



A new subspecies of *Pulmonaria officinalis* (Boraginaceae) from the southern Alps

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Abstract

Populations of *Pulmonaria* with unique features associated with shady and dry conditions were found in high beech woods on the west side of Mt. Marzola and in other dolomitic sites of Trentino (southern Italian Alps). Morpho-statistical and karyological analyses suggest that these populations represent a new subspecies of *P. officinalis*, *Pulmonaria officinalis* subsp. *marzolae*. The change of the basal leaf shape during the year, peculiar traits of foliar spots and hairs as well as a divergence of the karyotype asymmetry parameters suggest that this taxon is distinct from the typical form of *P. officinalis*. General form, the major hair types, inflorescence morphology and the chromosome number $2n = 16$, however, suggest its affinity to this species.

Key words: basal leaves, foliar spots, Italy, karyology, trichomes

Introduction

The species of the genus *Pulmonaria* Linnaeus (1753: 135) occurring in the Alps are imperfectly known. *Pulmonaria* comprises taxa notoriously difficult to identify and includes numerous species with distinct cytotypes and high morphological variability, both between and within populations (Kerner 1878, Merxmüller & Sauer 1972, Duvignaud *et al.* 1976, Bolliger 1982). Among morphological characters, features of the basal summer leaves are primarily used to distinguish species within the genus. These leaf features include the base shape and the indumentum, the spot pattern and the size of the lamina. Other important features are the colour of the flower at maturity and the interior of the corolla tube, which may be glabrous or hairy (Merxmüller & Sauer 1972, Pignatti 1982). Several species have been described from the northern Alps, mainly based on differences in chromosome numbers (Sauer 1975). On the southern side of the eastern Alps (Trentino-Alto Adige, Italy), there are at least two endemic *Pulmonaria* species: *P. australis* (Murr 1903: 138) Sauer (1975: 56) and *P. vallarsae* Kerner (1878: 33), besides the widespread *P. officinalis* Linnaeus (1753: 135). *Pulmonaria vallarsae*, described from southern Trentino and the Venetian Prealps, has long been considered to extend its range over most of the Italian peninsula (Pignatti 1982). More recently, Apennine populations formerly referred to *P. vallarsae* have been separated as an independent species: *P. apennina* Cristofolini & Puppi (Puppi & Cristofolini 1996: 17). In the western Alps and northern-central Italy a third species *P. hirta* Linnaeus (1763: 1667) also occurs. However, the status and relationships of the *P. hirta/vallarsae/apennina* species complex remain controversial (Vosa & Pistolesi 2004, Bernardo *et al.* 2010).

Of the three recognized species occurring in the Trento province (Trentino), *P. officinalis* is widely found in moist broadleaf woods, *P. australis* is sporadic in open woods, scrubland, and highland prairies, while *P. vallarsae* is limited to fresh woods of southernmost valleys. However, some populations of *Pulmonaria* from Trentino do not fit the current circumscription of these species. In particular, some mountain populations identified as *P. officinalis* based on their overall morphological characters show leaves with small dark-green spots (or no spots at all) and are associated with shady dry sites in woods. One such ‘dark’ population is found in beech woods on the west side of Mt. Marzola (a mountain ridge in the vicinity of Trento) at an elevation of 1200–1700 m and similar forms are also found in several other calcareous-dolomitic districts of Trentino. In contrast, *P. officinalis* typically has conspicuous or confluent leaf

Rhizomes 3–8 cm long and slender (< 1 cm diam.); several shoots with inflorescences can arise from a single rhizome. Lamina of summer leaves up to 16 × 10 cm, heart-shaped, with truncate to rarely cordate base; spots 42 ± 3, small and regularly shaped, never confluent, dark green, mostly indistinct or absent; upper surface rough, with sparse setae and sparse to abundant microglands (sessile glands); short hairs (puberes), glandular hairs (colleteres) and small pins (aculeoli) absent; petiole up to 15 cm × 4 mm; autumn leaves often ovate-lanceolate with a rounded to attenuate base. Flowers with reddish to blue-violet corolla; corolla tube glabrous inside below the ring of hairs. Nutlets not studied.

Additional material seen:—ITALY. **Trentino-Alto Adige:** Marzola (Trento), lungo il sentiero Bivio II—rifugio Bailoni, 46°01'11"N, 11°10'56"E, 1640 m, 19 June 2013, *P. Pupillo s.n.* (BOLO!); *ibidem* (ROV!); Marzola (Trento), lungo il sentiero Bivio II—rifugio Bailoni, 1620 m, 46° 01'23"N, 11°10'56"E, 8 June 2013, *P. Pupillo s.n.* (BOLO!); Marzola (Trento), sopra Bivio I, 1600 m, 46° 02'07"N, 11°11'14"E, 8 June 2013, *P. Pupillo s.n.* (ROV!); Marzola (Trento), sotto Bivio I, a sx del sentiero, 46° 02'11"N, 11°11'14"E, 1570 m, 8 June 2013, *P. Pupillo s.n.* (FI!).

Suggested conservation status:—The new subspecies occupies a relatively small geographical area, but it does not seem subject to any immediate threat caused by any human activity. The number of individuals is clearly above any critical value and it does not seem to decrease over the years. For this, we propose to include this taxon in the category LC (Least Concern), as defined by the IUCN (2001).

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