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The genus *Orobanche* (*Orobanchaceae*) in Sicily

Abstract

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The taxa of *Orobanche* occurring in Sicily and on the surrounding islets have been surveyed in the field and in herbaria. In total, 23 species occur in the region. *O. litorea* is found to be distinct from *O. minor* and *O. thapsoides* from *O. canescens*. *O. crenata* and *O. ramosa* are serious pests that cause heavy losses to broad bean and tomato cultures, respectively.

Key words: Flora, taxonomy, broomrapes, parasitic plants, Italy.

Introduction

Most of the European Floras (Webb 1972; Pignatti 1982; Foley 2001, etc.) in their treatment of *Orobanche* stress its taxonomic difficulty, said to be due to the lack of vegetative organs, to the intra- and inter-population variation, to the short flowering period and to the fragility and loss of colour of herbarium specimens. In reality the worst limitation is the fragility of herbarium specimens. In fact Camarda (1983) in the flowering scape alone observed 42 different characters. Variability must be assessed by studying a large number of individuals from different areas, so as to avoid distinguishing single individuals or populations as different taxa. The change of colour in dried specimens can be interpreted easily by the practiced observer.

Broomrapes are also interesting from an agricultural point of view, when one considers that at least 5 species are parasites of important crop species. From 2000 to 2006, the EU funded a research project (COST 849) involving more than 70 researchers, aimed to study and control infestation by *Orobanche*.

Issues of biodiversity conservation are also important, as several taxa are endemics to restricted areas.

In the frame of the planned revision of *Orobanche* for the whole of Italy (Domina 2009a; Domina & Arrigoni 2007; Domina & Mazzola 2009, 2011), the taxa occurring in Sicily have been studied in the field and in herbaria.

Historical background

The first reports of *Orobanche* from Sicily are found in Cupani (1696), who mentioned: “*Orobanche major caryphyllum olens*” (*Orobanche crenata* Forssk.), “*Orobanche spicato flore coerulescente*” (*O. schultzii* Mutel; also illustrated in Pastena & al. 2003, t. 116), “*Orobanche ramosa*” (*Orobanche ramosa* L.) and “*Orobanche majore flore*” (*O. variegata* Wallr. or *O. rapum-genistae* Thuill.). Ucria (1789) reports only *O. crenata* and *O. ramosa*.

Rafinesque (1810) published *O. purpurea* Raf. (non Jacq.) [= *O. variegata* Wallr.]. Bivona (1813) misidentified *O. variegata* Wallr. as *O. foetida* Poir. Presl (1822), described *O. canescens* and *O. sanguinea* as species new to science.

New species from Sicily were also described in Wallroth (1825) and Vaucher (1827). Gussone (1828, 1832, 1943) reported 8 species and 9 varieties. Bertoloni (1846) and Reuter (1847), for Sicily, did not deviate from to Gussone (1843). Lojacono (1878) described 3 new species. Strobl (1878), for the Madonie Mountains alone, reported 14 species.

Lojacono (1881-1883) published a sizeable monograph of Sicilian *Orobanche*. Caruel (1884), in Parlatore's Flora d'Italia, treated *Orobanche* only on the basis of Beck's revisions of the material in FI and W. Lojacono (1886-1887), commenting that treatment, complained that neglect of his earlier work.

Following Beck (1890), the treatments of Béguinot (1902) and Fiori (1926) are based on herbarium material, summarizing previous knowledge.

Lojacono (1904), reported 39 species and 6 varieties from Sicily. Beck (1930) reduced them to 21 species, 2 varieties and 24 forms.

In the last 40 years Chater & Webb (1972), Pignatti (1982), Greuter & al. (1989), and Conti & al. (2005) essentially confirmed Beck's (1930) assessment. Giardina & al. (2007) and Raimondo & al. (2010) already took into account a part of the results published here.

Recent field surveys and herbarium revisions yielded results on single species or aspects (Foley 1999; Turland & Foley 2004; Domina & Colombo 2005; Domina & Mazzola 2009, 2011; Domina & Soldano 2009; Domina & Stephanek 2009; Domina & al. 2005), adding new details or correcting old errors perpetuated by subsequent authors.

Materials and methods

This study is based on field, literature and herbarium surveys. The following herbaria were visited: B, BEO, BEOU, BOLO, CAG, CAT, COA, FI, FI-Arrigoni, G, Minà (herbarium F. Minà Palumbo, Castelbuono), MS, NAP, P, PAD, PAL, PRC, RO, SOM, SS, TO, UPSV, W, WU. Field surveys throughout Sicily and the surrounding islands were carried out since 2004.

In conformity with Crespo & Pujadas (2006), the genus *Orobanche* is here considered in a wide sense, including *Orobanche* sect. *Orobanche* and *O.* sect. *Trionychon* Wallr. in the circumscription of Beck (1930), and treating *Phelipanche* Pomel as a synonym of the latter. The question of a natural classification of the complex is still unresolved, and molecular data, at present, support a broad generic concept rather than generic segregation (see Domina 2009b, for a wider discussion).

The taxa are arranged in alphabetical order, according to their current accepted name. For each species the most relevant synonyms, the general and regional distribution, its hosts, specimens seen, and contingent notes are reported. Synonym protologues were verified and original material was studied. Regional distribution is based on verified herbarium specimens, field and literature data and is reported on maps (Figs. 1-23). Host identification was ascertained by collecting the broomrape and the host together, with clods as large as possible that were broken by hand, using water, so as not to damage the roots and haustoria. A synoptic table (Tab. 1) summarises the observed relationships. Observation of fresh and dried material allowed to find the morphological characters best suited to build an analytical key.

Results

Analytical key

1. Flowers subtended by two bracteoles adnate to the calix2
1. Calix without bracteoles7
2. Corolla length < 18 mm3
2. Corolla length ≥ 18 mm4
3. Stem branched from the base, branches almost as long as the stem; corolla almost tubular *O. ramosa*
3. Stem unbranched or with short branches; distal part of the corolla widened...*O. nana*
4. Calix teeth triangular, shorter or not much longer than the tube *O. mutelii*
4. Calix teeth linear, distinctly longer than the tube5
5. Corolla violet (dark when dried), with distal part almost tubular *O. lavandulacea*
5. Corolla light blue (light when dried), with distal part trumpet-shaped6
6. Sepals fused at the base; stem lavender; lower corolla lobes rounded *O. oxyloba*
6. Sepals separate to the base; stem yellowish; lower corolla lobes triangular.....*O. schultzii*
7. Corolla with reddish or brown glandular hairs *O. alba*
7. Corolla without dark glandular hairs.....8
8. Corolla inflated under the stamen insertion, narrowed distally9
8. Corolla of the same diameter throughout, or slightly widened distally.....10
9. Corolla lavender; calix teeth triangular; stigma pale violet.....*O. cernua*
9. Corolla yellow with purple veins; calix teeth linear; stigma yellow or white*O. hederæ*
10. Calix teeth linear, subequal, twice as long as the tube.....11
10. Calix teeth triangular12
11. Corolla lips curved outward *O. crenata*
11. Corolla lips straight.....*O. artemisiae-campestris*
12. Corolla > 20 mm long13
12. Corolla < 20 mm long17
13. Corolla distally gibbose *O. caryophyllacea*
13. Corolla tubular, campanulate or geniculate14
14. Corolla tubular, with straight dorsal line; stigma violet *O. chironii*
14. Corolla campanulate, with curved dorsal line; stigma yellow15

15. Dorsal line of the corolla regularly curved *O. rapum-genistae*
 15. Dorsal line of the corolla strongly curved near the base, almost straight distally....16
 16. Middle lobe of the lower corolla lip larger than the lateral lobes *O. variegata*
 16. Middle lobe of the lower corolla lip smaller than or subequal to the lateral ones.. *O. gracilis*
 17. Corolla geniculate above the base..... *O. amethystea*
 17. Corolla with dorsal line regularly curved18
 18. Corolla narrow (width / length = 0.2), distally red; stem bracts linear..... *O. sanguinea*
 18. Corolla wider (width / length \geq 0.25), distally withish with violet veins; stem bracts triangular19
 19. Spike dense, with \pm contiguous flowers.....20
 19. Spike lax, with clearly spaced flowers.....21
 20. Lower calix teeth almost lacking; floral bract subequal to the calyx..... *O. litorea*
 20. Lower calix teeth well developed; floral bract equalling or exceeding the calyx *O. thapsoides*
 21. Corolla woolly on the upper lip; style pubescent..... *O. pubescens*
 21. Corolla glabrous or hairy; style subglabrous22
 22. Flowers erecto-patent; filaments of stamens densely hairy at the base... *O. canescens*
 22. Flowers patent; filaments of stamens scarcely hairy at the base *O. minor*

Taxa

Orobanche alba Steph. ex Willd., Sp. Pl. 3: 350. 1800.

= *O. epitymum* DC. in Lamarck & Candolle, Fl. Fr. 3: 449. 1805.

= *O. alexandri* Tin. in Guss., Fl. Sicul. Syn. 2: 845. 1843.

General distribution: CW Europe, SW Asia.

Regional distribution: Limestone mountains along the Tyrrhenian coast from Mount San Giuliano (TP) to Mount Catalfano (PA), in the inland near Ciminna (PA), Sicani and Nebrodi Mounts, Peloritani and Etna. Locally abundant (Fig. 1).

Hosts: *Satureja fruticulosa* Grande, *S. graeca* L., *Calamintha nepeta* (L.) Savi., *Thymus serpyllum* L.

Specimina visa:

[Sicily]: *Orobanche alexandri* Tin. / *Catalfano* [manu Tineo] (NAP) [Lectotype of *O. alexandri* Tin. (Domina & Mazzola 2005)]; monte Cofano (Trapani), 5.1975, *S. Brullo* (CAT); Castellammare (Trapani), 15.7.1974, *S. Brullo* (CAT); monte delle Rose (Palermo), on *Thymus spinulosus*, 15.4.2004, *G. Domina* (PAL); monte Catalfano (Palermo), on *Satureja juliana*, 27.4.2004, *G. Domina* (PAL); monte Etna sopra Nicolosi (Catania), on *Calamintha nepeta*, 27.6.2004, *G. Domina* (PAL); monte Etna sopra Nicolosi (Catania), on *S. fruticulosa*, 22.5.2005, *G. Domina* (PAL); Ciminna (Palermo), on *S. graeca*, 14.5.2005, *G. Domina* (PAL); Messina, 5.1905, *G. Zodda* (MS); Fondachelli (Messina), 1858, s.c. (PAL); Taormina, monte Venere (Messina), 16.4.1933, *J. Bornmüller* (B); Palermo, 5, *A. Todaro*

n. 1153 [sub *O. alexandi* Tineo] (FI, PAL, TO); Palermo, on *Micromeria graeca*, 5.1881, *M. Lojacono* [sub *O. alexandri*] (FI, P, PRC, TO); Milo (Catania), 1888, *F. Tornabene* (CAT); monte Catalfano, 5, *V. Tineo* (NAP); Palermo, s.d., *M. Lojacono* n. 20 (PRC); Salice (Messina), on *Micromeria graeca*, 2.5.1881, *A. Borzì* (PAL); monte passo del Lupo (Trapani), 11.6.1985, *S. Romano & D. Ottonello* (PAL); Ris. Zingaro c.da Uzzo (Trapani), 20.5.1987, *S. Romano & G. Norata* (PAL); monte Cammarata (Agrigento), 8.7.1854 *Porcari* [sub *O. alexandri* Tineo] (PAL); monte Grifone (Palermo), 5.1881, *M. Lojacono* [sub *O. alexandri* Tineo] (PAL); monte Catalfano (Palermo), 5.1850, *Porcari* [sub *O. alexandri* Tineo] (PAL); monte Falcone (Palermo), 4.1874, *G. Reina* [sub *O. alexandri* Tin.] (PAL); Boschi di Val Demone (Messina); 1855, [A. Todaro] (PAL); Messina, s.d., *Prestandrea* [sub *O. alexandri* Tineo] (PAL); monte Catalfano, s.d., [V. Tineo] [sub *O. alexandri* Tineo] (FI); Misterbianco (Catania), 25.5.1942, *F. D'Urso* (FI); monte Cofano (Trapani), on *S. graeca*, 31.5.1990, *Raimondo & al.* n. 351 (PAL); monte Sparagio (Trapani), on *S. graeca*, 30.5.1990, *Raimondo & al.* n. 169 (PAL); Rocche dell'Argimusco (Messina), on *Thymus longicaulis*, 4.6.2011, *Raimondo & al.* (PAL)

O. amethystea Thuill., Fl. Env. Paris ed. 2: 317. 1800.

= *O. eryngii* Duby, Bot. Gall.: 350.1828.

General distribution: C Mediterranean, and E Europe.

Regional distribution: Common in Sicily, Lampedusa and Strombolicchio (Fig. 2).

Hosts: *Eryngium campestre* L., *Senecio candidus* (C. Presl) DC., *Kundmannia sicula* (L.) DC., *Scolymus grandiflorus* Desf., *Daucus carota* L.

Specimina visa:

[Sicily]: monte Cofano (Trapani), 20.4.1990, *Brullo, Minissale, Siracusa, Spampinato* (CAT); Is. delle femmine, (Palermo), 26.4.1991, *S. Brullo* (PAL); Portella Colla di Polizzi (Palermo), on *Eryngium campestre*, 7.7.2004, *G. Domina* (PAL); Portella Colla di Polizzi (Palermo), on *E. campestre*, 22.6.2003, *G. Domina* (PAL); Ficuzza (Palermo), on *E. campestre*, 16.6.2003, *G. Domina* (PAL); Noto antica (Siracusa), on *Daucus carota*, 1.5.2004, *G. Domina* (PAL, FI); Noto antica (Siracusa), on *D. carota*, 21.5.2005, *G. Domina* (PAL); Portella Paglia (Palermo), on *E. campestre*, 9.6.2004, *G. Domina* (B, PAL); Palazzo Adriano (Palermo), on *Kundmannia sicula*, 15.4.2004, *G. Domina* (PAL); Corleone (Palermo), on *E. campestre*, 15.4.2004, *G. Domina* (PAL); Monte Cammarata (Agrigento), on *E. campestre*, 8.6.2005, *G. Domina* (PAL); Monte Scalone (Palermo), on *Senecio candidus*, 28.6.2005, *G. Domina, R. Schicchi, P. Grubb & E. Tanner* (PAL); Monte Scalone (Palermo), on *E. campestre*, 28.6.2005, *G. Domina, R. Schicchi, P. Grubb & E. Tanner* (PAL); Giacalone (Palermo), on *E. campestre*, 26.5.2005, *G. Domina* (PAL); Lampedusa, baia dei conigli (Agrigento), 26.4.1987, *Brullo, Minissale & Spampinato* (CAT); Strombolicchio (Messina), 8.5.1990, *Brullo, Minissale, Scelsi & Spampinato* (CAT); Modica (Ragusa), 16.4.1990, *Bartolo & Brullo* (CAT); Madonie, Portella Colla (Palermo), 19.7.1983, *J. R. Akeroyd, S. L. Jury, D. M. Moore, F. J. Rumsey* (B); Marsala (Trapani),

23.4.1855, *E. & A. Huet du Pavillon* (P, TO); Palermo, s.d., *Porcari* [M. Lojacono n. 3] [sub *O. elatior* Sutt.] (PAL, PRC); Gela (Caltanissetta), on *Orlaya maritima*, s.d., *M. Lojacono* (PRC); Quacella (Palermo), 6.1848, [V. Tineo] [sub *O. canescens* C. Presl] (PAL); Santa Croce (Palermo), 6.1847, s.c., [sub *O. canescens* C. Presl] (PAL); Comunello d'Isnello (Palermo), 19.6.1847, [A. Todaro] [sub *O. minor*] (PAL); San Martino (Palermo), 5, [V. Tineo] [sub *O. minor*] (PAL); Terranova (Caltanissetta), 4.1833, *M. Lojacono* n. 669 [sub *O. attica*] (FI); Margio Scorzone (Palermo), on *Eryngium campestre*, 6.6.1990, *Raimondo & al.* n. 1476 (PAL).

Notes: The individuals growing on *Scolymus* have deser spikes and mucronated lower lips of the corolla.

Orobanche artemisiae-campestris Gaudin, Fl. Helv. 4: 179. 1829.

= *O. picridis* F.W. Schultz in Bot. Lit.-Blätt. 5: 504. 1830.

= *O. picridis* var. *carotae* (Des Moulins) G. Beck, Monogr. Orob.: 246. 1890.

= *O. carotae* Des Moul. in Ann. Sci. Nat., Bot., ser. 2, 3: 78. 1835.

= *O. centaurina* Bertol., Fl. Ital. 6: 430. 1846.

General distribution: Europe, Caucasus.

Regional distribution: Near Palermo, Nebrodi, Etna and Near Agrigento (Fig. 3). Rare.

Hosts: *Picris hieracioides* L., *P. echioides* L.

Specimina visa:

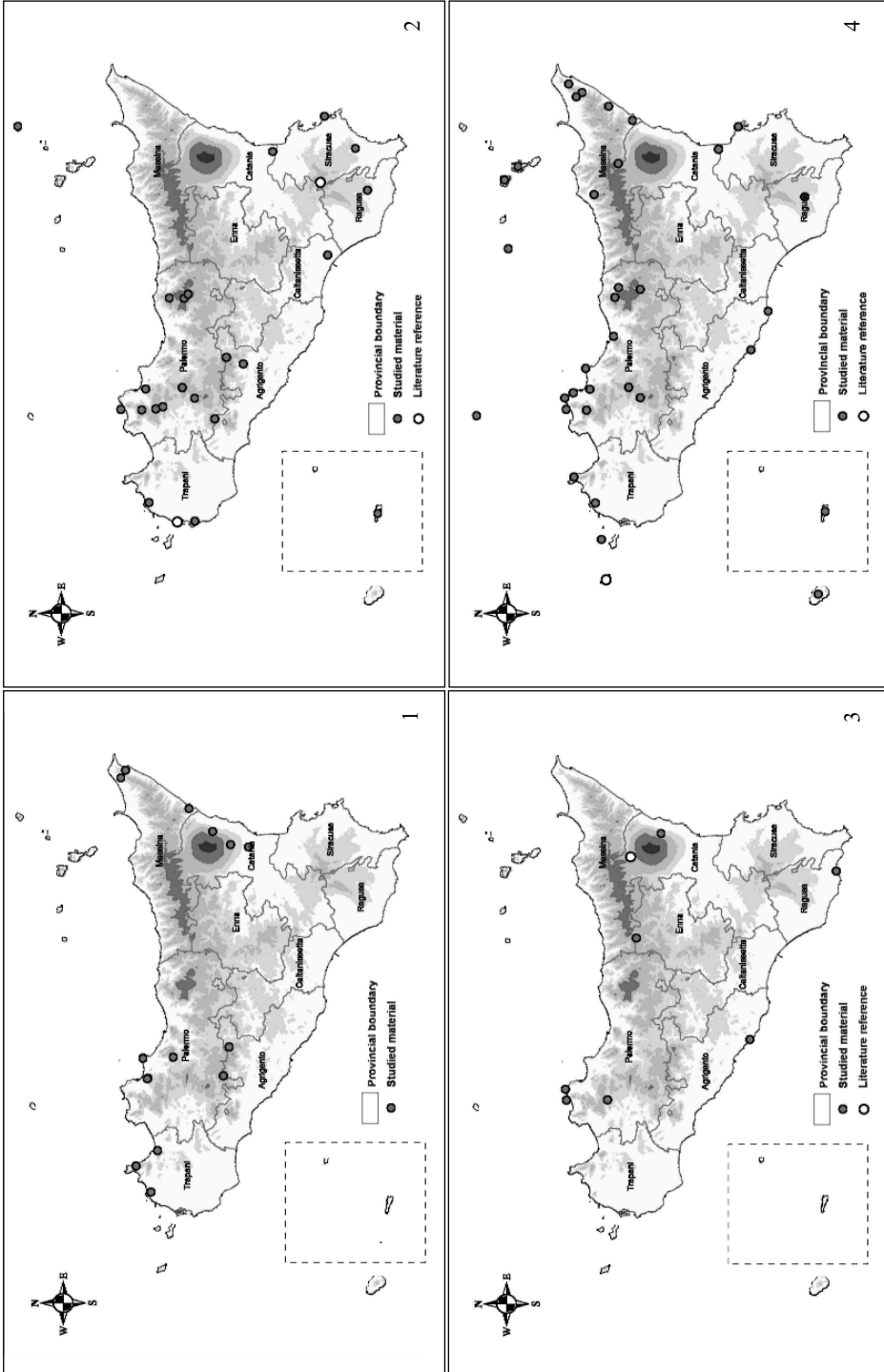
[Sicily]: Portella delle Ginestre (Palermo), on *Picris hieracioides*, 20.6.2004, *G. Domina* (PAL); Zafferana Etnea (Catania), on *P. hieracioides*, 26.7.2005, *G. Domina* (PAL); Giacalone (Palermo), on *Onopordon illyricum*, 25.5.2004, *G. Domina* (PAL); Pozzallo (Ragusa), 25.4.1969, *S. Brullo* (CAT); Sicilia, s.d., *M. Lojacono* (PRC); San Martino (Palermo), 5.1881, *M. Lojacono* n. 55 (PAL); Monte Gallo, malo passo (Palermo), 5.1881, *M. Lojacono* (PAL); Is. Femmine (Palermo), on *Rhagadiolus stellatus*, 16.4.1964, *A. Di Martino* [sub *O. amethystea* Thuill.] (PAL); Sambughetti (Messina), 11-19.7.1906, *U. Martelli* [sub *O. satyrus*] (FI); Sferracavallo (Palermo), 5.1881, *M. Lojacono* [sub *O. denu-data* Moris] (FI).

O. canescens C. Presl in J. Presl & C. Presl, Delic. Prag.: 72.1822.

General distribution: Sardinia, Corse, Sicily, C and S Italy, Greece and Crete.

Regional distribution: Common in sicily and in sourrounding islands (Fig. 4).

Hosts: *Asterceae*: *Galactites tomentosus* Moench, *Carlina sicula* Ten., *Glebionis coronaria* (L.) Spach, etc.



Figs. 1-4. Regional distribution of: 1. *O. alba*; 2. *O. artemisiae-campestris*; 3. *O. amethystea*; 4. *O. canescens*.

Specimina visa:

[Sicily]: In pascuis et pratis siccis ad Panormum Siciliae, 5.1817, *C. Presl* (PRC450908, Holotype designed by Domina & Stepanek 2009; PRC450909 Isotype designed by Domina & Stepanek 2009); San Martino delle Scale (Palermo), 26.4.2004, *G. Domina*, (PAL56362, Epitype designed by Domina & Stepanek 2009); Salina a Lingua (Messina), on *Carlina sicula*, 29.5.2005, *G. Domina* (PAL); monte Scalone (Palermo), on *Hypochaeris achyrophorus*, 28.6.2005, *G. Domina*, *R. Schicchi*, *P. Grubb* & *E. Tanner* (PAL); Levanzo (Trapani), on *Carlina sicula*, 24.4.2005, *G. Domina* (PAL); Levanzo (Trapani), on *Galactites tomentosus*, 24.4.2005, *G. Domina* (PAL); Taormina (Messina), on *Carlina lanata*, 17.4.2005, *G. Domina* (PAL); Pagliara (Messina), on *Asteraceae*, 17.4.2005, *G. Domina* (PAL); Is. delle Femmine (Palermo), 26.4.1991, *Brullo* & *Spampinato* (CAT); Ustica (Palermo), on *G. tomentosus*, 3.4.2005, *G. Domina* & *M. Aghababyan* (PAL); monte Scuderi (Messina), 13.6.1990, *Bartolo*, *Brullo*, *Scelsi* & *Spampinato* (CAT); Colle S. Rizzo (Messina), 27.5.1981, *S. Brullo* (CAT); Alicudi (Messina), 6.5.1980, *S. Brullo*, p.p. (CAT); Lipari (Messina), 24.4.1982, *Brullo* (CAT); Lipari, cave di pomice (Messina), 13.5.1972, *S. Brullo* (CAT); Floresta, valle del Flascio (Messina), 1973, *S. Brullo*, sub *O. minor* Sutton (CAT); Sferracavallo (Palermo), 5.1881, *M. Lojacono* n. 461 (FI, MS); Etna, s.d., *Nicotra* (MS); colli di Messina, 15.4.1897, [Nicotra] (MS); Mandanici (Messina), 5.1906, *L. Nicotra*, [sub *O. litorea*] (MS); San Martino (Palermo), 5.1828, *G. Gussone* (NAP); Palermo, 5.1817, *C. Presl* (PRC); Gibilrossa (Palermo), 5.1944, [V. Tineo] (PAL); Macchia di Zingaro (Palermo), 6.1878, *M. Lojacono* (PAL); monte Caputo (Palermo), 30.5.1849, [V. Tineo] (PAL); monte Gallo (Palermo), 1846, [V. Tineo] (PAL); Is. Eolie (Messina), s.d., [M. Lojacono] (PAL); Palermo, 5, [A. Todaro] (PAL); Lipari (Messina), 4.1894, [A. Todaro] (PAL); s.l., s.d., *M. Lojacono* n. 52 (PAL); Is. eolie (Messina), s.d., *Lojacono* (PAL); s.l., s.d., *M. Lojacono* [sub *O. yuccae* Bertoloni] (PAL); Palermo, 5, *A. Todaro* n. 1155 [sub *O. minor*] (PAL); Ustica (Palermo), 6.1840, *P. Calcara* [sub *O. minor*] (PAL); Montagna Grande (Palermo), 4.1845, [A. Todaro] [sub *O. minor*] (PAL); Licata (Agrigento), s.d., *Bonafede* [sub *O. pubescens*] (PAL); Is. Marettimo (Trapani), 21.4.1981, *F. Catanzaro* (PAL); monte Occhio (Palermo), 5.1842, s.c. (PAL); Mistretta (Messina); 11-15.7.1906, *U. Martelli* [sub *O. sparsiflora*] (FI); Palermo, 5.1835, *F. Parlatore* (FI); capo S. Alessio (Messina), 2.6.1956, *G. Gramuglio* (FI); Palermo, s.d., *A. Todaro* (FI); San Martino (Palermo), 1.6.1890, *S. Sommier* & *E. Levier* (FI); Castelbuono, San Guglielmo (Palermo), 5, *F. Minà Palumbo* n. 436 (FI); Palermo, s.d., *A. Todaro* (WU); monte Sparagio (Trapani), on *Asteraceae*, 30.5.1990, *Raimondo* & al. n. 160 (PAL).

O. caryophyllacea Sm. in Trans. Linn. Soc. London 4: 169.1798.

= *O. galii* Duby, Bot. Gall.: 349.1828.

= *O. major* L., Sp. Pl.: 632. 1753 (nom. rej.)

General distribution: C and S Europe, N Medit.

Regional distribution: Carbonate relieves along the Tyrrhenian coast, from Mount San Giuliano (TP) to Mount San Calogero (PA), in the inland in the mounts around Palermo, Sicani Mounts, Madonie and Iblei (Fig. 5).

Hosts: *Galium lucidum* Koch, *G. verum* L., *Rubia peregrina* L.

Specimina visa:

[Sicily]: Poggio San Francesco (Palermo), on *Galium lucidum*, 9.6.2004, *G. Domina* (PAL); Monte Cammarata (Agrigento), on *G. lucidum*, 27.5.2004, *G. Domina*, *G. Schneeweiss*, *D. Joel*, etc. (PAL); Monte Cammarata (Agrigento), on *G. lucidum*, 8.6.2005, *F.M. Raimondo* (PAL); Monte Cammarata (Agrigento), on *G. lucidum*, 16.5.2003, *G. Domina* (PAL); Monte Gallo al malo passo (Palermo), on *G. lucidum*, 16.5.2002, *G. Domina* (PAL); Monte San Calogero (Palermo), on *G. lucidum*, 18.5.2002, *G. Domina* (PAL); Monte Pellegrino (Palermo), on *G. lucidum*, 24.4.2004, *G. Domina* (PAL, FI); Montelepre (Palermo), on *G. lucidum*, 6.5.2004, *G. Domina* (PAL); Monte Scalone (Palermo), on *G. lucidum*, 28.6.2005, *G. Domina*, *R. Schicchi*, *P. Grubb* & *E. Tanner* (PAL); Madonie, Quacella (Palermo), 1.6.1988, *S. Brullo* (CAT); Buscemi (Siracusa), on *G. lucidum*, 21.5.2005, *G. Domina* (PAL); monte Lauro (Siracusa), 28.4.1990, *Bartolo* & *Brullo* (CAT); Noto antica (Siracusa), on *Rubia peregrina*, 21.5.2005, *G. Domina* (PAL); Palermo, 5, Citarda [sub *O. alexandri* Tin.] (MS); Castelbuono c.da Montaspro, s.d., *F. M. Palumbo* (herb. Minà); Palazzo Adriano (Palermo), 6.1829, *G. Gussone* (NAP); Palermo, s.d., *G. Gussone* (NAP); Madonie (Palermo), s.d., *G. Gussone* (NAP); Madonie, 6.1847, [A. Todaro] (PAL); monte Caputo (Palermo), 5.1847, [A. Todaro] (PAL); Quacella (Palermo), 24.6.1848, [V. Tineo] (PAL); monte San Calogero (Palermo), 12.5.2001, *Marcellino* & *d'Agostino* (PAL); San Martino (Palermo), 19.5.1835, [V. Tineo] (PAL); Monte Grifone (Palermo), 5.1844, [V. Tineo] (PAL); Busambra (Palermo), 6.1878, *M. Lojacono* (PAL); Monte Grifone (Palermo), s.d., *M. Lojacono* n. 5 (PAL); Troffone di Madonie (Palermo), 25.6.1847 [A. Todaro] (PAL); Timpe di Marfa (Palermo), 2.7.1848 [V. Tineo] (PAL); Palermo, 6.1869, *A. Todaro* (PAL); Cozzo della Mufara (Palermo), 22.6.1847 [A. Todaro] (PAL); monte Gallo (Palermo), 5.1850 [A. Todaro] (PAL); Santa Maria del Bosco (Palermo), 1852, [A. Todaro] (PAL); s.l., s.d., *M. Lojacono* n. 102 [sub *O. minor* forma] (PAL); Madonie (Palermo), on *G. lucidum* 5.1883, *M. Lojacono* (FI); Avola (Siracusa), 4-5, *Bianca* [sub *O. canescens*] (FI); Palermo, s.d., *F. Parlatore* (FI); Quacella (Palermo), on *G. lucidum*, 3.6.1990, *Raimondo* & al. n. 948 (PAL).

O. cernua Loefl., *Iter Hispan.*: 152. 1758.

= *O. tinei* Lojac., *Naturalista Sicil.* 6: 133. 1887.

= *O. bicolor* Bertol., *Fl. Ital.* 6: 448. 1844 (non C. A. Mey. 1830)

General distribution: Asia, Mediterranean basin, Azores islands.

Regional distribution: Madonie and Aeolian islands: Salina, Lipari, Panarea, Strmboli; abundant by localized. (Fig. 6).

Hosts: *Artemisia arborescens* L. and *A. alba* Turra (*fide* Tineo).

Specimina visa:

[Sicily]: Madonie, serra delle croci (Palermo), *V. Tineo* (PAL) [Holotype of *O. tinei* Lojac. designed by Domina & Mazzola (2005); Madonis Mts., 9 km N of Polizzi Generosa, 3 km

S of Petella Colla, along minor road, 37.51 N 14.00 E, 1300 m, *J. R. Akeroyd, S. L. Jury D. M. Moore & F. J. Rumsey* 19.07.1983, (RNG3633); Salina, Pollara (Messina), on *Artemisia arborescens*, 29.5.2005, *G. Domina* (PAL); Salina, piano Serro del Capo, 14.5.1970, *S. Brullo* (PAL); Panarea (Messina), s.d., *G. Gussone* (BOLO, NAP, RO); Lipari (Messina), s.d., *M. Lojacono* (PRC); Lipari (Messina), 4.1878, *M. Lojacono* (PAL); Panarea (Messina), 4.1877, *M. Lojacono* (FI).

O. chironii Lojac., Contr. Fl. Sic.: 12. 1878. \equiv *O. alsatica* var. *chironii* (Lojac.) Bég. in Fiori & Paol., Fl. Analitica Ital. 2(3): 480. 1902.

General distribution: Endemic to Sicily.

Regional distribution: Carbonate relives in the inland: mounts around Palermo, Rocca Busambra, Mount Cammarata and Madonie. Rare and localized (Fig. 7).

Hosts: *Anthemis cupaniana* Tod., rarely on other *Asteraceae* (Domina & Mazzola 2005)

Specimina visa:

[Sicily]: Basse rupi di Busambra (Palermo), on *Opopanax chironium*, 1878, *M. Lojacono* (PAL) [Holotype cfr. Domina & Mazzola (2005)]; Basse rupi di Busambra, on *Anthemis cupaniana*, 20.6.2004, *G. Domina* (PAL) [Epitype designed by Domina & Mazzola (2005)]; Busambra alla Frana (Palermo), on *A. cupaniana*, 16.6.2003, *G. Domina* (PAL); Busambra alla Frana (Palermo), on *A. cupaniana*, 28.6.2002, *G. Domina* (B, PAL, FI); Busambra alla Frana (Palermo), on *A. cupaniana*, 5.6.2002, *G. Domina* (PAL); Busambra alla Frana (Palermo), on *Asteraceae*, 20.6.2002, *G. Domina* (PAL); Rocca di Mele (Palermo), on *A. cupaniana*, 30.6.2002, *G. Domina* (PAL); Monte Scalone (Palermo), on *A. cupaniana*, 28.6.2005, *G. Domina, R. Schicchi, P. Grubb & E. Tanner* (PAL); Monte Pizzuta (Palermo), on *A. cupaniana*, 12.7.2005, *G. Domina* (PAL); Ficuzza (Palermo), on *Opopanax*, 3.6.1856, *E. & A. Huet du Pavillon* [sub *O. cervarie* Suard.] (TO); Busambra (Palermo), 7.1878, *M. Lojacono* n. 45 (PRC); Ficuzza (Palermo), 6.1882, *M. Lojacono* (PAL).

Notes: This species was described based on large-size individuals. Normally the individuals are smaller. The species belongs to the *O. minor* group, but clearly differs from its other species by having large stigma lobes and by the corolla being flattened rather than roundish in transect.

O. crenata Forssk., Fl. Aegypt.-Arab.: 113. 1775.

= *O. speciosa* DC. in Lamarck & Candolle, Fl. Fr. 5: 393. 1815.

= *O. pruinosa* Lapeyrouse, Abrég. Pl. Pyren. Suppl.: 87. 1818.

= *O. pelargonii* Caldesio in Nuovo Giorn. Bot. Ital. 12: 175. 1880.

= *O. crenata* subsp. *gussonei* Nyman, Consp. Fl. Eur.: 558. 1881.

= *O. crenata* var. *borzii* Albo, Vita Piant. Vasc. Sicilia Mer.-Or. 2: 236. 1919.

= *O. tommasinii* Rchb., Icon Fl. Germ. Helv. 20: 92. 1862.

General distribution: Europe, Mediterranean area and Caucasus.

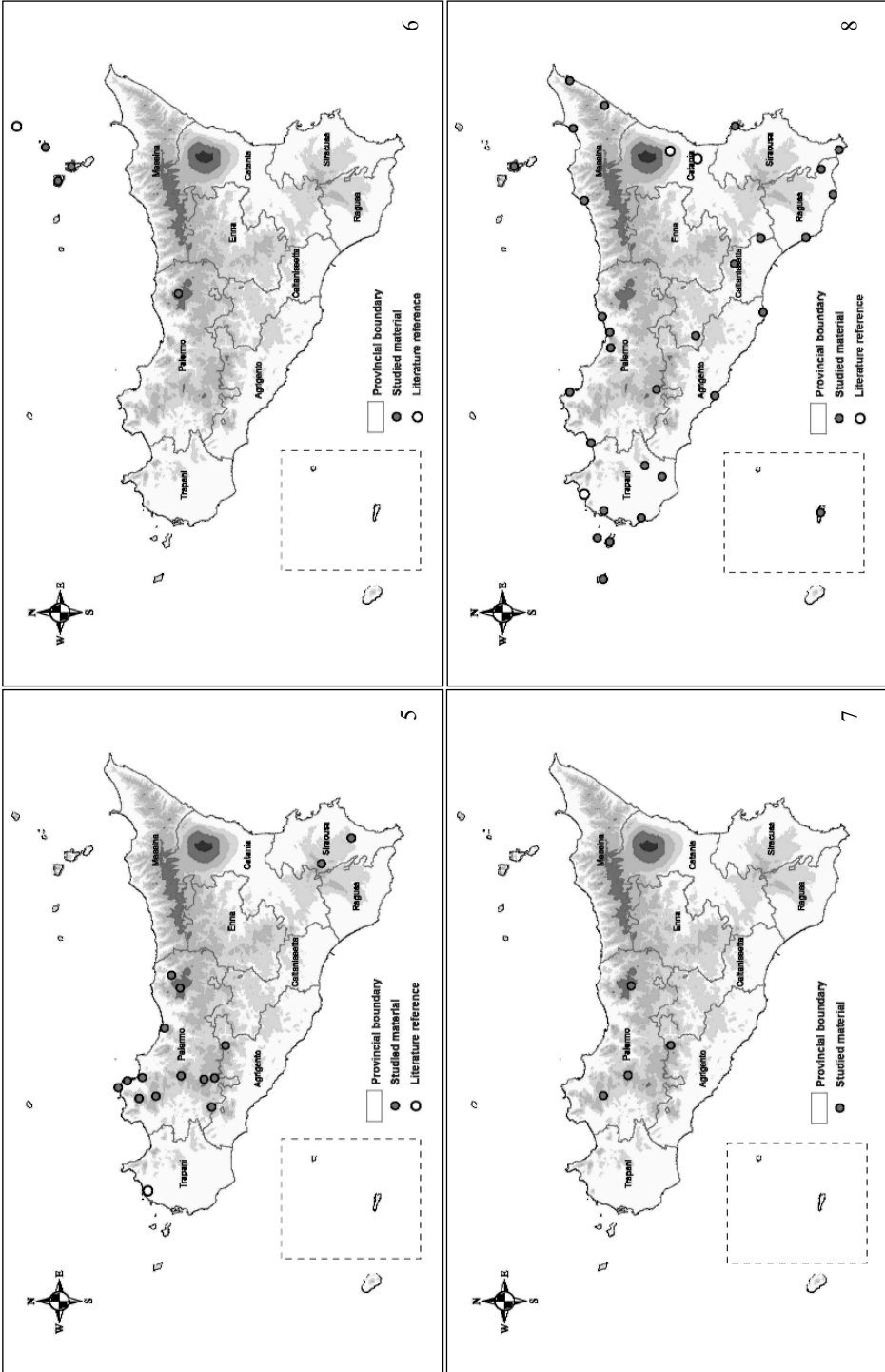
Regional distribution: Very common everywhere as pest, more localized on wild legumes (Fig. 8).

Hosts: *Vicia faba* L., *V. sativa* L., *V. villosa* Roth, *Pisum elatius* M. Bieb., *Lathyrus sativus* L., *L. odoratus* L.

Specimina visa:

[Sicily]: Campofelice di Roccella (Palermo), on *Vicia faba*, 23.3.2004, G. Domina (PAL, FI); Campofelice di Roccella (Palermo), on *V. faba*, 13.6.2005, G. Domina (PAL); Campofelice di Roccella (Palermo), on *Pisum sativum*, 7.3.2004, G. Domina (PAL); Caccamo (Palermo), on *Lathyrus odoratus*, 16.6.2004, G. Domina & M. Slovak (PAL); Sparacia (Agrigento), on *V. faba*, 27.5.2004, G. Domina, G. Schneeweiss, D. Joel (PAL); Prizzi (Palermo), on *V. faba*, 15.4.2004, G. Domina (PAL); Monte Pellegrino (Palermo), on *V. villosa* subsp. *varia*, 24.4.2004, G. Domina (PAL); rovine di Himera (Palermo), on *V. faba*, 20.4.2004, G. Domina, J. Matthews (PAL); Pagliara (Messina), on *V. villosa*, 17.4.2005, G. Domina (PAL); Pagliara (Messina), on *V. sativa*, 17.4.2005, G. Domina (PAL); Modicano (Ragusa), 26.4.1971, S. Brullo (PAL); Lipari (Messina), 29.5.1969, Brullo (PAL); Lipari (Messina), 27.4.1982, S. Brullo (CAT); Valle Ippari (Ragusa), 20.4.1986, Brullo, Giardina, Minissale & Spampinato (CAT); Santo Pietro (Catania), 9.5.1987, Bartolo, Brullo, Minissale & Spampinato (CAT); Pantano Longarini (Ragusa), 25.4.1969, S. Brullo, sub *O. versicolor* Schultz (CAT); Pantano Bruno (Ragusa), 25.4.1969, S. Brullo (CAT); Sampieri (Ragusa), 30.3.1970, S. Brullo (CAT); Levanzo (Trapani), on *V. sativa*, 24.4.2005, G. Domina (PAL); capo S. Alessio (Messina), 12.5.1956, Arena, Russo & Gramuglio [sub *O. loricata* Rchb.] (MS); Messina, 1857, s.c. (MS); Ispica (Ragusa), 25.4.2000, Giambianco [sub *O. caryophyllacea* Sm.] (MS); Villa Paradiso (Messina), 14.4.1996, Riggio (MS); Palermo, on *V. faba*, 5.1906, H. Ross n. 568 (B, FI, PAD); Palermo, on *V. faba*, 21.5.1889, D. Lanza (B); Taormina (Messina), on *V. faba*, 5.1932, Baschant (B); Ficarazzi (Palermo), on *V. faba*, 8.4.1855, E. & A. Huet du Pavillon (FI, TO, UPSV); Palermo, on *Pisum sativum*, 5, A. Todaro 1157 (FI, P, PAL, TO); Palermo, s.d., G. Gussone (RO); Palermo, on *V. faba*, 4.1892, M. Lojacono (P); Palermo, 5, G. Gussone (NAP); Palermo, s.d., M. Lojacono n. 15 (PRC); Is. Marettimo (Trapani), 6.4.1982, F. Catanzaro (PAL); Messina, spiaggia, 24.5.1832, [V. Tineo] (PAL); Mondello (Palermo), 4.1849 [A. Todaro] (PAL); Caltagirone (Catania), 7.1832, [V. Tineo] (PAL); Mondello (Palermo), 12.5.1855 [A. Todaro] (PAL); Palermo, s.d., M. Lojacono n. 41 (PAL); Solunto (Palermo), 28.4.1878, M. de Sardegna (UPSV); Palermo, on *V. faba*, 21.5.1889 D. Lanza (UPSV); Lampedusa (Agrigento), on *V. faba*, 23.3.1956, A. Di Martino (PAL); Marettimo (Trapani), on *V. faba* and *P. Sativum*, 6.4.1982, F. Catanzaro (PAL); Licata (Agrigento), on *V. faba*, P. Mazzola & G. Certa (PAL); Sicilia, s.d., G. Gussone [sub *O. alba*] (PAL); Augusta (Siracusa), 4.1890, Vaccari (FI); Is. Marettimo (Trapani), 27.4.1947, Francini & Messeri (FI); capo S. Alessio (Messina), 13.4.1987, G. Gramuglio (FI).

Notes: This taxon occurs also in extra agricultural areas affecting several wild legumes.



Figs. 5-8. Regional distribution of: **5.** *O. caryophyllacea*; **6.** *O. cernua*; **7.** *O. chironii*; **8.** *O. crenata*.

O. gracilis Sm. in Trans. Linn. Soc. London 4: 172. 1798.

= *O. cruenta* Bertol., Rar. It. Pl. Dec. 3: 56. 1810.

General distribution: Europe, NW-Africa.

Regional distribution: Mount San Giuliano, mountains around Palermo, Ficuzza, Nebrodi, Peloritani and Iblei, Aeolian islands at Salina and Vulcano (Fig. 9). Abundant but localized.

Hosts: *Calicotome infesta* (C. Presl.) Guss., *Calicotome villosa* Link, *Spartium junceum* L.

Specimina visa:

[Sicily]: Caronia, sughereta (Messina), on *Calicotome infesta*, 9.5.2003, *G. Domina* (PAL); Caronia, sughereta (Messina), on *C. infesta*, 25.4.2005, *G. Domina* (PAL); Tortorici (Messina), on *Spartium junceum*, 15.5.2005, *G. Domina* (PAL); Longi (Messina), on *S. junceum*, 15.5.2005, *G. Domina* (PAL); Mistretta (Messina), on *Coronilla emerus*, 31.3.2004, *G. Domina* (PAL); Iria (Messina), on *C. infesta*, 31.3.2004, *G. Domina* (PAL); Salina, Malfa (Messina), on *C. villosa*, 29.5.2005, *G. Domina* (PAL); Salina (Messina), 1.4.1970, Brullo (CAT); Salina, piano serro del Capo (Messina), 14.5.1970, *S. Brullo*, p.p. (CAT); Messina, campo inglese, 26.4.1980, *S. Brullo* (CAT); Fiumara Mandarici (Messina), 19.5.1985, *S. Brullo* (CAT); Messina, on *Cytisus* sp., 4.1972, A. Borzi (MS); Sicilia, 1844, *G. Gussoni* [sub *O. Cruenta* Bertol.] (BOLO); Taormina (Messina), 5 1932, *Baschant* [sub *O. sanguinea* C. Presl] (B); Is. Eolie (Messina), 4.1877, *M. Lojacono* [sub *O. condensata* Moris] (PAL); Palermo, on *S. junceum*, 5, *A. Todaro* n. 1156 [sub *O. spartii* Vauch.] (PAL); Is. Eolie (Messina), 1872, *M. Lojacono* [sub *O. spartii*] (PAL); Monte Grifone (Palermo), 5.1851, [A. Todaro] [sub *O. spartii* var. *lutea*] (PAL); Is. Vulcano c.da Vallonaccio (Messina), 18.4.1877, *M. Lojacono* [sub *O. spartii*] (PAL); Messina, s.d., *I. Nicotra* [sub *O. cruenta*] (FI); Comiso (Ragusa), 16.5.1873, *Aiuti* (FI); monte San Giuliano (Trapani), on *C. infesta*, 31.5.1990, *Raimondo & al.* n. 452 (PAL); Is. Eolie (Messina), 4.1877, *M. Lojacono* (PAL) [Lectotype of *O. gracilis* var. *todaroi* designed by Mazzola & Domina (2005)]; Salina, Malfa (Messina), 2.4.1970, *S. Brullo* (CAT); Sicilia, s.d., *M. Lojacono* n. 26 (PRC).

Notes: Populations of CN- Sicily has intermediate characters with *O. variegata* Wallr., this could suggest the possibility of hybrids between the two species.

In the Aeolian islands occurs *O. gracilis* var. *todaroi* (Lojac.) Domina & Mazzola, differing from *O. gracilis* Sm. var. *gracilis* by its higher size and for the lateral lower lobes of the corolla much larger than the central one.

O. hederæ Duby, Bot. Gall.: 350. 1828.

= *O. yuccæ* Savi f. ex Bertol., Fl. Ital. 6: 423. 1844.

= *O. glaberrima* Guss. ex Reut. in Candolle, Prodr. 11: 719. 1847.

= *O. laurina* Bonap. ex Bertol., Fl. Ital. 6: 424. 1846.

= *O. stenantha* Lojac. in Naturalista Sicil. 2: 62. 1882. ≡ *O. hederæ* f. *stenantha* (Lojac.) G. Beck, Monogr. Orob.: 260. 1890.

General distribution: W Europe and Great Britain, N Africa, trancaucasus and Turkey.

Regional distribution: Common everywhere (Fig. 10).

Hosts: *Hedera helix* L.

Specimina visa:

[Sicily]: s.l., s.d., M. Loacono. 16 [sub *O. stenantha* Lojac.] (PAL) [Lectotype of *O. stenantha* Lojac. designed by Domina & Mazzola (2005)]; Piano Zucchi (Palermo), on *Hedera helix*, 22.6.2004, G. Domina (PAL, FI); Piano Zucchi (Palermo), 25.7.1981, Brullo (CAT); Vallone Canna (Palermo), 2.8.1991, Brullo & al. (CAT); favare d'Isnello (Palermo), 12.7.1973, S. Brullo, (CAT); San Giorgio (Palermo), 31.10.2002, G. Domina (PAL); Bosco di Ficuzza (Palermo), on *H. helix*, 16.6.2003, G. Domina (PAL); Bosco di Ficuzza (Palermo), on *H. helix*, 29.6.2003, G. Domina (PAL); Castelbuono (Palermo), 14.6.2004, F.M. Raimondo (PAL); Bosco Garanza (Palermo), 6.2004, G. Baiamonte (PAL); bosco Malabotta (Messina), 29.7.1982, S. Brullo (CAT); sughereta di Niscemi (Catania), 17.4.1983, S. Brullo (CAT); monte Amara (Siracusa), 13.4.1980, Grillo (CAT); fiume Anapo (Siracusa), 4.5.1985, G. Spampinato (CAT); Messina, capo S. Alessio, 12.5.1956, Arena, Russo & Gramuglio [sub *O. loricata* Rchb.] (MS); Taormina (Messina), 23.5.1933, J. Bornmüller (B); Siracusa, Latomie, 6.5.1933, J. Bornmüller (B); Bosco di Castelbuono (Palermo), 5.1841, F. M. Palumbo [sub *O. canescens* C. Presl] (herb. Minà); Ficuzza (Palermo), s.d., M. Loacono (PRC); Palermo, s.d., M. Loacono n. 35 [sub *O. stenantha* Lojac.(PRC)]; Lipari (Messina), 29.4.1877, M. Loacono n. 26 [sub *O. canescens*] (PAL); Comunello (Palermo), 7.1847, A. Todaro [sub *O. canescens* C. Presl] (PAL); s.l., s.d., M. Loacono [sub *O. glaberrima* Guss.] (PAL); Ficuzza (Palermo), s.d., M. Loacono n. 105 (PAL); Horto Bot. Panormitanus, on *H. helix*, s.d., M. Loacono n. 11 (PAL); s.l., s.d., M. Loacono n. 10 [sub *O. australis* Moris] (PAL); bosco diMontaspro (Palermo) 3.7.1847 [A. Todaro] [sub *O. barbata*] (PAL); Quacella (Palermo), 9.6.1847 [A. Todaro] [sub *O. barbata*] (PAL); Pomieri (Palermo), s.d., V. Tineo [sub *O. bicolor*] (PAL); 17.7.1906, U. Martelli [sub *O. alexandrii* Tineo] (FI); Castelbuono San Guglielmo (Palermo), s.d. F. Minà Palumbo n. 437 (FI); Rocca busambra (Palermo), on *H. helix*, 2.6.1990, Raimondo & al. n. 736 (PAL).

O. lavandulacea Rchb., Iconogr. Bot. Pl. Crit. 7: 48. 1831. ≡ *Kopsia lavandulacea* (Rchb.) Caruel in Parl., Fl. Ital. 6: 357. 1884. ≡ *Phelypaea lavandulacea* (Rchb.) Reut. in DC., Prodr. 11: 7. 1847.

= *Orobanche lavandulacea* f. *crassipes* G. Beck, Monogr. Orob.: 106. 1890.

– *Orobanche caerulea* var. *ramosa* C. Presl, Fl. Sic. 1: XXXIV. 1826., nom. nud.

General distribution: Mediterranean and Canary islands.

Regional distribution: Common in the whole Island with the lone exception on the hilly clay inland (Fig. 11).

Hosts: *Bituminaria bituminosa* (L.) C. H. Stirt.

Specimina visa:

[Sicily]: Riserva Zingaro (Trapani), on *Bituminaria bituminosa*, 27.4.2003, *G. Domina* (FI, PAL); Caronia (Messina), on *B. bituminosa*, 9.5.2003, *G. Domina* (PAL); Mts. Climiti (Siracusa), on *B. bituminosa*, 18.4.2004, *G. Domina* (PAL); monte San Giuliano (Trapani), on *B. bituminosa*, 25.4.2004, *G. Domina* (PAL); Capo Zafferano (Palermo), on *B. bituminosa*, 2.4.2004, *G. Domina* (PAL); Portella Paglia (Palermo), on *B. bituminosa*, 9.6.2004, *G. Domina* (PAL); Prizzi (Palermo), on *B. bituminosa*, 15.4.2004, *G. Domina* (PAL); Monte Inici (Trapani), on *B. bituminosa*, 4.6.2005, *F.M. Raimondo, W. Greuter, M. Aghababayan* (PAL); San Martino delle Scale (Palermo), on *B. bituminosa*, 18.5.2005, *G. Domina* (PAL); Noto antica (Siracusa), on *B. bituminosa*, 21.5.2005, *G. Domina* (PAL); monte Caputo (Palermo), 14.6.1989, *Bartolo & al.* (CAT); Modica (Ragusa), 23.4.1983, *S. Brullo* (CAT); monte Catalfano (Palermo), 27.4.1983, *S. Brullo* (CAT); Capo Calavà (Messina), 20.4.1988, *Brullo & Minissale* (CAT); Capo S. Alessio (Messina), 27.3.1956, *Arena, Russo & Gramuglio* (MS); Capo S. Alessio (Messina), 5.5.1956, *Arena, Russo & Gramuglio* (MS); Mandanici (Messina), 1857, s.c. (MS); Milazzo (Messina), 20.4.1993, *Mondello* (MS); Sicilia, 1846, *G. Gussone* (BOLO); Taormina (Messina), 5.1932, *Baschant* (B); Palermo, on *Leguminosae*, 5.1905, *H. Ross* (B, PAD); Taormina, Castel Mola (Messina), 13.5.1933, *J. Bornmüller* (B); Ogliaastro (Palermo), on *B. bituminosa*, 13.5.1856, *E. & A. Huet du Pavillon* (TO, UPSV); monte Pellegrino (Palermo), 31.5.1855, *E. & A. Huet du Pavillon* (TO); Castellamare (Trapani), s.d., s.c. (RO); monte Caputo (Palermo), s.d., s.c. (RO); Castelbuono (Palermo), s.d., *F. M. Palumbo* (herb. Minà); Palermo, Boccadifalco, 5.1829, *G. Gussone* (NAP); monte Caputo, on *Psoralea bituminosa* and *Acanthus mollis* Palermo, s.d. *G. Gussone* (NAP); Palermo, c.da Buonriposo, 5, *G. Gussone* (NAP); Palermo, on *Leguminosae*, 5.1905, *H. Ross* n. 564 (PRC); Palermo, on *Leguminosae*, 5.1905, *H. Ross* n. 569 (FI, PRC); Palermo, 4.1817, *C. Presl* (PRC); Palermo, on *Psoralea bituminosa*, 5.1881, *M. Lojacono* (FI, PRC); Boschi di Val Demone (Messina), 1855, [A. Todaro] (PAL); Villapriolo (Enna), 5.1858 [A. Todaro] (PAL); monte San Calogero (Palermo), 12.5.2001, *Marcellino & d'Agostino* (PAL); Ris. Zingaro, c.da Uzzo (Trapani), 20.5.1987, *S. Romano & G. Norata* (PAL); San Martino (Palermo), 1.6.1890, *S. Sommier & E. Levier* (FI); Avola (Siracusa), s.d., *Bianca* (FI); Sferracavallo (Palermo), on *Psoralea bituminosa*, 5.1882, *M. Lojacono* (FI); capo S. Alessio (Messina), 2.6.1956, *G. Gramuglio* (FI); Chiusa Sclafani (Palermo), on *B. bituminosa*, 2.6.1990, *Raimondo & al.* n. 703 (PAL).

Notes: Individuals affected by fasciations are quite frequent (Spadaro & al. 2010).

- O. litorea*** Guss., Fl. Sicul. Prod. 2: 184. 1828 ≡ *O. littoralis* Lojac., Naturalista Sicil. 2: 37. 1882 [nom. illeg.] ≡ *O. minor* var. *litorea* (Guss.) Bég. in Fiori & Paol., Fl. Analitica Ital. 2(3): 484. 1902.
 = *O. angeilcifix*a Péteaux & St. Lager in Ann. Soc. Bot. Lyon 27: 221. 1890.
 = *O. fuliginosa* Jord., Observ. Pl. Nouv. 3: 225. 1846.
 = *O. sabulicola* Lojac., Naturalista Sicil. 2: 61. 1882.

General distribution: Sardinia, Corse, S France, Tuscany, Sicily, Greece and Crete.

Regional distribution: Along the Northern coast from Sferracavallo (PA) to Trapani and along the Southern Coast (Fig. 12). Localized.

Hosts: *Anthemis maritima* L. and other *Asteraceae*.

Specimina visa:

[Sicily]: In sabulosis maritimis, Balestrate [Palermo], 4.1881, *M. Lojacono* n. 20 [sub. *O. sabulicola*] (PAL) [Lectotype of *O. sabulicola* Lojac. designed by Domina & Mazzola (2005)]; Balestrate (Palermo), on *Anthemis maritima*, 25.4.2004, *G. Domina* (B, PAL, FI); Balestrate (Palermo), on *A. maritima*, 25.4.2002, *G. Domina* (PAL); Lampedusa (Agrigento), 26.4.1987, *S. Brullo & al.* (CAT); Scoglitti (Ragusa), 21.4.1973, *S. Brullo* (CAT); Baia del Silenzio (Siracusa), 22.4.1980, *Grillo* (CAT); Pineta di Vittoria (Ragusa), 12.4.1986, *Bartolo & al.* (CAT); Is. Ronciglio (Trapani), 20.4.1855, *E. & A. Huet du Pavillon* [sub *O. canescens* C. Presl] (TO); Trapani, s.d., s.c. (RO); Trapani, Colombaia, on *A. maritima*, *A. secundiramea* and *Glebionis coronaria*, s.d., *G. Gussone* (NAP); Marina di Palma (Agrigento), 5.1879, *M. Lojacono* (PRC); Sicilia meridionale, 4.1878, *M. Lojacono* n. 51 [sub *O. australis* Moris] (PRC); Sferracavallo (Palermo), 5.1881, *M. Lojacono* n. 50 (PRC); Palermo, s.d., *M. Lojacono* n. 14 (PRC); Palermo, s.d., *M. Lojacono* n. 2 (PRC); Palermo, s.d., *M. Lojacono* n. 52 [sub *O. salisi*] (PRC); Pantelleria (Trapani), 1838, [V. Tineo] (PAL); Sicilia, s.d., *G. Gussone* [sub *O. mediterranea* Guss.] (PAL); Balestrate (Palermo), 4.1881, *M. Lojacono* [sub *O. sabulicola* Lojac.] (PAL); Balestrate (Palermo), 5.1882, *M. Lojacono* [sub *O. sabulicola* Lojac.] (FI, WU); Lampedusa (Agrigento), 4.1905, *G. Zodda* (FI); Terranova (Caltanissetta), 4, *M. Lojacono* n. 45 (FI); Tonnarella dell'Uzzo (Trapani), on *Anthemis* sp., 30.5.1990, *Raimondo & al.* n. 168 (PAL).

Notes: *O. litorea* populations are endangered by habitat disturbance by bathing tourism.

O. minor Sm., Engl. Bot.: 422. 1797.

= *O. crithmi* Bertol., Fl. Ital. 6: 425. 1846.

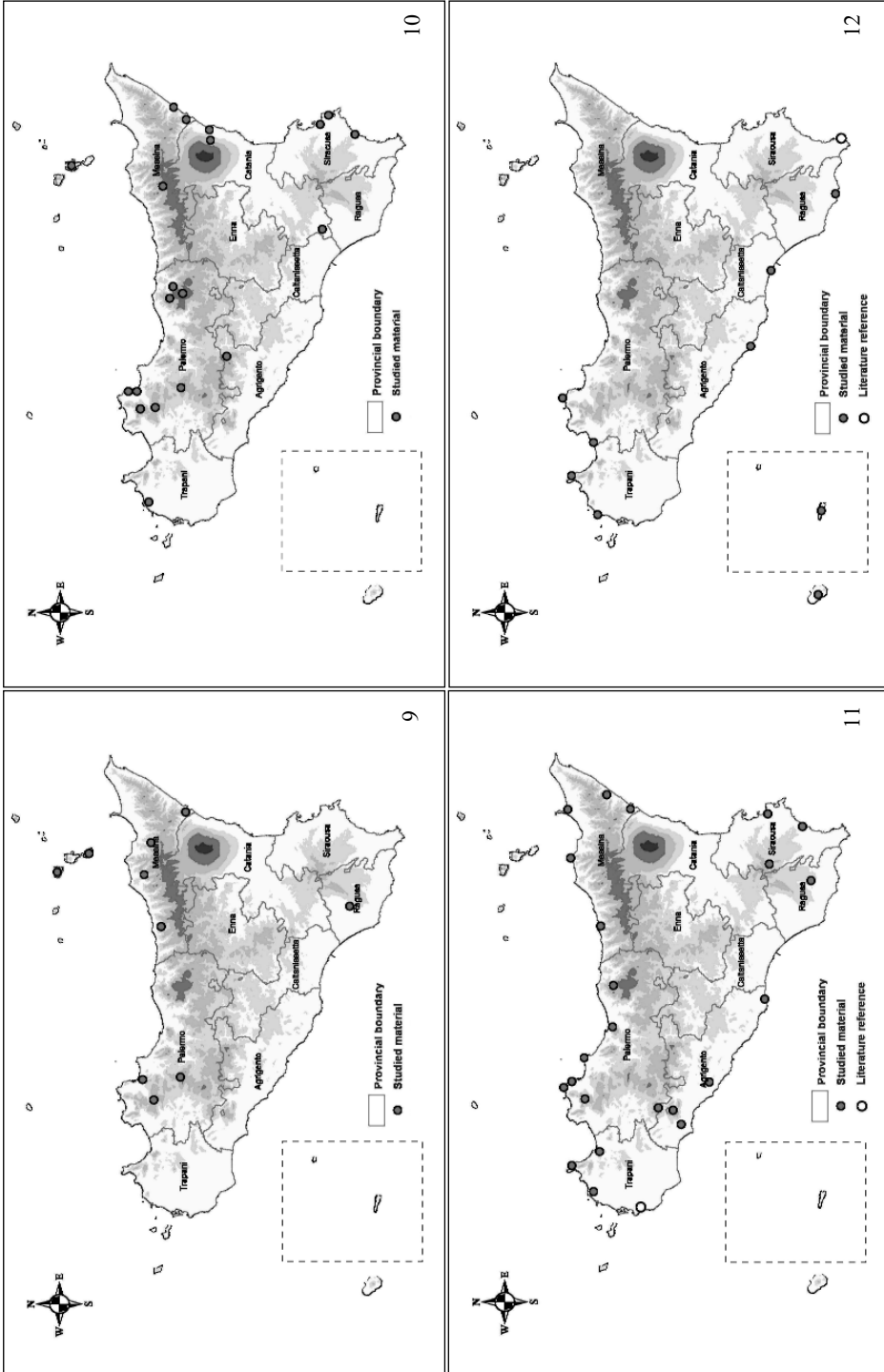
General distribution: Europe, Macaronesia, an introduced weed almost worldwide.

Regional distribution: Everywhere but scattered (Fig. 13).

Hosts: *Pelargonium zonale* L.'Hér., *Vicia sativa* L., *Trifolium pratense* subsp. *semipurpureum* (Strobl) Pignatti, *Hypochaeris laevigata* Benth. & Hook. f., *Galactites tomentosus* Moench.

Specimina visa:

[Sicily]: Rocca di Mele (Palermo), on *Trifolium pratense* subsp. *semipurpureum*, 30.6.2002, *G. Domina* (PAL); piano Pomieri (Palermo), on *Medicago lupulina*, 30.6.2002, *G. Domina* (PAL); Monte Gallo al Malopasso (Palermo), on *Lotus cytisoides*, 16.5.2002, *G. Domina* (PAL); Orto Botanico di Palermo, on *Pelargonium zonale*, 17.4.2002, *G. Domina* (PAL); Pietà di Polizzi (Palermo), 11.11.2002, *E. Di Gristina*, (PAL); *G. Domina* (PAL); Taormina (Messina), on *Vicia*



Figs. 9-11. Regional distribution of: 9. *O. hederaceae*; 10. *O. gracilis*; 11. *O. lavandulaceae*; 12. *O. litorea*.

sativa, 17.4.2005, *G. Domina* (PAL, FI); Marettimo (Trapani), 15.5.1982, *S. Brullo* (CAT); Messina, 1857, s.c. (MS); colli di Messina, 5.1897, s.c. (MS); Is. Lampedusa, capo Ponente (Agrigento), 18.4.1959, *J. Kohlmeyer* (B); Palermo, on *Leguminosae*, 5, *A. Todaro* 1155 (FI, TO); Ficuzza (Palermo), 6.6.1856 *E. & A. Huet du Pavillon* (TO); Sicilia, s.d., *M. Lojacono* n. 39 (PRC); Comunello (Palermo), s.d., *Porcari* [sub *O. canescens*] (PAL); Licata (Agrigento), 23.4.1869, *Citarda* (PAL); s.l., 14.5.1835 [V. Tineo] [sub *O. canescens*] (PAL); Bosco di Malabotta (Messina), on *Hypochoeris achyrophorus*, 4.6.2011, *Raimondo & al.* (PAL); Pagliara (Messina), on *H. achyrophorus*, 17.4.2005, *G. Domina* (PAL); Levanzo (Trapani), on *H. achyrophorus*, 24.4.2005, *G. Domina* (PAL); Poggio San Francesco (Palermo), on *H. laevigata*, 9.6.2004, *G. Domina* (PAL, FI); Giacalone (Palermo), on *H. laevigata*, 5.2004, *G. Domina* (PAL); monte Gallo (Palermo), on *Galactites tomentosus*, 5.2005, *G. Domina* (PAL); Is. Vulcano (Messina), 26.4.1982, *S. Brullo* (CAT); monte Erice (Trapani), 28.5.1997, *Brullo* (CAT); Sicilia, 5.1855, *A. Todaro* [sub *O. canescens* C. Presl] (PAL); Marettimo (Trapani), 21.4.1981, *F. Catanzaro* (PAL); Messina, s.d., *M. Lojacono* n. 108 [sub *O. amethystea*] (PAL); Valdemone (Messina), 6.1879, *Citarda* (Palermo); Mondello (Palermo), 5.1856 [A. Todaro] (PAL); Alcamo (Trapani), 28.4.1856 [A. Todaro] [sub *O. canescens*] (PAL); monte Sparagio (Trapani), on *Asteraceae*, 30.5.1990, *Raimondo & al.* n. 152 (PAL).

Notes: The individuals growing on *Leguminosae* are usually glabrous, those on *Geraniaceae* and *Asteraceae* are usually hairy.

***O. mutelii* F. W. Schultz in Mutel**, Fl. Franç. 2: 353. 1835 ≡ *Kopsia ramosa* subsp. *mutelii* (F. W. Schultz) Arcang., Comp. Fl. Ital.: 417.1894 ≡ *P. ramosa* subsp. *mutelii* (F. W. Schultz) Rouy in Rouy & Foucaud, Fl. France 11: 160. 1909 ≡ *O. ramosa* subsp. *mutelii* (F. W. Schultz) Cout., Fl. Portugal: 566. 1913 ≡ *O. ramosa* var. *mutelii* (F.W. Schultz.) Fiori, Nuova Fl. Analitica Ital. 2: 379. 1926.
 = *O. aegyptiaca* f. *trinacria* G. Beck, Monogr. Orob.: 102. 1890.
 = *O. mutelii* var. *interjecta* G. Beck, Monogr. Orob.: 98. 1890.
 = *O. mutelii* var. *angustiflora* G. Beck, Monogr. Orob.: 96. 1890 ≡ *Kopsia mutelii* var. *angustiflora* (G.Beck) Bég. in Fiori & Paol., Fl. Analitica Ital. 2(3): 472. 1902.
 = *O. mutelii* f. *emarginata* G. Beck, Monogr. Orob.: 98. 1890.
 = *O. mutelii* var. *ramosissima* Lojac., Contr. Fl. Sicil.:16. 1878.
 = *Phelypaea elongata* Lojac., Naturalista Sicil. 2: 133. 1883.
 = *P. panormitana* Lojac., Naturalista Sicil. 1: 174. 1883 ≡ *Kopsia mutelii* var. *panormitana* (Lojac.) Bég. in Fiori & Paol., Fl. Analitica Ital. 2(3): 472. 1902 ≡ *O. mutelii* f. *panormitana* (Lojac.) G. Beck, Monogr. Orob.: 97. 1890 ≡ *K. panormitana* (Lojac.) Lojac. in Naturalista Sicil. 6: 81. 1887.
 = *Kopsia aegyptiaca* var. *trinacria* Bég. in Parl., Fl. Ital. 6: 358. 1844. ≡ *O. aegyptiaca* var. *trinacria* (Bég.) G. Beck, Monogr. Orob.: 102. 1890.

General distribution: Mediterranean Region, Canary Islands.

Regional distribution: Along the coast and in the surrounding islands, in the inland on the mounts surrounding Palermo, Ficuzza, Mount Cammarata and Madonie (Fig. 14). Not common.

Hosts: *Asteraceae*, *Sonchus tenerrimus* L., *Hyoseris radiata* L., etc., *Oxalis pes-caprae* L., *Melilotus sulcata* Desf., *Urtica membranacea* Savigny, etc.

Specimina visa:

[Sicily]: s.l., s.d., *M. Lojaco* n. 9 [sub *Phelypaea albiflora* Gren. & Godr.] (PAL) [Lectotype of *Phelypaea panormitana* Lojac., designed by Domina & Mazzola (2005)]; Sferracavallo (Palermo), 5.1882, *M. Lojaco* n. 557 [sub *Phelypaea elongata* Lojac.] (FI) [Lectotype of *P. elongata* Lojac., designed by Domina & Mazzola (2005)]; Zingaro (Trapani), 26.4.1991, *Brullo & Spampinato* (CAT); monte Catalfano (Palermo), on *Medicago truncatula*, 27.4.2004, *G. Domina* (PAL); Giacalone (Palermo), on *Asteraceae*, 5.2004, *G. Domina* (PAL); Poggio San Francesco (Palermo), on *Hyoseris radiata*, 9.6.2004, *G. Domina* (PAL); Isnello, c.da Mericola (Palermo), on *Sonchus tenerrimus*, 8.4.2004, *G. Domina* (PAL); Isnello, c.da Mericola (Palermo), on *Melilotus sulcata*, 1.5.2002, *G. Domina* (PAL); Isnello, c.da Mericola (Palermo), 14.5.1986, *Minissale* (PAL); Monte Cammarata (Agrigento), on *Medicago orbicularis*, 16.5.2003, *G. Domina* (PAL); Piano Battaglia (Palermo), on *Anthemis cupaniana*, 7.7.2002, *G. Domina* (PAL); Is. Lampedusa (Agrigento), 19.3.1985, *Brullo & al.* (CAT); pinte di Vittoria (Ragusa), 10.6.1986, *Bartolo & al.* (CAT); Messina, c.da Papardo, 4.1990, *Mondello* (MS); Taormina (Messina), 16.5.1933, *J. Bornmüller* (B); Palermo, 5.1909, *H. Ross* (B); Favorita (Palermo), 12.5.1855, *E. & A. Huet du Pavillon* [sub *Phelypaea reuterii* E. & A. Huet du Pavillon] (TO; UPSV); Madonie (Palermo), 1847, *M. Alb. de Franqueville* (P); Castelbuono, c.da San Guglielmo (Palermo), 5.1838, *F. M. Palumbo* [sub *O. caesia* Rchb.] (herb. Minà); Madonie (Palermo), 4.1840, *F. M. Palumbo* (herb. Minà); Sicilia, 1858, *G. Gussone* (NAP); Palermo, 4.1817, *C. Presl* (PRC); monte Pellegrino (Palermo), 19.4.1874, *P. G. Strobl* (PRC); Ficuzza (Palermo), 6.1879, *M. Lojaco* (PRC); Palermo, s.d., *M. Lojaco* n. 37 (PRC); Palermo, s.d., *M. Lojaco* n. 30 [sub *Phelypaea panormitana* Lojac.] (PRC); Ficuzza (Palermo), 6.1879, *M. Lojaco* n. 52 [sub *Phelypaea caesia*] (PRC); Is. Levanzo (Trapani), 14.4.1965, *A. Di Martino* (PAL); Santa Croce fondachelli, 17.4.1828 [V. Tineo] (PAL); Foresta, 4.1878, *M. Vincenzo* (PAL); Polizzi (Palermo), 28.5.1830 [V. Tineo] (PAL); San Martino (Palermo), 19.5.1838, [V. tineo] [sub *O. caesia*] (PAL); Capaci (Palermo), 4.1881, *M. Lojaco* n. 460 [sub *Phelypaea panormitana*] (FI, WU); Pantelleria, s.d., *P. Calcara* (FI); monte Caputo (Palermo), 2.5.1895, *Baroni* (FI); monte Sparagio (Trapani), on *Oxalis pes-caprae*, 30.5.1990, *Raimondo & al.* n. 154 (PAL).

O. nana (Reut.) Beck in Biblioth. Bot. 19: 91.1890. ≡ *Phelypaea mutelii* var. *nana* Reut. in DC., Prodr. 11: 9. 1847 ≡ *Phelypaea nana* (Reut.) Rchb. f. in Rchb., Icon. Fl. Germ. Helv. 20: 88. 1862 ≡ *Kopsia nana* (Reut.) Freyn in Verh. K. K. Zool.-Bot. Ges. Wien 38(2): 623. 1888 ≡ *K. ramosa* var. *nana* (Reut.) Bég., Fl. Analitica Ital. 2(3): 471. 1902. ≡ *Phelypaea ramosa* subsp. *nana* (Reut.) Rouy in Rouy & Foucaud, Fl. France 11: 159. 1909 ≡ *O. ramosa* subsp. *nana* (Reut.) Cout., Fl. Portugal: 566. 1913 ≡ *O. ramosa* var. *nana* (Reut.) Fiori, Nuova Fl. Analitica Ital. 2: 379. 1926 ≡ *Phelipanche nana* (Reut.) Soják in Čas. Nár. Mus., Odd. Přír. 140: 130. 1972.

= *O. nana* f. *intercedens* G. Beck, Monogr. Orob.: 92. 1890.

= *O. nana* subsp. *melitensis* G. Beck, Feddes Rep. 18: 33. 1922. ≡ *Phelipanche nana* subsp. *melitensis* (Beck) Soják in Čas. Nár. Mus., Odd. Přír. 140: 130.1972.

General distribution: Europe and Mediterranean basin.

Regional distribution: Very common in the whole territory and in the surrounding islands.

Missing at higher altitudes (Fig. 15).

Specimina visa:

[Sicily]: Campofelice di Roccella, on *Oxalis-pes-caprae*, 28.3.2004, *G. Domina* (PAL); Campofelice di Roccella, on *O. pes-caprae*, 2.3.2004, *G. Domina* (PAL); Catania c.da Gelso Bianco, on *O. pes-caprae*, 22.3.2004, *G. Domina* (FI, PAL); San Martino delle Scale, on *O. pes-caprae*, 26.4.2004, *G. Domina* (PAL); Buonfornello, on *O. pes-caprae*, 19.3.2004, *G. Domina* (PAL); Geraci Siculo (Palermo), on *Hyoseris radiata*, 28.5.2004, *G. Domina* (PAL); Lascari, on *O. pes-caprae*, 9.3.2003, *G. Domina* (PAL); Pollina, on *O. pes-caprae*, 3.4.2003, *G. Domina* (PAL); Stagnone di Marsala, on *O. pes-caprae*, 20.3.2003, *G. Domina* (PAL); Monte San Calogero, on *Calendula arvensis* and *O. pes-caprae*, 27.3.2003, *G. Domina* (PAL); Marsala, on *Medicago* sp., 20.3.2003, *G. Domina* (PAL); Siracusa c.da Belvedere, on *O. pes-caprae*, 18.4.2004, *G. Domina* (PAL); Scillato, on *O. pes-caprae*, 8.4.2004, *G. Domina* (PAL); Monte Gallo, on *O. pes-caprae*, 20.4.2003, *G. Domina* (PAL); monte San Giuliano (Trapani), on *Melilotus sulcata*, 25.4.2004, *G. Domina* (PAL); Acquedolci (Messina), on *O. pes-caprae*, 12.4.2003, *G. Domina* (PAL); Altofonte, on *O. pes-caprae*, 13.4.2004, *G. Domina* (COA, G, PAL); Palermo, on *Urtica membranacea*, 6.4.2004, *G. Domina* (PAL); Siracusa, near San Leonardo river, on *O. pes-caprae*, 18.4.2004; Bonagia (Trapani), on *Hypochaeris achyrophorus*, *Euphorbia helioscopia*, *Coleostephus myconis* and *Medicago* sp., 27.3.2004, *G. Domina* (PAL); Sciacca, on *Galactites tomentosus*, 3.4.2004, *G. Domina* (PAL); Monte Formaggio, on *Sherardia arvensis*, 29.4.2004, *G. Domina*, *P. Mazzola*, *R. Lidberg* (PAL); Cefalù c.da Ferla, on *O. pes-caprae*, 28.3.2004, *G. Domina* (PAL); Palermo Orto Botanico, on *O. pes-caprae*, 25.3.2004, *G. Domina* (PAL); Agrigento c.da Mosella, on *O. pes-caprae*, 7.3.2004, *G. Domina* (PAL); Porto Empedocle, on *Galactites tomentosus*, *O. pes-caprae* and *Linum* sp., 13.3.2004, *G. Domina* (FI, PAL); Eraclea minoa (Agrigento), on *Glebionis coronaria*, 10.4.2004, *G. Domina* (PAL); Collesano, on *O. pes-caprae*, 8.4.2004, *G. Domina* (PAL); Cefalù (Palermo), 15.4.2000, *G. Domina* (PAL); Ustica (Palermo), on *O. pes-caprae*, 3.4.2005, *G. Domina* & *M. Aghababyan* (PAL); Falcone (Messina), on *O. pes-caprae*, 17.4.2005, *G. Domina* (PAL); Pagliara (Messina), on *O. pes-caprae* and *Trifolium subterraneum*, 17.4.2005, *G. Domina* (PAL); Milazzo (Messina), 16.4.2003, *P. Mazzola* (PAL); Cattolica Eraclea (Agrigento), on *O. pes-caprae*, 10.4.2004, *G. Domina* (PAL); Niscemi, 23.3.1990, *Bartolo* & *Pulvirenti* (CAT); Salina, Malfa (Messina), 2.4.1970, *S. Brullo* (CAT); Lipari (Messina), 25.4.1982, *S. Brullo* (CAT); Alicudi (Messina), 10.6.1980, *S. Brullo* (CAT); Fontane bianche (Siracusa), 28.5.1989, *Fichera* (CAT); Gorgi tondi (Trapani), 24.4.1974, *S. Brullo* (CAT); Marsala (Trapani), 14.4.1985, *S. Brullo* (CAT); Taormina (Messina), 5.1932, *Baschant* (B); Palermo, 5.1899, *H. Ross* n. 174 [sub *O. ramosa* var. *mutelii*] (B, FI, PAD, PRC); Is. Stromboli (Messina), 4.1958, *Leggenz* (B); Is

Lampedusa, c.da Albero Sole (Agrigento), 18.4.1959, *J. Kohlmeyer* (B); Palermo, 4.1829, *G. Gussone* (NAP); Alicudi (Messina), 10.5.1828, *G. Gussone* (NAP); Madonie (Palermo), s.d. *G. Gussone* (NAP); Taormina (Messina), 20.4.1904, Sterneck n. 269 (PRC); Is. Levanzo (Trapani), 14.4.1965, *A. Di Martino* (PAL); Is. Mozia (Trapani), 5.5.1956, s.c. (PAL); Prope Panormum, s.d., *M. Lojaco* [sub *Phelypaea olbiensis*] (PAL); Lipari (Messina), s.d., *Mandralisca* (FI); Comiso (Ragusa), 16.5.1873, *Aiuti* (FI); Pantelleria (Trapani), 27-28.3.1906, *S. Sommier* (FI); San Martino (Palermo), 1886, *C. Marchesati* (FI); Is. Lampedusa (Agrigento), 4.1905, *G. Zodda* (FI); Palermo, 4.1883, *M. Lojaco* n. 158 [sub *Phelypaea mutelii*] (FI); Solunto (Palermo), 9.5.1895, *S. Sommier* (FI); monte Pellegrino (Palermo), 26.4.1878, *M. De Sardegna* (WU).

Notes: *O. nana* is the most common broomrape in Sicily, it is mainly found on *Oxalis pes-caprae*.

O. oxyloba (Reut.) G. Beck in L. Koch, Entwickl.-Gesch. Orob.: 209. 1887 ≡ *Phelypaea oxyloba* Reut. in DC. Prodr. 11: 9. 1847.
 = *Phelypaea gussoneana* Lojac. in Naturalista Sicil. 1: 199-200. 1882 ≡ *Kopsia gussoneana* (Lojac.) Lojac. in Naturalista Sicil. 6: 81. 1887 ≡ *O. oxyloba* f. *gussoneana* (Lojac.) G.Beck, Monogr. Orob.: 113. 1890 ≡ *K. schultzei* var. *gussoneana* (Lojac.) Bég. in Fiori & Paol., Fl. Analitica Ital. 2(3): 473. 1902.

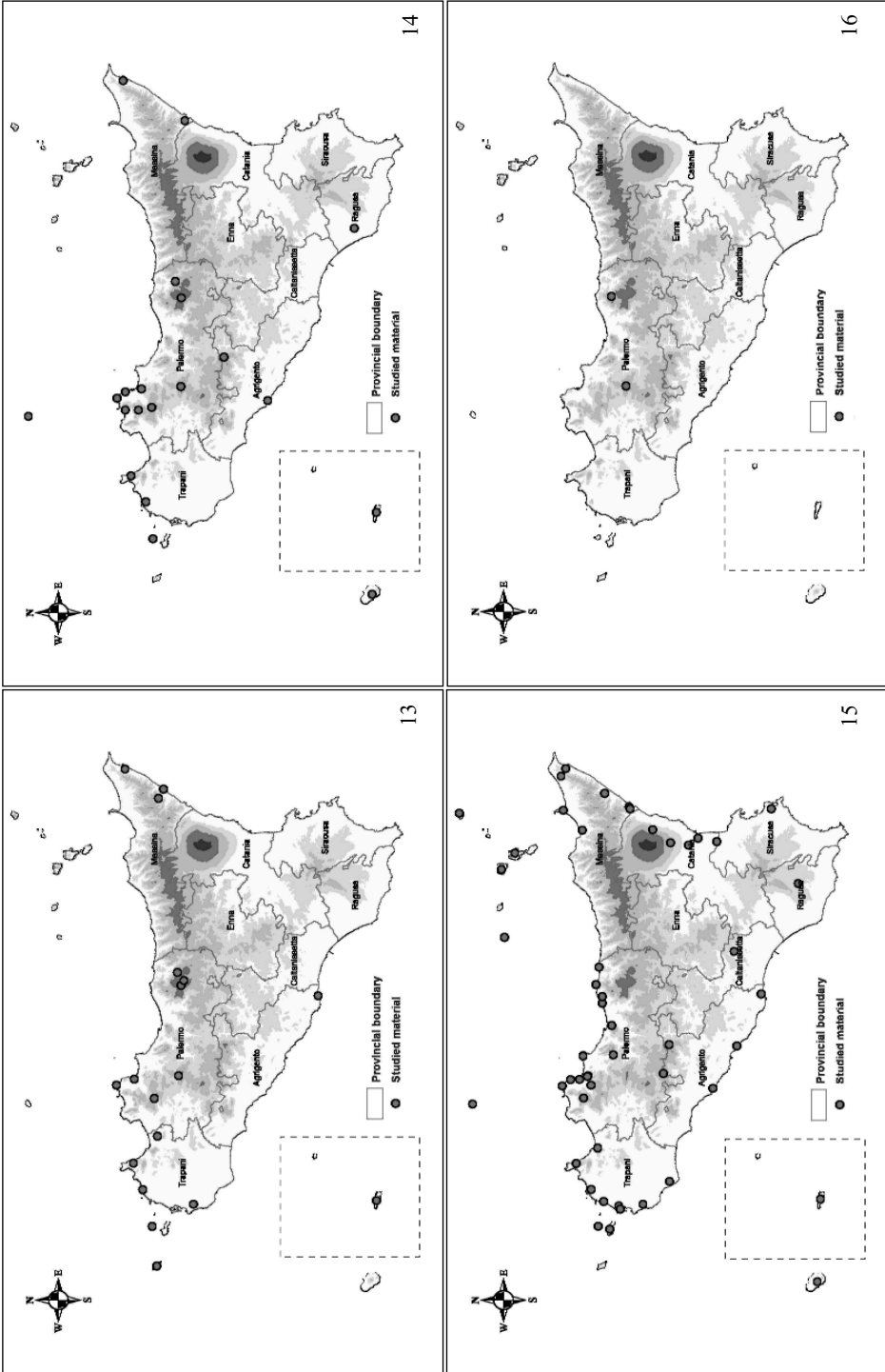
General distribution: Sicily, E-Mediterranean, Caucasus.

Regional distribution: Rocca Busambra and Madonie near Isnello (PA) (Fig. 16). Rare and localized.

Hosts: *Rumex nebroides* Campd., *Arabis alpina* subsp. *caucasica* (Willd.) Briq., *Geranium rotundifolium* L., *Hyoseris radiata* L., *Cyanus segetum* Hill, *Anthemis cupaniana* Tod. ex Nym.

Specimina visa:

[Sicily]: Busambra (Palermo), on *Rumex tuberosus*, 13.6.1878, *M. Lojaco* [sub *Phelypaea refescens*] (PAL) [lectotype of *P. gussoneana* Lojac. designed by Domina & Mazzola (2005)]; Rocca Busambra (Palermo), on *Arabis alpina* subsp. *caucasica*, 20.6.2004, *G. Domina* (PAL); Rocca Busambra (Palermo), on *Hyoseris radiata*, 20.6.2004, *G. Domina* (PAL); Rocca Busambra (Palermo), on *H. radiata*, 28.6.2004, *G. Domina* (PAL); Rocca Busambra (Palermo), on *Geranium rotundifolium*, 28.6.2004, *G. Domina*; Rocca Busambra (Palermo), on *Rumex nebroides*, 28.6.2004, *G. Domina*; Rocca Busambra (Palermo), on *Centaurea cyanus* and *Anthemis cupaniana*, 28.6.2004, *G. Domina*; Rocca Busambra (Palermo), on *H. radiata*, 16.6.2003, *G. Domina*; Rocca Busambra, on *Rumex nebroides*, 16.6.2003, *G. Domina*; Rocca Busambra (Palermo), on *R. nebroides*, 5.6.2002, *G. Domina*; Busambra (Palermo), on *R. triangularis*, 6.1878, *M. Lojaco* (P); Madonie [Isnello], c.da Rianello, on *Arthemisia camphorata*, s.d., *F. M. Palumbo* (Herb. Minà); Madonie, on *A. camphorata*, 6, *G. Gussone* (NAP); Palermo, s.d., *M. Lojaco* n. 7 (PRC);



Figs. 13-16. Regional distribution of: **13.** *O. minor*; **14.** *O. mutetii*; **15.** *O. nana*; **16.** *O. oxyloba*.

Busambra (Palermo); s. d., *M. Lojacono* n. 44 (PRC); Madonie (Palermo), 6.1853, [A. Todaro] (PAL); Busambra (Palermo), on *R. nebroides*, 6.1881, M Lojacono [sub *Phelypaea gussoneana*] (FI).

O. pubescens d'Urv. in Mém. Soc. Linn. Paris: 332. 1822.

= *O. versicolor* F.W.Schultz, Flora 1: 129. 1843.

= *O. pubescens* var. *campuliflora* Lojac., Naturalista Sicil., 2: 82. 1883 ≡ *O. campuliflora* (Lojac.) Lojac., Fl. Sic. 2(2): 170. 1904.

General distribution: E-Mediterranean and Caucasus.

Regional distribution: Along the Tyrrhenian Coast, in the islands surrounding Sicily, Nebrodi and Peloritani Mountains (Fig. 17).

Hosts: *Galactites tomentosus* Moench, *Carlina sicula* Ten., *Hyoseris radiata* L.

Specimina visa:

[Sicily]: Sferracavallo (Palermo), 5.1881, *M. Lojacono* [sub *O. todari* Lojac.] (PAL) [Holotype of *O. pubescens* var. *campulifera* Lojac. cfr. Domina & Mazzola (2005)], Ustica, cimitero (Palermo), on *Galactites tomentosus*, 14.6.2005, *G. Domina* & *M. Aghababyan* (PAL); Lipari (Messina), 29.5.1969, *S. Brullo* (CAT); Malabotta (Messina), 31.5.1989, *S. Brullo* (CAT); Is. Lampione (Agrigento), 20.4.1959, *J. Kohlmeyer* (B); Palermo, s.d. *G. Gussone* (NAP); Sferracavallo (Palermo), s.d., *M. Lojacono* [sub *O. canescens* C. Presl] (PAL); Pantelleria, s.d., *Errera* [sub *O. canescens*] (PAL); Sferracavallo (Palermo), 5.1881, *M. Lojacono* [sub *O. canescens* C. Presl] (FI); Pantelleria (Trapani), 27-28.3.1906, *S. Sommier* (FI); monte Antennamare (Messina), 5.1892, *A. Vaccari* [sub *O. barbata*] (FI).

O. ramosa L., Sp. Pl.: 633. 1753 ≡ *Kopsia ramosa* (L.) Dum., Comment. Bot.: 16. 1822.

= *O. ramosa* f. *polyclonos* Wallr., Orob. Gen. Diask.: 64. 1825. ≡ *K. ramosa* f. *polyclonos* (Wallr.) Bég. in Fiori & Paol., Fl. Analitica Ital. 2(3): 471. 1902.

= *Orobanche ramosissima* Gennari, Spec. Fl. Sard.: 152. 1894.

= *Phelypaea albiflora* Gren. & Godr., Fl. Fr. 2: 627-628. 1850.

= *P. emarginata* Reut. in Candolle, Prodr. 11: 9. 1847.

= *P. reuteri* Moris, Fl. Sard. 3: 243. 1858-1859.

General distribution: Europe, N Africa, Caucasus, Arabic peninsula Introduced in Australia and N America.

Regional distribution: Along the coast and in the islands surrounding Sicily, in the inland near Corleone (PA) (Fig. 18). Not common.

Hosts: *Lycopersicon esculentum* Mill., *Oxalis pes-caprae* L., ecc.

Specimina visa:

[Europe]: herb. Clifford 321, *Orobanche* 2 (BM) [Lectotype designed by Foley (2001)].
 [Sicily]: Siracusa c.da Milocca, on *Lycopersicon esculentum*, 18.4.2004, *G. Domina* (FI, PAL); Ribera (Agrigento), on *Oxalis pes-caprae*, 3.4.2004, *G. Domina* (PAL); Campofelice di Roccella (Palermo), 25.4.2005, *G. Domina* (PAL); Acquasanta (Siracusa), 30.3.1980, Grillo (CAT); Pozzallo (Ragusa), 25.4.1969, *S. Brullo* (PAL); Messina, 1856, s.c. (MS); Is. Vulcano (Messina), 4.1877, *M. Lojacono* n. 28 [sub *Phelypaea mutelii* var. *ramosissima* Gennari] (PRC); Is. Vulcano (Messina), on *Senecio squarrosus*, 4.1877, *M. Lojacono* (PAL); Ponte della Fraga (Palermo), 23.4.1848 [A. Todaro] (PAL); Is. Grande (Trapani), 25.4.1961, *C. Perrone* & *A. Di Martino* (PAL); Is. Marettimo (Trapani), 21.4.1981, F. Catanzaro (PAL); Is. Vulcano (Messina), 17.4.1877, *M. Lojacono* n. 10 [sub *O. mutelii* var. *ramosissima*]; Lipari (Messina), 4.1854, [A. Todaro] (PAL); Avola (Siracusa), on *Cannabis sativa*, 4-5, *Bianca* (FI); Mondello (Palermo), 8.3.1895, F. Parlato (FI); Taormina (Messina), 2.4.1873, *S. Sommier* (FI); Avola (Siracusa), 2-6, *Bianca* [sub *Phelypaea proboscistyla*] (FI); Catania, on *Lycopersicon esculentum*, 7.1899, [Tornabene] [sub *Phelypaea mutelii*] (FI); Is. Linosa (Agrigento), 4.1905, *G. Zodda* [sub *O. lavandulacea*] (FI).

Note: *O. ramosa* occurs in Sicily on wild plants, only recently has it been observed on tomatoes cultivated in greenhouses near Siracusa, where it was possibly introduced with tomato propagation material.

***O. rapum-genistae* Thuill.**, Fl. Env. Paris, ed. 2: 317. 1799.

= *O. rapum* Wallr., Orob. Gen. Diask.: 32. 1825.

≡ *O. benthamii* Timb.-Lagr., Mém. Acad. Sci. Toulouse 6: 643. 1874. ≡ *O. rapum-genistae* subsp. *benthamii* (Timb.-Lagr.) P. Fourn., Quatre Fl. France: 796. 1937.

= *O. carnea* Guss., Enum. Pl. Vasc. Is. Inarime: 246. 1854.

– “*O. major*” auct. sicil. (non L., Sp. Pl.: 632. 1753, nom. rej.).

General distribution: W- Europe, NW Africa.

Regional distribution: E-Sicily orientale, Nebrodi, Etna and Eolian Islands (Fig. 19).
 Abundant but localized.

Hosts: *Genista aetnensis* DC., *Spartium junceum* L., *Calicotome infesta* Guss.

Specimina visa:

[Sicily]: Zafferana etnea (Catania), on *Genista aetnensis*, 15.6.2003, *G. Domina* (B, PAL); Zafferana etnea (Catania), on *G. aetnensis*, 12.7.1983, *J. R. Akeroyd*, *S. L. Jury*, *F. J. Rumsey*, *M. J. Simpson* (B); Nicolosi (Catania), on *G. aetnensis*, 27.6.2004, *G. Domina* (PAL); Ragalna (Catania), on *G. aetnensis*, 31.7.2002, *G. Domina* (PAL); Rocche dell'Argimusco (Messina), on *Spartium junceum*, 12.6.2005, E. Di Gristina (PAL); Iria (Messina), on *Calicotome infesta*, 31.3.2004, *G. Domina* (PAL); Etna, Bosco di Milo (Catania), 11.6.1990, *S. Brullo* (CAT); Belpasso (Catania), 1.5.1990, *S. Brullo* (CAT);

Etna (Catania), 21.7.1990, *S. Brullo* (CAT); Is. Lipari (Messina), 29.5.1933, *J. Bornmüller* (B); Palermo, on *S. junceum*, 5, *A. Todaro* n. 1156 [sub *O. spartii* Vauch.] (FI); Bosco di Milo (Catania), on *G. aetnensis*, 11.6.1990, *Raimondo & al.* n. 1968 (PAL); Bosco di Malabotta (Messina), on *Cytisus villosus*, 4.6.2011, *Raimondo & al.* (PAL); Etna, Piano del Vescovo (Catania), 5.6.2011, *Raimondo & al.* (PAL); Acquedolci (Messina), on *Saprtium junceum*, 12.4.2003, *G. Domina* (PAL); Ficuzza (Palermo), on *Cytisus triflorus*, s.d., *M. Lojacono* n. 27 [sub *O. carnea* Guss.] (PRC); s.l., s.d., *Lojacono* [sub *O. carnea* Guss.] (PAL); Valle della Rocca (?), s.d., *V. Tineo* [sub *O. spartii*] (PAL).

***O. sanguinea* C. Presl in J. & C. Presl**, Delic. Prag.: 71. 1822.

= *O. crinita* Viv., Fl. Cors. Sp. Nov.: 11. 1824. ≡ *O. sanguinea* var. *crinita* (Viv.) Bég., Fl. Analitica Ital. 2(3):478. 1902.

= *Orobanche crinita* var. *straminea* Lojac., Naturalista Sicil. 2: 107. 1883. ≡ *O. sanguinea* f. *straminea* (Lojac.) G. Beck, Monogr. Orob.: 207. 1890.

= *O. nebrodensis* Tin. in Guss., Fl. Sic. Syn. 2: 845. 1843.

= *O. sanguinea* var. *maritima* Lojac. in Naturalista Sicil. 2:109. 1883.

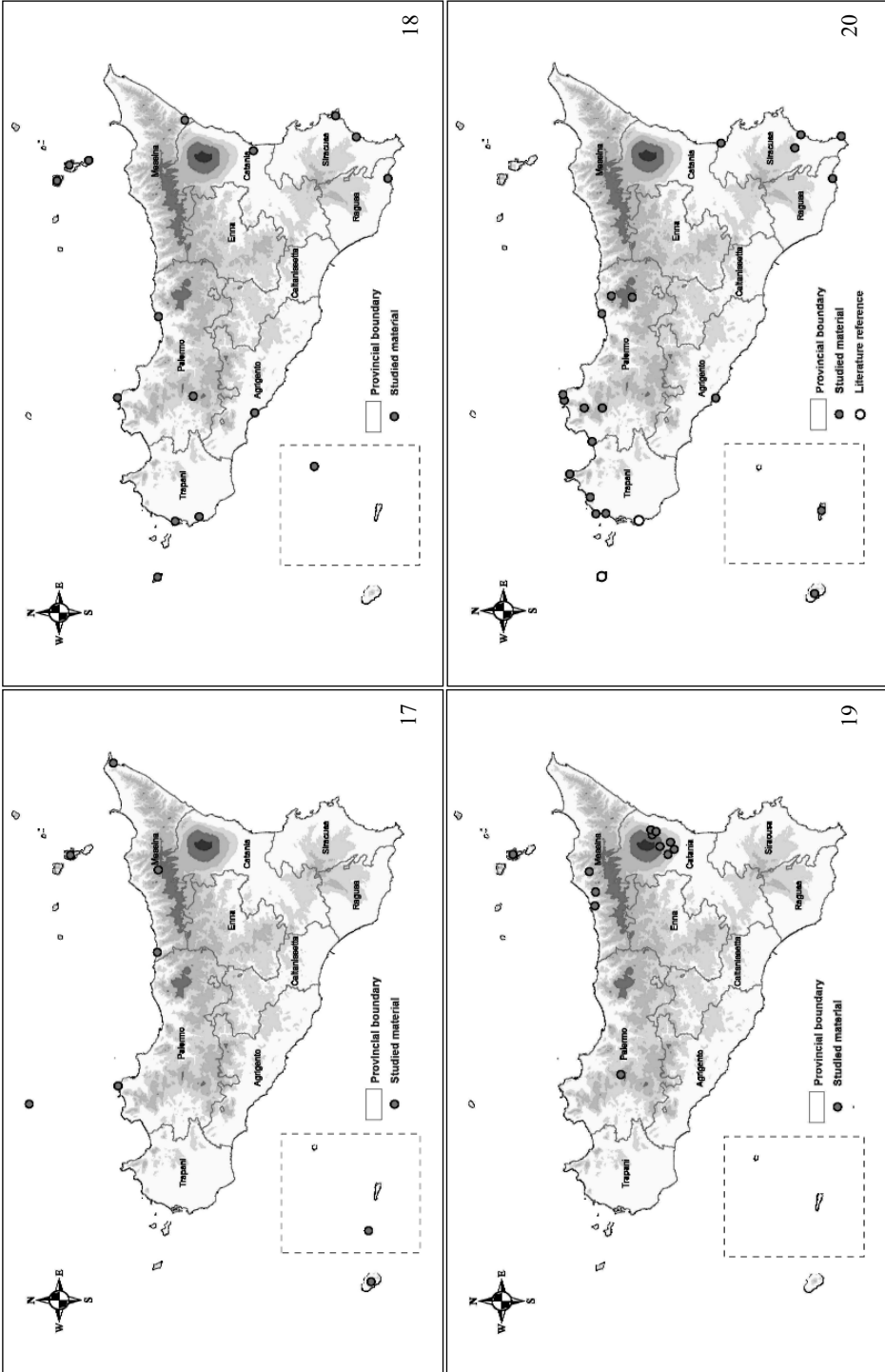
Hosts: *Lotus cytisoides* L., *L. ornithopodioides* L.

General distribution: Mediterranean basin.

Regional distribution: On carbonate gelive on Monte San Giuliano (TP), Mounts around Palermo, Madonie and Iblei (Fig. 20).

Specimina visa:

[Sicily]: Madonie (Palermo), 7.1817, C. Presl (PRC) [Lectotype designed by Domina & al. (2005)]; Monte San Giuliano (Trapani), on *Lotus cytisoides*, 25.4.2004, *G. Domina* (PAL); Noto (Siracusa), on *L. cytisoides*, 1.5.2004, *G. Domina* (PAL); San Giuseppe Jato (Palermo), n *L. cytisoides*, 19.6.2004, *G. Domina* (PAL); San Martino delle Scale (Palermo), on *L. ornithopodioides*, 26.4.2004, *G. Domina* (PAL); San Martino delle Scale (Palermo), on *L. ornithopodioides*, 18.5.2005, *G. Domina* (PAL); Isnello c.da Mericola (Palermo), on *L. cytisoides*, 1.5.2002, *G. Domina* (PAL); Isnello c.da Mericola (Palermo), on *L. cytisoides*, 18.5.2004, *G. Domina* (PAL); Isnello c.da Mericola (Palermo), on *L. cytisoides*, 8.6.2004, *G. Domina* (PAL, B, E, PRC); Palermo, 5.1906, *H. Ross* (B); Isnello (Palermo), s.d., *F. M. Palumbo* (herb. Minà); San Martino (Palermo), on *L. cytisoides*, s.d., *G. Gussone* (NAP); San Martino, 5.1879, *M. Lojacono* n. 36 (PAL); Pietà (Palermo), s.d., s.c. [sub *O. canescens*] (PAL); San Martino (Palermo), 1.6.1890, *S. Sommier & E. Levier* (FI), Campofelice di Roccella (Palermo), on *L. cytisoides*, 27.4.2002, *G. Domina* (PAL); Campofelice di Roccella (Palermo), on *L. cytisoides*, 20.4.2004, *G. Domina & J. Matthews* (PAL); Balestrate (Palermo), on *L. cytisoides*, 25.4.2004, *G. Domina* (PAL); Ronciglio (Trapani), on *L. cytisoides*, 25.4.2004, *G. Domina* (PAL); Is. Correnti (Siracusa), on *L. cytisoides*, 1.5.2004, *G. Domina* (PAL); Torresalsa (Agrigento), on *L. cytisoides*, 25.4.2005, *G. Domina* (PAL); Is. Lampedusa, cala pisana (Agrigento), on *L. cytisoides*, 9.5.2004, *G. Domina*



Figs. 17-20. Regional distribution of: 17. *O. pubescens*; 18. *O. ramosa*; 19. *O. rapum-genistae*; 20. *O. sanguinea*.

(PAL); Lampedusa, 25.4.1987, *S. Brullo*, Minissale & spampinato (CAT); Ferla (Siracusa), 18.4.1990, Bartolo & Pulvirenti (CAT); Pantelleria (Trapani), 29.4.1975, *S. Brullo* (CAT); Capo Passero (Siracusa), 20.4.1973, *S. Brullo* (CAT); Is. Ronciglio (Trapani), on *Lotus*, 20.4.1855, E. & A. Huet du Pavillon (FI, TO; UPSV); Palermo, on *Lotus*, 5, Todaro 1154 (FI, P, TO); Palermo, s.d., Gussone (RO); Siculiana (Agrigento), s.d., *G. Gussone* (NAP); Sferracavallo (Palermo), s.d., *G. Gussone* (NAP); Trapani Is. Ronciglio, 7.5.1867, *G. Gussone* (NAP); Mondello (Palermo), on *L. cytisoides*, 5.1879, *M. Lojacono* n. 34 (PAL); Palermo, 5.1906, H. Ross, n. 570 (FI, PRC, WU); Mondello (Palermo), on *L. cytisoides*, 4.1880, *M. Lojacono* (PAL); monte Gallo (Palermo), 5.1858, [A. Todaro] (PAL); Is Grande (Trapani), 1964, C. Perrone & A. Di Martino (PAL); Is. Lampedusa, cala Pisana (Agrigento), on *Lotus cytisoides*, A. Di Martino (PAL); dune di Calatubo (Trapani), 15.4.1985, D. Ottonello & S. Romano (PAL); saline del Ronciglio (Trapani), 15.5.1983, D. Ottonello (PAL); Ris. Zingaro (Trapani), 23.8.1986, D. Ottonello & al. (PAL); Mondello (Palermo), 5.1884, *M. Lojacono* [sub *O. crinita* var. *straminea* Lojac.] (FI); Mondello (Palermo), on *Lotus cytisoides*, 4.1880, *M. Lojacono* [sub *O. crinita*] (FI, WU); monte Gallo (Palermo), 5.1881, *M. Lojacono* [sub *O. densiflora* var. *maritima* Lojac.] (FI); Mondello (Palermo), 5.1853, A. Todaro [sub *O. litorea* Guss.] (FI, P); Is. Ronciglio (Trapani), on *L. cytisoides*, 5.1924, A. Ponso (FI); Lampedusa (Agrigento), on *L. cytisoides* 4.1908, G. Zodda (FI); Lampedusa (Agrigento), on *L. coronillaefolius*, 4.1873, Aiuti (FI), Avola (Siracusa), on *L. cytisoides*, 4-5, Bianca (FI); Sferracavallo (Palermo), 4.1877, *M. Lojacono* [sub *O. crinita* var. *albescens*] (WU); Palermo, on *L. cytisoides*, s.d., A. Todaro (WU); Isnello (Palermo), 16.5.1836, V. Tineo (PAL) [Holotype of *O. nebrodensis* Tin., cfr. Domina & Mazzola (2005)]; Isnello c.da Mericola (Palermo), on *L. cytisoides*, 1.5.2002, *G. Domina* (PAL); Isnello c.da Mericola (Palermo), on *L. cytisoides*, 18.5.2004, *G. Domina* (PAL).

Notes: The inland populations have looser spikes and are less hairy than the ones on the coast, which explains the existence of the names *O. sanguinea*, *O. crinita* and *O. nebrodensis*. The nomenclature of this taxon has recently been discussed by Turland & Foley (2004) and Domina & al. 2005).

O. schultzii Mutel, Fl. Franç. 2: 429. 1835. ≡ *Kopsia schultzii* (Mutel) Bég. in Fiori & Paol., Fl. Analitica Ital. 2(3): 472. 1902. ≡ *Phelipanche schultzii* (Mutel) Pomel in Bull. Soc. Sci. Phys. Algérie 11: 107. 1874. ≡ *Phelypaea schultzii* (Mutel) Walp. in Repert. Bot. Syst. 3: 463. 1844.
= *O. stricta* Moris ex Bertol., Fl. Ital. 6: 450. 1844. ≡ *K. stricta* (Bertol.) Caruel in Parl., Fl. Ital. 6: 356. 1884. ≡ *Phelypaea stricta* (Bertol.) Moris ex Reut. in DC., Prodr. 11: 7. 1847. ≡ *K. schultzii* var. *stricta* (Caruel) Bég. in Fiori & Paol., Fl. Analitica Ital. 2(3): 472. 1902. ≡ *O. schultzii* f. *stricta* (Moris) G.Beck, Monogr. Orob.: 112. 1890. ≡ *O. schultzii* var. *stricta* (Moris) Fiori, Nuova Fl. Analitica Ital. 2: 380. 1926.

General distribution: SC-Mediterranean.

Regional distribution: Common in Sicily on the coast and in the inland, in Marettimo and in the Aeolian Islands (Fig. 21).

Hosts: *Hyoseris radiata* L. and other *Asteraceae*.

Specimina visa:

[Sicily]: Monte Cammarata (Agrigento), on *Hyoseris radiata*, 27.5.2004, G. Domina, G. Schneiweiss, D. Joel (PAL); Pagliara (Messina), on *Asteraceae*, 17.4.2005, G. Domina (PAL); Centuripe (Catania), 18.5.1987, S. Brullo (CAT); Ali terme (Messina), 15.5.1987, Minissale & Spampinato (CAT); Filicudi (Messina), 29.4.1980, S. Brullo (CAT); Marettimo (Trapani), 16.5.1982, S. Brullo (CAT); Rocca di Novara (Messina), 2.7.1983, S. Brullo (CAT); Panarea (Messina), 4.1909, Zodda (MS); Taormina, mt. Mola, 13.5.1933, J. Bornmüller (B); Palermo, on *Spartium*, *Cytisus* and *Calicotome*, 5.1905, H. Ross (B); Cefalù (Palermo), 4.4.1958, J. Kohlmeyer (B); Terranova, c.da Feudo-Nobile (Caltanissetta), 1.5.1856, E. & A. Huet du Pavillon (TO; UPSV); Castelbuono (Palermo), 5.1846, F. M. Palumbo (herb. Minà); Is. Filicudi (Messina), 4.1854, [A. Todaro] [sub *O. ramosa* L.] (PAL); Is. Marettimo (Trapani), 21.4.1981, F. Catanzaro (PAL); Piana degli Albanesi (Palermo), 30.4.1984, s.c. (PAL); Is. Eolie (Messina), s.d., M. Lojacono [sub *Phelypaea caerulea*] (PAL); Salemi (Trapani), 4.1877, M. Lojacono [sub *Phelypaea caerulea*] (PAL); Madonie (Palermo), 6.1859, s.c. [sub *O. canescens*] (PAL); Is. Marettimo (Trapani), 27.4.1947, Francini & Messeri (FI); Agrigento, on *V. faba* 19.4.1873, S. Sommier (FI); Palermo, 1.5.1899, Baroni (FI); monte Sparagio (Trapani), on *Asteraceae*, 30.5.1990, Raimondo & al. n. 139 (PAL).

***O. thapsoides* Lojac.** in *Naturalista Sicil.* 2: 60. 1822.

General distribution: Narrow endemic to Sicily.

Regional Distribution: S Sicily in Gela and Licata (Fig. 22), not found recently. Very rare.

Hosts: Presumably on *Galactites tomentosus* Moench and other *Asteraceae*.

Specimina visa:

[Sicily]: Terranova (Caltanissetta), 4.1869, *Citarda* (Palermo); Palermo, s.d., M. Lojacono (PAL) [Lectotype designed by Domina & Mazzola (2005)]; [Sicily]: Terranova (Caltanissetta), 4.1869, *Citarda* (Palermo); Palermo, s.d., M. Lojacono (PRC); Licata (Agrigento), s.d., *Bonafede* [sub *O. pubescens*] (PAL); Terranova (Caltanissetta), s.d., Lojacono n. 111 (PAL); Sicilia meridionale, s.d., M. Lojacono n. 22 (PAL).

Notes: *O. thapsoides* differs from the other species close to *O. minor* by its denser spike and the triangular calix teeth.

***O. variegata* Wallr.**, *Orob. Gen.*: 40. 1825.

= *O. condensata* Moris, *Stirp. Sard. Elench.* (2): 8. 1827.

= *O. satyrus* De Not., *Repert. Fl. Ligust.*: 305. 1844.

= *O. sicula* Lojac. in *Naturalista Sicil.* 1: 255. 1882.

- = *O. spartii* Guss., Fl. Sicul. Prodr. 2: 182. 1828.
 = *O. grandiflora* C. Presl, Fl. Sic. 1: XXXIV. 1826.
 = *O. foetida* var. *lutea* Biv., Stirp. Rar. Sic. 1: 15 (1813). ≡ *O. spartii* var. *lutea* (Biv.) Guss., Fl. Sicul. Prodr. 2: 182. 1828. ≡ *O. lutea* Lojac. in Naturalista Sicil. 1: 256. 1882 (non Baumg. 1816).
 = *O. purpurea* Raf., Caratt.: 80. 1810 (non Jacq. 1762).

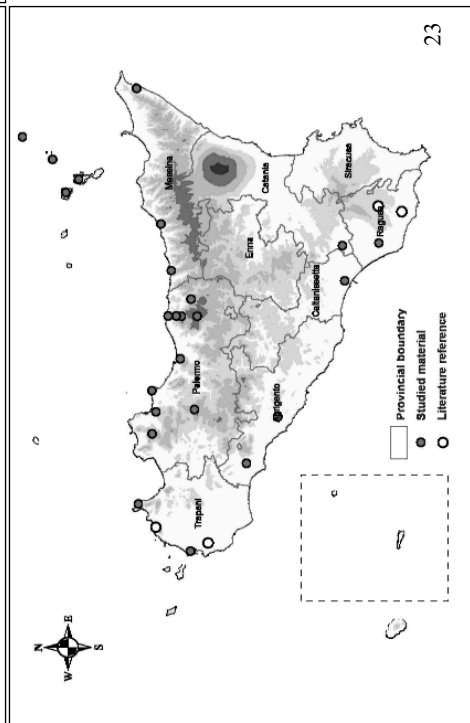
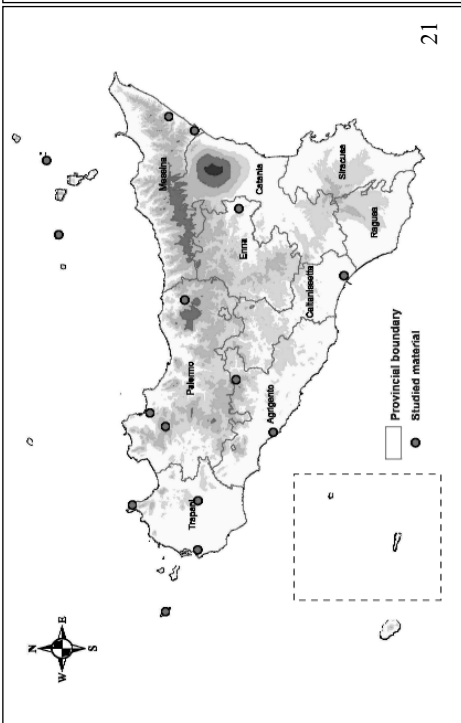
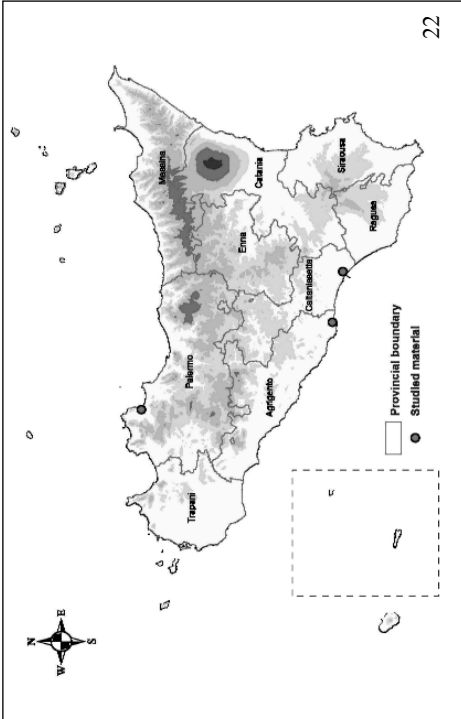
General distribution: Italy, Sicily, Sardinia, Corse, S France, Tunisia and Algeria.

Regional distribution: Very common in Sicily and in the Aeolian islands (Fig. 23).

Hosts: *Calicotome infesta*, *Spartium junceum*, *Genista aristata*

Specimina visa:

[Sicily]: s.d., s.l. *M. Lojaco* n. 33 [sub *O. sicula* Lojac.] (PAL) [Lectotype of *O. sicula* Lojac. designed by Domina & Mazzola, 2005]; Santo Stefano di Camastra (Messina), on *Spartium junceum*, 31.3.2004, *G. Domina* (B, PAL); Cefalù, c.da Allegracuore (Palermo), on *Calicotome infesta*, 29.4.2005, *G. Domina* (PAL); Cefalù, c.da Carbonara (Palermo), on *C. infesta*, 16.4.2005, *G. Domina* (PAL); Menfi (Agrigento), on *C. infesta*, 7.5.2005, *G. Domina* (PAL); Cattolica Eraclea (Agrigento), on *C. infesta*, 10.4.2004, *G. Domina* (PAL); Piano dell'occhio (Palermo), on *S. junceum*, 15.5.2005, *G. Domina* (PAL); Giacalone (Palermo), on *S. junceum*, 24.5.2005, *G. Domina* (PAL); Giacalone (Palermo), on *C. infesta*, 18/03/2005, *G. Domina* (PAL); Pollina (Palermo), on *C. infesta*, 3.4.2003, *G. Domina* (PAL); Isnello (Palermo), on *C. infesta*, 8.4.2004, *G. Domina* (PAL); Castelbuono, pr. Piano Ferro (Palermo), on *Genista aristata*, 23.5.2004, *G. Domina* (PAL); Lascari, c.da Landro nuovo (Palermo), on *C. infesta*, 6.4.2003, *G. Domina* (PAL); M. San Calogero (Palermo), on *S. junceum*, 18.5.2002, *G. Domina* (PAL); Zingaro (Trapani), 25.4.1991, *Brullo & Spampinato* (CAT); Bosco Santo Pietro (Catania), 23.3.1990, *S. Brullo* (CAT); Ferla (Siracusa), 18.4.1990, *Bartolo & Pulvirenti* (CAT); Lipari, 24.4.1982, *S. Brullo* (CAT); Antennammare (Messina), 11.5.1990, *Bartolo, Brullo, Pulvirenti & Spampinato* (CAT); Salina, Malfa (Messina), 30.4.1982, *S. Brullo* (CAT); Camaro (Messina), 4.5.1987, *S. Brullo, Minissale & Spampinato* (CAT); Pineta di Vittoria (Ragusa), 10.1.1991, *Bartolo, S. Brullo, Giardina, Minissale & Spampinato* (CAT), Nebrodi, c.da Pantana (Messina), 19.4.1988, *S. Brullo & Minissale* (CAT); Caronia (Messina), 18.4.1988, *S. Brullo & Minissale* (CAT); Etna, s.d., *Zodda* (MS); Is. Panarea (Messina), 4.1902, *Zodda* (MS); Messina, on *Cytisus triflorus*, 1856, s.c. (MS); Palermo, on *S. junceum*, 5, *A. Todaro* 1156 (TO); Palermo, 5.1886, *M. Lojaco* (TO); Gela (Caltanissetta), s.d., s.c. (RO); Sagana (Palermo), s.d., *Gasparrini* (RO); Castelbuono, c.da San Guglielmo, 4.1846, *F. M. Palumbo*, (herb. Minà); Sagana (Palermo), 5, *G. Gussone* (NAP); Gela (Caltanissetta), 4, *G. Gussone* (NAP); Nicosia (Enna), s.d. *G. Gussone* (NAP); Palermo, 5.1817, *C. Presl* [sub *O. grandiflora* C. Presl] (PRC); Ficuzza (Palermo), on *C. infesta*, s.d., *M. Lojaco* n. 42 (PRC); Is. Eolie (Messina), 4, *M. Lojaco* n. 19 (PRC); Palermo, s.d., *M. Lojaco* n. 33 (PRC); Palermo, 4.1905, *H. Ross* n. 571 (FI, PAD, PRC); Ficuzza (Palermo), on *C. spinosa*, 4.1880, *M. Lojaco* n. 361 (PRC); Madonie (Palermo), 12.6.1849, *Porcari* [sub *O. nebrodensis* Tineo] (PAL); Lipari (Messina), 1854, [*A. Todaro*] (PAL); Palermo, 5, [*V. Tineo*] (PAL);



Figs. 21-23. Regional distribution of: **21.** *O. schultzei*; **22.** *O. thapsoides*; **23.** *O. variegata*.

Palermo, 5, *A. Todaro* n. 1156 (FI, PAL); Mongerbino (Palermo), 18.3.1832, [V. Tineo] (PAL); Isole Eolie (Messina), 4.1877, *M. Lojacono* (PAL); Lipari (Messina), 4.1877, *M. Lojacono* (PAL); Marsala (Trapani), 3.1856, [A. Todaro] (PAL); Palermo, 5, [V. Tineo] (PAL); Castelbuono, Liccìa (Palermo), 4.1846, *F.M. Palumbo* (PAL); Lipari (Messina), 4.1854, [A. Todaro] (PAL); Is. Lunga (Trapani), 21.4.1968, *C. Perrone & A. Di Martino* (PAL); dune di Calatubo (Trapani), 15.4.1985, *D. Ottonello & S. Romano* (PAL); Castelbuono c.da Barraca (Palermo), 5.1883, *M. Lojacono* [sub *O. carnea* Guss.] (FI); Cefalù, S.Cosimo (Palermo), 4.4.1900, *U. Martelli* [sub *O. alexandrii*] (FI); Castelbuono (Palermo), 5, *F. Minà Palumbo* n. 435 (FI); Messina, on *Cytisus triflorus*, 18.4.1877, *Huter* (FI, WU); Palermo, 5.1883, *M. Lojacono* (FI); Lipari (Messina), s.d., *Mandalisca* (FI); Comiso (Ragusa), 16.5.1873, *Aiuti* (FI); Ficuzza (Palermo), 11.5.1895, *S. Sommier* (FI); Castelbuono (Palermo), on *Cytisus infestus*, 8.4.1874, *P. G. Strobl* (WU); Finale (Palermo), 11.4.1874, *P. G. Strobl* (WU); Quacella (Palermo), on *Coronilla emerus* subsp. *emeroides*, 3.6.1990, *Raimondo & al.* n. 940 (PAL); Rocche dell'Argimusco (Messina), on *S. junceum*, 12.6.2005, *E. Di Gristina* (PAL); Rocche dell'Argimusco (Messina), on *C. infesta*, 4.6.2011, *Raimondo & al.* (PAL).

Taxa inquirenda et excludenda

O. aegyptiaca Pers., Syn. Pl. 2: 181. 1806.

Species occurring in W Asia and E Mediterranean; its western distribution boundary lies in Greece. The reports from monte Gallo near Palermo (Beck 1890; Lojacono 1881-1883) and Lampedusa (Di Martino 1958) have not been confirmed during field surveys. The specimens found (FI and PAL) collected by Lojacono and Di Martino belong to *O. mutellii* F. W. Schultz. *O. aegyptiaca* var. *trinacria* Beck (1890) was described on the basis of the specimens housed in FI that, on our opinion, fall inside *O. mutellii* variation range. Thus *O. aegyptiaca* has to be excluded from the Sicilian flora.

O. densiflora Bertol., Fl. Ital. 6: 444. 1846.

This species occurs in the Iberian peninsula and NW Africa (Greuter & al. 1989; Foley 2001; Le Floc'h & al. 2010). Its occurrence in Malta has recently been excluded (Domina & Soldano 2009) It has been reported from monte Gallo near Palermo (Lojacono 1881-1883) but it has not been found in field nor herbarium specimens have been observed. Presumably there was a misunderstanding with *O. sanguinea* C. Presl.

O. denudata Moris, App. ad Stirp. Sard. Elench. (3): 10. 1827.

Endemic to Sardinia (Camarda 1982), has been reported from Sicily by Lojacono (1881-1883). It has not been found during field surveys. The specimens housed under this name in PAL and FI belong to *O. picridis* F.W. Schultz (FI). *O. denudata* has never been reported by subsequent authors. It has to be excluded from the flora of Sicily.

O. lutea Baumg., Enum. Stirp. Transsilv. 2: 215. 1816.

This species, occurring in C and E Europe to Caucasus is reported from Sicily according to Pignatti (1982). It has never been found during field trips and no herbarium specimens has been observed. We can presume that this species has been misunderstood during

field observations or by name with *O. lutea* Lojac. that is a subsequent synonym of *O. variegata* Wallr. This species is to be excluded from the flora of Sicily.

O. olbiensis (Coss.) Nyman, Syll. Fl. Eur.: 133. 1855.

Mediterranean species. Reported from Sicily by Lojacono (1883) and doubtfully occurring in the island in Carlòn & al. (2008). The specimen cited by Lojacono (PAL!), reviewed by Pujadas A. in 2001 and Domina G. in 2004, and his figure (Lojacono 1883) fall inside *O. nana* variation range. No other herbarium specimens or plants during field surveys were observed. Thus *O. olbiensis* has to be excluded from the Sicilian flora.

O. purpurea Jacq., Enum. Stirp. Vindob.: 108. 1762.

This species occurs in Europe and in the northern part of the Mediterranean. It has been reported from Sicily by Pignatti (1982).

No specimens have been found during field and herbarium surveys. Presumably *O. purpurea* has been morphologically confused with some other taxa belonging to *O.* sect. *Trionychon* (*O. lavandulacea* Rchb. or *O. ramosa* L.) or the misunderstanding may be attributable to a wrong synonymy with *O. purpurea* Raf. that is a later synonym of *O. variegata* Wallr. Most likely the species is to be excluded from the Sicilian flora.

O. rigens Loisel., Fl. Gall.: 384. 1807.

This taxon is endemic to Sardinia and Corsica. It is doubtfully recorded from Sicily for the first time by Beck (1890) who reports about one specimen in Winkler collected near Messina but consider this could have been generated by Label confusion. This datum is reported in the subsequent accounts (Beck 1930; Pignatti 1982). This taxon has not been found during field excursions and no further herbarium specimens have been found from Sicily. Most likely this taxon has to be excluded from the flora of Sicily.

Tab. 1. Hosts and species of *Orobanche* found in Sicily.

Apiaceae

<i>Daucus carota</i> L.	<i>O. amethystea</i> Thuill.
<i>Eryngium campestre</i> L.	<i>O. amethystea</i> Thuill.
<i>Kundmannia sicula</i> (L.) DC.	<i>O. amethystea</i> Thuill.
<i>Orlaya maritima</i> Koch	<i>O. amethystea</i> Thuill.

Araliaceae

<i>Hedera helix</i> L.	<i>O. hederæ</i> Duby
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Asteraceae

<i>Anthemis cupaniana</i> Tod. ex Nym.	<i>O. chironii</i> Lojac.
<i>A. maritima</i> L.	<i>O. litorea</i> Guss.
<i>A. secundiramea</i> Biv.	<i>O. litorea</i> Guss.
<i>Artemisia alba</i> Turra	<i>O. cernua</i> L.
<i>A. arborescens</i> L.	<i>O. cernua</i> L.
<i>Calendula arvensis</i> L.	<i>O. nana</i> (Reut.) Beck
<i>Carlina lanata</i> L.	<i>O. canescens</i> C. Presl

- C. sicula* Ten.
Glebionis coronaria (L.) Spach
Coleostephus myconis Cass.
Cyanus segetum Hill
Galactites tomentosus Moench

Hyoseris radiata L.

Hypochaeris achyrophorus L.
H. laevigata Benth. & Hook. f.
Onopordon illyricum L.
Picris echioides L.
P. hieracioides L.
Scolymus grandiflorus Desf.
Senecio candidus (C. Presl) DC.
S. squarrosus A. Rich.
Sonchus oleraceus L.
S. tenerrimus L.
- O. canescens* C. Presl
O. nana (Reut.) Beck, *O. litorea* Guss. (*vide* Guss.)
O. nana (Reut.) Beck
O. oxyloba (Reut.) G. Beck
O. nana (Reut.) Beck, *O. canescens* C. Presl, *O. minor* Sm., *O. pubescens*, *O. thapsoides* Lojac.
O. minor Sm., *O. schultzi* Mutel, *O. mutelii* F.W. Schultz, *O. artemisiae-campestris* Gaudin
O. minor Sm, *O. canescens* C. Presl
O. minor Sm.
O. artemisiae-campestris Gaudin
O. artemisiae-campestris Gaudin
O. artemisiae-campestris Gaudin
O. amethystea Thuill.
O. amethystea Thuill.
O. ramosa L.
O. nana (Reut.) Beck
O. mutelii F.W. Schultz

Brassicaceae

- Arabis alpina* subsp. *caucasica* (Willd.) Briq. *O. gussoneana* (Lojac.) Domina & Raimondo

Euphorbiaceae

- Euphorbia helioscopia* L. *O. nana* (Reut.) Beck

Fabaceae

- Bituminaria bituminosa* (L.) C.H. Stirt.
Calicotome infesta (C. Presl) Guss.

C. villosa Link
Coronilla emerus L.
Cytisus triflorus L'Hér
C. villosus C. Presl
Genista aetnensis C. Presl
G. aristata C. Presl
Lathyrus odoratus L.
L. sativus L.
Lotus cytisoides L.
L. ornithopodioides L.
L. edulis L.
Melilotus sulcata Desf.
Medicago lupulina L.
M. truncatula Gaertn.
Pisum elatius M. Bieb.
Spartium junceum L.
- O. lavandulacea* Rchb.
O. gracilis Sm., *O. variegata* Wallr., *O. rapum-genistae* Thuill.
O. gracilis Sm., *O. variegata* Wallr.
O. gracilis Sm.
O. variegata Wallr., *O. rapum-genistae* Thuill.
O. variegata Wallr., *O. rapum-genistae* Thuill.
O. rapum-genistae Thuill.
O. variegata Wallr.
O. crenata Forssk.
O. crenata Forssk.
O. sanguinea C. Presl
O. sanguinea C. Presl
O. nana (Reut.) Beck
O. nana (Reut.) Beck
O. minor Sm.
O. mutelii F. W. Schultz
O. crenata Forssk.
O. gracilis Sm., *O. rapum-genistae* Thuill., *O. variegata* Wallr.
O. nana (Reut.) Beck
O. minor Sm.
O. crenata Forssk.
- Trifolium subterraneum* L.
T. pratense subsp. *semipurpureum* Pignatti
Vicia faba L.

<i>V. sativa</i> L.	<i>O. crenata</i> Forssk., <i>O. minor</i> Sm.
<i>V. villosa</i> Roth	<i>O. crenata</i> Forssk.
Geraniaceae	
<i>Geranium rotundifolium</i> L.	<i>O. oxyloba</i> (Reut.) G. Beck
<i>Pelargonium zonale</i> L'Hér	<i>O. minor</i> Sm.
Lamiaceae	
<i>Calamintha nepeta</i> (L.) Savi	<i>O. alba</i> Willd.
<i>Satureja fruticulosa</i> Grande	<i>O. alba</i> Willd.
<i>S. graeca</i> L.	<i>O. alba</i> Willd.
<i>S. juliana</i> L.	<i>O. alba</i> Willd.
<i>Thymus spinulosus</i> Tenore	<i>O. alba</i> Willd.
<i>T. serpyllum</i> L.	<i>O. alba</i> Willd.
Linaceae	
<i>Linum decumbens</i> Desf.	<i>O. nana</i> (Reut.) Beck
Oxalidaceae	
<i>Oxalis pes-caprae</i> L.	<i>O. nana</i> (Reut.) Beck, <i>O. ramosa</i> L.
Plantaginaceae	
<i>Plantago lagopus</i> L.	<i>O. nana</i> (Reut.) Beck
Polygonaceae	
<i>Rumex nebroides</i> Campd.	<i>O. oxyloba</i> (Reut.) G. Beck
Rubiaceae	
<i>Galium lucidum</i> All.	<i>O. caryophyllacea</i> Sm.
<i>G. verum</i> L.	<i>O. caryophyllacea</i> Sm.
<i>Rubia peregrina</i> L.	<i>O. caryophyllacea</i> Sm.
<i>Sherardia arvensis</i> L.	<i>O. nana</i> (Reut.) Beck
Solanaceae	
<i>Lycopersicon esculentum</i> Mill.	<i>O. ramosa</i> L.
Urticaceae	
<i>Urtica membranacea</i> Savigny	<i>O. nana</i> (Reut.) Beck

Endangered taxa

The inventory of Sicilian entangered taxa (Raimondo & al. 1994) includes *O. aegyptiaca* Pers. as 'Extinct (E)', *O. cernua* L. in Loefl as 'Rare (R)', *O. chironii* Lojac. as 'Rare (R)' and *O. rapum-genistae* subsp. *rigens* (Loisel) P. Fourn. as 'Extinct (E)'. According to Scoppola & Spampinato (2005) in Sicily *O. aegyptiaca* is recorded as 'Endangered (EN)' and *O. chironii* as 'Vulnerable (VU)'. Herbarium and field surveys confirmed that *Orobanche aegyptiaca* Pers., reported to monte Gallo near Palermo (Lojacono 1881-1883)

and Lampedusa (Di Martino 1958) does not occur in Sicily (see below). The same for *O. rapum-genistae* subsp. *rigens* (Loisel) P. Fourn., Endemic to Sardinia and Corse.

O. cernua L. in Loefl., paleotemperate species, in Sicily occurs on the Aeolian islands and the Madonie Mountains. It is quite frequent at Salina, Lipari, Panarea and Strmboli, in our opinion this species according to IUCN criteria (2001) is Least Concern (LC).

Orobanche chironii Lojac., Endemic to Sicily, was found on Mount Busambra (Palermo), the only known locality up to now known, and also on Mount Pizzuta (Palermo), on the Madonie (Palermo) and at Mount Cammarata (Agrigento). Observed populations includes few individuals but are stable in the last 7 years. According to IUCN criteria this species belongs to 'Endangered' (EN) category.

Orobanche thapsoides Lojac., endemic to Sicily, was found only once in a single individual in the *Locus classicus* near Gela (Caltanissetta) on *Galactites tomentosus* Moench. In addition specimens collected near Licata (Agrigento) and Palermo have been studied but the plant was not found in the field. According to IUCN criteria this species should be considered as 'Critically endangered' (CR).

Orobanche gussoneana (Lojac.) Domina & Raimondo, lies in its western limit of distribution. It is recorded at Busambra Mountain (Palermo) and the Madonie (Lojacono, 1881-1883). During field surveyis has been found only at Busambra, host of different plants. On the basis of 7 years of observation, according to IUCN criteria it should be classified as 'Vulnerable (VU)'. These data are summarized on table2.

The studied taxa occurs on well conserved habitats as screes and at the base of rocks. All the localities fall in protected areas. Their hosts are quite common in sicily. No need of particular conservation strategies is therefore required. Only exception *O. thapsoides* that occurs in one area subjected to intensive greenhouse agriculture.

Tab. 2. Endangered Sicilian Taxa.

Taxon	General distribution	Regional distribution	Hosts	IUCN Category
<i>Orobanche cernua</i>	Asia, Mediterranean basin, Azores islands	Madonie Mts. and Aeolina Islands	<i>Artemisia arborescens</i>	LC
<i>O. chironii</i>	Endemic to Sicily	Mounths of Palermo, Mount Cammarata and Madonie Mts.	<i>Anthemis cupaniana</i>	CR
<i>O. oxyloba</i>	Sicily, W. Medit., Caucasus	Rocca Busambra (PA)	<i>Anthemis cupaniana</i> <i>Arabis alpina</i> subsp. <i>caucasica</i> <i>Geranium rotundifolium</i> <i>Hyoseris radiata</i> <i>Cyanus segetum</i> <i>Rumex nebroides</i>	VU
<i>O. thapsoides</i>	Endemic to Sicily	Gela (CL), Licata (AG), Palermo?	<i>Galactites tomentosus</i>	CR

Conclusions

This survey confirms the occurrence of most of the taxa previously recorded for Sicily, giving their detailed distribution on the island. In total, 23 species have been recorded. Three taxa (*O. chironii* Lojac., *O. oxyloba* (Reut.) G. Beck and *O. thapsoides* Lojac.) are endangered in Sicily, being rare endemics or on the border of their distribution range.

Two species (*O. crenata* Forssk. and *O. ramosa* L.) are dangerous pest, the former on the whole Island, damaging broad-bean and pea fields, the latter in E Sicily on tomatoes in greenhouses. Six taxa (*O. olbiensis* Nyman, *O. aegyptiaca* Pers., *O. purpurea* Jacq., *O. densiflora* Bertol., *O. denudata* Moris and *O. lutea* Baumg.), reported from Sicily in the main European and Italian Floras, are excluded because their Sicilian records are based misidentification or are not supported by herbarium or field data.

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References

- Anonymous [IUCN] 2001: Red List Categories, Version 3.1. – Cambridge.
- Beck Mannagetta, G. 1890: Monographie der Gattung *Orobanche*. – Bibliotheca Botanica **19**. Cassel.
- 1930: *Orobanchaceae* L. – in Engler A.(ed.): Das Pflanzenreich **96**. – Leipzig.
- Béguinot, A. 1902: *Orobanchaceae* – Pp. 470-486 in Fiori A. & Paoletti G.: Flora analitica d'Italia, **2(3)**. – Florence.
- Bertoloni, A. 1846: *Orobanche*. Pp. 419-455 in Flora italica **6**. – Bologna.
- Bivona, A. 1813: Stirpium rariorum minusque cognitarum in Sicilia, **1**. – Palermo.
- Camarda, I. 1983: Proposta di una scheda dei caratteri morfologici del genere "*Orobanche*" L. – Webbia **37(1)**: 171-184.
- Caruel, T. 1884: *Orobanchaceae*. – Pp. 345-389 in Parlatore F.: *Fl. italiana* **6**. – Florence.
- Chater, A. O. & Webb, D. A. 1972: *Orobanche* L. – Pp. 286-293 in Tutin, T. G., Heywood, V. H., Burges, N. A., Moore, D. M., Valentine, D. H., Walters, & S. M., Webb, D. A.: Flora Europaea, **3**. – Cambridge.
- Conti, F., Abbate, G., Alessandrini, A & Blasi, C. 2005: An Annotated Checklist of the Italian Vascular Flora. – Rome.
- Crespo, M. B. & Pujadas, A. 2006: Notas sobre *Phelipaea reuteriana* Rchb. f. (*Orobanchaceae*). – Fl. Montiber. **33**: 27-31.
- Cupani, F. 1696: Horthus Catholicus. – Napoli.
- Di Martino, A. 1958: Nuovo contributo alla flora inedita delle Isole Pelagie. – Lav. Ist. Bot. Giardino Colon. Palermo **16**: 84-93.
- Domina, G. 2009a: Il genere *Orobanche* (*Scrophulariaceae*) in Italia. – 104° Congr. S.B.I. riass.: 29, Campobasso 16-19 settembre 2009.
- 2009b: *Orobanchaceae* – P. 331 in: GREUTER W., RAAB-STRAUBE VON E. (EDS.), Euro+Med Notulae, 4. – Willdenowia **39**: 327-333.
- & Arrigoni P.V. 2007: The genus *Orobanche* (*Orobanchaceae*) in Sardinia. – Fl. Medit. **17**: 115-136
- & Colombo, P. 2005: Seed micromorphology and its variation in Sicilian *Orobanche* (*Magnoliopsida*). – Fl. Medit. **15**: 99-107. 2005

- & Mazzola, P. 2009: Notes on the genus *Orobanche* in Italy: 2. Taxa described by Gussone. – *Bocconea* **23**: 177-185.
- & — 2011: Notes on the genus *Orobanche* in Italy 3: Taxa described by A. Bertoloni. – *Pl. Biosyst.* **145(2)**: 342-346.
- & Soldano, A. 2009: Sul nome di *Orobanche densiflora* Bertol. e sulla presenza del taxon in Italia. – P. 222 in: 104° Congr. S.B.I. riass.: 222, Campobasso 16-19 settembre 2009.
- & Stepanek, J. 2009: Typification of the name *Orobanche canescens* C. Presl (*Orobanchaceae*) with taxonomic notes. – *Candollea* **64(1)**: 31-37.
- , Greuter, W. & Mazzola, P. 2005: A note on the type of *Orobanche sanguinea* C. Presl (*Orobanchaceae*), nom. cons. prop. – *Taxon* **54(2)**: 500-502.
- Fiori, A. 1926: *Orobanchaceae*. – Pp 378-392 in: Nuova Flora analitica d'Italia, **2**. – Florence.
- Foley, M. J. Y. 1999: *Orobanche sanguinea* C. Presl or *O. crinita* Viv.?: the correct name for the widespread Mediterranean coastal plant. – *Candollea* **54(1)**: 89-95.
- 2001: *Orobanche* L. Pp. 32-76 in Piva, J., Sales, F., Hedge, I. C., Aedo, C., Aldasoro, J. J., Castroviejo, S., Herrero, A., Velayos, M.: Flora Iberica, **14**. – Madrid.
- Giardina, G, Raimondo, F. M. & Spadaro, V. 2007: A catalogue of plants growing in Sicily. – *Bocconea* **20**: 5-582.
- Greuter, W., Burdet, H. M. & Long, G. 1989: Med-Checklist, **4**. – Genève.
- Gussone, G. 1828: *Orobanche*. – Pp. 179-186 in *Florae Siculae prodromus*, **2**. – Napoli.
- 1832: *Orobanche*. – Pp. 204-208 in *Supplementum ad Florae Siculae prodromus*. – Naple.
- 1843: *Orobanche*. – Pp 132-139, 844-855 in: *Florae Siculae sinopsi*, **2**. – Naple.
- Le Floc'h, E., Boulos, L, Vela, E. & Domina, G. 2010: *Orobanchaceae* Pp. 272-275 in Le Floc'h, E., Boulos, L, Vela, E.: Catalogue synonymique commenté de la Tunisie. – Tunis.
- Lojacono Pojero, M. 1878: Contributi alla flora di Sicilia. – Palermo.
- 1881-1883: Criterii sui caratteri delle *Orobanche* ed enumerazione delle nuove specie rinvenute in Sicilia. – *Naturalista Sicil.* **1**: 45-48, 53-56, 90-93, 131-136, 162-165, 169-175, 198-202, 209-216, 255-258; **2**: 11-15, 37-41, 59-64, 80-84, 105-110, 132-136.
- 1886-1887: Alcune osservazioni alle *Orobanche* della Flora Italiana del Caruel. – *Naturalista Sicil.* **6**: 56-58, 79-82, 104-106, 130-133.
- 1904: *Orobanchaceae*. – Pp. 148-171 in: *Flora Sicula*, **2(2)**. – Palermo.
- Pastena, C., Anselmo, A. & Zimmardi, M. C. 2003: Cupani, Panphyton Siculum. – Palermo.
- Pignatti, S. 1982: *Orobanchaceae*. – Pp. 606-616 in: *Flora d'Italia*, **2**. – Bologna.
- Presl, C. 1822: *Plantarum Rariorum Siciliae* in Presl, J. & Presl, C.: *Deliciae Pragenses*. – Prague.
- Rafinesque Schmaltz, C. S. 1810: Caratteri di alcuni nuovi generi e nuove specie di animali e di piante della Sicilia con varie osservazioni sopra i medesimi. – Palermo.
- Raimondo, F. M., Domina, G. & Spadaro, V. 2010: Checklist of the vascular flora of Sicily. – *Quad. Bot. Amb. Appl.* **21(2010)**: 189-252.
- , Gianguzzi, L. & Ilardi, V. 1994: Inventario delle specie “a rischio” nella flora vascolare nativa della Sicilia. – *Quad. Bot. Amb. Appl.* **3(1992)**: 65-132.
- Reuter, G. F. 1847: *Orobanchaceae* – Pp. 1-45 in: De Candolle, A.: *Prodromus systematis naturales regni vegetabilis*, **11**. – Paris.
- Scoppola, A. & Spampinato, G. 2005: Atlante delle specie a rischio di estinzione. – CD-ROM enclosed to: Conti, F., Abbate, G., Alessandrini, A & Blasi, C. 2005: *An Annotated Checklist of the Italian Vascular Flora*. – Rome.
- Spadaro, V., Bazan, G & Raimondo, F.M. 2010: Schede 1-11 – Pp. 285- 295 in: Raimondo, F. M. & Schicchi, R.: *Piante e loro anomalie vegetative: schede documentarie*. 1-26. – *Quad. Bot. Amb. Appl.* **21(2010)**: 283-310.
- Strobl, P. G. 1878: *Orobanchaceae*. – Pp. 432-439 in: *Flora der Nebroden*, **2**. – Regensburg.

- Turland, N. J., Foley M. J. Y., 2004: Proposal to conserve the name *Orobanche sanguinea* (*Orobanchaceae*) with a conserved type. – *Taxon* **53(4)**: 1076-1077.
- Ucria, B. 1789: Hortus regium Panhormitanus. – Palermo.
- Vaucher, J. P., 1827: Monographie des Orobanches. – Genève.
- Wallroth, C. 1825: *Orobanches* Generis Diaskeyn. – Frankfurt.
- Webb, D. A. 1972: *Orobanchaceae*. Pp. 285-294 in: Tutin, T. G., Heywood, V. H., Burges, N. A., Moore, D. M., Valentine, D. H., Walters, S. M., Webb, D. A.: *Flora Europaea*, **3**. – Cambridge.

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