

## Notes on some rare *Orobanche* and *Phelipanche* species (Orobanchaceae) in Croatia

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We report new floristic records of some rare *Orobanche* and *Phelipanche* species (Orobanchaceae) in Croatia. *Orobanche salviae* and *O. alsatica* are reported for the first time in 100 years, and *O. laserpitii-sileris*, and *P. lavandulacea* are rare species with only few localities known.

**Key words:** *Orobanche*, *Phelipanche*, flora, Mljet, Pag, Plitvice, Croatia

### Introduction

*Orobanche* s. str. and *Phelipanche* (Orobanchaceae; syn. *Orobanche* sect. *Trionychon*; in this communication the generic concept of HOLUB (1972, 1990) and TERYOKHIN et al. (1993), based on profound caryological and morphological characters, recently substantiated by molecular and cytological data (SCHNEEWEISS et al. 2004a, b, CARLÓN et al. 2005, WEISS-SCHNEEWEISS et al. 2006) is followed) are regarded by most field botanists as difficult genera. In consequence, distribution data are often fragmentary and may be unreliable. The pronounced morphological variability, often linked to different host plants, is the principal cause for the difficult determination (KREUTZ 1995). Additionally, the flowering period is short, which strongly limits the number of field records. Moreover, the determination key in the Croatian excursion flora (DOMAC 1994) does not include all the taxa growing in Croatia, making determination difficult.

The number of *Orobanche* species listed for Croatia varies. HIRC (1910) listed 20, DOMAC (1994) 15, and HRŠAK (2000) 30 species. Later on, *O. bartlingii* (sub *O. alsatica* s. l.) was found in Croatia (ALEGRO 2004).

The distributional data of many taxa are scarce and for some rare species only a few localities are known. Many data are more than 100 years old and have not been taken into consideration in the recent Croatian floristic literature (DOMAC 1994, HRŠAK 2000). From the findings listed below, it is clear that the distribution data of *Orobanche* and *Phelipanche* species in Croatia are fairly incomplete and more attention should be given to season-speci-

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fic mapping. The optimal time for the taxa growing along the Adriatic Sea is April/May, whereas e.g. *O. salviae* and *O. laserpitii-sileris* flower during early summer.

## Results and discussion

In the following, we present new localities for some rare *Orobanche* and *Phelipanche* species found during trips to the islands Mljet and Pag as well as to Plitvička jezera in 2006 and 2007. As the main source of distribution data we used the Flora Croatica Database (NIKOLIĆ 2007) as well as the monograph by BECK-MANNAGETTA (1930) and the references cited therein. Additionally, the herbarium ZA was checked for the four species reported in this article, but no specimens were found.

### *Orobanche salviae* Schultz ex Koch

This species mostly parasitises *Salvia glutinosa*, and is distributed in the Alps and their foothills from France to Hungary as well as in the Balkans (KREUTZ 1995). It usually grows in shady places in deciduous or mixed forests, and is easily recognised by its host and the late flowering time compared to other species (July to September; KREUTZ 1995).

Even if neither DOMAC (1994) nor HRŠAK (2000) list it for Croatia, it was reported for Čičarija (Istria) by POSPICHAL (1899) and by Ginzberger (in BECK-MANNAGETTA 1930) for Mt Plješevica near Plitvice, but BECK-MANNAGETTA (1930) doubts this record. HIRC (1910) doubts the records from the area of Senj, where no *Salvia glutinosa* grows. KREUTZ (1995) lists *Orobanche salviae* for Croatia, but with no exact data.

We have found it at two localities in the Plitvička jezera area:

- 1) SE of Repušnica (S of Kapela Korenička), NE of Štetina draga, beech-forest (on *Salvia glutinosa*), 710 m. 15°40'40"E, 44°47'20"N. 14.7.2006, B. Frajman and P. Schönswetter, 11481 (WU); included in Flora Croatica Database (NIKOLIĆ 2007), but attributed to »several authors«.
- 2) 150 m N of village Mukinje, beech-forest (on *Salvia glutinosa*). 15°37'48"E, 44°52'58"N. 16.7.2006, B. Frajman and P. Schönswetter, 11488 (WU).

The above localities suggest that the nearby locality Plješevica given by Ginzberger is reliable.

### *Orobanche laserpitii-sileris* Reut. ex Jord.

This broomrape parasites on *Laserpitium siler*, more rarely also on *L. latifolium* and *L. halleri* (all Apiaceae, the latter not present in the Croatian flora; KREUTZ 1995). Its main distribution range comprises the Alps and the Balkan Peninsula, with some localities in the Pyrenees (KREUTZ 1995). BECK-MANNAGETTA (1930) lists two localities for Croatia, based on the revision of herbarium specimens: Klek near Ogulin (leg. Lengyel) and Kapela near Plitvička (Kozjak) jezera (leg. Rossi). Later, it was reported by BARČIĆ (1974) for the island of Badije. Since neither BARČIĆ (1974) nor TRINAJSTIĆ (1985) list any *Laserpitium* for the whole Korčula archipelago and *O. laserpitii-sileris* grows only at montane altitudes (KREUTZ 1995), we follow TRINAJSTIĆ's (1985) doubts regarding this record. The only other published locality of *O. laserpitii-sileris* that we are aware of is in the area of Strahin-

šćica in Hrvatsko Zagorje (REGULA-BEVILACQUA 1991). Also we have encountered *O. laserpitii-sileris* in the same area where it was collected by Rossi.

It was found in Plitvička jezera National Park, along the path from the lake Kozjak to the lake Okrugljak, N of the lakes, on stabilised limestone screes (on *Laserpitium siler*). 15°37'48" E 44°52'58" N. 16.7.2006, B. Frajman & P. Schönswetter, 11489 (WU).

### ***Orobanche alsatica* Kirschl.**

This species (in the broad sense, see below) is parasitic on Apiaceae, mainly on *Peucedanum cervaria* and *P. alsaticum*. It is distributed from eastern France through central Europe to China and grows mostly in warm, (semi)arid grasslands, along forest margins and on open rocky places (KREUTZ 1995). POSPICAL (1899) reported it for Volovica near Pazin, but this find was overlooked by both DOMAC (1994) and HRŠAK (2000). After more than a century ALEGRO (2004) was the first to report exact localities from Paklenica. As his plant was parasitic on *Seseli libanotis*, it is most probably the closely related *O. bartlingii* Grisebach, which occurs in that area (herbarium vouchers G. M. Schneeweiss, P. Schönswetter and A. Tribsch 6240, 6250, 6253, 6266, 6295 stored in WU). While some authors regard *O. bartlingii* as conspecific with *O. alsatica* (*O. alsatica* var. *libanotidis* (Rupr.) Beck), KREUTZ (1995) treats it as an independent species, differing from *O. alsatica* in its smaller flowers (smaller than 20 mm), insertion of the stamina (1–3 mm above the base of the corolla-tube in *O. bartlingii* and more than 4 mm in *O. alsatica*), and stigma hairiness (glabrous in *O. bartlingii* and glandular-pubescent in *O. alsatica*).

Consequently, our report of *O. alsatica* s. str. from the island of Pag is the second for Croatia: in the village of Bošana NE of the town of Pag, on the roadside (on *Peucedanum cervaria*). 30 m. 15°1'40" E, 44°27'30" N. 30.4.2007, B. Frajman and P. Schönswetter, 12066 (WU).

### ***Phelipanche lavandulacea* (Rchb.) Pomel (*Orobanche lavandulacea* Rchb.)**

Among the SE European species of *Phelipanche*, *P. lavandulacea* is easily recognised by the strongly branched stems and the dark blackish-purple flowers. It is parasitic on *Psoralea bituminosa* L., and the distribution ranges from the eastern Iberian Peninsula to western Asia (FOLEY 2001).

For Croatia it was first reported by VISIANI (1847) for »Primorje et Ragusa«, where it was growing on *Vicia faba*, which makes this report somewhat unreliable since the only confirmed host plant is *Psoralea bituminosa* (G. M. Schneeweiss, personal communication). Later it was reported by STUDNICZKA (1890) for the island of Hvar (in the surroundings of the town of Hvar). BECK-MANNAGETTA (1930) in his Orobanchaceae monography lists several additional localities from which he has seen herbarium specimens: Korčula island, Pelješac Peninsula near Orebić, Nerežišće on the island of Brač, and near Bukovica. However, DOMAC (1994) does not list it for Croatia.

The species appears to be at least locally common on the island of Mljet:

1) along the road E of the village Babino polje (on *Psoralea bituminosa*). 17°35'6" E, 42°43'53" N. 28.4.2006, B. Frajman and P. Schönswetter, 11555 (WU).

2) in Pelješac Peninsula, Monte Vipera. 3.4.2003, leg. S. Kovačić, det. G. M. Schneeweiss (WU, Schönswetter and Tribsch 8781).

Among the more common *Orobanche* species with several localities listed by the Flora Croatica Database we report the following:

***Orobanche sanguinea* C. Presl.** Mljet island (Croatia), cape Blaca E of Saplunara, sandy beach (on *Lotus cytisoides*). 3 m, 17°44'16''E, 42°41'21''N. 25.4.2006, B. Frajman and P. Schönswetter, 11507 (WU).

***Orobanche picridis* F. W. Schultz.** Mljet island (Croatia), along the road between Blato village and the village of Kozarica above the pond. 17°28'5''E, 42°45'58''N. 28.4.2006, B. Frajman and P. Schönswetter, 11545 (WU).

***Orobanche minor* Sm.** Mljet island (Croatia), along the road E of the village of Babino polje (on *Psoralea bituminosa*). 17°35'6''E, 42°43'53''N. 28.4.2006, B. Frajman and P. Schönswetter, 11554 (WU).

***Orobanche minor* Sm.** Pag island (Croatia), village of Bošana NE of the town of Pag, on the roadside (on *Artemisia alba*, *Helichrysum italicum*, maybe *Salvia officinalis*). 30 m. 15°1'40''E, 44°27'30''N. 30.4.2007, B. Frajman and P. Schönswetter, 12071 (WU).

### Acknowledgements

We thank Gerald M. Schneeweiss (Vienna) for confirming our determinations, comments on previous versions of the manuscript and for hints to relevant literature, to Antun Alegro as well as Ivana Rešetnik (Zagreb) for checking *Orobanche* specimens in the herbarium ZA, and to Sanja Kovačić for collecting *Phelipanche lavandulacea*.

### References

- ALEGRO, A.L., 2004: Flora of National Park Paklenica (in Croatian). Paklenički zbornik 2, 35–54.
- BARČIĆ, B., 1974: Flora of the Island Badija (in Croatian). Acta Bot. Croat. 33, 191–203.
- BECK-MANNAGETTA, G., 1930: Orobanchaceae. In: ENGLER, A. (ed.), Das Pflanzenreich Regni vegetabilis conspectus 4, 1–275. Verlag von Wilhelm Engelmann, Leipzig.
- CARLÓN, L., GÓMEZ CASARES, G., LAÍNZ, M., MORENO MORAL, G., SÁNCHEZ PEDRAJA, Ó., SCHNEEWEISS, G.M., 2005: Más, a propósito de algunas *Orobanche* L. y *Phelipanche* Pomel (Orobanchaceae) del oeste del Paleártico. Documentos Jardín Botánico Atlántico Gijón 3, 1–71.
- DOMAC, R., 1994: Flora of Croatia (in Croatian). Manual for determination. Školska knjiga, Zagreb.
- FOLEY, M.J.Y., 2001: *Orobanche* L. In: PAIVA, J., SALES, F., HEDGE, I.C., AEDO, C., ALDASORO, J.J., CASTROVIEJO, S., HERRERO, A., VELAYOS, M. (eds.), Flora Iberica 14, 32–72. Real Jardín Botánico, Madrid.
- HIRC, D., 1910: Revision of the Croatian flora (in Croatian). Rad JAZU 181, 47.
- HOLUB, J., 1972: New names in Phanerogamae 6. Folia Geobot. Phytotax. 12, 417–432.
- HOLUB, J., 1990: Some taxonomic and nomenclatural changes within *Orobanche* s. l. (Orobanchaceae). Preslia 62, 193–198.
- HRŠAK, V., 2000: Orobanchaceae. In: NIKOLIĆ, T., Flora Croatica, Index Florae Croaticae. Nat. Croat. 9, 47–48.

- KREUTZ, C.A.J., 1995: *Orobanche*. Die Sommerwurzarten Europas. The European broomrape species. Band 1: Mittel- und Nordeuropa 1: Central and Northern Europe. Sichtung Naturpublikaties Limburg, Maastricht.
- NIKOLIĆ, T. (ed.), 2007: Flora Croatica database (in Croatian). On-Line (<http://hirc.botanic.hr/fcd>). University of Zagreb.
- POSPICHAL, E., 1899: Flora des Oesterreichischen Küstenlandes, 2. Franz Deuticke, Leipzig.
- REGULA-BEVILACQUA, L.J., 1991: Beitrag zur Flora des Gebietes von Krapina, Radoboj und des Gebirgszuges Strahinščica in Hrvatsko Zagorje., Acta Bot. Croat. 50, 115–127.
- SCHNEEWEISS, G.M., COLWELL, A., PARK, J.M., JANG, C.G., STUESSY, T.F., 2004a: Phylogeny of holoparasitic *Orobanche* (Orobanchaceae) inferred from nuclear ITS-sequences. Mol. Phylogenet. Evol. 30, 465–478.
- SCHNEEWEISS, G.M., PALOMEQUE, T., COLWELL, A.E., WEISS-SCHNEEWEISS, H., 2004b: Chromosome numbers and karyotype evolution of holoparasitic *Orobanche* (Orobanchaceae) and related genera. Am. J. Bot. 91, 439–448.
- STUDENIZCKA, C., 1890: Beiträge zur Flora von Süddalmatien. Verh. Zool. Bot. Ges. Wien 40, 55–84.
- TERYOKHIN, E.S., SHIBAKINA, G.V., SERAFIMOVICH, N.B., KRAVTSOVA, T.I., 1993: Determinator of broomrapes of the USSR flora (in Russian). Nauka, Leningrad.
- TRINAJSTIĆ, I., 1985: Flora of the Korcula archipelago (in Croatian). Acta Bot. Croat. 44, 107–130.
- VISIANI, R., 1847: Flora Dalmatica, 2. Fridericus Hofmeister, Lipsia (Leipzig).
- WEISS-SCHNEEWEISS, H., GREILHUBER, J., SCHNEEWEISS, G.M., 2006. Genome size evolution in holoparasitic *Orobanche* (Orobanchaceae) and related genera. Am. J. Bot. 93, 148–156.