



## ***Primula subpyrenaica* (Primulaceae) a new species from the Pyrenean range (south-western Europe)**

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### **Abstract**

A new species in the genus *Primula*, *P. subpyrenaica*, is described from the Pyrenean range in the north-eastern Iberian Peninsula. The species belongs to *P.* sect. *Auricula*, and is related to *P. auricula* and *P. lutea* mainly on a morphological basis. However, *P. subpyrenaica* differs from those two species and from other related taxa by various morphological characters (non-scariose and longer bracts, fragrant leaves, yellowish or brownish when pressed). Data on its ecology, taxonomic relationships and conservation status of this narrow endemic is also provided.

**Key words:** Primulaceae, Endemism, Pyrenees, Taxonomy, Iberian Peninsula

### **Introduction**

*Primula* Linnaeus (1753: 142) is a widespread genus distributed mainly in temperate regions of the northern hemisphere (Richards, 2003). It comprises *ca.* 500 species, with its greatest diversity in mountain ranges of East Asia (Hu & Kelso, 1996). Traditionally, 37 sections have been recognized within *Primula*, among them sect. *Auricula* Duby (1828: 384), the species of which are generally narrow endemics from the mountains of central and southern Europe. This section has been the subject of several studies (Smith & Fletcher, 1949; Valentine & Kress, 1972; Halda, 1992; Richards, 2003), the most recent of which by Zhang & Kadereit (2004) recognized two subsections, *Euauricula* Pax (1889: 220) and *Cyanopsis* (Schott) Pax (1889: 223) based on molecular and morphological characters. According to Zhang *et al.* (2004), sect. *Auricula* appeared in the late Tertiary (3.6 Ma), derived from an Asian ancestor, followed by the divergence of the two major lineages (subsect. *Euauricula* and subsect. *Cyanopsis*) which split at the Plio-Pleistocene boundary (2.4 Ma), with internal diversification taking place mostly during the early Quaternary.

Differences between some of these taxa within sect. *Auricula* are often subtle, especially in the vegetative characters. Usually leaf shape, leaf texture, leaf margin, morphology and arrangement of glandular hairs, scent of leaves, presence or absence of farina, bract size, calyx shape, flower colour and seed coat ornamentation are used to distinguish between the different taxa. Among the 25 species currently recognized within sect. *Auricula*, only three (all in subsect. *Euauricula*) have yellow flowers, while the rest have pink, purple or blue flowers. One of those species with yellow flowers is *P. palimuri* Petagna (1787: 332), a southern Italian endemic whose taxonomic status has not been controversial because of distinctive morphological traits. The other two yellow-flowered taxa have been traditionally included within *P. auricula* Linnaeus (1753: 143), a species considered by some authors as a highly polymorphic without subspecific taxa (Valentine & Kress, 1972, Ernst *et al.* 1977; Pignatti, 1982) or, alternatively, one encompassing two subspecies with unclear boundaries (Smith & Fletcher, 1949; Halda, 1992; Richards, 2003). More recently, Zhang & Kadereit (2004), using molecular data, proposed two distinct clades that are well defined geographically but do not correspond with traditional subspecific delimitation. Based on herbarium material, those authors were able to relate genetic data with morphological characters, which led them to split *P. auricula* into two different species: *P. auricula* s. str., for populations from the mountains of southern and

sector of Serra de Picancel. Currently 12 patches are known, always separated by less than 500 m, and with a maximum distance of 3.7 Km between the more extreme patches. The number of basal rosettes (ramets or potential individuals) is several thousands. It has been looked for in nearby ranges with suitable habitats as far as 15–20 km away, but unsuccessfully to date.

The species grows on basic rocks (conglomerates) at elevations ranging from 790 to 1100 m along with *Sesleria albicans* Kit. ex. Schultes (1814: 216), *Ramonda myconi* (L.) Reichenbach (1831: 388), *Saxifraga longifolia* Lapeyrouse (1801: 26) and a number of moss species (Aymerich *et al.*, 2012). The surrounding vegetation consists of forests of *Pinus sylvestris* Linnaeus (1753: 1000) and *Quercus ilex* Linnaeus (1753: 995); mean annual rainfall is ca. 900–1000 mm, with marked inter-annual variation.

**Conservation status:**—To date, the species with the narrowest distribution within subsect. *Euauricula*, a group with a high number of narrow endemics (7 species of 15 as stated by Zhang *et al.*, 2004) was *P. recubariensis* Proser & Scortegana (1998: 28), a species described two decades ago restricted to one pre-Alpine massif in Italy (Proser & Scortegana, 1998). *Primula subpyrenaica* has now become the species with the narrowest distribution. Despite this, Aymerich *et al.* (2012) considered that these populations, now regarded as *P. subpyrenaica*, are not under threat, due to the high number of mature individuals (ramets) and the lack of evidence of current threats; thus, the proposed IUCN (2001) category is NT (Near threatened).

**Identification key:**—We propose the following key to distinguish between the yellow-flowered species of *Primula* sect. *Auricula*:

1. Plants summer-dormant; leaves efarinose; seed coat smooth; bracts foliose, 10–25 mm long; calyces 7–11 mm, with acute lobes; corolla lobes ca. 5 mm. .... *P. palinuri*
- Plants evergreen or winter-dormant; leaves efarinose or farinose; seed coat papillose; bracts membranous or foliose, 1–19 mm long; calyces 2.5–8.5 mm, with obtuse (rarely subacute) lobes; corolla lobes typically >5 mm. .... 2
2. Bracts foliose, typically >6 mm long (2–19 mm); calyces typically >5 mm (4–8.5 mm); leaves efarinose, yellowish brown when dry (sometimes yellowish green); leaves fragrant. .... *P. subpyrenaica*
- Bracts scarious, typically <4 mm long (1–6 mm); calyces typically <5 mm (1–6 mm); leaves efarinose or farinose, green when dry; leaves ordinarily not fragrant ..... 3
3. Leaves narrowly obovate or lanceolate, efarinose or almost efarinose, grey green when dry; glandular hairs typically <0.2 mm long; flowers light yellow ..... *P. lutea*
- Leaves broadly obovate, often farinose, green when dry; glandular hairs typically >0.2 mm long; flowers dark yellow ..... *P. auricula*

## Acknowledgements

The authors give many thanks to the curators of all the herbaria consulted, to C. Roquet for kindly helping in some literature searches and to I. Granzow for improving the English of the manuscript.

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## Appendix 1

Specimens used in morphometric and micro-morphological studies. Localities of the individuals also used for micro-morphological study are underlined.

***Primula auricula*: Austria:** Graz, Nordabhang unten ruine Gösting nächst Graz, 25 April 1893, *Etreissmann* (W3947); Salzburg, Felsen in der Dachstein gruppe nachst der Hoffsburgshutte, 21 June 1927, *J. Vetter* (W5072); **Hungary:** Banatus, Fecshérkereszt near Herkulergürdo, 1835, *Rochel* (B100448247); **Italy:** A Agordine, forcella Pianezze, 2050 m, 18 August 1913, *Miro* (G00374908); Abruzzi, M. Sirente am Macerola, ca. 2250 m, 5 July 1979, *W. Burri & F. Krendl* (W95552); Abruzzi, Maiella, NE di Campo di Giove, SW-Hang der Femina Morta, ca. 1800-2400, 8 June 1978, *W. Burri & F. Krendl* (W09554); Agordino, Belluno, in Valle di Garès presso il Liera, 1100 m, 16 August 1913, *M. Minio* (G00374907); Monte Scampa, 1600 m, 22 July 1912, *sine leg.* (G00374914); Tirolia australe, in petrosis alpinis vallis Judicar, June 1894, *Porta* (G00374913); Tirolia australe, in petrosis alpinis vallis Judicar, 4 June 1886, *Porta* (G00374912); Tirolia australis, Judicaris prope Bordone, 15 June 1899, *Cimarolli* (G00374910); Tirolia australe, Val di Ledro, 1900-2100 m, 10 June 1880, *Porta* (G00374906); Tirolia australe, Val di Ledro, 1300-1600 m, June 1900, *Porta* (G00374909); Tirolia australe, Judicar, in petrosis alpinis, 2000-2300 m, 4 June 1886, *Porta* (B100448269); Tirolia australe, Val di Ledro, in rupestribus alpinis 1800-2000 m, 10 June 1883, *Porta* (B100448270); Trieste, Felsen in einer Dolme bei f. Conzian, 1 May 1886, *V. Engelhardt* (B100448252); Veneto, Belluno, N Ortsrand von Belluno, 1400-1500 m, 20 April 1999, *M. & K. Weigend 1999/53* (B100310467); Venetia, Udine, in petrarum rimis vallis Fressen, 1400-1500 m, 16 July 1914, *Porta* (G00374911); Friuli-Venezia Giulia, Pordenone, Karnische Voralpen, Monte Raut, Grat zwischen der Forcella Capra und dem Gipfel, 1870-2024 m, 10 June 2000, *M. Staudinger* (W23014); **Slovenia:** Julian Alps, Triglav-Gebiet, between Rudno polje & Vodnikova koca, 29 June 1968, *M. Bässler & I. Quasdorf* (B100448248).

***Primula lutea*: France:** Col de Porte, St. Nizier, 19 June 1859 (GR); Col l'Arc, au-dessus de Chaix (Isère), rochers calcairesm 1900 m, June 1876, *Lombard 1300* (GR); Rochers de la Grande Chartreuse et de Chamechaude, près grenoble (Isère), 12 June 1853, *B. Jayet 1309* (GR); St. Nizier, Jun 1841 *Chabert?* (GR); Chamechaude, pres des escarpements, 29 June 1893, *sine leg.* (GR); rochers de Châtard, près de Baume-les-Dames (Doubs), 25 April 1861, *E. Michalet & E. Poux 1309 bis* (GR); Env. De Bonneville, sur les rochers de la base d'Andey (Brezon), *L. Coppier* (GR); Baume, rochers de Châtard, 29 April 1864, *G. Carlet* (GR); Rochers de la Grande Chartreuse et de Chamechaude, pres Grenoble, 12 June 1853, *B. Jayet* (Isère) (B100448249); Haute-Savoie, Mt. Méry, 4 July 1898, *Beauverd* (G00374891); Haute-Savoie, 27 August 1922, *Beauverd* (G00374904); Haute-Savoie, Lapiaz du Parmelan, 1700 m, 27 June 1903, *Beauverd* (G00374903); Haute-Savoie, Pic du Chaluna, 12 July 1900, *Megevand* (G00374902); Haute-Savoie, rochers du Praz de