



A new diploid butterwort species (*Pinguicula*, Lentibulariaceae) from Sardinia

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Abstract

A new diploid species belonging to *Pinguicula* sect. *Pinguicula* is described from Sardinia, an island where no butterwort was previously reported from. The taxonomic relationship of *P. sehuensis* sp. nov. with other species is briefly discussed.

Keywords: carnivorous plants, endemics, karyology, Italy, Mediterranean Basin, vascular flora

Introduction

Pinguicula Linnaeus (1753: 17) (butterworts) is the second most diverse genus of the carnivorous family Lentibulariaceae, with about 100 currently accepted species (Rodondi *et al.* 2010). A number of them were only recently recognized, especially in consequence of taxonomic studies in Central America (see literature cited in Cieslak *et al.* 2005, Domínguez *et al.* 2014). Also in the Mediterranean area, 14 new taxa were described in the last 30 years (Tammara & Pace 1987, Romo *et al.* 1996, Zamora *et al.* 1996, Casper & Steiger 2001, Conti & Peruzzi 2006, Ansaldi & Casper 2009, Yildirim *et al.* 2012, Peruzzi & Gestri 2013, Innangi & Izzo 2014).

The family Lentibulariaceae, order Lamiales, has recently been proved to be monophyletic (Jobson *et al.* 2003), as the whole genus *Pinguicula* (Cieslak *et al.* 2005, Degtjareva *et al.* 2006, Kondo & Shimai 2006, Shimai & Kondo 2007, Shimai *et al.* 2007). The latter authors significantly contributed in explaining the phylogenetic relationships within this genus, showing that many of the infrageneric taxa recognized by Casper (1966) are poly- or paraphyletic. Recently, Degtjareva *et al.* (2004) provided useful new taxonomic information on seed morpho-anatomy, Rodondi *et al.* (2010) studied pollen morphology in detail, while Peruzzi (2004) and Casper & Stimper (2009) summarized the karyological knowledge of this genus.

At present, 13 species are listed for Italy (Conti & Peruzzi, 2006; Pascal *et al.* 2008; Ansaldi & Casper, 2009; Compostella *et al.* 2010; Peruzzi & Gestri 2013; Innangi & Izzo 2014). *Pinguicula alpina* Linnaeus (1753: 17), *P. grandiflora* Lamarck (1789: 22), *P. leptoceras* Reichenbach (1823: 69) and *P. poldinii* Steiger & Casper in Casper & Steiger (2001: 28), occur in the Alpine portion of Italy (the latter species so far known as endemic). *Pinguicula reichenbachiana* Schindler (1908: 13) occurs in central-Western Liguria; while *P. christinae* Peruzzi & Gestri (2013: 699) is endemic to Northern Apennine; *P. apuana* Casper & Ansaldi in Ansaldi & Casper (2009: 13) and *P. mariae* Casper in Ansaldi & Casper (2009: 3), are endemic to the Apuan Alps (Tuscany); *P. fiorii* Tammara & Pace (1987: 430) and *P. vallis-regiae* Conti & Peruzzi (2006: 329), are both endemic to Abruzzo; *P. lavalvae* Innangi & Izzo (2014: 8; online publication) is endemic to Campania, and *P. hirtiflora* Tenore (1811: VI), occurs only in Campania and Calabria (Southern Italy). The latter two species are also the only ones overwintering as a rosette (tropical growth-type) in Italy (Peruzzi *et al.* 2004). Besides them, the species with the widest distribution range in Italy is *P. vulgaris* Linnaeus (1753: 17), occurring in Alps throughout the peninsula up to central Italy (see Conti & Peruzzi 2006 for further information on endemic subspecies at the Southern limit of Italian distribution). In this framework of knowledge, in 2012 we discovered a peculiar *Pinguicula* population in Sardinia, a region where no butterwort was ever recorded before. This plant is here described as a species new to science.

$2n = 48$ chromosomes, had an allopolyploid origin, involving *P. grandiflora* ($2n = 32$) and an unknown diploid species. In this framework, *P. sehuensis* could indeed represent this diploid species. However, it must be noted that Casper & Stimper (2009), in their survey on *Pinguicula* chromosome numbers, while confirming the diploid status of *P. corsica*, actually confused the counts for *P. dertosensis* and *P. nevadensis*, which they reported as octoploid with $2n = 64$ and tetraploid with $2n = 32$ chromosomes, respectively. Irrespective of this, we can consider *P. sehuensis* as a patroendemic species, i.e. a diploid unit which has only polyploid relatives, similarly to *P. corsica* (Siljak-Yakovlev & Peruzzi 2012). However, *P. corsica* and *P. sehuensis*, albeit both diploid and geographically close, seem not obviously related each other, neither on taxonomical nor on ecological grounds. A molecular phylogenetic study of all central Mediterranean endemic taxa is planned and will clarify the evolutionary relationships of *P. sehuensis* with other species of *P. sect. Pinguicula*.

Additional specimens seen (paratypes):—ITALY. **Sardinia:** Montarbu, Seui (Ogliastra), calcari mesozoici, 1035 m, NW 315°, 39°53'N–9°21'E, 24 June 2012, *G. Bacchetta s.n.* (CAG!); Pirastu Trottu, Montarbu, Seui (Ogliastra), rocce stillicidiose su travertino, 1185 m, N 15°, 39°53'N–9°23'E, 19 June 2013, *G. Bacchetta & A. Delage s.n.* (CAG!).

Concluding remarks

Once again, Italy is confirmed as an European diversity hotspot for butterworts, hosting at present a total of 14 taxa, 10 of them endemic. Comparatively, the larger Iberian and Balkan peninsulas (and their islands) host indeed nine taxa, five of them endemic (Blanca *et al.* 1999; Blanca 2001) and three taxa, two of them endemic (Casper 1966; Shuka *et al.* 2007), respectively. Sardinia in particular was recently highlighted as the second region in number of Italian endemics (322 taxa; Peruzzi *et al.*, 2014), of which 183 are strictly regional endemics (Fenu *et al.*, 2014). Our discovery further adds one species to this richness.

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