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A new form of *Ophrys bombyliflora* Link described from Malta

Keywords

Orchidaceae; *Ophrys bombyliflora* forma *parviflora*; taxonomy; Malta.

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A new form, *Ophrys bombyliflora* Link forma *parviflora* S. Mifsud is described for plants with significantly smaller lips from the typical form of *Ophrys bombyliflora* and with a bright, contrasting speculum. These plants were observed as homogenous populations in 2 different sites in Malta, isolated from populations of the locally common *Ophrys bombyliflora* Link.

Zusammenfassung

Mifsud, S: (2009): Eine neue Form von *Ophrys bombyliflora* Link aus Malta.- J. Eur. Orch. 41 (3/4): 611-622.

Auf Malta wurden an zwei Fundorten homogene Gruppen von *Ophrys bombyliflora* Link beobachtet, die sich durch kleinere Lippen und hellerem Mal von der hier häufig vorkommenden typischen Form unterscheiden und räumlich deutlich von dieser getrennt wachsen. Sie werden als *Ophrys bombyliflora* Link forma *parviflora* S. Mifsud neu beschrieben.

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Introduction

Ophrys bombyliflora is observed to have a rather stable morphology apart from the taxonomically-insignificant variations in the pattern of the speculum. This stability is reflected in the fact that despite this taxon has been described more than 200 years ago (LINK 1800: 325), it has not undergone many taxonomical changes and according to IPNI (2009) only 2 taxa are recorded in their database of plant names - *Ophrys bombyliflora* Link subsp. *canariensis* G.Kunkel which do not have a type and Latin description and *Ophrys bombyliflora* Link f. *buccheriana* De Langhe & R.D'Hose, described from Sicily (DE LANGHE & D'HOSE 1985: 70) which like the previous taxon, is not given any credit in recent publications such as DELFORGE (2006) or BAUMANN *et al.* (2006).

However, homogenous populations of *Ophrys bombyliflora* from 2 different sites in Malta have shown important differences from the last revised descriptions of *Ophrys bombyliflora* given by DELFORGE (2006) or BAUMANN *et al.* (2006). The general reduction in the size of the flower and to some extent the slightly different shape in the median lobe and petals are considered significant enough for a description of a new form of this species – *O. bombyliflora* Link forma *parviflora* S. Mifsud.

Isometric analysis of the lip of the new form

i) Method and material

Measurements of important distinguishing characters in the lip of the typical *Ophrys bombyliflora* and those of the smaller flower form were taken in situ and compared. The two most important characters that differ from the typical form are the width of the broadest part of the unfolded median lobe (usually just above its tip) and the length of the lip specifically from the shoulders of the lateral lobes (or else the upper boss of the stigmatic cavity) to the tip of the median lobe.

The width of the median lobe was preferred from the conventional width of entire lip (that is from shoulder to shoulder of the lateral lobes) because in this species, the orientation of the lateral lobes varied between specimens of different maturity [Figure 5] and this was prone to give inconsistent width results, whereas the shape of median lobe is stable enough for this analysis.

10 random specimens from the population with small flowers and 10 random

specimens of *O. bombyliflora* from different populations at the locality of Pembroke were selected for measurement. The measurement was done by a digital Vernier scale, and values were rounded to the nearest 0.5mm. Results are given in Table. 1

ii) Interpretation of Results

The results show that the lip of *O. bombyliflora* with small flowers is on average 6.5mm long and 4.5mm wide (ref. median lobe alone) which on comparison, it is significantly smaller from 9.5mm by 7.2mm respectively for the typical *O. bombyliflora* found in Malta. This equates that the lip of the small-flowered variants are smaller by about 30%

iii) Other morphological differences

Apart that all flower parts are as expected, relatively smaller, the upper petals in the small-flowered plants were found almost as long in *O. bombyliflora* but slender. They measured 4mm long and 2mm wide compared with 4mm x 3mm respectively in *O. bombyliflora*. Apart being more slender, the triangular shape, petal colour and hair distribution and colour were similar.

On a similar note, the median lobe also had a rather slender shape in many specimens observed. Rather than being perfectly globular as in the typical *O. bombyliflora* specimens, it assumed an oblong-like shape with a rounded tip. On the other hand the size of the column was almost the same size, and so it appears large compared to the small stigmatic cavity (2mm) of the small-flowered form. [Figure 3]

The speculum of the small-flowering *O. bombyliflora* was to some extent also different. All specimens studied had a highly contrasting speculum owing to the fact that it was milky-blue to ash-grey (almost white) in colour and therefore contrasting out well with the darker surrounding of the lip. Many specimens had 'butterfly-shaped' (▶◀) speculum, and in few it was even dissected. The speculum of *O. bombyliflora*, as described by DELFORGE (2006) is often "obtrusive" and has the shape of a bi-lobed shield and in fact this generally concurs with the specimens found in Malta, though it must be said that rarely, specimens with contrasting speculum can be found.

Table 3 gives a full comparison between the small-flowered plants and the typical *O. bombyliflora* as found in Malta.

Habitat and Distribution in Malta

Ophrys bombyliflora Link is one of the most common and vastly distributed orchids on the Maltese Islands and in fact BARTOLO *et al.* (2001) gives over 70 different sites on the islands of Malta. The population of *O. bombyliflora* with significantly small flowers was first observed on 1st March 2007 in a coastal garigue about 300m away from the North East coast of mainland Malta known as Pembroke, more precisely at the site known as the Rifle ranges of Pembroke. This was observed again on the 29th February 2008 and recently on the 27th February 2009.

The population at Pembroke, the type locality, was found in rather shallow damp soil in a basin of karstic rock in a garigue habitat (approx 300m away from the sea). The area of occurrence measured 2.2m x 1.2m and more than 100 specimens could be counted, the flowering ones all with small flowers. Accompanying plants recorded amongst this population on 1st March 2009 were *Trachynia distachya* (L.) Link, *Sherardia arvensis* L., *Galactites tomentosa* Moench, *Scilla autumnalis* L., *Romulea ramiflora* Tenore, *Linum trigynum* L., *Euphorbia exigua* L. *Hyparrhenia hirta* (L.) Stapf, *Anthyllis vulneraria* L. subsp. *maura* (G.Beck) Maire, *Urginea pancration* (Steinheil) Philippe, *Scorpiurus muricatus* L., *Reichardia picroides* (L.) Roth, *Asparagus aphyllus* L., *Trisetaria aurea* (Tenore) Pignatti, *Thymus capitatus* L., *Evax pygmaea* (L.) Brotero, *Carlina involucreta* Poiret, *Sherardia arvensis* L., *Gynandris sisyrinchium* (L.) Parlatore, *Teucrium fruticans* L., *Prasium majus* L., *Convolvulus lineatus* L., and *Leontodon tuberosus* L.. The first 10 species listed above were the most common, and the dominating species was the short grass *Trachynia distachya*.

Two populations of pure flocks similar to the type locality were also found at “ix-Xaghra tal-Ghattuqa” (23rd March 2008) and “ix-Xaghra tal-Qallelija” (27th March 2009) both situated in an area called Bingemma, limits of the village of Mgarr located in the West part of mainland Malta. They were 500-600m apart and found in a slightly degraded labiate garigue with more or less the same species as in Pembroke but with the presence *Ferula communis* L., *Allium roseum* L. and more *Lamiaceae* plants, namely *Thymus capitatus* L. and *Teucrium fruticans* L. Both populations were much smaller from that of Pembroke, comprising of 30 to 50 plants scattered over an area of about 2.0 m x 1.5 m and seem to be not fully established as the one in Pembroke.

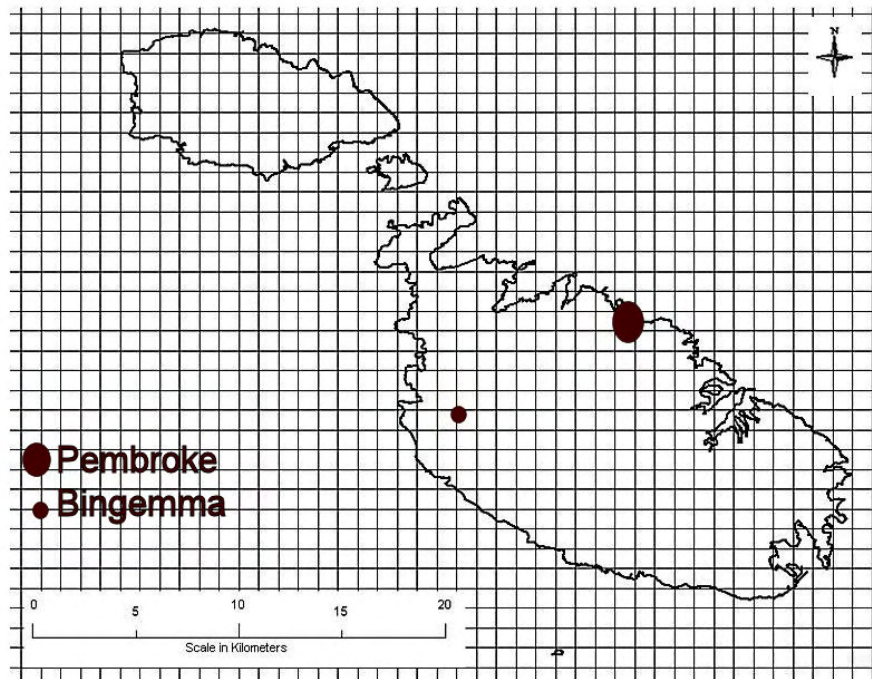


Fig. 9: Distribution map of *Ophrys bombyliflora* forma *parviflora* in the Maltese islands.

Taxonomic discussion

The populations mentioned above formed only small flowers and no large-flowering forms were found intermixed within. In other words it consisted of a pure flock of the small-flower form. The closest population of *O. bombyliflora* in the type locality was found 50-60 m away, and was locally frequent in this area, but always present in small isolated patches. No intermediate specimens or intermixed populations were observed during a number of surveys close to the type locality population. Hence the populations of *O. bombyliflora* that are known to the author exhibit themselves homogenously either in the size-range of the normal form or in the small-flowered form.

It must be also mentioned that the small flowers are not a result of stunted plants or plants living in an environment-stressed conditions, but the differences are genetically derived. This was concluded because the height of the plants varied from 4 cm to 14 cm (average 10 cm) which is more or less the same for *O. bombyliflora* s.l. and some specimens had their leaves measuring about 8 cm × 3 cm, [Figure 1, 2] which are even relatively large compared to those normally formed by *O. bombyliflora* in Malta. The populations in Pembroke and Bingemma were growing in full sunshine and in fertile soil owing to the quantity and type of accompanying flora present.



Fig. 1: *Ophrys bombyliflora* forma *parviflora*, Pembroke, Malta (Holotype locality), 29-Feb-2008; Plant with small flower but large leaves. Photograph by S. Mifsud.



Fig. 2: *Ophrys bombyliflora* forma *parviflora*, Pembroke, Malta (Holotype locality), 27-Feb-2009; Two plants from the population of 100-150 plants. Photograph by S. Mifsud.

For these reasons, the description for these pure flocks of variants with small flowers and bright speculum is suitable. The key to distinguish the 2 taxa is suggested to be the width of the median lobe of the lip where specimens with a width of 5mm or less are assigned to the new form *Ophrys bombyliflora* forma *parviflora* S. Mifsud. Since the morphology of the flower is essentially similar to *O. bombyliflora*, and no pollinator studies have been carried out, the taxonomical rank of forma is proposed.

***Ophrys bombyliflora* Link forma *parviflora* S. Mifsud forma nova**

Diagnosis: *Ophrys bombyliflora* similis, sed flore omni modo minor, cuius sepala lateralia 7-9 mm × 4-5mm, sepalum dorsaliun 7-8mm × 4-5mm, petala 3.5mm × 2mm, labellum (5.5) 6.0-7.0 (7.5)mm × 6-7mm longa et lata. Lobus medianus labelli tantum 4-5mm latum. Petala quomodo teneriores, lobus medianus labelli oblongior quam globosior. Speculi forma varians, saepe papilionis, vel etiam filo tenero divisa, sed semper a labello circumstante colore fulvo nebuloso discrepans, colorem caeruleum lacteum, conspicuum et clarum, praebens.

Holotypus: Rifle ranges in the locality of Pembroke, North East area of Malta. Patches of damp soil dominated by short grasses and garigue communities in a shallow basin formed in karstic limestone rock forming part of a garigue about 300m away from the sea. 1st Mar 2007, leg. S.Mifsud. Deposited at the Argotti Botanic Garden Herbarium, Floriana (Malta).

Description: Similar to *Ophrys bombyliflora*, but with a general smaller flower size where the lateral sepals measure 7-9mm by 4-5mm, dorsal sepal 7-8mm by 4-5mm, upper petals 3.5mm by 2mm and lip being (5.5-)6.0-7.0 (-7.5)mm long and 6-7mm wide. The width of the median lobe is only 4-5mm. Shape variations are present in the upper petals, which are somehow more slender and also in the median lobe, which is more oblong in shape rather than globose. The speculum shape varies, often butterfly-shaped or even bisected by a fine line but always contrasting out from the dull-brown surroundings of the lip by having a conspicuous, bright milky blue colour.

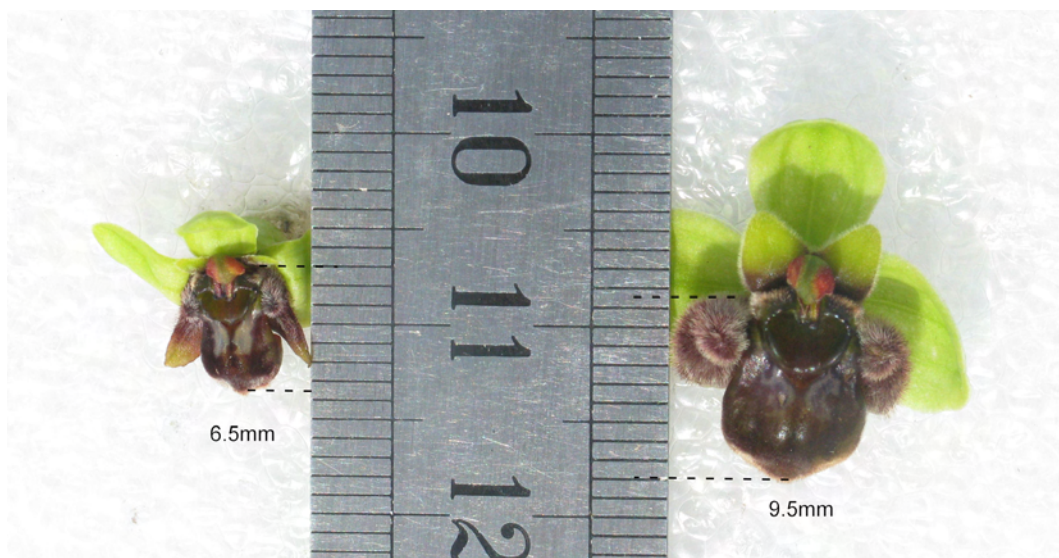


Fig. 3: *Ophrys bombyliflora* forma *parviflora*, Pembroke, Malta (Holotype locality), 10-Mar-2009; Comparative photo showing lip length of this form to be 6.5mm compared with a typical *O. bombyliflora* Link (right side) with a lip length of 9.5mm. Photograph by S. Mifsud.

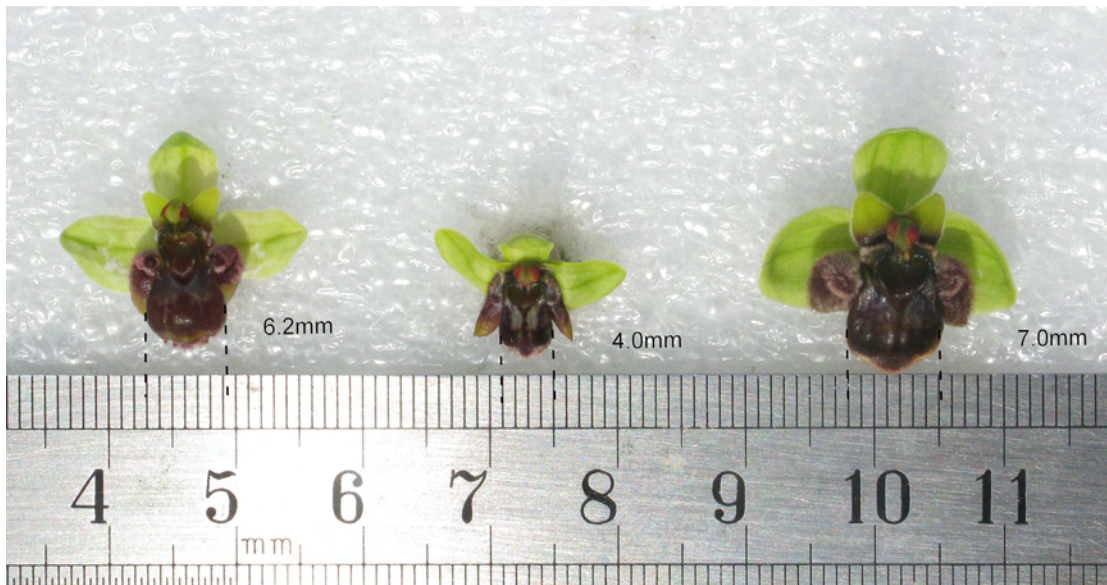


Fig. 4: *Ophrys bombyliflora* forma *parviflora*, Pembroke, Malta (Holotype locality), 10-Mar-2009; Comparative photo showing flower of this form having a median lobe with a width of 4mm (central sample) compared with a typical *O. bombyliflora* Link (right side) with a median lobe of 7mm and another smaller specimen having a median lobe width of 6.2mm. Photograph by S. Mifsud

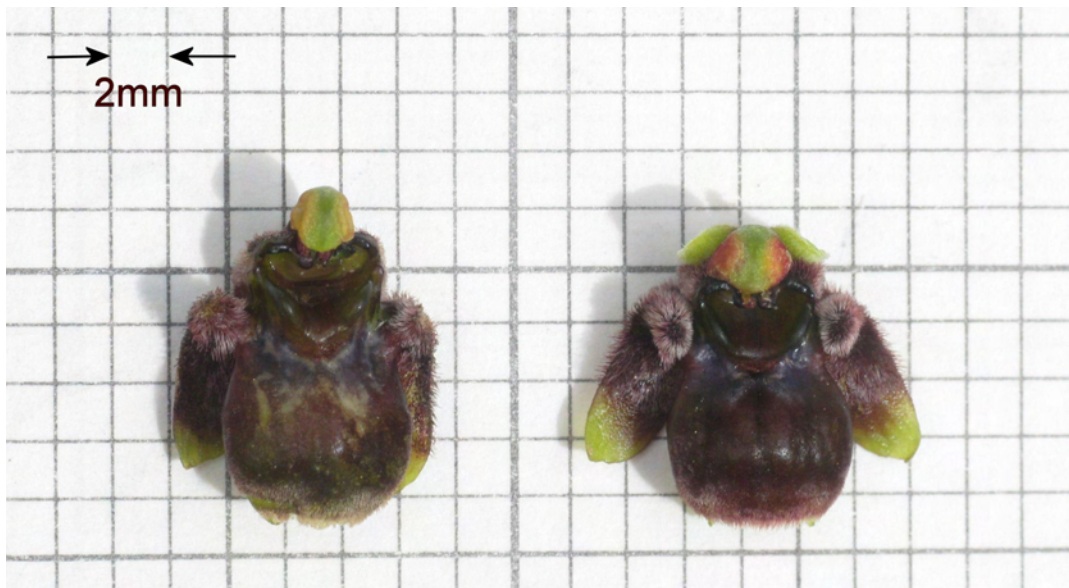


Fig. 5: *Ophrys bombyliflora*, Dingli Cliffs, Malta, 8-Mar-2009; Small specimens of *Ophrys bombyliflora* f. *bombyliflora* found by author in Malta with a lip length of 7.5-8.0mm and a 6.2mm wide, globular median lobe. This photograph also shows how lateral lip lobes vary in orientation and may lead to inconsistent lip-width measurements. Photograph by S. Mifsud.



Fig. 6: *Ophrys bombyliflora* forma *parviflora*, Pembroke, Malta (Holotype locality), 29-Feb-2008; Close up of a specimen. Photograph by S. Mifsud.

Fig. 7: *Ophrys bombyliflora* forma *parviflora*, Pembroke, Malta (Holotype locality), 10-Mar-2009; Closeup of specimen Photograph by S. Mifsud.



Fig. 8: *Ophrys bombyliflora* forma *parviflora*, Pembroke, Malta (Holotype locality), 29-Feb-2008; Composite image of same flower shown from different angles. Photograph by S. Mifsud.

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Tables

Table 1: Results of the measurement of the length of lip and width of the median lobe of *O. bombyliflora* forma *bombyliflora* and *O. bombyliflora* forma *parviflora* from Malta (Pembroke population).

<i>Ophrys bombyliflora</i> forma <i>bombyliflora</i>			<i>Ophrys bombyliflora</i> forma <i>parviflora</i>		
Specimen	Length of lip/mm	Width of median lobe /mm	Specimen	Length of lip/mm	Width of median lobe /mm
1	9.0	7.0	1	6.0	4.5
2	9.5	7.0	2	7.5	5.0
3	10.0	7.5	3	6.5	4.5
4	9.5	8.0	4	6.0	4.0
5	10.5	8.0	5	6.0	4.5
6	8.5	7.0	6	7.0	4.5
7	10.5	7.5	7	7.0	5.0
8	9.0	7.0	8	6.0	4.5
9	9.5	6.5	9	6.5	4.0
10	9.5	7.0	10	7.0	5.0
Average:	9.55	7.25	Average:	6.55	4.55
L/W ratio:	1.31		L/W ratio:	1.43	

Table 2: Comparison of morphological characters between *Ophrys bombyliflora* forma *bombyliflora* and *Ophrys bombyliflora* forma *parviflora* from Malta

	<i>Ophrys bombyliflora</i> forma <i>bombyliflora</i> ⁽¹⁾	<i>Ophrys bombyliflora</i> forma <i>parviflora</i> ⁽³⁾
Plant height	5-25cm ; 5-18cm ⁽³⁾	5-16cm
No. of flowers	1 to 5	1 to 3(-4)
Lateral Sepals (shape; colour)	Broadly oval; bright green ⁽¹⁾ or pale green ⁽³⁾	Identical or narrowly oval with a blunt-tipped apex; bright or pale green
Lateral Sepals (LxW size)	9-12mm x 6-8mm	7-9mm x 4-5mm
Upper Petals (shape)	Broadly triangular; villous; brown at base which gradually change to bright green towards tip.	Same, except more narrow in shape

Upper Petals (LxW size)	3-4mm x 3-4mm ⁽¹⁾ ; 3.0 - 5.0mm x 2.5 - 3.5mm ⁽²⁾	3.5mm x 2mm
Lip size (LxW) [Figure 3]	8-10mm x 11-13mm ⁽¹⁾ ; 6-10mm x 7-10mm ⁽²⁾ ;	6-7mm x 6-7mm ⁽⁴⁾
Median lobe (LxW size) [Figure 4]	6-8mm x 6-8mm ^(3,5) ; globular	4.0-5.0mm x 4.0-4.5mm ^(3,5) ; oblong-globular
Lip Length:Width Ratio	0.8	1.0
Median lobe (shape)	Globular, with pale grey hair longest at the appendage	Assumes a more oblong shape rather than globular . Same pilosity
Lateral lobes	Acute conical swellings at base which gradually develops into a triangular flap; villous outside to hairless at tip	Identical shape
Size of lateral lobes (LxW)	8.5 x 3.0mm ⁽³⁾	6 x 2mm
Speculum	Unobtrusive, pale brown, grey or purple sometimes edged white; shaped as bilobed shield; ⁽¹⁾ . Occasionally bright and contrasting with surrounding dark lip. ⁽³⁾	Always bright (milky blue to almost white) and conspicuous, hence contrasting out from the surrounding dark lip; butterfly-shaped (▶◀) sometimes even dissected.
Appendage	Triangular, hairless, fleshy, strongly bent down, pale green	Identical
Stigmatic Cavity (shape)	Hemispherical, surrounded by bosses;	Identical
Stigmatic Cavity (LxW size)	3.0mm x 3.5mm ⁽³⁾	2.0mm x 2.5mm
Column	Short, rounded tip, loculus red outside	Identical and same size, and hence looks relatively larger in this small-flower form

(1) As per description in DELFORGE (2006)

(2) As per description in BAUMANN et al. (2006)

(3) General observation from populations in Malta; sizes from an average of 10 specimens

(4) Length of lip is measured from shoulders of its lateral lobes to the tip of its median lobe

(5) Length of median lobe is measured from wall ('boss') of the basal part of the stigmatic cavity to the tip of the lobe