



Neotinea tridentata var. *libanotica* (ORCHIDACEAE), A NEW VARIETY FROM LEBANON

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Received: April 16, 2014; Accepted: May 02, 2014

Abstract- A new variety, *Neotinea tridentata* var. *libanotica* K. Addam & M. Bou-Hamdan, from Lebanon is described and illustrated. Morphologically this variety is close to *Neotinea tridentata* (Scop.) R.M. Bateman, A.M. Pridgeon & M.W. Chase, *Neotinea tridentata* subsp. *conica* (Willd.) R.M. Bateman, Pridgeon & M.W. Chase, but differ in floral details, such as: 3 to 4 basal scale leaves, inflorescence is ovoid to elongate, the perianth segments are not curved and don't form a helmet (hood) and are widely opened, the angle formed between the lateral and dorsal sepals is 90° bisected by the petals forming two equal 45° angles, the angles formed between the two sepals varies from 180°-160°, the lip pendent or projecting forward at an angle of 65°.

Keywords- Three-toothed orchid, Lebanon, Middle East, taxonomy

Citation: Addam K., et al. (2014) *Neotinea tridentata* var. *libanotica* (Orchidaceae), A New Variety from Lebanon. Journal of Botanical Research, ISSN: 0976-9889 & E-ISSN: 0976-9897, Volume 5, Issue 1, pp.-035-038.

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Introduction

Neotinea, Latin *Tinea* a moth; Neo Greek prefix signifying new, or fresh. Origin: *Neotinea*, from V. Tineo a 19th century Sicilian botanist [1].

This genus was originally *Tinea*, to which the younger Keichenbach prefixed Neo, to distinguish it from *Tinea*, a well-known genus of small moths [2].

The *Neotinea tridentata* group whose name means "three teeth" and refers to the canine-like points on the hood was first described from Slovenia in 1772. Originally it was grouped with the genus *Neotinia* before being reclassified as an *Orchis*. After considerable recent research the *O. tridentata* group has now been returned to the *Neotinea* genus [3].

"This newly recognized genus of some seven European species, all of which have recently been reclassified and moved from the genus *Orchis*. The species were all once part of the monophyletic *Orchis tridentata* group which had, for many years, been the subject of considerable research and study. The group was known to be in many ways similar to the *Orchis militaris* group until subsequent molecular analysis failed to support this position and threw up results that were contradictory but without being conclusive." [3]. Further study eventually led to their assignment to the genus *Neotinea*, *Neotinea commutata*, *Neotinea conica*, *Neotinea maculata*, *Neotinea tridentata*, *Neotinea tridentata* x *ustulata*, *Neotinea ustula-*

ta. *Neotinea* species are distributed from Central to South Europe, North Africa, Asia Minor, up to the Caucasus Mountains, but mostly in the Mediterranean region [4].

Both of Dr. Paul Mouterde (1892-1972) the author of "Nouvelle flore du Liban et de la Syrie" and Prof. George Edward Post (1838-1909) the author of "Flora of Syria, Palestine and Sinai" mentioned the presence of two *Neotinea*: *Orchis commutata* Tod. synonym of *Neotinea tridentata* (Scop.) Bateman, Pridgeon & Chase and *Orchis lactea* Poir. synonym of *Neotinea lactea* (Poir.) Bateman, Pridgeon & Chase [5,6].

Orchid 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, favorable 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 [4,5]. Haber & Haber [5] have recorded eighty six species and subspecies of Orchidaceae in Lebanon. Four of them were identified to belong to *Neotinea* genus* *Neotinea tridentata* (Scop.) Bateman, Pridgeon & Chase, *Neotinea tridentata* var. *commutata* (Tod.) Kreutz, *Neotinea tridentata* subsp. *conica* (Willd.) Bateman, Pridgeon & Chase in. *Neotinea maculata* (Desf.) Stearn. 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

The plant has two ellipsoidal tubers, with erect, glabrous stem 15-30 cm tall that [Fig-1](A), [Fig-3] contains 3 to 4 basal scale leaves, 3 to 4 glaucous green unspotted foliage leaves (grouped in a rosette or spaced out on the stem) and 1 to 3 leaves sheathing the stem higher up [Fig-1](B), [Fig-3] lower leaves narrow - lanceolate 4-12 cm long and 2-3.5 cm wide [Fig-1](C). Inflorescence ovoid to elongate [Fig-1](D), [Fig-5], flowers are small, weakly scented [Fig-1](E), [Fig-4], bracts lilac 7-10 mm long ± equal to ovary [Fig-5][Fig-6].

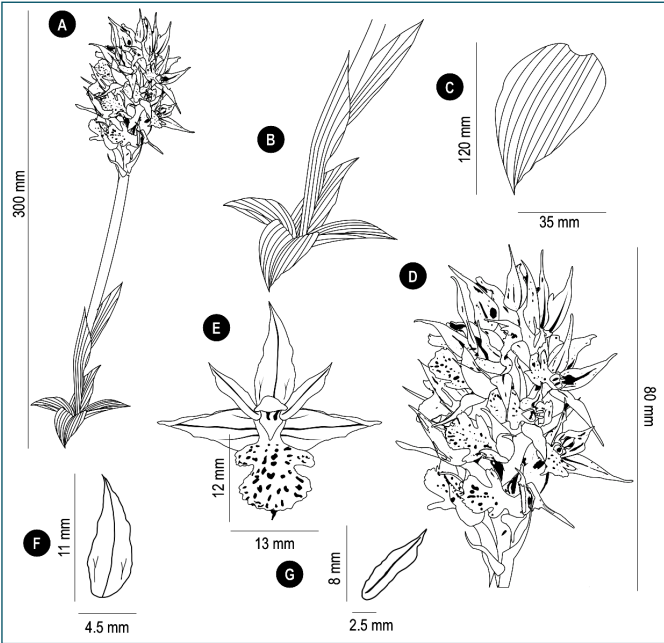


Fig. 1- 1A: Whole; **1B:** flower leaves form basal rosette at the base and stem leaves; **1C:** Basal leaf description; **1D:** inflorescence of the flower; **1E** Single flower; **1F** Sepal; **1G** Petal (from Addam & Bou-Hamdan 1002 (Holotype GU); Drawn By: Khaled Manasfi)

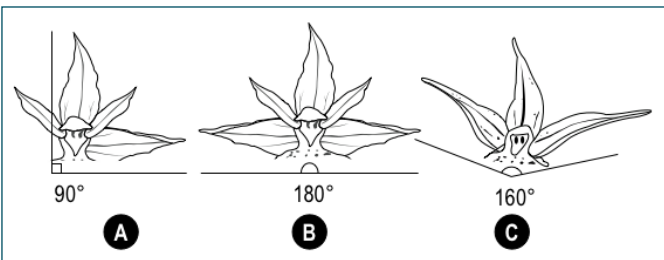


Fig. 2- 1A: 90° angle formed by the lat. & dors. Sepals; **2B:** 180° angle between the two lat. Sepals; **2C:** 160° angle between the two lat. Sepals.

Parianth segments are not curved, don't form a helmet (hood), and are widely opened; the angle formed between the lateral and dorsal sepals is 90° bisected by the petals forming two equal 45° angles, the angles formed between the two sepals varies from 180° to 160° [Fig-2](B&C),[Fig-5],[Fig-6]. Sepals purplish-pink to light pink with darker veins, ovate 7-11 mm long and 2.5-4.5 mm wide with a short point or extended into a long, grooved, bent point [Fig-1](E&F). Petals are lanceolate 5-8 mm long, 1.5-2.5 mm wide with one dark vein that divides it into two equal parts and have the same color as the sepals and end very sharp [Fig-1](F&G),[Fig-4],[Fig-5]. The lip is 3-lobed toothed pendent and projecting forward at an angle of 65°, purplish-pink to light pink heavily spotted all over the surface with

papillose purple, violet or red dots 7-12 mm long and 7-13 mm wide. The center is flat to slightly concave, lateral lobes varied, oblong, near spatulate, tip rounded or obliquely truncated rarely toothed, median lobe broader and longer than lateral lobes, broadly spatulate, sometimes entire, most often bilobed, secondary lobes short, broad, often near rhomboidal, toothed and separated by a small tooth, spur 5-10 mm long, cylindrical, downward curving [Fig-1](E),[Fig-4].



Fig. 3- Whole plant (Photo: Addam K.)

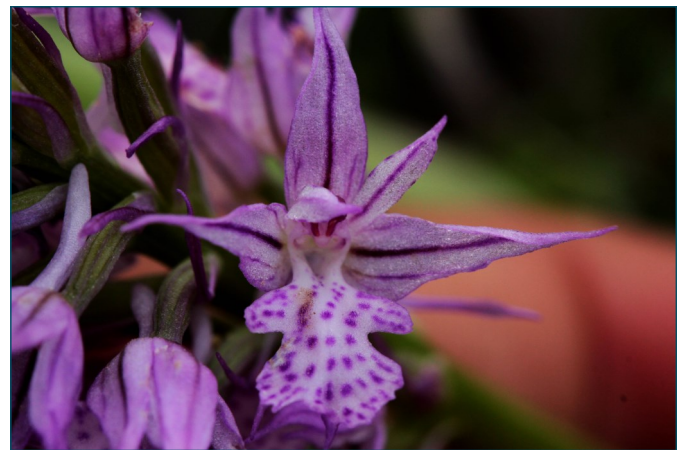


Fig. 4- Flower from above (Photo: Addam K.)

Distribution

Western slopes of Mount Lebanon Range, Lebanon: Two flowering plants were found in Aley [Kaza of Aaley one of the eight mohafazats (governorates) of Lebanon] (N 33° 48' 502" E 35° 36' 753"), 900 m alt., 17 km away from Beirut. Four flowering plants were found in the municipality of Maasser ech Chouf [Kaza of

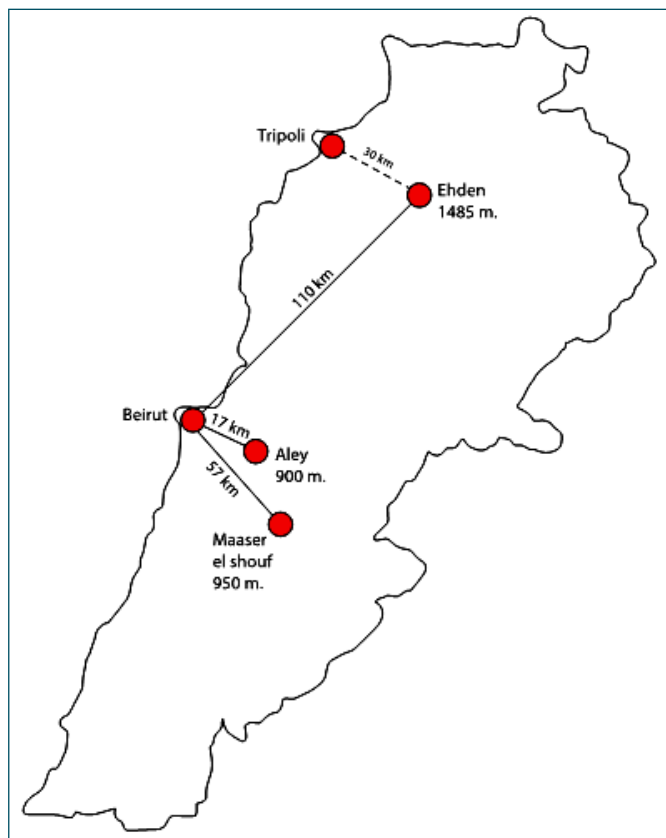
Chouf one of is one of the eight mohafazats (governorates) of Lebanon] (N 33° 37' 419" E 35° 34' 547"), 950 m alt. 57 km from Beirut. Northern mountains of Lebanon and on the southwestern slopes of Mount Makmel, Four flowering plants were found in Ehden (a mountainous town situated in the heart of the northern mountains as it is part of the Zgharta District) (N 34° 18' 178" E 35° 58' 407"), 1485 m and 25 km from Zgharta, 110 km from Beirut and 30 km from Tripoli [Map-1].



Fig. 5- Inflorescence (Photo: Addam K.)



Fig. 6- 65° angle formed by lip projecting forward (Photo: Addam K.)



Map 1- Distribution of *Neotinea tridentate* var. *libanotica* in Lebanon

Conservation Status

Nine specimens of this variety were found to grow in 2 localized areas on western slopes of Mount Lebanon Range at 18-20 km proximity from each other, and in the Northern mountains of Lebanon on the southwestern slopes of Mount Makmel.

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The direct observations over three year's period indicated a decline in population size. However, the authors consider that this subspecies should be classified as Critically Endangered [CR B1ac (ii, iv)] [8].

Specimens Examined

Lebanon: 17 km away from Beirut, Aley, (N 33° 48' 502" E 35° 36' 753"), 900 m alt. 14-4-2012 *Neotinea tridentate* var. *libanotica* Addam K. & Bou-Hamdan M. 1002 (Holotype GU). 57 km from Beirut, Maasser ech Chouf 1002 (Holotype GU), (N 33° 37' 419" E 35° 34' 547"), 950 m alt 4-4-2013. 25 km from Zgharta, 110 km from Beirut and 30 km from Tripoli, Ehden (N 34° 18' 178" E 35° 58' 407") 1485 m alt 1002 (Holotype GU), beginning April until the beginning of May. 2014 [Map-1].

Habitat: poor meadows, open rocky woodlands, and only in cool

sunlit places and never in the shades of the trees, on fresh to fairly dry base - rich soils and only at high altitudes. It grows mostly in open spaces in the mountains where no high trees exist. This orchid usually grows near the following trees: *Cotoneaster nummularia* Fisch. & Mey. *Juniperus oxycedrus* L. *Calycotome villosa* (Vahl) Link.

Phenology: Flowering Late 4-5.

Etymology: The variety epithet is given in honor of Lebanon.

Notes

The new variety *Neotinea tridentata* var. *libanotica* K. Addam & M. Bou-Hamdan appears to grow strictly in open rocky woodlands, and only in cool sunlit places and never in the shades of the trees, on fresh to fairly dry base - rich soils and only at high altitudes (above 900m) while *N. tridentata*, *N. conica* and *N. commutata* grow in the shade and in sunlit, both places and at an altitude of 50 m to 1600 m. It grows mostly in open spaces in the mountains where no high trees while the others *N. tridentata*, *N. conica* and *N. commutata* grow in open spaces and under pine trees. *Neotinea tridentata* var. *libanotica* usually grows near the following trees: *Cotoneaster nummularia* Fisch. & Mey. *Juniperus oxycedrus* L. *Calycotome villosa* (Vahl) Link.

The general structure of the *Neotinea tridentata* var. *libanotica* K. Addam & M. Bou-Hamdan plant is similar to the plant structures of the *Neotinea tridentata* group with 3 to 4 basal scale leaves while the *N. conica*, *N. tridentata* and *N. commutata* have up to 11 leaves. *N. libanotica* has 1-3 leaves sheathing the stem whereas the others mentioned have maximum two leaves [9]. The inflorescence of *N. libanotica* is ovoid to elongate and dense on the other hand the inflorescence of *N. conica* is conical to ovoid and near ovoid and short at *N. tridentata* and finally *N. commutata* has a conical, short one [9]. The perianth segments are not curved and don't form a helmet (hood) and are widely opened, the angle formed between the lateral and dorsal sepals is 90° bisected by the petals forming two equal 45° angles, the angles formed between the two sepals varies from 180° to 160°; however, all the others in the group of *N. tridentata* have a helmet formed of the curved three sepals and the two petals. The open wide sepals of *N. libanotica* is purplish-pink to light pink with darker veins whilst the hood of *N. conica* is white to pale pink, base green, veined green outside, crimson-green inside while the sepals of *N. tridentata* and *N. commutata* are entirely lilac or crimson-pink rarely whitish, veined purple. The lip pendent or projecting forward at an angle of 65°, while in *N. tridentata*, *N. conica* and *N. commutata* the angle is 45° on the other hand the size of the lip in *N. libanotica* is 7-12 mm long and 7-13 wide while the lip in *N. conica* 5-8 mm long 5-9 mm wide. in *N. tridentata* the lip is 7-12 long and that for *N. commutata* is 12-20 long. We did not mention the difference between *N. libanotica* and *N. lactea* because it is totally different from the others in the group by its lip that is deeply tri-lobed [10] convex, lobes turn down at the point of attachment (when fully open), middle lobes sometimes sharply bent down [7], strong spur pointing down wards [11].

Acknowledgement

The authors would like to thank all those who volunteered to help in the hunt for new orchid species, Dr. Mustafa Hamzah CBT (Chairman of Board of Trustees) Arts, Sciences and Technology University in Lebanon (AUL), Khaled Manasfi for preparing the illustrations, AUL and Global University for funding.

Conflict of Interest: None declared.

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