



***Pilosella kalinensis* (Asteraceae), a new diploid species in *P.* sect. *Alpicolinae* from the Rila Mountains in Bulgaria**

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Pilosella kalinensis is a new, diploid species, discovered in extreme habitats on the highest peaks in the Rila Mountains in Bulgaria. It belongs to the *P. alpicola* aggregate within *P.* sect. *Alpicolinae* and is distinguished by having somewhat larger capitula covered with very dense, long, blackish, straight trichomes. It is endangered by hybridization with *P. rhodopea*.

Key words: Balkan Peninsula, Compositae, hybridization, *Pilosella*, ploidy level, taxonomy

The *Pilosella alpicola* aggregate in *P.* sect. *Alpicolinae* (Nägeli & Peter) Szeląg (2008: 304) comprises four high-mountain species in the Alps, Carpathians and Balkan Peninsula. It was a subject of a biosystematic study by Šingliarová & al. (2011) which reported *P. rhodopea* (Grisebach) Szeląg (2008: 302) as the only representative of this aggregate in Bulgaria from the Rila Mountains, Pirin Mountains and Stara Planina Mountains.

Our many years of field exploration in the highest mountain ranges of the Balkan Peninsula and Southern Carpathians have revealed that *P. rhodopea* in the Rila Mountains (2925 m a.s.l.) shows diversity in the size of capitula, and colour, density and length of indumentum of the leaves, stems and involucre, which are not observed in other parts of its geographical range. We hypothesized that these features might be a remnant of hybridization between *P. rhodopea* and another unknown taxon of the *P. alpicola* aggregate which grows (or grew) in these mountains.

In 2019, on Mt. Golyam Kalin (Голям Калин) (2667 m a.s.l.) in the core of the Rila Mountains, we found a population of plants which corresponded this hypothesis, with bigger capitula than in *P. rhodopea* covered with blackish gray, straight trichomes up to 11 mm long, and with the grassy-green leaves. They were growing in an extreme habitat on a granite ridge at 2600–2640 m a.s.l. together with many relict, high-mountain vascular plants (Vladimirov 2021). Six randomly analyzed plants from this population were diploid. Later, the same morphological plants, described here as a new species, were also found on the summits of Mt. Dodov Vrah (Додов Врѣх) (2661 m a.s.l.) and Mt. Malyovitsa (Мальовица) (2729 m a.s.l.).

The diversity of the *P. alpicola* aggregate in the Rila Mountains was unnoticed by Šingliarová & al. (2011) as all the populations they analyzed were in the subalpine zone.

Material and methods

Living plants collected in the field and cultivated in the experimental garden of the Institute of Biodiversity and Ecosystem Research in Sofia were checked for ploidy level following the method described in Szeląg & Vladimirov (2019). The herbarium specimens are deposited in SOM and in the herbarium of Z. Szeląg.

***Pilosella kalinensis* Szeląg & Vladimirov, *sp. nov.* (Figs. 1–2)**

Type:—BULGARIA. Rila Mountains, Mt. Golyam Kalin, in the rock crevices on granite ridge, 2620 m a.s.l., 14 August 2019, Z. Szeląg & V. Vladimirov (holotype SOM; isotypes Herb. Hierac. Z. Szeląg).



FIGURE 1. *Pilosella kalinensis* (details of the isotype).

Description:—Phyllopodous. Monocephalous, or with two capitula on erect peduncles, up to 2 cm long, grouped on the top of the stem. Stolons absent. Stem 12–18 cm high, in the lower third with numerous stellate hairs, sparse, pale, black-based trichomes, up to 8 mm long, and sparse, black glands 0.2 mm long; in middle part with numerous stellate hairs, scattered,

black in the lower half trichomes, up to 8 mm long, and scattered black glands 0.2 mm long; in the upper third with subdense stellate hairs, numerous black (with grey apex) straight trichomes, up to 10 mm long, and scattered to numerous black glands 0.2–0.3 mm long. Peduncles with dense stellate hairs, dense, black (with grey apex) straight trichomes, up to 11 mm long, and scattered to numerous black glands 0.2–0.3 mm long. Rosette leaves 5–8, up to 9 cm long and up to 1.2 cm wide, lanceolate, entire, acute at apex (the outer leaves shorter and rounded at apex); on upper surface grassy-green with sparse pale simple trichomes 3–4 mm long, scattered to numerous stellate hairs, mixed with sparse yellowish glands 0.3 mm long; on lower surface with protruding pale midrib, and with subdense stellate hairs, only on margins with sparse pale simple trichomes 3–5 mm long and sparse yellowish glands 0.3 mm long. Cauline leaf usually one, up to 1.5 cm long, lanceolate, sessile, acute at apex, with sparse stellate hairs, black-based straight trichomes, up to 5 mm long. Involucres 8.0–9.5 mm long and 8–10 mm wide, globose at base, with very dense indumentum. Involucral bracts subacute at apex, up to 1.3 mm wide at base, with very dense black (with grey apex) straight trichomes 7.5–10 mm long, scattered stellate hairs, and few dark glandular hairs 0.2 mm long. Ligules warm-yellow, flat or semi-tubular, glabrous at apex. Styles pure yellow. Achenes light brown, 1.8–2.2 mm long. Pappus white. Pollen in anthers quite numerous. Flowering: August.



FIGURE 2. *Pilosella kalinensis* (left) and *P. rhodopea* on Mt. Golyam Kalin (right).

Ploidy level and mode of reproduction:— $2n \sim 2x \sim 18$, sexual.

Distribution:—Endemic to the Rila Mountains. Besides the type locality on Mt. Golyam Kalin, *Pilosella kalinensis* was also found on the Mt. Dodov Vrah and Mt. Malyovitsa. Its additional localities on the neighboring peaks higher than 2600 m a.s.l. are to be expected.

Discussion:—On Mt. Golyam Kalin, *Pilosella kalinensis* grows with *P. rhodopea*. They are accompanied by plants with intermediate morphology, mostly triploids and tetraploids and very rare pentaploids, of undoubted hybrid origin. Describing these hybrids as distinct taxa would require cytogenetic studies that are outside our current scope of interest.

Pilosella kalinensis is probably a glacial relict, restricted by the ongoing warming to extreme habitats on the highest peaks, where its small, isolated populations are endangered due to the hybridization with *P. rhodopea* which benefits from climate change and is increasingly occupying higher altitude areas.

The morphological differences between both species are as follows:

1. Capitula covered with dense, nearly white, twisted, intertwined trichomes up to 5 mm long (on peduncles trichomes sparse to scattered); leaves adaxial surface greyish-green *P. rhodopea*
2. Capitula and peduncles covered with very dense, blackish, straight trichomes up to 11 mm long; leaves adaxial surface grassy-green *P. kalinensis*

Šingliarová & al. (2011) hypothesized that *P. alpicola* Schultz & Schultz-Bipontinus (1862: 426) has originated as a result of the hybridization between Balkan *P. rhodopea* and Alpine *P. glacialis* (Lachenal) Schultz & Schultz-Bipontinus (1862: 426). In both these species, however, the capitula are covered with pale trichomes (moreover, in *P. glacialis* the trichomes are sparse and short), while the indumentum on the capitula in *P. alpicola* consists of long, dense and darker trichomes (<https://www.infoflora.ch/en/flora/hieracium-alpicola.html>). The discovery of diploid *P. kalinensis* suggests that the supposed Balkan parental species of *P. alpicola* may have been *P. kalinensis* rather than *P. rhodopea*.

Notes

Šingliarová & al. (2011: 451) questioned the affiliation of *P. breviscapa* (DC.) Soják (1971: 218) and *P. petraea* Schultz & Schultz-Bipontinus (1862: 426) to *P. sect. Alpicolinae*. This resulted from misunderstanding that the informal rank “aggregate” is only a part of the section and not its equivalent. It was also a mistake to use the name of *Hieracium angustifolium* Schur (1866: 390), which belongs to the *H. lachenalii* agg., as a synonym of *Pilosella glacialis* (Šingliarová & al. 2011: 466).

Acknowledgments

We would like to thank Dr. Tim Rich (Cardiff) for valuable suggestions and improving the English text.

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