



Ophrys omegaifera SUBSP. *gharifensis* (ORCHIDACEAE), A NEW SUBSPECIES FROM LEBANON

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Received: September 15, 2013; Accepted: October 01, 2013

Abstract- A new subspecies, *Ophrys omegaifera* subsp. *gharifensis* K. Addam & M. Bou-Hamdan, from Lebanon is described and illustrated. Morphologically this subspecies closely resembles *Ophrys omegaifera* H. Fleischm. group and in particular *Ophrys omegaifera* H. Fleischm. subsp. *israelitica* (H. Baumann & Künkele) G. & K. Morschek but differ in floral details, such as: bigger flowers that diverge from the stem at almost 90° and have macula (mirror) characterised by two bright yellow, symmetrical, ovoid-shaped, concave patterns that vary in size. Plants seem to be shorter with inflorescences typically carrying one, rarely, four flowers.

Keywords- Bee orchid, Lebanon, Middle East, taxonomy

Citation: Addam K., et al. (2013) *Ophrys omegaifera* Subsp. *gharifensis* (Orchidaceae), A New Subspecies from Lebanon. Journal of Botanical Research, ISSN: 0976-9889 & E-ISSN: 0976-9897, Volume 4, Issue 1, pp.-25-27.

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Introduction

The most interesting of all orchid genera is probably terrestrial *Ophrys*. The uniqueness of this genus lays in the evolutionary two-way relationships between insects and plants. As a result of such relations, the flowers of *Ophrys* have evolved a few extraordinary devices that mimic morphological features and the female sexual pheromones of certain bee species (rarely wasps or beetles) to deceive inexperienced male bees into landing and pseudo-copulating on the flower labellum [1]. The floral scent guides the pollinator to the flower (long-distance attraction) [2]; whereas visual cues like petal colour and speculum structure attract the male bees to the flower at short distances [3-5]. Tactile cues such as trichomes on *Ophrys* labella and the three-dimensional topology of the lip, on the other hand, guide the insects to find the right position for pollination. Such sexual deception is the main prerogative of orchid's survival.

Ophrys species are distributed from Central to South Europe, North Africa, Asia Minor, up to the Caucasus Mountains, but mostly in the Mediterranean region. Geological upbringing, favourable climate and topographical diversity of Lebanon contribute greatly to the richness of its flora. This small country on the East Mediterranean hosts more than 3000 species of plants documented by various botanists [6,7]. Haber & Haber [7] have recorded eighty six species and subspecies of Orchidaceae in Lebanon. Thirty two of them were identified to belong to *Ophrys* genus. However, new species and subspecies of Orchidaceae family are continually being discovered one of which is described here. All cited specimens have been seen by the authors.

Taxonomy

Ophrys omegaifera subsp. *gharifensis* K. Addam & M. Bou-Hamdan subsp. nov. De Libano describitur ac illustratur. Haec species simillimam *Ophrys omegaifera* subsp. *israelitica* (H. Baumann & Künkele) G. Morschek & K. Morschek sed differunt talis nobis: grandior flores divergantur a gradum 90° et habent macula propria sunt duo lucida flavis, commensus, ovoideae informibus, concava exemplaria variare in magnitudine. Inflorescentia typice portat unum, raro, usque ad quattuor floribus. Typus: Lebanon, Gharifeh, 35 km away from Beirut, 650 m alt., 2 Feb. 2011, Addam & Bou-Hamdan 1001 (holotype GU!, isotype LU).

Herb hermaphrodite, with erect, glabrous stem, from 9 to 23 cm height. Leaves basal, elliptic, acute, glabrous, entire, parallel veined, lamina up to 7 cm long and 3 cm wide. Inflorescences loose spikes bearing 1 to 4 flowers. Bracts light green, 2 to 2.4 cm long and up to 1 cm across. Flowers up to 20 mm long. Sepals concave, ovate, light green, with dorsal 10 to 12 mm long and 6 mm wide, curved down towards the labellum, and wide-spread, symmetrical laterals 12-14 mm long and up to 7 mm wide. Petals light green, narrowly oblong, spread out, from 7 to 9 mm long and up to 2 mm across, with yellowish to brownish, undulated edges. Labellum with divergence angle 90°, light to dark brown, hairy, from 13 to 18 mm long and 8 to 14 mm wide, acutely trilobate, central lobe, with a distinct notch, side lobes rounded, with yellowish to reddish-brown edges, curved rearwards. Speculum, light-coloured, with blue blotches and two symmetrical, ovoid-shaped of varied size, concave yellow patterns clearly outlined by a thin blue line, flat, sharply delimited by a wide, grey or silver ω-shaped line

[Fig-1], [Fig-2], [Fig-3] and [Fig-4]. Ovary inferior 15-18 mm long. Fruit capsule.

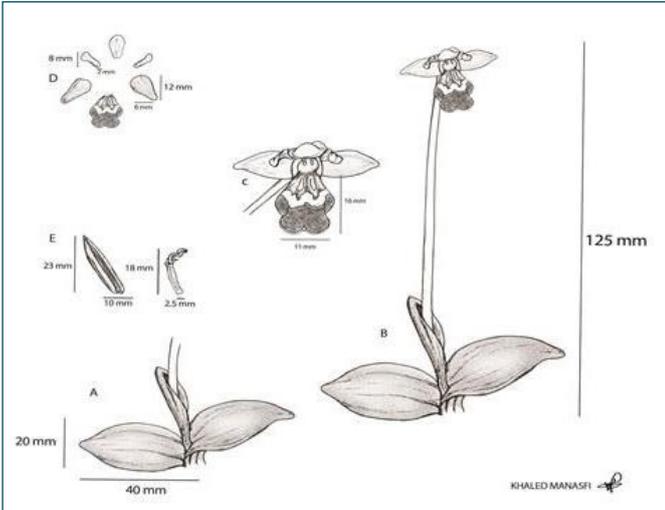


Fig. 1- 1A: leaves form a *Ophrys omegifera* subsp. *gharifensis* basal rosette at the base; 1B: inflorescence consists of one flower; 1C: flower viewed from above; 1D: floral organs; E bract and ovary. (from Addam & Bou-Hamdan 1001 (Holotype GU!); Drawn By: Khaled Manasfi.)

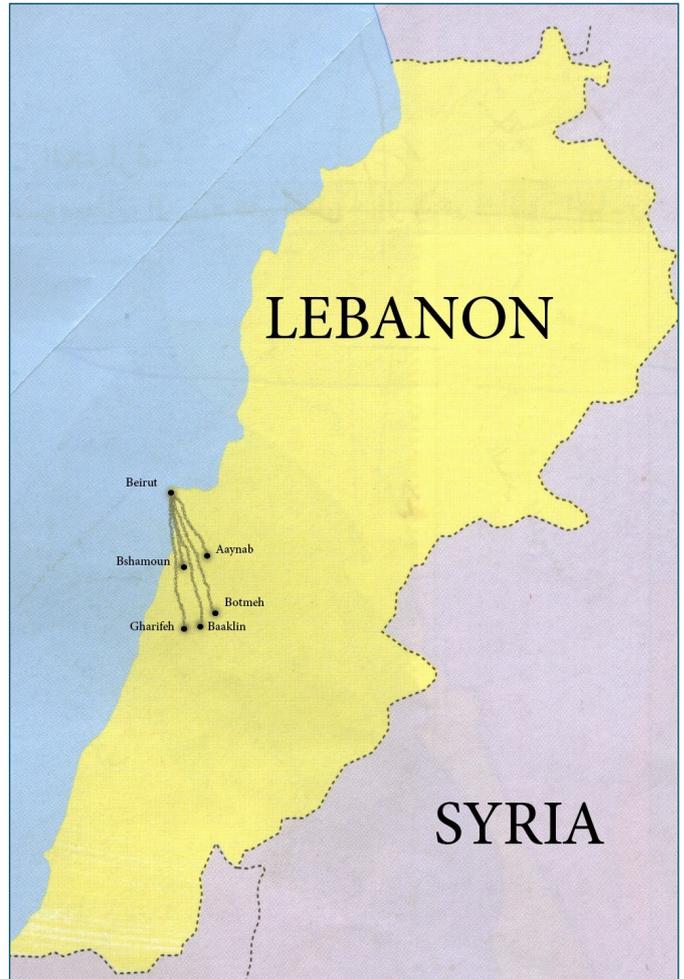


Fig. 2- *Ophrys omegifera* subsp. *gharifensis* in flower (Photo: Addam K.)

Distribution

Western slopes of Mount Lebanon Range, Lebanon: Two flowering plants were found in Bshamoun (N 33 47'135" EO 35 30'717"), 261 m alt., 17 km away from Beirut. One flowering plant was found in Aaynab (Ras Eljabal, Kaza of Aaley), 730 m alt., 28 km away from Beirut. Fifteen flowering plants were found in Baakline (Kaza of Chouf) (N 33 39'336" EO 35 32'042"), 762.3 m alt., and four (N 33

4' 132" EO 35 32'162"), 821m alt., 30 km away from Beirut. Three flowering plants were found in Gharifeh (Kaza of Chouf) (N 33 38'721" EO 35 32'111"), 650 m alt., ten (N 33 37'533" EO 35 33'563"), 835.7 m alt., and three (N 33 37.530' EO 35 33'574"), 838.9 m alt., 35 km away from Beirut. Two flowering plants were found in Botmeh (Kaza of Chouf) (N 33 39'80" EO 15 38'87"), and twenty one (N 33 39'768" EO 35 38' 378"), 1052 m alt., 50 km away from Beirut [Map-1].



Map 1- Distribution of *Ophrys garifensis* in Lebanon



Fig. 3- *Ophrys omegifera* subsp. *gharifensis* flower viewed from above (Photo: Addam K.)



Fig. 4- *Ophrys omegaifera* subsp. *gharifensis* flower parts variations (Photo: Addam K.)

Specimens Examined

Lebanon: 35 km away from Beirut, Gharifeh, N 33 38.721' EO 35 32.111', 650 m alt., 2 Feb. 2011, Addam & Bou-Hamdan 1001 (Holotype GU!); 17 km away from Beirut, Bshamoun, N 33 47'135" EO 35 30' 717"), 261 m alt., 22 Jan. 2012, Addam & Bou-Hamdan 2001 (isotype LU); Gharifeh, 22 Jan. 2012, Addam & Bou-Hamdan; 5 km away from Gharifeh and 30 km away from Beirut, Baakline, N 33 39'336" EO 35 32'042", 762.3 m alt., 22 Jan. 2012, Addam & Bou-Hamdan 2002 (isotype LU); Gharifeh, Bshamoun, Baakline, Aaynab, N 33 37'533" EO 35 33'563", 835.7 m alt., Botmeh, N 33 39'80" EO 15 38'87", 1044 m alt., and N 33 39'768" EO 35 38' 378" 1052 m alt., beginning Dec. until end Feb. 2013, Addam & Bou-Hamdan 2003 (isotype LU).

Habitat

Low to middle mountain zone of western slopes of Mount Lebanon Range, pine forest; 260-1100 m alt.

Conservation Status

Sixty one specimens of this species were found to grow in five much localized areas on western slopes of Mount Lebanon Range at 18-20 km² proximity from each other. The direct observations over 3 year's period indicated no decline in population size. However, the authors consider that this subspecies should be classified as Critically Endangered (CR B1ac (ii, iv)) [8]. Some geographical areas such as Bekaa Plain, Anti-Lebanon and some North and South Mount Range were not assessed for the presence of this species due to the political dispute in these regions.

Phenology

Flowering: Early Dec. to Feb. end.

Etymology

The subspecies epithet is given in honour of Gharifeh village. There are many legends about the origin of the name of Gharifeh but many agree that it comes from Syria and means "cliff" or "extended mountain." The village of Gharifeh is located in the Caza of Chouf, one of the 6 Cazas on the Mohafazah of the Mount Lebanon.

Notes

The new subspecies appear to grow strictly in moist, shady and calciferous soils. Each population of *Ophrys omegaifera* subsp. *gharifensis* was normally observed to share its habitat with moss (*Sharrpiella seliger* (Bird.) and *Collybia dryophila* (Bull.: Fr.) Kum-

mer mushrooms. The general structure of *O. omegaifera* subsp. *gharifensis* plant is similar to the plant structures of the *Omegaifera* group. It is characterised by early December flowering. Usually, leaves form a basal rosette at the base in the late autumn. Later, the two uppermost leaves would grow up and parallel to the delicate stem enclosing its base [Fig-1A]. Typically, plants consist of not more than five leaves. Inflorescence generally consists of one (mostly) to maximum of 4 flowers (one specimen found) [Fig-1B], [Fig-2]. Plants of *O. omegaifera* subsp. *israelitica*, on the other hand, are usually taller and carry up to 10 flowers in its spike [8]. The size of the flowers is somewhat bigger than the flower size of *O. omegaifera* subsp. *israelitica*, however, labellum is held strictly horizontally forward. Basal and central areas of the lip including speculum are flat and glabrous, whereas lower section of the labellum is hairy and only slightly curved downwards. The edge of the lip has a velvety, yellowish to reddish-brown border, generally fairly narrow and of a constant width along the entire edge [Fig-3].

The lateral lobes to some extent hirsute and tend to fold back under the central lobe but also could part away from it. The short stem with very few but bigger flowers and with their system of speculum coloration, form, size and the arrangement of colours of the macula (mirror) are the major distinguishing attributes of *de nova* subspecies from that of *O. omegaifera* subsp. *israelitica* [Fig-4]. Bright yellow, ovoid-shaped, varied in size, concave patterns that are clearly outlined by a thin blue line are the key elements characterising this new subspecies [Fig-1], [Fig-3] and [Fig-4].

Acknowledgement

The authors would like to thank all those who volunteered to help in the hunt for new orchid species, Khaled Manasfi for preparing the illustrations, Global University for funding and the Lebanese University for using its facilities.

Conflict of Interest: None declared.

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