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Swertia punctata Baumg. (*Gentianaceae*) in Bulgaria

Abstract

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Swertia punctata was first recorded from Bulgaria in 1883 by J. Pančić from the Western Stara Planina and the Rila Mountains to the south. Since no herbarium material was avoilable to Bulgarian botanists, the plants from Western Stara Planina were considered a misidentification for *S. perennis*. This was corroborated by the fact that all Swertias collected later from Rila are indeed of the latter species. Both taxa have been confused by many European botanists but are clearly distinct. A revised description of *S. punctata* is now presented, together with diagnostic characters, ecological and distributional data for both taxa.

Introduction: historical aspects of the taxa in Bulgaria

Swertia punctata Baumg. was first recorded from Bulgaria in 1883 by the outstanding Serbian botanist Josif Pančić (1814-1888). In the year 1880 he found the species below Mt Kopren in the Western Stara Planina Mts and next year discovered it in the northwest part of the Rila Mts. We do not know if Pančić collected any specimens or if he only made observations as so far (*fide* Achtarov 1950), no Bulgarian botanist has seen herbarium material of the *Swertia* Pančić reported. Many authors state that *S. punctata* occurs in Bulgaria, e.g., Velenovsky (1891) cites it for the Rila Mts and Mt Kopren; Davidov (1906-1907) for Rila; Urumov (1908) for Rila and in 1917 for W Rodhopi, and Hayek (1931) for Rila and W Rodhopi. In all these works the characters used to distinguish *S. punctata* and the closely related *S. perennis* L., then known from Bulgaria, were never mentioned. *S. perennis* was listed in the Bulgarian flora in 1891 by Stefan Georgiev, the first Bulgarian professor of botany. The voucher specimens were collected in the Rila Mts and determined as *S. perennis* var. *alpestris* Baumg.

It is interesting to note that in the first three editions of *Flora na Bălgarija* (Stojanov & Stefanov 1925, 1933, 1948), only *S. perennis* was mentioned — from Rila, Vitosha and the Pirin Mts. No reference was made to the existence of *S. punctata* (Stojanov & Stefanov 1933, 1948) or the species was considered a misidentification for *S. perennis* var. *alpestris* (Stojanov & Stefanov 1925). The fourth edition (Stojanov, Stefanov & Kitanov 1967) gives the following text: "*S. perennis* L. .... on wet rocks and along streams. A rare plant

in the alpine belt of Rila, Pirin and Vitosha Mts. The two lowermost cauline leaves are sometimes alternate. ..... *S. punctata* has erroneously been recorded from Bulgaria ...."

By an interesting coincidence one of the authors of the fourth edition, the eminent botanist Boris Kitanov, had actually collected *S. punctata* in the Western Stara Planina Mts on 26 August 1949 (SOM 145661). His locality was "on wet rocks along the Prodanovska river near the waterfall above the village of Chiprovci (UTM coordinates FP-50)". It is possible that this material was never checked by Kitanov and it was left to Dimitar S. Dimitrov, the present curator at Sofia University herbarium (SO), to identify Kitanov's material. This he did and the specimen was published in 1991 under the name *S. perennis*. Dimitrov might have been influenced by Tutin's statement in *Flora Europaea* (1972) that *"S. punctata* Baumg. does not seem to merit even subspecific rank and is probably no more than a colour variant of typical *S. perennis*".

S. punctata was also omitted by Kožuharov & Petrova (1982) in the multi-volume edition of *Flora na Narodna Republika Bălgarija*. It was also thought that the plants from Western Stara Planina referred to as *S. punctata* were in fact misidentified *S. perennis*. This was corroborated by the fact that all Swertias existing in Bulgarian herbaria (SO, SOA, SOM) which had later been collected from Rila and the other localities indicated for *S. punctata*, were indeed of *S. perennis* except the specimen collected by Kitanov but only recently determined by us.

Description of *S. punctata*

Rhizome thick, yellowish, with roots arising mainly from the nodes. Stem erect, stout, green, ± terete, branched at inflorescence. Basal leaves alternate, 2-3, elliptic, petioles equalling or one shorter than the other. Cauline leaves 2-5, smaller, elliptic to elliptic-lanceolate; lowermost petiolate; uppermost leaves near inflorescence sessile, semi-amplexicaul, alternate or opposite. Leaves all entire. Flowers (15-) 30-65 (-101) in relatively dense panicle. Peduncles 4-angled, 1-2-branched. Sepals connate at base, linear-lanceolate, 7-11 mm long, glabrous. Corolla 5-lobed, divided almost to base; petals oblong-lanceolate to linear, 10-14 mm, greenish-yellow with blackish-violet dots, obtuse, erecto-patent to almost erect at anthesis. Nectaries 2 at base of each petal, surrounded by fimbriae 3-5 times diam. of nectary. Capsule 10-12 mm long. Seeds globose, c. 2 mm, finely reticulate, winged.

S. punctata and *S. perennis* are closely related but can easily be distinguished from each other (see Fig. 1 & Table 1).

Habitat and ecology of the two species

S. punctata seems to be very rare in Bulgaria. Within the last 100 years it had only been collected once (by Kitanov in 1949) and more recently, by V.V. in 1993, 1994 and 1997. Two populations on Midžur (UTM coordinates FP-30) were found, one in the *Fagus* belt at 1300 m (SOM 153586, 13 August 1997), the other in the subalpine belt at 2000 m.

The plants grew in open, wet to marshy places on north- to northwest-facing, rocky siliceous slopes. There were fewer than 100 flowering individuals in the 1300 m popula-

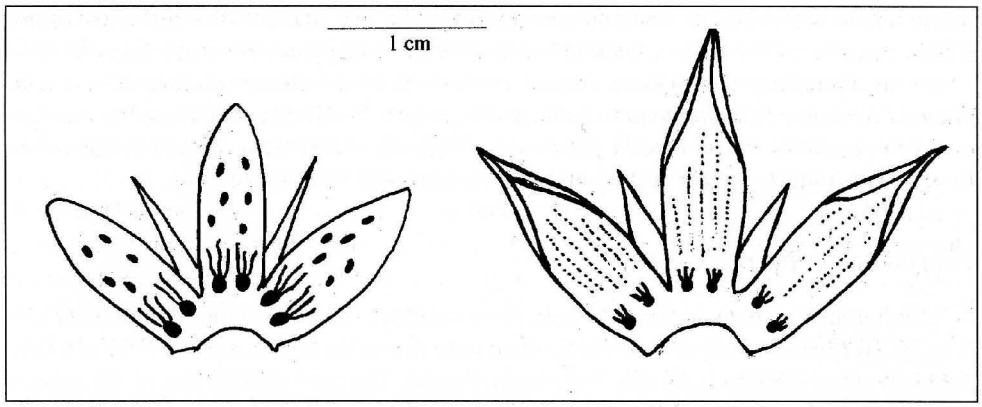

Fig. 1. Dissected corollas of *Swertia punctata* (left) and *S. perennis* (right).

Table 1. Main differences between *S. punctata* and *S. perennis*.

Characters	*S. punctata*	*S. perennis*
Stem height	20-65 cm	15-45 cm
Stem diameter at base	(2.5-) 3-7 mm	1.0-2.5 (-3.5) mm
Stem colour	green	greenish-purple, rarely green
Number of flowers/inflorescence	(15-) 30-65 (-101)	5-15 (-24)
Corolla colour	greenish-yellow with blackish-violet dots	bluish-violet
Petal position at anthesis	erecto-patent to almost erect	patent
Petal shape	oblong-lanceolate to linear, obtuse at apex; margin not inrolled	lanceolate to linear, acute at apex as result of inrolling at upper 1/3
Sepal/petal ratio	2/3 or more than 2/3 of petals	1/2 to 2/3
Length of fimbriae	3-5 times diam. of nectary	1-3 times diam. of nectary
Balkan distribution	Carpathians, Western Stara Planina Mt, Kosovo	Carpathians, Rila, Pirin and Vitosha Mts

tion which was aggregated in an area c.100 m^2 along the Barza Reka river. The plants spread vegetatively in discrete clumps and in small damp depressions. *Caltha palustris, Carex echinata, C. kitaibeliana, C. ovalis, Crepis paludosa, Dactylorhiza saccifera, Deschampsia cespitosa, Eriophorum latifolium, Juncus effusus, Parnassia palustris, Saxifraga stellaris* subsp. *alpigena* and *Silene pusilla* were dominant. Less prominent were *Alchemilla monticola, Angelica pancicii, Athyrium filix-femina, Euphrasia pectinata, Filipendula ulmaria, Gentiana asclepiadea, Geum rivale, Luzula luzuloides* and *Salix caprea*, etc. The flowering period was from mid-July to mid-August. The flowers were observed to be visited by bees (*Bombus* sp. pl.).

At 2000 m on Midžur (peak 2169 m) there were only 10 plants growing on the wet siliceous rocks. They were solitary or in scattered groups of 2-3 individuals. Associated species were *Lycopodium selago, Primula elatior, Soldanella rhodopaea,* etc. The flowering period was noted as mid-August to early September.

S. perennis occurs in similar habitats, in open wet places over siliceous bedrock above 1000 m. One population at 1950 m from Vitosha Mt, between the peaks of Reznjovete and Koupena, was investigated for comparison. The plants grew in marshy places on east-fac-

ing slopes, in dense groups occupying an area of 20-25 m^2, together with *Agrostis canina, Caltha palustris, Carex nigra, Cardamine rivularis, Dactylorhiza saccifera, Deschampsia cespitosa, Eriophorum latifolium, Juncus atratus, Myosotis nemorosa, Potentilla erecta, Primula farinosa, Salix lapponum, Salix waldsteiniana, Saxifraga stellaris* subsp. *alpigena, Senecio pancicii, Soldanella pindicola, Veratrum lobelianum*, etc. The population flowered in August. Insect visitors included *Bombus* and various Diptera.

Distribution of the two species

In Bulgaria *S. punctata* is known from three localities, all in Western Stara Planina Mts (Fig. 2). Herbarium material is available from only two of them. Attempts in 1997 to locate the plants from Kitanov's locality were unsuccessful. The total distribution of the species seems to be Western Stara Planina in Bulgaria, Kosovo in Serbia and the Carpathians. Boissier (1879) refers to the Caucasus for the species and this was probably uncritically followed by Velenovsky (1891), Hegi (1927), Ţopa (1961) and Jovanović-Dunjić (1973). Grossheim (1952), Kárpáti (1970) and Edmondson (1979) considered the Caucasian species to be *S. iberica* Fischer & Meyer. We have not examined the plants from the Caucasus but think it unlikely they represent *S. punctata*.

S. perennis is found at altitudes above 1000 m in the mountains of Rila, Vitosha and North Pirin (Fig. 2). Its distribution is Anatolia and throughout most of Europe except the extreme north.

The small size and number of the populations discovered indicate the glacial-relictual nature of *Swertia* in the Balkans. The genus probably had a wider distribution in the Carpathians and the Balkan peninsula during the Quaternary glaciation. After the withdrawal of the ice, populations became discontinuous as the plants move up the mountains.

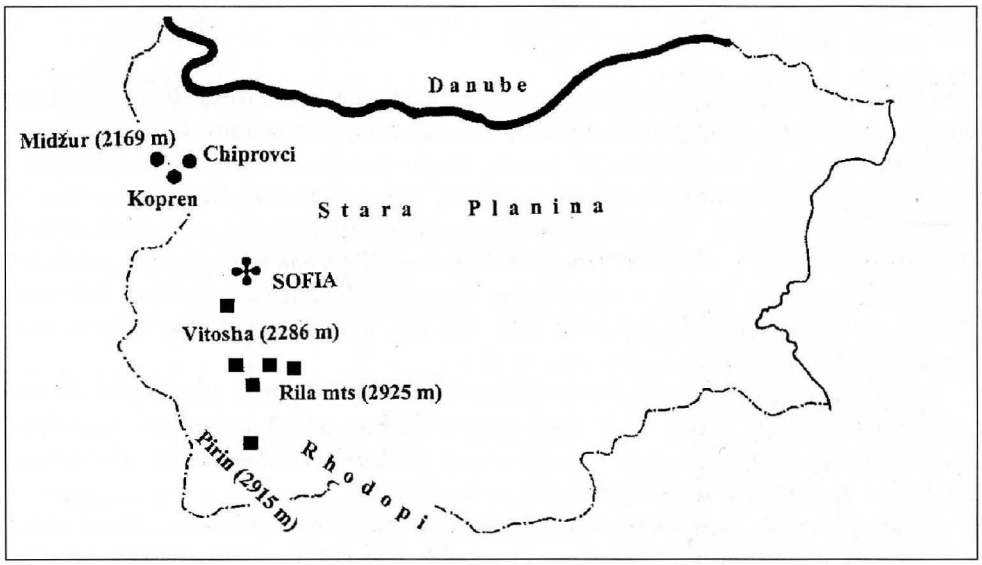

Fig. 2. Distribution of *Swertia punctata* ● and *S. perennis* ■ in Bulgaria

This would have resulted in the differentiation and disjunct establishment of the two species.

Chromosome number

This is the first report of a chromosome count for *S. punctata*. The chromosome number was determined as 2n = 28 (somatic metaphase). Staining of root tip-squashes was by haematoxylin, using the standard technique. The same chromosome number has been found in *S. perennis* (Tutin & al. 1972) indicating the close relationship of the two taxa.

Acknowledgements

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