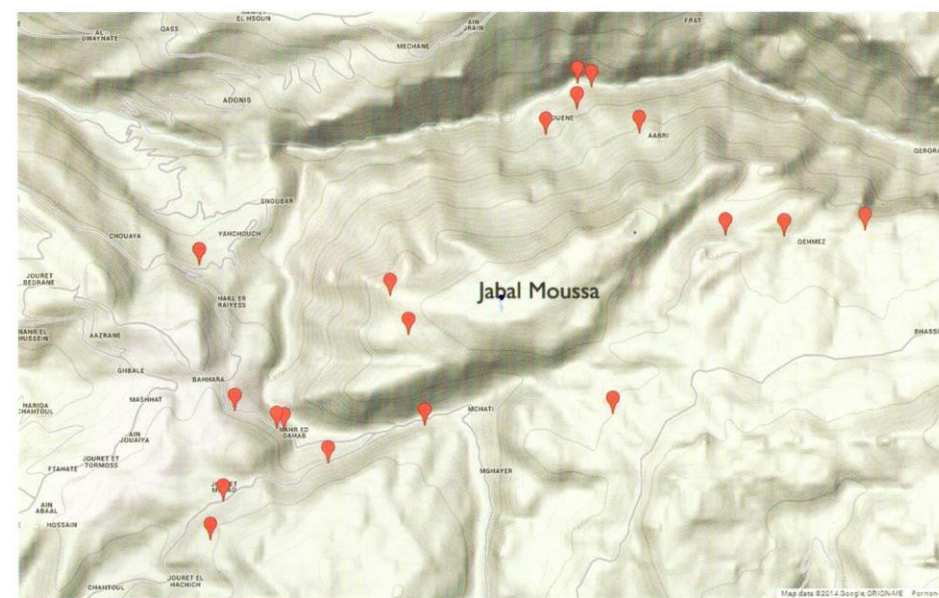
We were successful in finding and collecting data for some 17 locations where *Cyclamen libanoticum* grows. Some of these could be considered contiguous sites and others could be extrapolated to cover a wider area than was visited. All these locations were in an area

of approximately 20 sq km (7.7 sq miles) within one of the three zones of the Jabal Moussa Biosphere Reserve:

Core Conservation Zone	6
Buffer Zone	8
Development Zone	3

Herbarium specimens and dried leaf material for DNA research were collected from populations large enough to allow this without any detrimental impact.

*Cyclamen libanoticum* has always been considered one of the most endangered species of cyclamen. The field study has shown that whilst it comes from a very restricted area to which it is endemic, *C. libanoticum* is more locally abundant than was thought. The UNESCO Biosphere Reserve of Jabal Moussa does not provide legal protection but the conservation measures in place in the core Conservation zone and the monitoring that takes place within the Buffer and Development zones by the dedicated Association for the Protection



Map showing the distribution of *C. libanoticum* around Jabal Moussa. Map data ©2014 Google ORION-ME.





Above and right. A selection of *C. libanoticum* leaf patterns encountered during the field study.

of Jabal Moussa offer a good prospect for its continued survival and prosperity. While *C. libanoticum* is not at present under threat and was seen to be regenerating well from seed at most sites, future threats, probably in the Buffer and Development zones, can be foreseen from:

- (i) Woodland change and development, both through the felling of timber and natural increase in dense scrub
- (ii) Agriculture – woodland and scrub are being cleared and hillsides terraced for agriculture

- (iii) Building – significant new buildings can be seen around most villages.

#### Habitat

*Cyclamen libanoticum* was found growing at altitudes of 437 – 2,384m (1,434 – 7,822ft). Sixty nine per cent of sites were over 900m (2,953ft) and 31% were over 1,300m (4,265ft). The four lowest sites were on the northern side of Jabal Moussa in the Nahr Ibrahim gorge. *Cyclamen libanoticum* grows predominantly in locations with a northerly aspect or sometimes westerly as follows: NNE 13%; N 63%; NNW 6%; NW 13%; W 6%.



*C. libanoticum* near the village of Mchati.



The degree of slope did not appear to be a factor other than when the steepness of the slope towards the north contributed to the degree of shade. Sixty three per cent of sites were in 80-100% shade and the majority of the others were at the base of north-facing cliffs. The exception, site 14/04, is discussed above.

Soil pH was between 7.2 and 8.3, measured around the tubers. In 63% of sites the pH was between 7.7 and 7.9. An analysis of the soil showed that 63% of sites consisted of mainly or totally inorganic material, whilst 37% were dark and largely or richly organic with some decomposed material. Both types of soil were generally poorly drained.

Note: The value 63% appears three times in these statistics but in each case comprises a different mix of sites. There was however some correlation between those sites in 80-100% shade and those with inorganic soil.

#### Companion plants

The top 12 most frequent companion plants were as follows:

<i>Quercus coccifera</i>	10
<i>Primula vulgaris</i>	6
<i>Smilax aspera</i>	6
<i>Cyclamen persicum</i>	5
<i>Paeonia kesrouanensis</i>	5
<i>Tamus orientalis</i>	5

<i>Taraxacum officinale</i>	5
<i>Bellis perennis</i>	4
<i>Crataegus monogyne</i>	4
<i>Lonicera etrusca</i>	4
<i>Ruscus aculeatus</i>	4
<i>Spartium junceum</i>	4

Note: Nomenclature throughout this article follows Tohmé and Tohmé, 2007 and 2012.

#### Morphological data

A sample of 80 pairs of leaves and flowers collected across 10 locations were measured. Leaves:

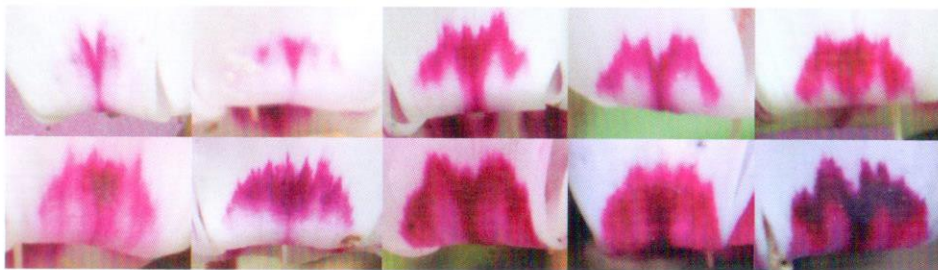
- (a) Leaf lamina size: length 37.8 – 152.6mm; width 34.5 – 137.2mm
- (b) In 95% of samples the leaf lamina length exceeded the width
- (c) The ratio of leaf length to width varied from 0.92:1 to 1.45:1
- (d) The thickness of the leaf lamina varied from 0.2mm to 0.5mm
- (e) The diameter of the petiole approximately 1cm below the leaf varied from 0.9 to 3.3mm
- (f) There was no correlation between leaf and corolla lobe size
- (g) There was no correlation between leaf size and any environmental factor
- (h) There was some correlation between leaf size, leaf lamina thickness and petiole diameter



- (i) Leaves had between 5 and 10 main veins. It was not uncommon for there to be an extra main vein on one side of the leaf
- (j) The depth of the leaf sinus varied from 9.0 to 41.6mm
- (k) In 41% of samples the leaf lobes were overlapping at the sinus. Where not overlapping, the angle varied from 0° (ie touching) to 80°
- (l) Leaf reverse: green 5%; pink 75%; red/purple 20%
- (m) There was no correlation between leaf reverse colour and corolla lobe or corolla lobe blotch colour.

#### Flowers:

- (a) Corolla lobe size: length 17.8 – 34.6mm; width 6.8 – 13.0mm
- (b) Ratio of corolla lobe length to width varied from 1.9:1 to 4.1:1
- (c) There did not appear to be any correlation between corolla size and any environmental factor
- (d) Using the RHS colour charts, 9% of corolla lobes were within the Red-Purple groups 68, 72, 73 and 74; 79% were within the Purple groups 75-78; and 11% were Violet groups 84-85. This doesn't really say anything about the depth of colour but does show that there is less magenta and more purple/violet in the colour of the corolla lobes than encountered in other cyclamen species. No white-flowered plants were seen
- (e) Again, using the RHS colour charts to assess the basal corolla lobe blotch, 15% were in the Red-Purple groups 72 and 74; 64% in the Purple groups 77-79; 14% in Purple-Violet groups 80-82; and 7% in Violet groups 83 and 86. The variation in colour of the basal blotch was a surprise – particularly the number of plants (17%) where the blotch matched the very dark Purple group 79A and 79B. The basal blotch generally continues inside the mouth of the corolla (see picture, right). No plants were seen without a basal blotch
- (f) There was no correlation between the colour of the corolla lobe and corolla lobe blotch. The blotch colour was not necessarily within the same colour group as the body of the lobe
- (g) The shape of the corolla lobe blotch was variable. The following is indicative of the variation encountered:
  - a letter 'M' or seagull in silhouette
  - a letter 'M' or seagull with the 'arches' filled with a third colour
  - a beehive-shaped lighter blotch entirely containing the 'M' or seagull.
  - a minimalist 'Y' shape
  - a more robust bat-wings style
- (h) Corolla lobe twist: There is a generally lower degree of twist in the corolla lobes of *C. libanoticum* than is encountered in other species. 0° - 6.0%; 20° - 1%; 30° - 3%; 45° - 24%; 90° - 56%; 120° - 8%



A selection of *C. libanoticum* corolla lobe blotches encountered during the field study.



A *C. libanoticum* flower showing how the corolla lobe blotch is repeated on the inside of the tube.

- (i) All flowers, with the exception of one, were scented
- (j) In 89% of flowers the style was exserted; in 11% it was inserted.

#### Acknowledgements

The Levant is a troubled region. Lebanon has had its own problems in the past and has become caught up in those of its neighbours, Israel and Syria. Talking with the Lebanese during our visit it appears that the advice of the British Foreign and Commonwealth Office is realistic and fair insofar as unlike some other countries there is no general advice against visiting Lebanon. There is currently very little foreign tourism. During our visit we felt perfectly safe and without exception found the Lebanese people to be welcoming and helpful whether it was in towns, villages or in the mountains and for this we thank them.

A field study of this nature is unlikely to be successful without assistance from the host country. Foremost we are grateful for the

help and support of Myrna Semaan, both in the planning stage and in the field with her intimate knowledge of the area around Jabal Moussa. Pierre Doumet, President of the Association for the Protection of Jabal Moussa, was enthusiastic in his welcome and made available to us the resources of the Association and its staff. Joelle Barakat, Roman Bruder and Elie Khalil of APJM provided guidance and local knowledge in the field. We are grateful to Eng George Phrem of the Ministry of Agriculture of Lebanon for granting a CITES permit for the export of dried plant material.

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