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## *Orobanche australis* Moris ex Bertol. the correct name for *O. thapsoides* Lojac. (Orobanchaceae)

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### Abstract

The taxonomic relationships between *Orobanche australis* and *O. thapsoides* are analyzed through the study of the original material. These species are also compared with other morphologically similar ones occurring in the Mediterranean (*O. canescens*, *O. pubescens*, *O. palaestina*, *O. amethystea*). The lectotype of *O. palaestina* is designated. From the comparison of these taxa it is evident that *O. australis* and *O. thapsoides* refer to the same taxon, to which the name *O. australis* must be given by priority. The distribution of this species includes Sardinia, Sicily, Peninsular Italy and Southern France. It grows on pastures from the sea level to about 1000 m of altitude, host of Asteraceae. An identification key between the species considered and a distribution map is provided.

**Keywords:** broomrape, Mediterranean flora, nomenclature, taxonomy, typification

### Introduction

This contribution is part of the line of investigations on *Orobanche* Linnaeus (1753: 632) (Orobanchaceae Ventenat 1799: 292) in Italy and the Mediterranean conducted by the authors since several years (e.g. Domina *et al.* 2005). It is aimed at clarifying the taxonomic relationship between *Orobanche australis* Bertoloni (1846: 440) and *Orobanche thapsoides* Lojacono-Pojero (1882: 60) considered endemic to Sardinia and Sicily respectively (Domina & Arrigoni 2007, Domina *et al.* 2011, Peruzzi *et al.* 2015, Bartolucci *et al.* 2018).

*Orobanche australis* is described on specimens collected in Sardinia by Moris and sent to Bertoloni. *Orobanche thapsoides* is described on herbarium specimens collected in southern Sicily, housed in the Herbarium of the Botanical Garden of Palermo (Domina *et al.* 2014). Beck (1930) considers *O. thapsoides* synonym of *O. versicolor* Schultz (1843: 129) and *O. australis* synonym of *O. canescens* (Presl 1822: 72).

Beck (1930) gives a large interpretation of the Presl's species including in it several other taxa described from Sicily and Sardinia. Domina & Stepanek (2009) restore the exact taxonomic delimitation of *O. canescens* according to the author's concept of the species.

*Orobanche versicolor* is a synonym of *O. pubescens* (Dumont d'Urville 1822a: 332, non Gilibert 1782). The name *O. pubescens* (Dumont d'Urville 1822a: 322) has as isonym *O. pubescens* (Dumont d'Urville 1822b: 76). Comparing the places of publication, it follows that, despite the two sources were published in the same year, with the same formatting and only different page numbers, Dumont d'Urville (1822a) was previously published and is the source that has to be cited. In fact, Dumont d'Urville (1822a), although not including the month of publication, presents an erratum whose content is partly included in Dumont d'Urville (1822b).

*Orobanche palaestina* Reuters (1847: 718), occurs in the eastern Mediterranean region and Asia Minor; it turned out to be very similar to the species examined. As far as we know, this species has not yet been lectotypified, which is what we want to catch up with.

## Material and methods

The present research is based on the comparative study of the original material of *Orobanche australis* and *O. thapsoides* housed in BOLO and PAL respectively (Domina & Mazzola 2007, 2009). Herbarium acronyms follow Thiers (2022). Additionally, the revision of material deposited in other Italian and European herbaria together with field research were combined in the study. These species are also compared with other morphologically similar ones occurring in the Mediterranean area: *O. canescens*, *O. pubescens*, *O. palaestina*, *O. amethystea* Thuillier (1799: 317).

## Results

*Orobanche palaestina* Reuter in Candolle (1847: 718)

Ind. Loc.:—In Palaestina prope Naplouse et circa Baniyas (Boissier!)

Type (lectotype **designated here**):—“circa Baniyas, Palaestina”, Apr.-Mai 1846, E. Boissier (barcode G00150143, the right plant, photo! <http://www.ville-ge.ch/musinfo/bd/cjb/chg/adetail.php?id=184427&base=img>)

Note:—The original material for the name consists of two syntypes both housed in Geneva (at G). One specimen (barcode G00150142) includes four plants and bears two labels: “*Orobanche*, Palaestina, Apr.-Mai 1846, Naplouse, E. Boissier” and “Palaestina, Apr.-Mai 1846, E. Boissier”. The other one (barcode G00150143) includes two plants and bears the labels: “*Orobanche Palaestina* Reut in DC. prodr.” and “*Orobanche palaestina* Reut., circa Baniyas, Palaestina, Apr.-Mai 1846, E. Boissier”. Both are complete and fit the description made by Reuter. There are also two further syntypes whose local origin is not precisely identified: the first (barcode G00192012) includes two complete, well-developed plants and the label “*Orobanche Palaestina* Reut., Palaestina, Apr.-May 1846. E. Boissier. Rascheya Baniyas Naplouse”; the second one (with barcode G001920123) includes a rather weakly developed plant and the label “*Orobanche Palaestina* Reuter, Palaestina april mai 1846, Ed. Boissier”. We choose the right specimen of the herbarium sheet barcoded G00150143 as the lectotype.

*Orobanche australis* Moris ex Bertoloni (1846: 440)

Type (lectotype designated by Domina & Mazzola 2011: 343):—*Orobanche australis* Moris [manu Moris], Bert. Fl. Ital. 6 p. 440. n. 17 [manu Bertol.] Sardinia [manu Moris], Misit Moris, 1846 [manu Bertol.] (BOLO).

—*Orobanche canescens* auct., non Presl: Beck, Monogr. Orob. 236. 1890, p.p.; Béguinot, in Fiori & Paoletti, Fl. Anal. Ital. 2: 485. 1902, p.p.; Fiori, Fl. Anal. Italia 2: 391. 1926, p.p.; Beck, in Engler, Pflanzenr. IV (261): 181. 1930, p.p.

—*Orobanche versicolor* auct., non F. W. Schultz: Béguinot, in Fiori & Paoletti, Fl. Anal. Ital. 2: 484. 1902, p.p.

Specimens seen:—[Sardinia] Sardinia, misit 1846, *Moris* (BOLO!)—Arizzo, 8.1851, *Gennari* (TO!)—Sardinia, misit 1853, *Moris* (FI); Sardinia, s.d., *Moris* (RO-HC!)—Laconi, s.d., Masala (TO!) - Monti di Capoterra e Santa Barbara, s.d., *Gennari* (TO!)—Isola dell’Asinara, 29.05.1968, *Barba* (FI!); [Peninsular Italy, Campania] Monte Alburno, da Ottati a Costa la Croce (550-990 m), 29/05/1931, *A. De Philippis & G. Moggi* [sub. *O. canescens* C. Presl det. *G. Moggi*] (FI); [Southern France] Felsen bei Port Vendres, 4.1944, s.c. s.n. (SAAR-BNL!)

*Orobanche thapsoides* Lojaco-Pojero (1882: 60)

Type (lectotype designated by Domina & Mazzola 2007: 228): Herbarium horti Bot. Panormitani, *Orobanche thapsoides* Mihi, 33 Terranova *Citarda*, Aprile 1869 [manu Lojaco]; sub *O. canescens*, Sic. Merid., Mag. '69 Cit. [manu Lojaco], code PAL43238!

—*Orobanche pubescens* auct., non D’Urv.: Beck, in Engler, Pflanzenr. IV (261): 186. 1930, p.p.

—*Orobanche versicolor* auct., non F. W. Schultz: Beck, Monogr. Orob. 239. 1890, p.p.; Béguinot, in Fiori & Paoletti, Fl. Anal. Ital. 2: 484. 1902, p.p.; Rouy, Fl. France 11: 183. 1909, p.p.; Fiori, Fl. Anal. Ital. 2: 391. 1926, p.p.

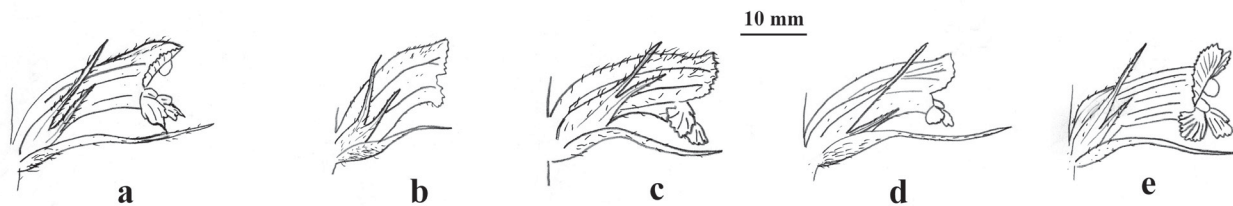
—*Orobanche australis* auct., non Moris: Lojaco, Crit. sui Carat. Orob., in Nat. Sicil. II, 3: 59. 1883; Caruel, in Parlatore, Fl. Ital. 6: 384. 1885, p.p.; Lojaco, in Nat. Sicil. VI, 6: 80. 1887; Lojaco, in Nat. Sicil. VI, 8: 131. 1887; Nyman, Consp. Fl. Eur. Suppl. 2: 244. 1890, p.p.; Nicotra, Syll. Fl. Sic. 42. 1893; Arcangeli, Comp. Fl. Ital. ed. 2: 414. 1894, p.p.; Lojaco, Fl. Sic. 2, 2: 166. 1904.

Specimens seen:—[Sicily] Terranova (Caltanissetta), 4.1869, *Citarda s.n.* (code PAL 79004!); Palermo, s.d., *M. Lojacono* (PRC!); Licata (Agrigento), s.d., *Bonafede n. 101* [sub *O. pubescens*] (code PAL 78897!); Terranova (Caltanissetta), s.d., *Lojacono n. III* (code PAL 79002!); Sicilia meridionale, s.d., *M. Lojacono n. 22* (code PAL 79003!); Sicily: Prov. Messina, Ca. 35 km S of Messina, Capo S. Alessio. On rocks. Stalk purple; flowers white with purple; stigma purple. 18.5.1963, Stud. biol. Rheno-Trai. in itinere 63-764 [sub *O. crenata* Forssk. det. *F. Kooy* 1977] (barcode U 1469362 photo!); Marina di Palma (Agrigento), pastures on *Scolymus grandiflorus* Desf., 18.4.2018, *G. Domina* (PAL!); Portella Paglia (Palermo), 9.6.2004, *G. Domina* [sub *O. amethystea* Thuill.] (B!, PAL!).

The morphological differences and the hosts of the taxa taken into consideration here are presented in Table 1 and Figure 1.

**TABLE 1.** Distinctive morphological characters among the studied taxa and relative hosts.

	<i>O. australis</i>	<i>O. thapsoides</i>	<i>O. canescens</i>	<i>O. pubescens</i>	<i>O. palaestina</i>	<i>O. amethystea</i>
<b>Spike</b>	along its entire length very dense; apically mostly rounded and not comose	along its entire length very dense; apically mostly rounded and not comose	dense above, lax below; apically rounded or acuminate, comose by bracts	dense above, lax below; apically rounded, rarely acuminate, not comose	dense above, lax below; apically rounded, rarely acuminate, comose by bracts	dense above, lax below; apically acuminate and comose by bracts
<b>Basal flowers</b>	basally or in lower third geniculate and horizontal	basally or in lower third geniculate and horizontal	basally or in lower third curved and horizontal	basally or in lower third curved and erect to (sub)horizontal	usually curved as a whole, somewhat flatter in the middle part	basally or in lower third geniculate and erect to (sub)horizontal
<b>Floral bract</b>	distinctly longer than the flower	distinctly longer than the flower	sub-equal the flower or longer than this	equal the flower or rarely a little longer than this	distinctly longer than the flower	equal the flower or a little longer than this
<b>Corolla, dorsal line</b>	bent at the base and on the upper lip	bent at the base and on the upper lip	bent at the base and on the upper lip	bent at the base and on the upper lip	bent along its entire length, somewhat flatter in the central part	bent at the base and on the upper lip
<b>Upper lip</b>	longer than the lower one; lobes usually directed forward	longer than the lower one; lobes usually directed forward	sub-equal to the lower one; lobes at first directed forward, later directed upward	longer than the lower one; lobes usually directed forward (rarely upward)	longer than the lower one; lobes usually directed forward	shorter than the lower one; lobes usually directed forward (rarely upward)
<b>Corolla hairness</b>	short or medium length, straight glandular hairs	short or medium length, straight glandular hairs	dense short or medium length, straight glandular hairs	dense, long, often curly glandular hairs (especially on the upper lip)	glabrous to sparsely hairy	short straight glandular hairs
<b>Filaments</b>	inserted ca. 2 mm above the base of corolla tube; basally numerous long hairy, glabrous above	inserted ca. 1.5–4 mm above the base of corolla tube; basally numerous long hairy, (sub)glabrous above	inserted 2–3(–4.5) mm above the base of corolla tube; basally numerous hairy, glabrous above	inserted 3–4 mm above the base of corolla tube; basally long woolly, glabrous or sparse long glandular hairy above	inserted 4–5 mm above the base of corolla tube; basally hairy, glabrous above	inserted 3–4.5 mm above the base of corolla tube; basally short hairy, (sub)glabrous above
<b>Stigma</b>	yellow	yellow	whitish or pale pinkish, sometimes yellowish	violet or purplish, rarely whitish (if the whole plant is pale)	yellow	purplish
<b>Main Host</b>	Asteraceae	Asteraceae	Asteraceae	Asteraceae and Apiaceae	Asteraceae and Apiaceae	Apiaceae



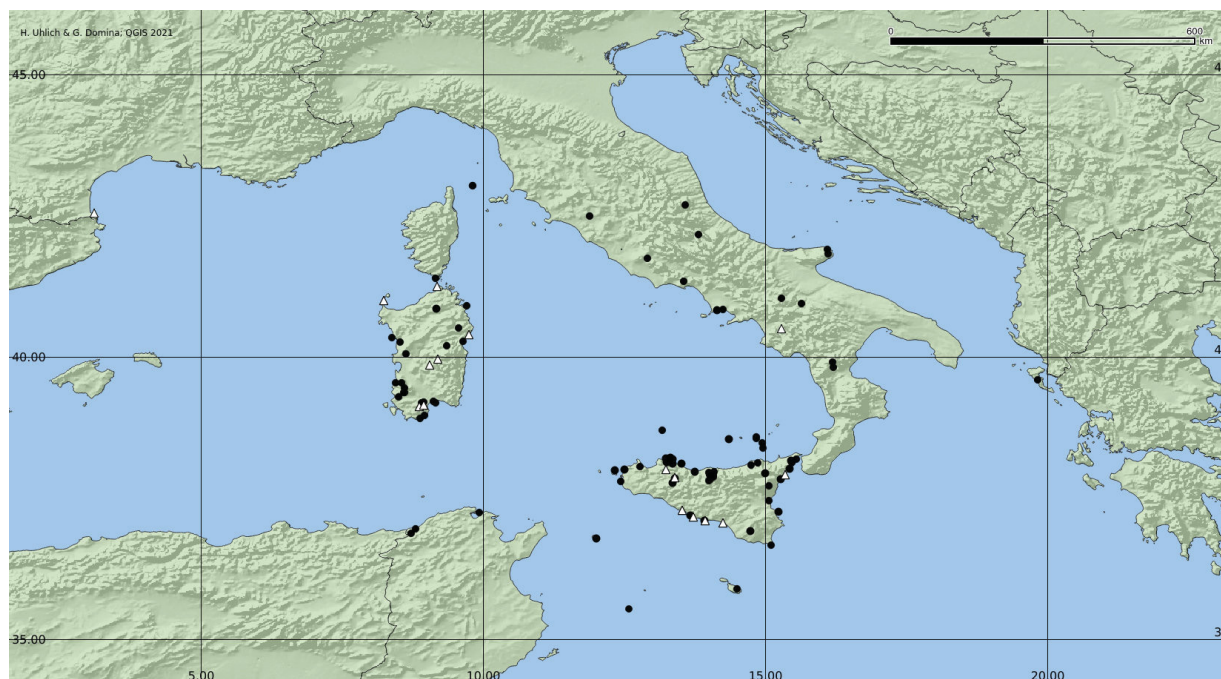
**FIGURE 1.** Comparison of the flowers of the compared taxa drawn from the original material: a) *Orobanche australis*; b) *O. canescens*; c) *O. pubescens*; d) *O. palaestina*; e) *O. amethystea* (drawing by G. Domina).

Identification key for the species treated here:

1. Indument sparse; corolla more or less regularly curved (or in middle part somewhat flatter) ..... *O. palaestina*
- Indument dense; corolla curved basally and on the upper lip, straight in the middle part ..... **2**
2. Inflorescence dense in all its length; stem usually very robust; bracts usually distinctly longer than the corolla ..... *O. australis*
- Inflorescence dense above, lax below or loosely overall; stem gracile or moderately robust, very rare robust; bracts as long as the corolla or slightly longer ..... **3**
3. Indument of the corolla glandular woolly or glandular lanate (that means covered by numerous long curly hairs) .... *O. pubescens*
- Indument of the corolla short to medium length, straight glandular hairy ..... **4**
4. Basal flowers basally or in the lower third curved; stigma whitish, bright pink, rarely yellowish. On Asteraceae..... *O. canescens*
- Basal flowers basally or in the lower third geniculate; stigma dark purplish, very rare yellow. Usually on Apiaceae, rarely on Asteraceae, Solanaceae (*Digitalis*) ..... *O. amethystea*

## Conclusion

From the comparison of these taxa it is evident that *O. australis* and *O. thapsoides* refer to the same taxon, to which the name of *O. australis* must be given by priority. The distribution of this species includes Sardinia, Sicily, Peninsular Italy and Southern France (Figure 2). It grows on pastures from the sea level to about 1000 m of altitude, host of *Asteraceae*.



**FIGURE 2.** Occurrence of *Orobanche australis* (white triangles) and *O. canescens* (black dots) in Central Mediterranean (drawing by H. Uhlich).

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