

CRITICAL NOTES ON THE SICILIAN FLORA: THE GENUS *DACTYLORHIZA* NECKER EX NEVSKI SECT. *DACTYLORHIZA*

by

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Abstract

MAZZOLA, P., R. LIDBERG & M. RAIMONDO (1981). Critical notes on the Sicilian flora: The genus *Dactylorhiza* Necker ex Nevski sect. *Dactylorhiza*. *Actas III Congr. OPTIMA. Anales Jard. Bot. Madrid* 37(2): 661-676.

The genus *Dactylorhiza* Necker ex Nevski sect. *Dactylorhiza* in Sicily has been revised as regards taxonomy, distribution, ecology and caryology. Field examination of sicilian populations and studies of literature and herbariums have lead to the conclusion that in Sicily occurs only one taxon: *Dactylorhiza saccifera* (Brongn.) Soó. The identification has been confirmed by comparison with populations from locus classicus in Peloponnese. The authors formulate the hypothesis that the notable polymorphism of *D. saccifera* in the sicilian area is one of the main reasons of ancient authors attributing other taxa of the mentioned section to this region.

Resumen

MAZZOLA, P., R. LIDBERG & M. RAIMONDO (1981). Notas críticas sobre la flora de Sicilia: El género *Dactylorhiza* Necker ex Nevski Sect. *Dactylorhiza*. *Actas III Congr. OPTIMA. Anales Jard. Bot. Madrid* 37(2): 661-676 (En inglés).

Después de un estudio taxonómico, corológico, ecológico y cariológico de las especies del género *Dactylorhiza* Necker ex Nevski Sect. *Dactylorhiza* en Sicilia se llegó a la conclusión de que existe un sólo taxón: *Dactylorhiza saccifera* (Brongn.) Soó. Los autores piensan que el notable polimorfismo que presenta *D. saccifera* en Sicilia, es una de las razones por las que otros táxones de esta sección habían sido citados anteriormente para esta región.

INTRODUCTION

The genus *Dactylorhiza* Necker ex Nevski sect. *Dactylorhiza* is to be found in Sicily in humid areas above 600 metres in the mountainous regions of the northern part of the Island, between Palermo, Messina and Catania. Even though this stretch of Sicilian territory represents a negligible region compared to the total distribution area in Europe, of the above mentioned section, there are considerable discrepancies bet-

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ween up to date und ancient literature, herbarium data, taxonomic and phytogeographic facts related to the section.

Dactylorhiza maculata s. st. and *D. saccifera* (Brongn.) Soó are reported from the mentioned area, as well as *D. elata* (Poir.) Soó. They are often assigned to the same localities. Due to the constricted area of these localities in Sicily, the existence of taxa should have been revealed during the course of later years. Besides the close affinity of the taxa in question, this area has interested the authors from the point of view of giving a better interpretation of the part that the section plays within the local hygrophilous vegetation.

LITERATURE

From the description of the *Orchis palmata montana*, given by CUPANI (1713) (Fig. 1) up to the present day, Sicily has been the object of a series of reports and descriptions relating to the section under examination. UCRIA (1789:383) notes *Orchis latifolia* L. as well as *O. maculata* L. Beside this last taxon, TODARO (1842) describes *O. gervasiana* Tod. LOJACONO (1908) reports *O. incarnata* L., *O. munbyana* Boiss. & Reuter and describes *O. incarnata* L. var. *comosa* Lojac. and *O. saccifera* Brongn. var. *incisa* Lojac.

Various diagnosis and reports were carried out on dry material preserved in the Sicilian Herbarium of the University of Palermo, without a sufficiently reliable comparison in the field with the populations of the Island. This is the case with *O. incarnata* L., *O. munbyana* Boiss. & Reuter and *O. incarnata* L. var. *comosa* Lojac. (LOJACONO, 1908). The diagnosis of *O. gervasiana* Tod. and of *O. bonanniana* Tod. were made merely on the basis of a drawing by CUPANI (TODARO, 1842).

Other ancient scholars only accepted taxa, today referable to the subsect. *Eumaculatae* Verml. (PARLATORE, 1858; STROBL, 1878:183; 1880:60 FIORI 1923:326), while TINEO (1846) presented the description of his new species *O. macrostachys* which has later been identified with *O. saccifera* Brongn.

In up to date literature, according to the most recent Italian Flora (ZANGHERI, 1976:1034), *Dactylorhiza maculata* (L.) Soó subsp. *maculata*, *D. maculata* (L.) Soó subsp. *macrostachys* (Tineo) Soó and *D. elata* (Poir.) Soó var. *munbyana* (Boiss. & Reuter) Soó are to be found in Sicily. SUNDERMANN (1975) reports *D. incarnata* (L.) Soó subsp. *elata* (Poir.) Sunderm. and with uncertainty the presence of *D. maculata* (L.) Soó subsp. *saccifera* (Brongn.) Simk. According to NELSON (1976) both *D. maculata* (L.) Soó subsp. *saccifera* (Brongn.) Soó and *D. elata* (Poir.) Soó are to be found in Sicily, but for the latter he puts a question mark and expresses uncertainty regarding the identification of subspecies. WILLIAMS (1978) and SOÓ (1980) attribute *D. maculata* (L.) Soó subsp. *maculata*, *D. saccifera* (Brongn.) Soó, *D. maculata* (L.) Soó subsp. *macrostachys* (Tineo) Soó and *D. elata* (Poir.) Soó subsp. *sesquipetalis* (Will.) Soó to the same territory.



Fig. 1.—The first picture of *D. saccifera* in Sicily was reported in 1713 by Cupani as «*Orchis palmata montana...*» (right). The same illustration is the iconotype of *O. gervasiana* Todd.

It is obvious that today, as in the past, the literature is at variance regarding this section (appendix 1). However the prevalent tendency is to attribute several taxa to the island, referable to both subsections *Dactylorhiza* and *Eumaculatae* Vermln.

The value of the stated local ancient works is today mainly historical, but certainly they have in some way influenced subsequent works even at a specialised level. All the more so as none of the above mentioned recent authors expressly declares to have made field observations of Sicilian populations in question.

However the authors of this paper have ascertained that in the classical stations of the Madonie and Caronie mountains, well known to them, only one taxon is to be found today, though somewhat polymorphous, clearly referable to *D. saccifera* (Brongn.) Soó. This same taxon fits as well with the dried material in the Herbarium of Palermo, labelled *Orchis maculata* L., *O. macrostachys* Tin., *O. incarnata* L., etc.

Such observations, together with the above given informations, give strength to the doubt that the last effective verification of the section, carried out with on the spot observations, goes back to that of LOJACONO (1908).

The discrepancies between the various written reports and the personal observations of the authors of this paper, suggested the case for a verification of the genus *Dactylorhiza* Necker ex Nevski sectio *Dactylorhiza* and its distribution in Sicily.

METHODOLOGY

The research programme included:

— a field examination of the populations in the most representative and critical regions of the Island. This was combined with a collection of ecological and phytogeographical data relevant for the established purposes.

— the comparison in field with non Sicilian populations in a reliable taxonomic position.

— a cytogeographical examination of populations in question.

— examination of the dried material found in the Sicilian Herbariums (BOLO, CAT, FI, MS, PAL, Herb. Minà Palumbo di Castelbuono).

— the bringing up to date of the distribution of the sect. *Dactylorhiza* in Sicily.

The research in Sicily has taken place from 1978 up to the present day. Stations of the Madonie and Caronie mountains have been visited, some hitherto unknown, others deduced from reports contained in local literature and exsiccata. The territory of Etna, where NELSON (1976) doubtfully reports the presence of *D. elata*, has also been partially explored. This area also includes the locality of Cerrita (= Giarrita near Linguaglossa) locus classicus of the *Orchis macrostachys* Tin. As regards this area, the search for *Dactylorhiza* was fruitless because the required edafic

conditions do not exist today. One cause of the probable disappearance of the *locus classicus* might have been the activities of the volcano.

The comparison with other non Sicilian populations of *D. saccifera* was held to be opportune because of the supposition that the cause of the taxonomic uncertainties could be the notable variability observed by the authors in the Island. For this purpose populations of the species in the Peloponnese mountains were chosen. In this region the observations were conducted in two localities, one at the village of Zarouchla near Mount Chelmos, Aroania Ori, North Peloponnese, the other on the Taigete mountains near Artemisia, South Peloponnese. This latter area contains the *locus classicus* of *Orchis saccifera* described by BRONGNIART (1832:259) and therefore consists of the typical population of *Dactylorhiza saccifera* (Brongn.) Soó.

As a part of the comparison of Sicilian and Peloponnese populations, the chromosomic number has been determined according to the method of colouring crushed root apex in Feulgen reactive and reinforcing with acetic orceine.

RESULTS

The field research, besides furnishing additional data on the distribution of the sect. *dactylorhiza* in Sicily, has proved the existence on the Island of one single taxon which the authors have attributed to *D. saccifera* (Brongn.) Soó. This determination is based on taxonomic characters encountered in all Sicilian localities visited and which are summarised as follows:

Height of the plant 30-75 cm. Stem generally solid, sometimes with a false cavity in the upper part (cf. SUNDERMANN, 1975).

Well developed stem leaves (3-) 4-7, distributed on the lower half of the stem. The lowest of them, and sometimes also the next one, rounded at the apex. Normally more than two bracteate leaves. Leaves with dark spots on the upper surface, either oval and transverse or, often circular and then smaller. These spots are sometimes faded or, occasionally, completely absent. Spike many flowered, pointed and up to 30 cm in length in vigorous specimens. Bracts longer than the ovaries, the lower ones at least twice as long as ovary. Lilac pink flowers with red-violet marking, lateral sepals patent. Labellum three-lobed with the median lobe at least as long as the lateral lobes, often longer. Spur conical, cylindrical or saccate, sometimes slightly curved.

The above given characters, especially the solid stem and the lower stem leaf rounded at apex, determine the belonging to the subsection *Eumaculateae* Vermln. Within the range of this subsection the characters of the floral bracts and the more or less sacky spur fits well with the description of *D. saccifera*. From field comparison, the Sicilian populations present notable affinity to *D. saccifera* from Peloponnese. This is obvious from the iconographic material given here for the two populations (Fig. 2



Fig. 2.—*Dactylorhiza saccifera* (Brongn.) Soó. a) from Peloponnese: Aroania mountains at Zaroucla; b, c) from Sicily: Madonie mountains, Torrente Madonia near Piano Zucchi.

and 3). Slight differences were noted especially concerning the spur which in the Peloponnese populations is more markedly saccate.

Besides those morphological incongruences, the authors observed a marked uniformity in the structure of the populations seen in the Peloponnese in comparison with those of Sicily. In fact although there were present more or less developed individuals, with or without spots, they always were easily determinable, even though they sometimes appeared in atypical or poorly developed forms. However this fact does not correspond with the notable polymorphism of the taxon in Sicily. The reason for this is probably a greater environmental discontinuity in Sicily, but behind this could also be hidden taxonomical differences, not easily perceptible due to the close affinity of the two populations. Possible differences of this sort can be revealed by appropriate biometric studies which from part of the future programme of the authors.

The difficulties of accurate determination of orchids from dried material are well known. Nevertheless all the identifiable specimens from Sicilian *excicata* clearly belong to *D. saccifera* (appendix 2). For those specimens which are in a bad shape or incomplete, there is no reason to suppose that they should belong to other taxa.

The caryological data obtained from root meristems of samples collected in Sicily (Caronie mountains, Contrada Mutu. Madonie mountains, Torrente Madonia. Aroania mountains, Zarouchla. Taigete mountains, Artemisia) show $2n = 40$ (cf. RAIMONDO & *al.*, 1981), which agree with the reported numbers for the species (SOÓ, 1980). It ought to be pointed out that in *D. saccifera* cytodesmes with $2n = 40$ and 80 have been found. In *D. maculata* s. l. there have been observed $2n = 40, 60, 80$. In *D. elata*, finally, there are only known cytodesmes with $2n = 80$ (SOÓ, 1980).

DISTRIBUTION AND ECOLOGY OF *D. SACCIFERA* IN SICILY

Considering the above given comments on the critical taxonomic position of *D. saccidera* and the difficulties to interpret ancient informations, it is not possible today to state the total distribution area of the taxon. *D. saccifera* is reported from S. and S.E. Europe and with uncertainty from N. Africa.

The distribution of the taxon in Sicily is reported in an annotated list of localities with the geographic coordination referring to the I G M map of Italy I:50 000 U T M system, NJ 33, keyed on the 1:1 000 000 scale series 1301 (appendix 3). All the localities have been verified by the authors and are in fact those visited for taxonomic observations. These data have been transferred to a map (Fig. 4) completed with informations gathered from literature and herbariums. This map shows the actually known distribution of the species in the Island.

From recent reports (BRULLO & GRILLO, 1978; PETRONICI & *al.* 1978; RAIMONDO, 1979) is revealed a certain contraction of occurrences compared to the past century. Particularly is to be noted the probable

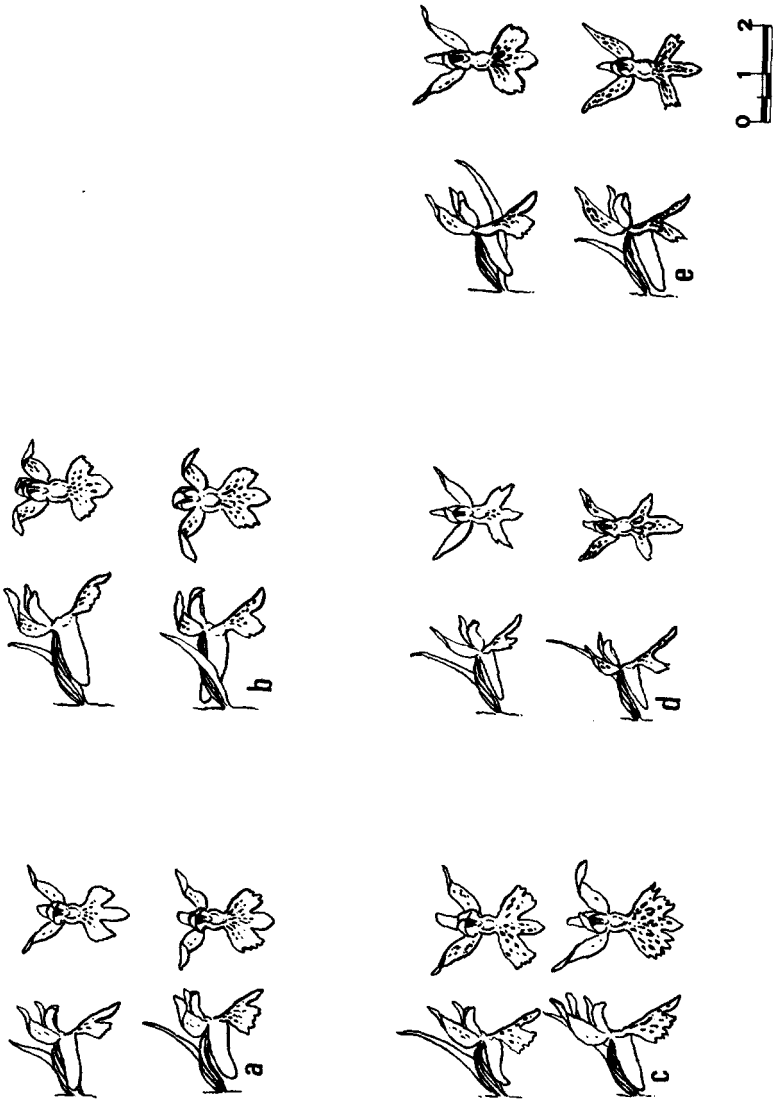


Fig. 3.—Flowers of *D. sacrifera* in the median part of the spike. a) from Peloponnese: Taigete mountains near Artemisia; b) from Peloponnese: Aroania mountains at Zaroucla; c, d, e) from Sicily: Madonia mountains, Torrente Madonia near Piano Zucchi.

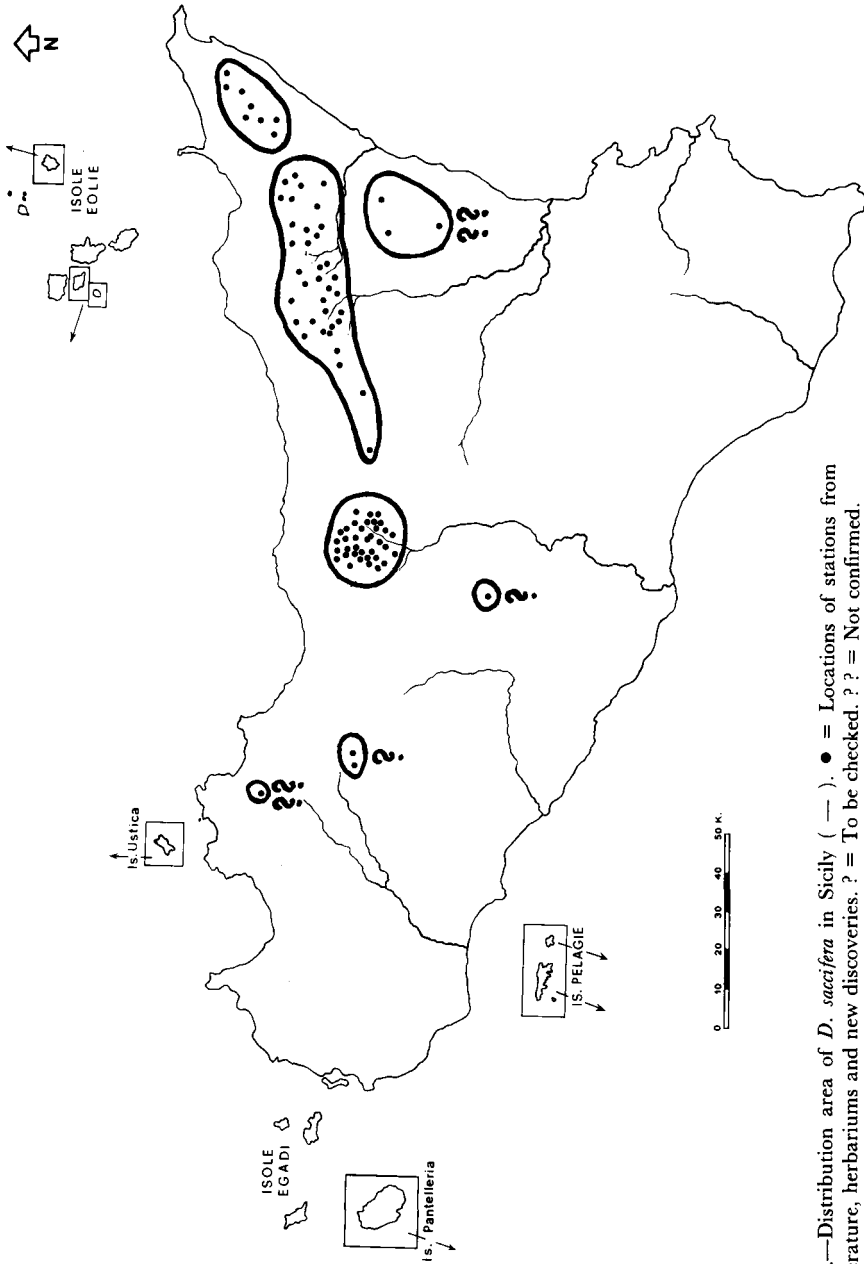


Fig. 4.—Distribution area of *D. sacrifera* in Sicily (—). ● = Locations of stations from literature, herbariums and new discoveries. ?? = To be checked. ? = Not confirmed.

disappearance of the species in the region of Etna for reasons already suggested.

Furthermore the species seems to have completely disappeared also from the vicinities of areas in urban development like Messina and Catania. The records from the Peloritani mountains, although ancient, are fairly reliable. Regarding Monte Busambra only one anonymous colect is available. It is dating from the last century and is still to be verified. The stations of Marianopoli are also to be verified. The presence of sect. *Dactylorhiza* is to be excluded in the neighbourhood of Palermo because of unsuitable edaphic conditions. LOJACONO (1908) reported *Orchis munbyana* Boiss. & Reut. on the basis of dried material collected by Todaro at S. Ciro near Palermo and labelled *O. laxiflora*. It is to be noted that in the Herbarium of the University of Palermo a vigorous dried specimen of *O. laxiflora* without tubers from the same locality is labelled *O. palustris* by Todaro and *O. latifolia* by Lojacano. As has already been stated *D. saccifera* in Sicily is encountered above 600 m in the most pronounced mountainous parts of the northern Island. Its occurrence is located in the mediterranean-temperate, atlantic, colchic or sannitic vegetations belts (sensu PIGNATTI, 1979), more frequently and expressly in the last two. However the species does not fall within the climax aspects because of its absolute dependence on the water factor. The species is in fact a usual component in connection with vegetational aspects of the classes *Phragmitetea* Tx. & Preising 1942 and *Parvocaricetea* (Westhoff 1961) Den Held & Westhoff 1975. Particularly in the Madonie mountains, *D. saccifera* plays an important phytosociological part in the latter mentioned class (RAIMONDO & al., 1980).

In Peloponnese *D. saccifera* was found to occur in a zone between 800 and 1300 m, i.e. more or less at the same altitude as in Sicily. Within the local vegetation belts the examined populations were found growing on various substrates, mostly non calcareous or with a poor limestone content. The phytocoenotic conditions both in Sicily and Peloponnese very much recall refugal stations (Krio Nero near Artemisia and Passo Scuro in the Madonie).

In optimal conditions the hemerophilous tendencies noted in Sicily are far more obvious in Peloponnese.

CONCLUSIONS

From the research it has been found that in Sicily occurs only one taxon. It is closely connected both morfologically and ecologically with *Dactylorhiza saccifera* (Brongn.) Soó.

The striking polymorphous aspect of sicilian populations compared to those of Peloponnese recalls the need for further studies.

If one excludes the Etna region and the city environments, the distribution of *D. saccifera* has been confirmed in the whole area earlier assigned to the section. The missing confirmation of the *locus classicus* of Tineo

on Etna makes improbable also the existence today of other similar ancient reports in this region.

Similar situations to that of the relatively restricted area of Sicily might also be found in other parts of the *D. saccifera* areal. On the basis of this hypothesis the opinion of the authors is that could be needed for other verifications within the distribution area of the taxon in question.

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APPENDIX I

SICILIAN TAXA AND STATIONS OF SECT. *DACTYLORHIZA* NECKER EX NEVSKI MENTIONED IN LITERATURE

Cupani (1696)	<i>Orchis palmata pratensis maculata</i>	<i>sine loco.</i>
	<i>O. palmata minor, binis testiculis extremo bisulcis.</i>	<i>sine loco.</i>
Ucria (1789: 183)	<i>O. latifolia</i> L.	Madonie alli Favari.
	<i>O. maculata</i> L.	Madonie alli Favari
Presl (1826: 41)	<i>O. elata</i> Desf.	<i>sine loco.</i>
	<i>O. maculata</i> L.	<i>sine loco.</i>
Todaro (1842)	<i>O. gervasiana</i> Tod.	Monte Busambra. <i>Gervasi.</i>
	<i>O. bonanniana</i> Tod.	Monte Busambra <i>Gervasi.</i>
	<i>O. maculata</i> L.	S. Guglielmo presso Castelbuono, <i>Parlatore; Mind.</i>
Gussone (1844)	<i>O. maculata</i> L.	S. Guglielmo, <i>Parlatore</i> ; Etna alla Cerrita, Russomanno sopra Milazzo, <i>Tineo</i> ; Itala, Polizzi, Madonie, monti di Mistretta, Capizzi, Cesaró, Floresta, Cannata, Militello di Valdemone, Francavilla, Messina.
	<i>O. gervasiana</i> Tod.	Monte Busambra, <i>Gervasi.</i>
	<i>O. bonanniana</i> Tod.	Monte Busambra, <i>Gervasi.</i>
Tineo (1846)	<i>O. macrostachys</i> Tin.	Etna alla Cerrita.
Bertolini (1853):	<i>O. maculata</i> L.	Messina. <i>Tineo.</i>
Parlatore (1858)	<i>O. maculata</i> L.	Madonie alle Favare, presso Castelbuono a S. Guglielmo, Polizzi, nei monti di Mistretta, Capizzi, Cesaró, Floresta, Cannata, Militello di Valdemone, Francavilla e Messina, <i>Gussone</i> ; Etna alla Cerrita, sopra Milazzo a Rusomanno, <i>Tineo.</i>
	<i>O. maculata</i> L.	
	var. <i>saccifera</i> Brongn.	Monti delle Madonie; Caronie, <i>Mandralisca</i> ; S. Michele, <i>Todaro.</i>
Strobl (1878:183;1880:60)	<i>O. maculata</i> L.	S. Angelo, Bocca di Cava; Castelbuono a S. Guglielmo, <i>Parlatore</i> ; alle Favare, <i>Ucria</i> ; Monticelli, Russelli, Ferro, Castagneti della Batia, va-

		llone di Canalicchio, Favare di Petralia, nocioleti di Polizzi, <i>Miná</i> (PAL! Herb. Miná Palumbo Castelbuono!)-Cerrita, <i>Tineo</i> -Nicolosi, <i>Tornabene</i> .
	<i>O. maculata</i> L. var. <i>saccifera</i> Brongn.	Alle Favare, <i>Ucria</i> ; (sub. <i>O. latifolia</i>); Boschi di Nicolosi, <i>Tornabene</i> ; Monti delle Madonie, <i>Parlatore</i> ; Passo della botte, abbeveratoio di Monticelli.
Nicotra (1878:457)	<i>O. maculata</i> L.	Montescuderi, <i>Seguenza</i> ; Mistretta, Capizzi, Mandanici, Cesaró, Cannata, Francavilla, Militello, Messina, Fondachelli, Russomanno, Caronia, fra Roccella e Santa Domenica!.
	<i>O. maculata</i> L. var. <i>saccifera</i> Brongn.	Caronia
Virga (1878:127)	<i>O. maculata</i> L.	Territorio di Isnello.
Tornabene (1887; 1892)	<i>O. maculata</i> L. <i>O. maculata</i> L. var. <i>sicula</i> Torn.	Ficuzza.
		Catania, vallone di Nesima, Nicolosi, Cirrita.
Lojacono (1908)	<i>O. incarnata</i> ?? L. <i>O. incarnata</i> ?? L. var. <i>comosa</i> Lojac. <i>O. munbyana</i> Boiss. & Reuter. <i>O. maculata</i> L.	S. Michele di Ganzeria, <i>Nyman</i> (PAL!) Marianopoli, <i>Ross</i> (PAL!).
		Palermo a S. Ciro, <i>Todaro</i> (sub. <i>O. laxiflora</i> PAL). Madonie, Castelbuono, scaturigini di Canalicchio e della Badia, Monticelli, Polizzi, monti di Mistretta, Capizzi, Cesaró, Floresta, Cannata, Militello, Francavilla, Messina, <i>Gussone</i> ; Etna alla Cerrita, Russomanno sopra Milazzo, Itala, <i>Tineo</i> ; Promiscua con <i>O. maculata</i> .
	<i>O. saccifera</i> Brongn. <i>O. saccifera</i> Brongn. var. <i>incisa</i> Lojac.	Madonie, scaturigini del Passo della Botte; Valdemone all'Acqua Santa, Bosco di Frascio, <i>Reina</i> ; Madonie, <i>Miná</i> ; Boschi di S. Michele, <i>Todaro</i> ; Madonie, Caronie, <i>Mandralisca</i> .
Fiori (1923:326)	<i>O. maculata</i> L. <i>O. maculata</i> L. var. <i>saccifera</i> (Brongn.) Fiori	<i>sine loco</i> . <i>sine loco</i> .

Camus & Camus (1929)	<i>O. sesquipedalis</i> Willd.	
	var. <i>corsica</i> Briq.	<i>sine loco. Lojacono.</i>
	<i>O. elata</i> Poir. ssp.	
	<i>munbyana</i> (Boiss. & Reuter)	
	Camus	Palermo, <i>Lojacono.</i>
	<i>O. maculata</i> L.	<i>sine loco.</i>
	<i>O. maculata</i> L.	
	ssp. <i>saccifera</i> (Brongn.)	
	Camus	<i>sine loco.</i>
	<i>O. maculata</i> L.	
ssp. <i>saccifera</i> (Brongn.) Ca-		
mus		
var. <i>incisa</i> Lojac.	<i>sine loco.</i>	
D'Africa (1942)	<i>O. maculata</i> L.	<i>sine loco</i>
	<i>O. maculata</i> L.	
	var. <i>saccifera</i> (Brongn.) Fiori	<i>sine loco</i>
	<i>O. latifolia</i> L.	
var. <i>incarnata</i>	Marianopoli, Ross (PAL!).	
D'Urso & Gentile (1957)	<i>O. maculata</i> L.	Nicosia.
	Maire (1959)	
<i>O. maculata</i> L.	<i>sine loco</i>	
<i>O. elata</i> (Poir.) ssp.		
<i>munbyana</i> (Boiss. & Reuter.)		
Camus	<i>sine loco</i>	
De Leo (1965)	<i>O. maculata</i> L.	Madonie, Mirto.
	Sundermann (1975)	
<i>D. incarnata</i> (L.) Soó		
ssp. <i>elata</i> (Poir. Soó.)		
Sunderm.	<i>sine loco.</i>	
<i>D. maculata</i> (L.) Soo	?	
ssp. <i>saccifera</i> (Brongn. Bory)		
Sunderm.	?	
Nelson (1976)	<i>D. elata</i> (Poir.) Soo	
	ssp. <i>elata</i>	?
	<i>D. maculata</i> (L.) Soó	
	ssp. <i>saccifera</i> (Brongn.) Nel-	
son	<i>sine loco.</i>	
Zangheri (1976)	<i>D. maculata</i> (L.) Soó	
	ssp. <i>macrostachys</i>	
	(Tineo) Soó	<i>sine loco</i>
	<i>D. maculata</i> (L.) Soó	
	ssp. <i>maculata</i>	<i>sine loco</i>
	<i>D. elata</i> (Poir.) Soó	
var. <i>munbyana</i> (Boiss. &		
Reuter.) Soó	<i>sine loco</i>	
Landwdehr (1977)	<i>D. maculata</i> (L.) Soó. s.l.	<i>sine loco.</i>
	Brullo & Grillo (1978)	
<i>D. saccifera</i> (Brong.) Soó var.	<i>sine loco.</i>	
<i>saccifera</i>		
<i>D. elata</i> (Poir.) Soó s.l. s.	<i>sine loco.</i>	
var. <i>munbyana</i> (Boiss. &		
Reuter.) Soó	Valle del Flascio, Cesaró, Contrada Acquasanta, Flo- resta, Pizzo Interleo, Porte- lla Maulazzo.	
Petronici & al. (1978)	<i>D. maculata</i> (L.) Soó s.l.	Mandarini, Vicaretto.

Williams & al. (1978)	<i>D. elata</i> (Poir.) Soó	
	ssp. <i>sesquipedalis</i> (Willd.) Soó	<i>sine loco.</i>
	<i>D. maculata</i> (L.) Soó	
Barbagallo & al. (1979)	ssp. <i>maculata</i>	<i>sine loco.</i>
	<i>D. saccifera</i> (Brongn.) Soó	<i>sine loco.</i>
	<i>D. elata</i> (Poir.) Soó	
Raimondo (1979)	var. <i>mynbyana</i> (Boiss. & Reuter.) Soó	Serra del Re.
	<i>D. maculata</i> (L.) Soó	
Soó (1980)	ssp. <i>macrostachys</i> (Tin.) Soó	Geraci Siculo in località Jazzu'a Scala
	<i>D. elata</i> (Poir.) Soó ssp. <i>sesquipedalis</i> (Willd.) Soó	<i>sine loco</i>
	<i>D. maculata</i> (L.) Soó	
	ssp. <i>maculata</i>	<i>sine loco</i>
	<i>D. saccifera</i> (Brongn.) Soó	<i>sine loco</i>

SPECIMINA VISA

Sub *Orchis maculata* L. var. *saccifera* Brongn.: Madonie alle Favare, 9 giugno 1909, *Cavara* (CAT!) - Madonie alle Favare, 9 giugno 1909, *Cavara* (FI!) - In aquosis Castelbuono, majo 1883, *Lojacono* (FI!) - In uliginosis montosis Madonie, majo 1883, *Lojacono* (FI!) - Al Camarò in un vallone presso S. Nicola, cresceva insieme alla specie tipica, 29 maggio 1911, *Sturniolo* (MS!) - In collis apricis Granitelli, majo 1882, *F. Gagiulli* (MS!) - Le Caronie, Pizzo dell'Orso, maggio 1855, *Reina* (PAL!) - Acquasanta, Bosco del Frascino, 8 giugno 1879, *R. C.* (PAL!).

Sub *Orchis macrostachys* Tin.: Etna Cerrita, 12 giugno 1832, *Tineo* (typus) (PAL!) - an *O. latifolia* var. *comosa* n. sp. (holotypus, *Lojacono*, 1908; D'Africa, 1942), Marianopoli, s.d., *Ross* (PAL!).

Sub *Orchis maculata* L.: Messina s.d., *Tineo* (BOLO!) - Ficuzza, s.d., *s. coll.* (CAT!) - In sylvaticis montosis Madonie, s.d., *Todaro* (FI!) - Ad rivulos et ad scaturigines Siciliae, giugno 1840, *Parlatore* (FI!) - Sicilia, Novara?, s.d., *Munafò* (FI!) - In uliginosis montosis Castelbuono a Canalicchio, 1878, *Lojacono* (FI!) - In aquosis montosis Madonie, s. d., *Todaro* (FI!) - Sicilia, Madonie, s. d., *Parlatore* (FI!) - Messina al campo alla Casazza del Re, s. d., *Seguenza* (FI!) - Nei luoghi selvatici montuosi, Messina, in giugno, *Nicotra* (FI!) - In sylvaticis montosis Mandanici, maggio, *Nicotra* (FI!) - Monticelli, s. d., *Minà* (FI!) - Caronia, s. d., *Mandralisca* (FI!) - Castelbuono al Bosco, giugno 1840, *Parlatore* (FI!) - Novara, s. d., *Munafò* (FI!) - In humidis Castelbuono al bosco, s. d., *Parlatore* (FI!) - In humidis montosis, S. Michele, s. d., *Todaro* (FI!) - In montosis circa Messina, majo 1881, *Arcadipane* (MS!) - Luoghi umidi Mandanici, Messina, 6/7/76, *Dei Midici G.* (MS!) - Al Camarò, vallone presso S. Nicola a sud della foresta, 29 maggio 1911, *Sturniolo* (MS!) - Monte Scuderi, s. d., *Borzi* (MS) - Cesarò, agosto 1905, *Nicotra* (MS!) - In monte Aetna, majo 1883, *Aloi A.* (MS!) - In humidis M. Sori a Mangalavite, giugno 1906, *s. coll.* (MS!) - Messina, s. d., *Sturniolo* (MS!) - In uliginosis montosis, Madonie, junio, *Lojacono* (MS!) - Madonie, junio, *Todaro* (MS!) - Messina alle Casazze del Re, Camarò, 19 maggio 1918, *Sturniolo* (MS!) - Nei luoghi selvatici e montuosi, raccolta nelle colline di Mandanici e in Messina alla Casazza del Re, maggio giugno 1856, *s. coll.* (MS!) - Mandanici, s. d., *s. coll.* (MS!) - Vallone di Canalicchio, Castagneti di la Batia, Monticelli, Ferro, ruscelli e stagnosi montuosi, giugno 1841, *Minà Palumbo* (Herb. Minà Palumbo di Castelbuono!) - Vallone di Canalicchio, s. d., *Minà Palumbo* (Herb. Minà Palumbo di Castelbuono!) - Valdemone, s. d., *Citarda* (PAL!) - f. albo, Polizzi, Nocella, maggio, *s. coll.* (PAL!) - Madonie ad scaturigines et in rivulos, Castelbuono a S. Guglielmo, s. d., *s. coll.* (PAL!) - In humidis montosis et ad frigidas scaturigines, Madonie, Monte Soro, junio, *s. coll.* (PAL!) - Boschi di Valdemone, maggio 1885, *Todaro* (PAL!) - Madonie, s. d., *Tineo* (PAL!) - Pietà alle Nocille, 8 giugno 1845, *Todaro* (PAL!) - Margi di la Batia, foglie macchiate, giugno 1841, *s. coll.* (PAL!) - Madonie,

giugno 1859, *s. coll.* (PAL!) - Madonie, maggio, *s. coll.* (PAL!) - S. Michele, s. d., *s. coll.* (PAL!) - Madonie in sylvaticis montosis, junio, *Todaro* (PAL!) - Madonie, s. d., *Minà* (PAL!) - Madonie, agosto 1871, *Minà* (PAL!) - S. Michele, maggio 1871, *Nyman* (PAL!).

Sub *Orchis palustris* Jacq.: *O. latifolia*? an ob commutatione schedulae ad *Madonias* lecta? *Parlatore*; In pratis et pasquis humidis, Palermo a S. Ciro, s. d., *Todaro* (PAL!).

APPENDIX 3

SICILIAN STATIONS OF *D. SACCIFERA*, VISITED AND LOCATED ON THE MAP
I.G.M. 1:50000 (SIST. U.T.M.)

- VB 18/97, Castelbuono, Passo Scuro presso S. Guglielmo m600-700
 VB 18/96, Castelbuono, Canalicchio m 700-760
 VB 21/94, Geraci, Vicaretto (Scaletta Sorba), numerose stazioni fra m 600 e m 900
 VB 21/93, Geraci, località Verde, tra Vicaretto e Pizzo Verde m 900-1000
 VB 25/89, Geraci, rigagnolo al km 38 SS. 286 m 1080-1120
 VB 24/89, Geraci, «Margio» Frasciano m 1200-1250
 VB 24/89, Geraci, «Urgo» Nervo m 1350
 VB 23/40, Geraci, «Urgo» di Pietra Giordano m 1350
 VB 23/89, Geraci, «Margio» di Pietra Giordano m 1450
 VB 23/90, Geraci, «Margio» di «l'Occhiu di l'acqua», tra Pietra Giordano e S. Cosimano m 1320-1350
 VB 21/89, Petralia, Piano Raimonda fra Cozzo Raimonda e il torrente Mandarini m 1350
 VB 22/91, Geraci, «Margio» dello Scorsone tra S. Cosimano e Cozzo Scaletta d'Alfano m 1200-1350
 VB 21/89, Petralia, «Triemula di la lapazzeda» m 1300
 VB 21/89, Petralia, sotto il «marcatu di la lapazzeda» m 1280
 VB 20/90, Petralia, appena sopra Portella Mandarini m1300
 VB 20/90, Petralia, Piano Vucarvanu m 1370
 VB 18/91, Petralia, Piano Farina m 1380-1440
 VB 19/91, Petralia, Vallone S. Nicola m 1300
 VB 20/89, Petralia, contrada Mandarini, «Margio» della Pistola m 1150
 VB 19/90, Petralia, a Sud di Pizzo Fao m 1430-1450
 VB 20/92, Geraci, contrada Bozzolino m 1250-1270
 VB 21/92, Geraci, «Filici francisi» tra Cava e Bozzolino m 1250
 VB 11/94, Isnello, torrente Madonia, lungo tutto il corso da m 800 in s
 VB 11/96, Isnello, Montaspro sopra la torre m 880
 VB 16/90, Petralia, Passo Canale tra Canna e Pomieri m 1290, semidistrutta
 VB 67/99, S. Fratello, contrada Volpe m 1160
 VB 67/99, S. Fratello, contrada Mutu m 1280
 VB 69/94, Strada fra S. Fratello e Cesarò presso il ponte Tordi 1, m 1300
 VB 86/97, Randazzo, fra le contrade S. Paolo e Tre Arie m 1300
 VB 87/97, Randazzo, contrada S. Paolo alle fontanelle m 1330
 VB 88/97, Randazzo, Piano abbeveratoio m 1410
 VB 87/96, Randazzo, contrada S. Paolo, margini della strada che porta a Tre Arie m 1300
 VB 96/98, Randazzo, contrada Porcheria al km 10 della SS. 116 m 1150
 VC 96/00, Randazzo, tra contrada Natoli e Pizzo Leo m 1190
 VC 95/03, Floresta, Portella dello Zoppo tra km 15 e km 16 della SS. 116 m 1250
 VC 94/04, Floresta, contrada Caci m 1250
 VC 89/08, Ucria, SS. 116 al km 30 m 950
 VC 88/12, Ucria, contrada S. Nicola dopo il km 37 della SS. 116 m 700