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Two new species in *Hieracium* sect. *Alpestris* (Asteraceae) from Mt. Babia Góra, Western Carpathians, Poland

ZBIGNIEW SZELAĞ

University of the National Education Commission, Institute of Biology and Earth Sciences, Podchorążych 2, 30-084 Kraków, Poland

✉ azszelag@wp.pl; <https://orcid.org/0000-0002-7017-2823>

Abstract

Two apomictic, tetraploid ($x=9$) species in *Hieracium* sect. *Alpestris* are described from Mt. Babia Góra, the northernmost mountain massif in the whole Carpathian chain with an alpine belt. *Hieracium babiogorensis* combines the morphological features of *H. prenanthoides* s.lat. and *H. bifidum* s.lat., and *H. besseri* is of presumably hybrid origin between *H. prenanthoides* s.lat. and *H. caesium* s.lat. Both new species are illustrated with photos of the holotypes and live plants in the type localities.

Key words: apomictic plants, Babia Góra massif, Europe, *Hieracium*, Western Carpathians, taxonomy

Introduction

The massif of Mt. Babia Góra, topped by the Diablak peak (1725 m a.s.l.), is the northernmost mountain ridge in the Carpathian chain with an alpine belt. Most of the massif is situated within the borders of Poland and is protected as the Babia Góra National Park. Since 1977, this territory has also been the UNESCO Biosphere Reserve.

The area above the timberline on Mt. Babia Góra is scarcely ca 5 square kilometres (Fig. 1), but the great diversity of habitats, especially on the northern slopes (Kłapyta 2020), allows numerous high-mountain vascular plants to grow there (Zapałowicz 1880; Walas 1933), including some interesting phytogeographically species of *Hieracium* Linnaeus (1753: 799). One of them is *H. grabowskianum* Nägeli & Peter (1886: 207), found here nearly a hundred years ago (Zahn 1928), though the first records of *Hieracium* from Mt. Babia Góra were provided by Besser (1809). Despite such a hopeful beginning, the study of the genus *Hieracium* on Mt. Babia Góra was not been continued and only a few records from this area were provided in Zahn's (1935–1938) monograph.

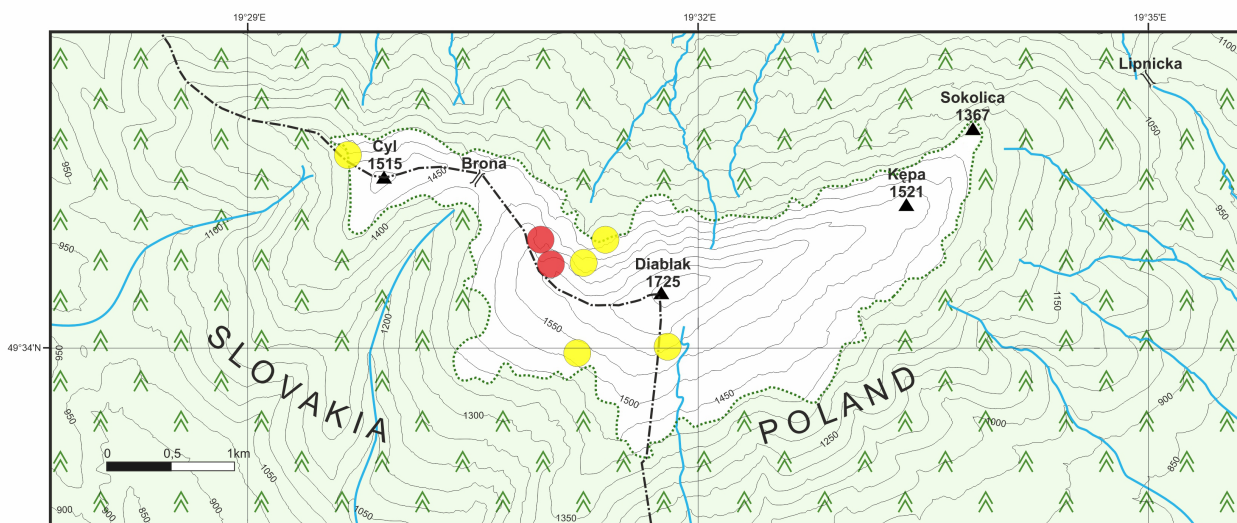


FIGURE 1. Distribution of *Hieracium babiogorensis* (yellow dots) and *H. besseri* (red dots) on Mt. Babia Góra.

In 2020, I began the field survey on Mt. Babia Góra which has led to some interesting discoveries (Szeląg & Szafraniec 2023). The present paper is devoted to the discovery of two new species of *H.* sect. *Alpestrina* (Fries) Arvet-Touvet (1876: 23) (Fig. 2). In central Europe, i.e. in the Alps, Carpathians and Sudetes, the section comprises mountain taxa of hybrid origin between *H. prenanthoides* s.lat. and various taxa of *H.* sect. *Bifida* Tyler (2006: 69) (Zahn 1938). In the British Islands, however, *H.* sect. *Alpestrina* is treated somewhat wider and includes also the lowland species related with *H.* sect. *Foliosa* (Fries) Arvet-Touvet (1876: 23) (Rich & Scott 2011).



FIGURE 2. *Hieracium babiogorense* (left) and *H. besseri* (right) in the type localities.

Taxonomic treatment

Hieracium babiogorense Szeląg, *sp. nov.* (Figs. 2–4)

Type:—POLAND. Western Carpathians, Mt. Babia Góra massif, NE slope of the Kościółek Wschodni ridge, tall-herb vegetation *Mulgedio-Aconitetea*, 1520 m a.s.l., 23 July 2023, Z. Szeląg (holotype KRAM).

Paratypes:—POLAND. Western Carpathians, Mt. Babia Góra massif, Borsucza Polana glade, along a tourist path, 1400 m a.s.l., 20 July 2021, Z. Szeląg (Herb. Hierac. Z. Szeląg); near the Akademicka Perć tourist path, on *Picea abies* forest margin, 1390 m a.s.l., 21 July 2022, Z. Szeląg (Herb. Hierac. Z. Szeląg); southern slope of Mt. Diablak, W of the Głodna Woda stream, 1610 m a.s.l., 1 August 2023, Z. Szeląg (Herb. Hierac. Z. Szeląg); SLOVAKIA. Western Carpathians, Mt. Babia Góra massif, SW of Mt. Diablak, along a yellow tourist path (the locality indicated by J. Chrtek jr.), 1530 m a.s.l., 1 August 2023, Z. Szeląg (Herb. Hierac. Z. Szeląg).

Description:—Phyllopodous. Stem 35–60 cm high, purple-green, in lower half with moderately numerous, pale, 4–5 mm long simple hairs, and with a few stellate hairs; in upper half with sparse, pale, dark-based, 1–1.5 mm long simple hairs, sparse stellate hairs, and with scattered pale microglands. Rosette leaves 4–6 (withering at anthesis in plants growing in tall-grass), coriaceous, somewhat glaucous with less or more intensive brown-purple spots, outer leaves smaller and more rounded at apex; inner leaves up to 15 cm long and up to 3 cm wide, cuneate at base, gradually tapered to a long, winged petiole covered by dense, up to 5 mm long simple hairs mixed pale microglands; lamina lanceolate, acute at apex, sharply dentate, on the upper surface glabrous, on the lower surface with sparse to moderately numerous, up to 2 mm long, simple, pale hairs, on margins and along midrib with numerous, pale, simple hairs and sparse microglands. Cauline leaves 3–6, gradually reduced in size upwards, coriaceous, on the upper surface somewhat



FIGURE 3. Holotype of *Hieracium babiogorense* (KRAM).

glaucous, with less or more intensive brown-purple spots. Lowest cauline leaf in shape, size and indumentum similar to rosette leaves; other cauline leaves semi-amplexicaul, lanceolate and long sharpened at apex, sharply dentate, on the upper surface glabrous or with very few stellate hairs, on the lower surface and on margins with scattered, simple, pale hairs up to 1.5 mm long, and very sparse stellate hairs, on midrib with numerous simple, pale, dark-based hairs up to 3 mm long and very sparse stellate hairs (upper cauline leaf on margins and along midrib also with scattered microglands and few stellate hairs). Synflorescence with 5–15 capitula. Synflorescence branches 3–4, up to 8 cm long in axils of middle and upper cauline leaves, often also with thin branches, up to 20 cm long, in axils on low cauline leaves at the base of stem. Acladium 2–3 cm long. Peduncles thin, erect, with dense stellate hairs, numerous dark-based simple hairs up to 1.7 mm long, and scattered blackish glandular hairs 0.3–0.5 mm long. Bracteoles 1–2, grey green with numerous dark-based, simple hairs, and sparse stellate hairs. Involucres 8–10 mm long, subglobose at base, with moderately dense indumentum. Involucral bracts in three rows, lanceolate, obtuse at apex, up to 1.2 mm wide at base, blackish-green, inner bracts with pale green margins, with subdense, dark-based, up to 2 mm long simple hairs, sparse, blackish glandular hairs 0.2–0.4 mm long, mixed with few yellow microglands, and numerous stellate hairs along margins. Ligules warm-yellow, with cilia at apex. Styles dirty-yellow with dense back microtrichomes. Achenes brown, 3.7–3.8 mm long. Pappus pale-grey. Pollen in anthers very few, irregular. Flowering: end of July and August.

Affinity:—*Hieracium babiogorensis* is tetraploid and reproduces apomictically (Grabowska-Joachimik & Szeląg, unpubl.), combining the morphological features of *H. prenathoides* s.lat. and *H. bifidum* s.lat., and is most probably a hybrid between these taxa. It belongs to the *H. juraniforme* agg. based on *H. juraniforme* (Zahn) Zahn (1906: 646) and is the only representative of this group outside the Alps (Zahn 1938).

Distribution and habitat:—Endemic to the Babia Góra massif in the Western Carpathians, both on the Polish and Slovak sides (Fig. 1). In 2023, the population of *H. babiogorensis* comprised at least two hundred plants. In the *locus classicus* they were growing in the subalpine tall-herb vegetation *Mulgedio-Aconitetea*, at 1480–1530 m a.s.l.; the other localities are situated in rocky grasslands along a tourist paths amongst *Pinus mugo*, and on the *Picea abies* forest margins, at 1380–1610 m a.s.l.



FIGURE 4. Involucres of: A. *Hieracium babiogorensis*; B. *H. besseri* (from holotypes).

Hieracium besseri Szeląg, *sp. nov.* (Figs. 2, 4–5)

Type:—POLAND. Western Carpathians, Mt. Babia Góra massif, glacial niche in lowest part of the Kamienna Dolinka valley, grassland on sandstone rocks, 1550 m a.s.l., 27 July 2021, Z. Szeląg (holotype KRAM; isotypes Herb. Hierac. Z. Szeląg).

Paratypes:—POLAND. Western Carpathians, Mt. Babia Góra massif, upper part of the Kamienna Dolinka valley, NE slope of the Kościółek Zachodni ridge, rocky grassland below the steep sandstone rocks with *Saxifrago-Festucetum versicoloris* community, 1590 m a.s.l., 27 July 2021, Z. Szeląg (Herb. Hierac. Z. Szeląg); Mt. Babia Góra massif, glacial niche in lowest part of the Kamienna Dolinka valley, grassland on sandstone rocks, 1550 m a.s.l., originally found on 27 July 2021, specimens from plants transferred from the type locality to the author's garden, pressed on 31 May 2023, Z. Szeląg (Herb. Hierac. Z. Szeląg).

Description:—Phyllopodous. Stem 35–40 cm high, green, in lower half with moderately numerous, pale, 2–3 mm long simple hairs, and with single stellate hairs; in upper half with sparse, pale, dark-based, 1–2 mm long simple hairs, numerous to subdense stellate hairs, and with scattered pale microglands. Rosette leaves 4–6, glaucous,



FIGURE 5. Holotype of *Hieracium besseri* (KRAM).

outer leaves (withering at anthesis) smaller and more rounded at apex; inner leaves up to 10 cm long and up to 2.5 cm wide, cuneate at base, gradually tapered to a long, winged petiole; lamina lanceolate, acute at apex, denticulate and sharply dentate, on both surfaces with sparse, 0.7–1.2 mm long, pale simple hairs, on margins and along midrib with numerous, simple hairs up to 2 mm long, without or with a few stellate hairs. Cauline leaves 3–4, gradually reduced in size upwards, on the upper surface glaucescent, on the lower surface light green. Lowest cauline leaf in shape, size and indumentum similar to rosette leaves; other cauline leaves sessile to semi-amplexicaul, lanceolate and acuminate at apex, sharply denticulate to dentate at the base of lamina, on the upper surface with very sparse (almost glabrous), pale simple hairs up to 0.5 mm long, on the lower surface with sparse, pale simple hairs up to 0.7 mm long, and very few stellate hairs (upper cauline leaf on margins and along midrib also with scattered microglands and sparse stellate hairs). Synflorescence compact on the top of stem. Synflorescence branches 3–4, up to 3 cm long, mostly monocephalous. Acladium 1.5–2 cm long. Peduncles erect, with dense stellate hairs, numerous dark-based simple hairs up to 1.2 mm long, and with sparse blackish glandular hairs 0.3–0.5 mm long. Bracteoles 2–4, grey-green with scattered stellate hairs, and dark-based simple hairs. Involucres 11–13 mm long, subglobose at base, with moderately dense indumentum. Involucral bracts in three rows, lanceolate, acute at apex, up to 1.3 mm wide at base, dark green, inner bracts with pale green margins, with numerous, blackish, up to 1.7 mm long simple hairs, sparse, blackish glandular hairs 0.3–0.5 mm long, mixed with yellow microglands, and scattered stellate hairs along margins. Ligules warm-yellow, without cilia at apex. Styles dirty-yellow with dense back microtrichomes. Achenes black, 3.8–4.3 mm long. Pappus pale-grey. Pollen in anthers very few, irregular. Flowering: end of July.

Affinity:—*Hieracium besseri* is a sister species of *H. engleri* (Uechtritz 1871: 293) from the Sudetes, from which differs in somewhat taller stem, more dentate leaves, and more acute rosette leaves. The morphological dissimilarities between the species become clearly visible when they are cultivated in the garden and they differ especially in the shape and number of stem leaves (up to 7 in *H. besseri* and up to 4 in *H. engleri*), and the number of capitula (Fig. 6).



FIGURE 6. *Hieracium besseri* (left) and *H. engleri* (right) specimens from plants cultivated in the author's garden, pressed on 31 May 2023.

The keyed differences between *H. besseri* and *H. engleri* are as follows:

1. Stem in lower half with moderately numerous simple hairs 2.0–3.0 mm long and solitary stellate hairs; leaves denticulate to dentate; achenes black, 3.8–4.3 mm long..... *H. besseri*
2. Stem in lower half with dense simple hairs 3.0–4.5 mm long and numerous stellate hairs; leaves weakly denticulate or almost entire; achenes brown-black, 3.0–3.3 mm long..... *H. engleri*

Both species are tetraploid (Musiał & Szelaĝ 2023; Grabowska-Joachimiaĳ & Szelaĝ, unpubl.) and belong to the *H. carpathicum* agg. which includes taxa morphologically intermediate between *H. prenanthoides* s.lat. and *H. caesium* s.lat. A large number of hybridogenous taxa in the Sudetes and Western Carpathians originated with the involvement of *H. prenanthoides* s.lat. (Zahn 1938; Chrtek 2004) indicating that at one time the sexual populations of *H. prenanthoides* s.lat. must have occurred here as well. As the diploid population of *H. prenanthoides* s.lat. is currently known only from the Southwestern Alps (Favarge 1969; Fehrer *et al.* 2009), both *H. besseri* and *H. engleri* must be considered relict species.

Notes:—Compared to the specimens from Mt. Nosal in the Tatra Mts., which were issued as *H. carpathicum* Besser (1809: 154) in the exsiccates by E. Wołoszczak (*Flora polonica exsiccata* No. 963) and cited by Zahn (1938: 375), *H. besseri* and *H. engleri* are characterized by having the compact synflorescence on the top of the stem with short, erect peduncles, and significantly shorter stems.

According to Zahn (1938), *H. carpathicum* is wider distributed in the Western Carpathians and, besides the Tatra Mts., it occurs also in the Nízke Tatry Mts. and Veľká Fatra Mts. In my opinion, however, it seems unlikely that plants from the Western Carpathians are conspecific with *H. carpathicum* which was described from specimens collected in the Eastern Carpathians (Besser 1809). Undoubtedly, the *H. carpathicum* agg. in the Western Carpathians requires further research.

Distribution and habitat:—Endemic to the Babia Góra massif in the Western Carpathians, known only from the Polish side of the mountains (Fig. 1). In 2023, the population of *H. besseri* comprised not more than 20 plants, growing in two clusters in the Kamienna Dolinka valley, in subalpine grasslands and in grassy places amongst loose bushes of *Pinus mugo* on sandstone bedrock.

Etymology:—The species is named in honour of Willibald Swibert Joseph Gottlieb von Besser, born on 7 July 1784 in Innsbruck, Austria. In 1798, Besser settled in Poland; initially he lived in Lwów (now Lviv in Ukraine) where he graduated from high school, then, from 1805, in Cracow, where he completed the medical studies. He was fluent in Polish. In 1821–1831, Besser was a professor of natural history at the Polish Volhynian high school in Krzemieniec (now Kremenets in Ukraine). In 1834–1838, he was a professor of botany at the University of Kiev. Besser died on 11 October 1842 and was buried in Krzemieniec.

Willibald Besser, Tyrolean by birth, Polish by choice, was well-known and valued expert of the flora of Eastern Europe, especially of the Bessarabia, Podolia and Volhynia regions (Besser 1822, 1828, 1832). He described numerous plant species, including *Hieracium carpathicum*. Besser was the first botanist to visit Mt. Babia Góra, and the results of this trip he included in his monumental flora of Galicia (Besser 1809), the historical region comprising south-eastern Poland and western Ukraine.

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