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# The taxonomic position of *Orobanche rechingeri* Gilli (Orobanchaceae) in relation to *Orobanche nowackiana* Markgr.

MICHAEL J. Y. FOLEY

## ABSTRACT

FOLEY, M. J. Y. (2000). The taxonomic position of *Orobanche rechingeri* Gilli (Orobanchaceae) in relation to *Orobanche nowackiana* Markgr. *Candollea* 55: 269-276. In English, English and French abstracts.

*Orobanche nowackiana* Markgraf and *O. rechingeri* Gilli, both originally described from the Balkans where they are confined to serpentine soils, possess closely similar morphological characters. In the absence of type material and subsequent collections of the former, a comparison has been made between the respective descriptions of the original authors. In addition, previously undetermined specimens of *Orobanche* collected on serpentine soils in the general area of the type locality of *O. nowackiana* (central Albania) have recently been located. These were found to conform closely to Markgraf's description of his plant and have now also been compared to specimens of authentic Greek *O. rechingeri*. Due to their extremely similar morphologies it is concluded that the two taxa are conspecific, and that the name *O. rechingeri* should be considered a synonym of *O. nowackiana*. A neotype for *O. nowackiana* has been designated.

## RÉSUMÉ

FOLEY, M. J. Y. (2000). Position taxonomique de *Orobanche rechingeri* Gilli (Orobanchaceae) en relation avec *Orobanche nowackiana* Markgr. *Candollea* 55: 269-276. En anglais, résumés anglais et français.

*Orobanche nowackiana* Markgr. et *O. rechingeri* Gilli ont été décrits des Balkans où on ne les trouve que sur serpentine. Ils présentent par ailleurs des caractères morphologiques très proches. En l'absence du matériel typique et de matériel plus récent du premier taxon, l'auteur a comparé leurs descriptions respectives. De plus, des spécimens indéterminés du genre *Orobanche*, provenant du *locus classicus* de *O. nowackiana* (Albanie centrale) et collectés sur serpentine, ont été récemment retrouvés. Ils se sont avérés correspondre à la description de Markgraf. Ils ont été également comparés à des spécimens du taxon grec *O. rechingeri*. En conclusion, au vu de leurs morphologies extrêmement proches, les deux taxons sont considérés comme conspécifiques. *Orobanche rechingeri* est donc placé en synonymie de *O. nowackiana*. Un néotype est désigné pour *O. nowackiana*.

**KEY WORDS:** OROBANCHACEAE – *Orobanche nowackiana* – Serpentine – Albania – Greece.

## Introduction

*Orobanche nowackiana* Markgr. appears to be little-known except to the original author who described it from montane serpentine localities in Albania. His description is detailed (MARKGRAF, 1926) but the syntypes cited in his protologue are presumed to have been lost during the 1939-1945 hostilities when there was fire damage to the Berlin herbarium (B).

Although his original description has been repeated (e.g. BECK 1930; HAYEK & MARKGRAF, 1929) there appear to have been no subsequent records. An exhaustive check of European herbaria likely to hold Albanian specimens of this taxon collected either by Markgraf or by others has also been unproductive.

Another morphologically similar taxon also occurring on serpentine soils was described by GILLI (1966) as *O. rechingeri* based upon material collected in central Greece in 1961 (holotype: *Rechinger 22940* (W!)). The type locality was at a relatively low altitude (200-400 m) and the host plant a species of *Alyssum* (Sect. *Odontarrhena*); members of this section are hyperaccumulators of nickel (HARTVIG, 1986).

The close similarity between the two taxa is readily apparent from their respective original descriptions and from preserved specimens. Their similar geographical distribution and apparent restriction to serpentine substrates also suggests a close relationship between the two which seems worthy of further examination.

### Discussion

In his original diagnosis, Markgraf describes *O. nowackiana* as being a small, yellow, unbranched plant to 5 cm high with a farinaceous stem and elliptical scale-like leaves, 8 mm long. The inflorescence is short, 3-4 cm long, dense and few-flowered. The bracts are white-woolly and ovate and the bracteoles linear. The calyx is divided into five parts, hairy, with subequal, lanceolate teeth, 5-7 mm long, and twice the length of the calyx tube. The corolla tube is yellow, fairly straight, glandular-pilose and more than twice the length of the calyx, constricted above the ovary and deflexed after anthesis, and the throat has dark purple spots. The lobes of the corolla are rounded, the two laterals of the lower lip being slightly longer and broader than the median. The filaments are glabrous and inserted 4 mm above the base of the corolla, the anthers are slightly villous, the style slightly glandular hairy towards the apex, and the stigma purple.

This description is accompanied by a drawing of the plant which gives a general impression of its habit but little other detail. It is also stated that it occurs within the geographical range of both *O. caesia* Rchb. and *O. purpurea* Jacq. but from which it is chiefly distinguished by its long calyx lobes and yellow flowers. The plants were collected in Albania in open scrub on serpentine detritus at 1400 m at Shpat, near Zavalin and at a slightly higher altitude at Çermenika near Martanesh, both in early June 1924. They were respectively thought to parasitise *Thymus jan-kae* and *Poa badensis*, the latter a most unusual host for an *Orobanch*e.

Since then no further records appear to have come to light. BECK (1930) considered *O. nowackiana* to be a variety of *O. caesia* and more or less repeated Markgraf's original description. He gave no additional localities but may possibly have seen Markgraf's type specimens. Also in the two recent Albanian Floras (DEMIRI, 1981; QOSJA & al., 1996) there is no mention of *O. nowackiana* nor does it appear to be known to present Albanian botanists (L. Dinga and J. Vangjeli, pers. comm., 1993, 1995) whilst in *Flora Europaea* (CHATER & WEBB, 1972) the authors did no more than re-emphasise the salient characters of the original description.

Gilli's description of *O. rechingeri* (GILLI, 1966) bears a close similarity to that of Markgraf for *O. nowackiana*. Again the stem is simple, 5-8 cm long, with white glandular hairs and dense oval or broadly lanceolate scale-like leaves, especially below. The inflorescence is capitate or shortly cylindrical, few- and dense-flowered, 2-3.5 cm long. The bracts are lanceolate, white lanate and the bracteoles linear. The calyx is campanulate, glandular, with dense arachnoid-lanate hairs; the tube short 1-3 mm, unequally dentate, with teeth from 2 mm to 6-10 mm long. The pale yellow corolla, 17-20 mm long, is constricted below but broadens above, and is glandular but also possesses white, arachnoid-lanate hairs. The lower corolla lobes are rounded or acuminate, denticulate and pilose. The filaments, inserted at 3-4 mm above the corolla base, are pilose at the base, otherwise glabrous or sparsely glandular; the anthers have a long, densely arachnoid-lanate

indumentum, and the stigma lobes are yellow. The protologue states: “*Graecia (Thessalia) in valle inter Kedron et Lutropigi (Smokovo), substr. serpentin., ca. 200-400 m; [...] in Alyssso Sect. Odontorrh. paras.; 7-8.v.1961, leg. K. H. Rechinger*” and the holotype (W!) has been examined and complies with Gilli’s description.

By comparing *O. rechingeri* with Markgraf’s description of *O. nowackiana*, Gilli (1966) considered the former to be a good species, distinguishing it from the latter by its lanceolate bracts, calyx teeth 3-6 times the length of the tube, the filaments pilose at the base, the anthers long and densely arachnoid-lanate and the yellow stigma lobes. From *O. caesia*, he found *O. rechingeri* to differ in its shorter stem, smaller flowers, disproportionately long calyx teeth, and densely arachnoid-lanate anthers.

CHATER & WEBB (1972) considered *O. rechingeri* to possess some similarity to *O. schultzei* Mutel, but the latter is often a branched-stemmed plant with morphological affinities closer to *O. lavandulacea* Rchb. or to *O. ramosa* L.; these authors also added that both *O. rechingeri* and *O. nowackiana* should be investigated further. Although they only recorded *O. rechingeri* from the type locality, there are many other collections from Greece as well as from Turkey. At these localities the plants were parasitic upon those serpentine species of the *Brassicaceae* known to be hyperaccumulators of nickel, especially the genera *Alyssum* and *Bornmuellera* (HARTVIG, 1991).

It is evident, therefore, that two closely-related *Orobanche* taxa have been described, each centred on the same relatively restricted area of southern Europe and of similar habitat choice. Based on their original diagnoses, their main morphological characters are summarised in Table 1.

It can be seen that the similarities are appreciable. Both are small plants with few-flowered, fairly dense inflorescences and yellow corollas. The bracts are described as white hairy, ovate in *O. nowackiana* and lanceolate in *O. rechingeri*. In both species the corolla is constricted below. The filaments are inserted at a similar height and are glabrous (although quoted as pilose at the base for *O. rechingeri*). The anthers are given as slightly villous in *O. nowackiana* but more densely arachnoid-lanate in *O. rechingeri*.

Table 1. – Comparison of important characters of <i>Orobanche nowackiana</i> and <i>O. rechingeri</i> as given by their original authors		
	<b><i>O. nowackiana</i></b> (after MARKGRAF, 1926)	<b><i>O. rechingeri</i></b> (after GILLI, 1966)
<b>Stem height</b>	simple, to 5.0 cm	simple, 5.0-8.0 cm
<b>Scale (leaves)</b>	many, elliptical, 8 mm long	ovate to broadly lanceolate, 5.0-10.0 mm long
<b>Inflorescence</b>	3.0-4.0 cm long, dense, few-flowered	2.0-3.5 cm long, dense, few-flowered
<b>Bracts</b>	ovate, white lanuginous	lanceolate, abundantly white lanate
<b>Calyx</b>	5-fid, pilose, teeth subequal lanceolate, 5-7 mm long to twice length of tube	campanulate, glandular and white densely arachnoid-lanate, tube 1-3 mm, teeth (2-) 6-10 mm
<b>Corolla colour</b>	yellow	pale yellow
<b>Corolla</b>	length not given, slightly constricted below	17-20 mm long, slightly constricted below
<b>Lobes of lower lip</b>	rounded	rounded, oblong or acuminate
<b>Filament insertion</b> (height above corolla base)	4 mm	3-4 mm
<b>Filament hairs</b>	glabrous	pilose at base, otherwise glabrous
<b>Anthers</b>	slightly villous	long and densely arachnoid-lanate
<b>Stigma lobes</b>	purple	yellow
<b>Substrate</b>	serpentine (Albania)	serpentine (Greece)

Differences (cf. Table 1) between the two are few and relatively small. Markgraf stated that the corolla of *O. nowackiana* had dark purple spots in the throat. This character appears to have been unobserved in other members of the genus and must be questionable; it could be a result of ageing or of environmental influence. The apparent difference in stigma lobe colour may not be significant since, within other individual members of the genus, e.g. *O. minor* Sm., *O. amethystea* Thuill. (CHATER & WEBB, 1972), the lobes may occur in more than one colour form; they may also discolour on ageing and this can cause further confusion. Again, relatively modest differences in bract shape (ovate or lanceolate) represent a weak taxonomic character and are likely to be of little significance. Markgraf described the calyx shape of *O. nowackiana* as 5-fid (presumably rather than the more normal 4-fid). This is also unlikely to be significant since calyx morphology (especially of the teeth) can vary appreciably within the same taxon and an extra, often incipient, fifth tooth, is sometimes present in other taxa also. The length quoted for the calyx teeth (5-7 mm) lies within Gilli's range of (2-)6-10 mm for *O. rechingeri* and differences in pilosity of the filament base and of the anthers are unlikely to be significant. Several of these relatively minor divergences are mentioned in Gilli's original description and are the principal basis on which he separated the two species. Despite this, the differences outlined above appear to lie within the general level of variation to be expected within individual taxa of this family or, at most, are representative of separate geographical races of a single taxon. In either case these plants appear unworthy of separate taxonomic recognition.

As indicated earlier, the host quoted by MARKGRAF (1926) for his *O. nowackiana* is in one instance *Thymus jankae* and in the other *Poa badensis*. There are few confirmed records of an *Orobanche* taxon parasitising a member of the *Poaceae* and verified instances on monocotyledons in general are also rarely known. *Thymus jankae* is obviously a potential host, but it is rather unlikely that *O. nowackiana* would exhibit such a widely differing host choice in the only two confirmed collections known at that time. It is much more likely that the host association was erroneously assumed by Markgraf (for similar observations see CHATER, 1986) and that the appropriate members of the *Brassicaceae* also occurred in the immediate neighbourhood.

The probability that the two taxa are conspecific has been greatly supported by the comparison of specimens of Greek *O. rechingeri* with some previously undetermined ones from Albania. The latter specimens were provided by J. Vangjeli (Tirane) from the central Albanian serpentine region and some of these are now preserved at E. Amongst them is a collection made at 1600 m (Liqeni i Zi (on serpentine), 25.vi.1961, Qosja (E) (Fig. 1.)) which comprises four plants each of which are morphologically indistinguishable from collections referred to *O. rechingeri* from Greece (including *Rechinger's* type (W), *Akeroyd & al.* (LTR), and several other Greek (and Turkish) collections in B and E); they also comply with Markgraf's original description of *O. nowackiana*. Their stature, habit, inflorescence shape and bract, corolla and calyx morphology all correspond fully. The type and level of indumentum (especially on the calyces) is also very similar in all specimens (FOLEY, 1998) and consists of long, white, somewhat arachnoid, usually eglandular hairs. Another collection from serpentine at 1120 m but from a different geographical area to the first (Balgjaj, 18.vi.1964, *Mitrushi & Tartari* (E)), consists of a mixed gathering. However, the right hand specimen is again morphologically almost identical to the Greek collections and the same can also be said for a third sheet of four specimens from the same area (Balgjaj, 15.vi.1975, *Vangjeli, Xhulaj & Tartari* (E)). It is very unlikely that two distinct, yet closely similar taxa, would independently only occur on montane serpentines in such a relatively restricted geographical area.

The above conclusions very strongly indicate *O. rechingeri* to be conspecific with *O. nowackiana* and, since the latter name has priority, *O. rechingeri* should be reduced to synonymy within it. Although the syntypes of *O. nowackiana* are lost, the recently discovered Albanian specimens referred to above adequately satisfy Markgraf's description. Since Markgraf's published illustration of *O. nowackiana* (MARKGRAF, 1926) lacks taxonomic detail and is inadequate as a type, the upper left-hand specimen of the collection of the first sheet mentioned (Liqeni i Zi [Albania], 25.vi.1961, Qosja (E)) is designated as the neotype of *O. nowackiana* (Fig. 2.).



Fig. 1. – *Orobanche nowackiana* Markgr. The neotype is the upper left-hand specimen [Qosja s.n.].



### Conclusion

Any slight differences between Markgraf and Gilli's original descriptions are considered to be of little taxonomic consequence and appear to lie within the anticipated range of variation within a single taxon or, at worst, represent no more than local races of it; *O. rechingeri* Gilli is therefore considered to be conspecific with *O. nowackiana* Markgr. The known geographical range of the latter is thus extended eastwards from Albania through Greece and into Turkey and possibly also into western Asia. What is almost certainly this same taxon was found by Reeves and colleagues (R. Reeves, pers. comm., 1993; specimen (!) and photo (!)) in 1988 on the eastern Aegean island of Lesbos whilst searching for the endemic *Alyssum lesbiacum*, a known hyperaccumulator of nickel; the *Orobanche* occurred in close proximity to such plants.

*Orobanche nowackiana* is morphologically closest to *O. caesia* but differs in its longer, rather more arachnoid-villous indumentum, very small stature, differently shaped, more inflexed, yellow corollas, its separate, more southern geographical range, and an apparent restriction to serpentine soils where it is parasitic upon those members of the Brassicaceae which are hyper-accumulators of nickel.

***Orobanche nowackiana*** Markgr. in Ber. Deutsch. Bot. Ges. 44: 429. 1926.

Described from Albania: "Shpat, in offenen Staudenfluren auf Serpentinsschutt bei Zavalin, 1400m [...]; Çermenika, Teke Balim Sultan i Epër bei Martanesh, Punkt 1512 westlich der Klosterweise, in einer Zwergstrauchheide über Serpentinsschutt [...]"



Fig. 2. – *Orobanche nowackiana* Markgr. The neotype [*Qosja s.n.*].

**Syntypes:** **ALBANIA**, Zavalin, 2.vi.1924, *Markgraf* 459; Martanesch, 9.vi.1924, *Markgraf* 582 (both thought to be formerly in B but apparently subsequently destroyed).

**Neotype** (designated here): **ALBANIA**, Liqeni i Zi, 25.vi.1961, *Qosja* (E!), upper left-hand specimen on sheet (Fig. 1 & 2).

= *O. rechingeri* Gilli in Oesterr. Bot. Z. 113: 214. 1966. **Holotype:** Greece, *Rechinger* 22940 (W!).

(Synonymy, see HARTVIG, 1991, under *O. rechingeri*)

Plant 50-100(-150) mm tall, stem yellowish, simple but sometimes with several clustered stems arising from a +/- subterranean base, otherwise singly, with a short, few-flowered inflorescence; leaves linear-lanceolate to narrowly ovate to c.3 mm wide; bracts 12-15 mm long, broadly lanceolate to ovate; bracteoles present, linear-lanceolate; calyx c.10 mm long with tapering teeth and long, white, arachnoid hairs; corolla 18-25 mm long, pale yellow, suberect, tubular, somewhat constricted and angled proximally, slightly broadening distally but still relatively narrow, slightly curved; lobes of lower lip rounded; filaments inserted 7-8 mm above the corolla base, +/- glabrous; anthers pilose; stigma lobes pale yellow. The stem, bracts and calyces, possess a pronounced white, arachnoid-villous indumentum. Parasitic upon serpentine species of the Brassicaceae, especially the genera *Alyssum* and *Bornmuellera*; possibly on other taxa also. (The measured height of filament insertion is found to be more than that mentioned by the original authors).

*Habitat.* – Restricted to serpentine soils; at lower levels on grassy slopes, phrygana etc. as well as on rocky hill sides and snowbed meadows in montane areas reaching at least 2200 m.

*Flowering.* – May-July.

*Distribution.* – Albania, Greece, the eastern Aegean, Turkey, and possibly further into western Asia.

*Selected specimens.* – **ALBANIA:** Liqeni i Zi [Lura], 25.vi.1961, *Qosja* (E); Balgjaj [Burrel], 18.vi.1964, *Mitrushi* & *Tartari* (E) [right hand specimen only]; Balgjaj, 15.vi.1975, *Vangjeli*, *Xhulaj* & *Tartari* (E). **GREECE:** Mt Vourinos, Makedonia, 30.vi.1976, *Akeroyd*, *Mellors* & *Preston* 230 (LTR); Katara Pass, Trikala, 25.v.1962, *Greuter* E926 (B); Pefki, Trikala, 25.v.1991, *Uhlich* (B); inter Kedron & Lutropigi, 7-8.v.1961, *Rechinger* 22940 (W) [holotype of *O. rechingeri*]. **TURKEY:** Sandras Dag, Mugla, 7.vii.1984, *Hartvig*, *Secmen* & *Strid* 23355 (E); Köse Dag, Corum, 31.v.1965, *Coode*, *Jones* & *Tobey* 1891 (E); Murat Dag, Kütahya, 5.vii.1962, *Davis* & *Coode* D36808 (E).

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