



Orobanche zajaciorum (Orobanchaceae): a new species from the Caucasus

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Abstract

A new, probably endemic, species, *Orobanche zajaciorum* (Orobanchaceae) is described from Georgia, in the Lesser Caucasus. The species grows on rocky slopes and is a parasite *Scutellaria sosnowskyi*. It is a small pale pink-yellowish plant, characterised by strongly curved, geniculate, white-pink flowers. A detailed description, diagnosis, and illustrations are provided.

Keywords: Lesser Caucasus, Georgia, Samtskhe-Javakheti, *Scutellaria sosnowskyi*, taxonomy

Introduction

The holoparasitic family Orobanchaceae includes 15 genera with ca 250 species (Pusch & Günther 2009). The main centres of its distribution are the warmer parts of the Mediterranean, western and central Asia, northern Africa and North America (Kreutz 1995). *Orobanche* Linnaeus (1753: 632) (incl. *Phelipanche* Pomel (1874: 102)) is the largest genus and most difficult in terms of species identification, comprising ca 200 species (Pusch & Günther 2009), which are often rare or endangered (e.g. Halamski & Piwowarczyk 2008, Piwowarczyk & Przemyski 2009, 2010, Piwowarczyk *et al.* 2010, 2011, 2014, 2015, Piwowarczyk 2011, 2013, Nobis *et al.* 2014 a, b). The distribution of the genus *Orobanche* and related genera, as well as the host range of many species is still not sufficiently known.

A new species of *Orobanche* from Georgia in the Lesser Caucasus is presented in this paper. The Caucasus is a rampart between Europe and Asia, located between the Caspian and Black Seas. It is divided among Georgia, Armenia, Azerbaijan, the Russian Federation, the north-eastern part of Turkey, and a part of north-western Iran. Topographically, the Caucasus comprises the Greater Caucasus (highest peak: Mount Elbrus, 5642 m), the Lesser Caucasus (to 4000 m), the South Caucasian Uplands, and the Transcaucasian Depression, between the Greater and Lesser Caucasus. Caucasian flora comprises 6350 native species of vascular plants, 1600 of which are endemic (Akhakatsi *et al.* 2008, Nakhutsrishvili 2013). This region is considered to be one of 34 hotspots of biodiversity worldwide (Mittermeier *et al.* 2005). The flora of the Caucasus is represented by more than 42 species of the family Orobanchaceae, including 36 species of *Orobanche* (incl. *Phelipanche*) (Grossheim 1949). The flora of Georgia comprises about 4150 species of vascular plants, of which 260 species are endemic (Nakhutsrishvili 2013). The flora of Georgia lists 33 species of the family Orobanchaceae: 28 species of *Orobanche sensu lato*, two of *Cistanche* Hoffmannsegg & Link (1809: 319) and three of *Diphelypaea* Nicolson (1975: 654) (Gagnidze 2005). These data require verification, thorough revision, and field research in the Caucasus, as evidenced by recent reports of new taxa (e.g. Rätzel & Uhlich 2004, Aghababyan 2013) or new records (Piwowarczyk & Tatanov 2013, Rätzel *et al.* 2013).

During field investigations in 2014 of the genus *Orobanche* in Georgia, a new locality was discovered and identified as belonging to a new species of *Orobanche*. Descriptions and illustrations are included here and diagnostic characters are discussed. Herbarium acronyms used in the text follow the Index Herbariorum (<http://sciweb.nybg.org/science2/IndexHerbariorum.asp>).

or yellow colour of the stigma, like *O. lutea* and *O. schelkovnikovii* Tzvelev in Novopokrovskij & Tzvelev (1958: 686). *O. zajaciorum*, due to its small size, distinctively curved geniculate and small flowers (to 17 mm), simple and narrow calyx segments is difficult to confuse with other taxa of the *Orobanche* subsection *Galeatae* or other. I found no herbarium material (especially in LE or TBI) from other regions corresponding to this taxon. Also, the host, *Scutellaria sosnowskyi*, facilitates the identification of this taxon.

Heretofore, within the genus *Scutellaria*, only *S. hirta* Sibthorp & Smith (1809: 425) was given as a host of *O. cypria* Reuter in Unger & Kotschy (1865: 294) and was known from Cyprus (Beck 1930); records in Iran and Iraq (Beck 1930, Schiman-Czeika 1964) require confirmation (Meikle 1985). However, *O. cypria* differs significantly from the newly-described species: mostly maroon or red stem and flowers, the calyx is divided into two teeth, the corolla is slightly curved with strongly plicate and fimbriate-denticulate margins of lobes.

Georgia occupies an interesting geobotanical position as a part of the Caucasus region which connects Europe and Asia. The complex orographic structure of Georgia and its geographical position account for the geographical and ecological isolation of some plant communities, which has resulted in a high degree of local endemism, as well as a variety of species of different geographical-genetic elements. The newly-described species can probably be found in the following localities within the range of the host *Scutellaria sosnowskyi*, covering eastern Turkey to the Transcaucasus (Turkey, Armenia, Georgia), that is, mainly the Lesser Caucasus. Attention should also be paid to the known hybrids of the host plant *S. sosnowskyi* (Cicek & Yaprak 2011), or other species of this genus, and family Labiatae.

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References

- Aghababayan, M.V. (2013) Redeeming *Phelypaea armena* from oblivion, with a reassessment of Transcaucasian *Cistanche* (Orobanchaceae). *Flora Mediterranea* 23: 131–139.
- Akhakatsi, M., Mosulishvili, M., Kimeridze, M. & Maisaia, I. (2008) *Conservation and sustainable utilization of rare medicinal plants in Samtskhe-Javakheti*. Biological Farming Association Elkana, Georgian Society of Nature Explorers Orchis, Tbilisi, pp. 1–124.
- Baumgarten, J.C.G. (1816) *Enumeratio Stirpium Magno Transsilvaniae principatui* 1. In *Libria Camesinae, Vindebonae*, 355 pp.
- Çiçek, M. & Yaprak, A.E. (2011) A new natural hybrid of *Scutellaria* (Lamiaceae) from Turkey. *Phytotaxa* 29: 51–55.
- Gagnidze, R. (2005) *Vascular Plants of Georgia. A Nomenclatural Checklist*. Sak'art'velos Mec'nierebat'a Akad, Tbilisi, pp. 1–248.
- Grossheim, A.A. (1949) *Opredelitel' rastenii Kavkaza. Sovjetskaia nauka*, Moskwa.
- Beck von Mannagetta, G. (1930) Orobanchaceae L. In: Engler, A. (Ed.) *Das Pflanzenreich IV. 261 (Heft 96)*. Verlag von Wilhelm Engelmann, Leipzig, pp. 1–348.
- Halamski, A.T. & Piwowarczyk, R. (2008) Graines d'Orobanches comme critère taxonomique – information sur les travaux en cours. *Bulletin mensuel de la Societe Linneenne de Lyon* 77(3–4): 37–40.
- Hoffmannsegg, J.C. von & Link, J.H.F. (1809–1820) *Flore portugaise ou description de toutes les plantes qui croissent naturellement en Portugal avec figures coloriées, cinq planches de terminologie et une carte* 1. Charles Frédéric Amelang, Berlin.
- Holandre, J. (1829) *Flore de la Moselle ou Manuel d'Herborisation et précédé d'un aperçugéologique sur le département et d'éléments abrégés de botanique* 1. Mme. Thiel, Metz.
- IUCN (2013) *Guidelines for using the IUCN Red List Categories and Criteria*. Version 10.1. Prepared by the Standards and Petitions Subcommittee. Available from: <http://jr.iucnredlist.org/documents/RedListGuidelines.pdf> (accessed 21 January 2014).
- Kreutz, C.A.J. (1995) *Orobanche. The European broomrape species. Central and northern Europe*. Natuurhistorisch Genootschap, Limburg, pp. 1–159.
- Linnaeus, C. (1753) *Species Plantarum* 2. Impensis Laurentii Salvii, Holmiae (Stockholm), pp. 561–1200.
- Meikle, R.D. (1985) Orobanchaceae. In: Meikle, R.D. (Ed.) *Flora of Cyprus* 2. Bentham – Moxon Trust, Royal Botanic Garden Kew, London, pp. 1232–1242.
- Mittermeier, R.A., Gil, R.P., Hoffman, M., Pilgrim, J., Brooks, T., Mittermeier, C.G., Lamoreux, J. & Fonseca, G.A.B. (2005) *Hotspots revisited: Earth's biologically richest and most endangered terrestrial ecoregions*. University of Chicago Press, Boston, pp. 1–392.

- Nakhutsrishvili, G. (2013) *The Vegetation of Georgia (South Caucasus)*. Springer-Verlag, Berlin Heidelberg, pp. 1–235.
<http://dx.doi.org/10.1007/978-3-642-29915-5>
- Nicolson, D.H. (1975) *Diphelypaea* (Orobanchaceae), nom. nov. and other cauterizations on a nomenclatural hydra. *Taxon* 24(5–6): 651–657.
<http://dx.doi.org/10.2307/1220740>
- Nobis, M., Nowak, A., Nobis, A., Paszko, B., Piowarczyk, R., Nowak, S. & Plášek, V. (2014a) Contribution to the flora of Asian and European countries: new national and regional vascular plants records. *Acta Botanica Gallica* 160(1):81–89.
<http://dx.doi.org/10.1080/12538078.2013.871209>
- Nobis, M., Ebel, A.L., Nowak, A., Turginov, O.T., Kupriyanov, A.N., Nobis, A., Olova, M.V., Paszko, B., Piowarczyk, R., Chen W-L., Gudkova, P.D., Klichowska, E., Nowak, S. & Pujadas-Salvà, A.J. (2014b) Contribution to the flora of Asian and European countries: new national and regional vascular plant records, 2. *Acta Botanica Gallica* 161(2): 209–221.
<http://dx.doi.org/10.1080/12538078.2014.921643>
- Novopokrovskij, I.V. & Tzvelev, N.N. (1958) Orobanchaceae. In: Shishkin, B.K. (Ed.) *Flora Unionis Republicarum Socialisticarum Sovieticarum (Flora URSS)*, vol. 23. Institutum Botanicum nomine V. L. Komarovii Academiae Scientiarum URSS, Mosqua and Leningrad, pp. 685–687.
- Piowarczyk, R. (2011) *Orobanche mayeri* (Suess. & Ronniger) Bertsch & F. Bertsch – the new species to Poland. *Acta Societatis Botanicorum Poloniae* 80(3): 179–183.
<http://dx.doi.org/10.5586/asbp.2011.020>
- Piowarczyk, R. (2013) Seed productivity in relation to other shoot features for endangered parasitic plant *Orobanche picridis* F.W. Schultz (Orobanchaceae). *Polish Journal of Ecology* 61(1): 55–64.
- Piowarczyk, R., Chmielewski, P. & Cwener, A. (2011) The distribution and habitat requirements of the genus *Orobanche* L. (Orobanchaceae) in SE Poland. *Acta Societatis Botanicorum Poloniae* 80(1): 37–48.
<http://dx.doi.org/10.5586/asbp.2011.006>
- Piowarczyk, R., Chmielewski, P., Gierczyk, B., Piowarski, B. & Stachyra, P. (2010) *Orobanche pallidiflora* Wimm. & Grab. in Poland: distribution, habitat and host preferences. *Acta Societatis Botanicorum Poloniae* 79(3): 197–205.
<http://dx.doi.org/10.5586/asbp.2010.025>
- Piowarczyk, R., Halamski, A.T. & Durska, E. (2014) Seed and pollen morphology in the *Orobanche alsatica* complex (Orobanchaceae) from central Europe and its taxonomic significance. *Australian Systematic Botany* 27(2): 145–157.
<http://dx.doi.org/10.1071/SB14013>
- Piowarczyk, R., Madeja, J. & Nobis, M. (2015) Pollen morphology of the Central European broomrapes (Orobanchaceae: *Orobanche*, *Phelipanche* and *Orobanchella*) and its taxonomical implications. *Plant Systematic and Evolution* 301: 795–808.
<http://dx.doi.org/10.1007/s00606-014-1117-6>
- Piowarczyk, R. & Przemyski, A. (2009) New locality of *Orobanche coerulescens* Stephan ex Willd. (Orobanchaceae) at the NW limit of its geographical range. *Acta Societatis Botanicorum Poloniae* 78(4): 291–295.
<http://dx.doi.org/10.5586/asbp.2009.038>
- Piowarczyk, R. & Przemyski, A. (2010) The distribution and habitat preferences of the declining species *Orobanche arenaria* (Orobanchaceae) at the northern limit of its geographical range. *Acta Societatis Botanicorum Poloniae* 79(1): 43–50.
<http://dx.doi.org/10.5586/asbp.2010.007>
- Piowarczyk, R. & Tatanov, I. (2013) *Orobanche laxissima* Uhlich & Rätzel (Orobanchaceae) – a new species for Dagestan (Russia) and Azerbaijan. *Biodiversity Research and Conservation* 32: 25–28.
<http://dx.doi.org/10.2478/biorc-2013-0014>
- Pomel, A.N. (1874) *Nouveaux matériaux pour la Flore Atlantique* 11. Paris, pp. 1–399.
- Pusch, J. & Günther, K.F. (2009) Orobanchaceae (Sommerwurzgewächse). In: Hegi, G. (Ed.) *Illustrierte Flora von Mitteleuropa* 6/1A, Lieferung 1. Weissdorn-Verlag, Jena, pp. 1–99.
- Rätzel, S., Ristow, M. & Uhlich, H. (2013) Orobanchaceae. In: Raab-Straube, E. & Raus, T. (Eds.) Euro+Med-Checklist Notulae, 2. *Willdenowia* 43: 239–249.
<http://dx.doi.org/10.3372/wi.43.43202>
- Rätzel, S. & Uhlich, H. (2004) *Orobanche benkertii* sp. nov. (Orobanchaceae Vent.) und weitere *Orobanche*-Sippen aus dem NW-Kaukasus. *Feddes Repertorium* 115(1–2): 189–211.
<http://dx.doi.org/10.1002/fedr.200311036>
- Schiman-Czeika, H. (1964) Orobanchaceae. In: Rechinger, K.H. (Ed.) *Flora Iranica* 5. Akademische Druck- u. Verlagsanstalt, Graz, pp. 1–25.
- Sibthorp, J. & Smith, J.E. (1809) *Florae Graecae prodromus: sive Plantarum omnium enumeratio, quas in provinciis aut insulis Graeciae* 1. R. Taylor et Soc., London.

- Smith, J.E. (1798) XII. Remarks on some Foreign Species of *Orobanche*. *Transactions of the Linnean Society* 4: 164–172.
<http://dx.doi.org/10.1111/j.1096-3642.1798.tb00524.x>
- Teryokhin, E.S., Schibakina, G.B., Serafimovitsch, N.B. & Kravtsova, T.I. (1993) *Opređelitel Sarasychovykh Flory SSSR*. Nauka, Sankt Petersburg. pp. 1–123.
- Takhtajan, A.L. (1940) *Scutellaria sosnowskyi* Takht. sp. nov. Hekotophe hobhe n mehee nbechthbe pactehnr. *Zametki po Sistematike i Geografii Rastenii* 9: 24–25.
- Unger, F. & Kotschy, T. (1865) *Die Insel Cypem ihrer physischen und organischen Natur nach mit Rücksicht auf ihre frühere Geschichte*. W. Braumüller, Wien, pp. 1–598.
<http://dx.doi.org/10.5962/bhl.title.61480>