

## A new diploid species of *Pilosella* (Asteraceae) from Turkey

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**Abstract:** *Pilosella ilgazensis* Vladimirov, Coşkunçelebi & Kit Tan, a new diploid ( $2n = 2x = 18$ ) species from Ilgaz Mountain National Park, North Anatolia, Turkey, is described and illustrated. It grows in subalpine grassland and open *Juniperus sibirica* Burgsd. communities. *Pilosella ilgazensis* is morphologically intermediate between *P. alpicola* s.l., from the high mountains of Central and Southeast Europe, and the Euro-Asiatic *Pilosella echioides* s.l. The relationship of the species with other similar taxa is discussed. The name *Hieracium leontocephalum* Halácsy, from a morphologically similar taxon from the Balkan Peninsula, is lectotypified, and a new generic combination, *Pilosella leontocephala* (Halácsy) Vladimirov, Coşkunçelebi & Kit Tan is presented.

**Key words:** *Hieracium*, Compositae, Ilgaz, lectotypification, new combination, North Anatolia, *Pilosella*

### 1. Introduction

During field studies for a project investigating *Hieracium* s. str. and *Pilosella* Hill species in Turkey, an interesting *Pilosella* species was found in the Ilgaz mountains, North Anatolia. A search of herbaria (especially B, BP, E, G-BOIS, KRAM, M, P, W, and WU) and the literature revealed that taxon *P. macrotricha* (Boiss.) F.W.Schultz & Sch.Bip. (Sell and West, 1975) is heterogeneous and consists of at least 2 species. One is the original taxon of Boissier, which was interpreted later by Zahn (1922–30) as *H. macrotrichum* = *H. procerum* > *macranthum*. The other species is a morphological intermediate between *P. echioides* s.l. and *P. alpicola* s.l. and is very distinctive with its densely sericeous-lanate involucre, few capitula, patently pilose stem and leaves covered with dense, patent simple eglandular hairs up to 8 mm long.

Our paper aims to: 1) describe a new diploid species of *Pilosella*, 2) discuss the relationships of the new species with similar species, and 3) lectotypify the name *H. leontocephalum* Halácsy and propose a new nomenclatural combination under the generic name *Pilosella*.

### 2. Materials and methods

Morphological characters were noted from the authors' collection from Ilgaz mountains, Turkey and from herbarium specimens kept in B, BP, E, G-BOISS, KRAM, M, P, W,

and WU. Several individuals from the Turkish accession were cultivated under glass in the Institute of Biodiversity and Ecosystem Research in Sofia for further study and to obtain chromosome counts. Herbarium vouchers from specimens collected in the field were deposited in the herbarium of the Department of Biology at Karadeniz Technical University (KTUB); the herbarium of the Institute of Biodiversity and Ecosystem Research, Bulgarian Academy of Sciences (SOM); and the herbarium of the Natural History Museum, University of Copenhagen (C).

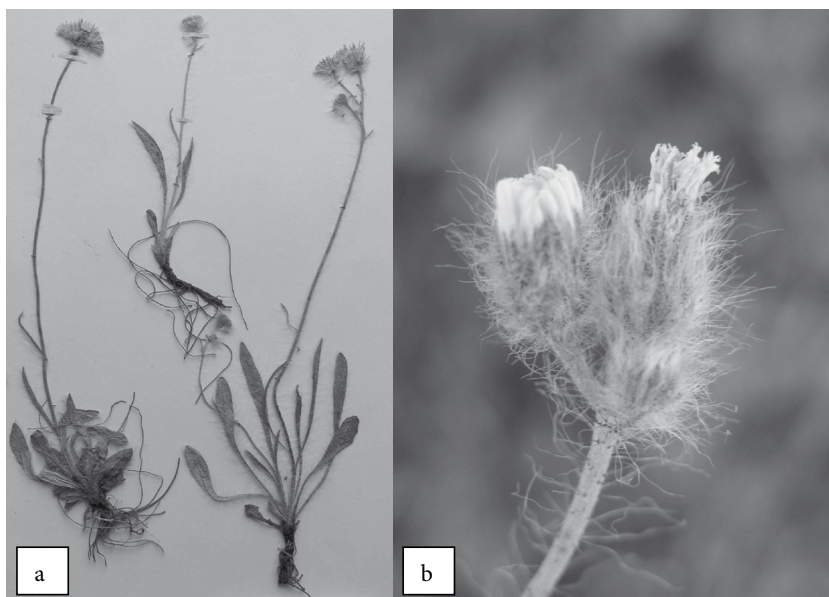
The chromosome number was counted at the mitotic phase in the plants grown under glass in Sofia. Root tips were pretreated with colchicine solution (0.01%) for c. 90 min, then fixed in acetic alcohol (1:3) for at least 2 h at room temperature, hydrolyzed in 1 M HCl for 20 min at 60 °C, stained in Gomori's hematoxylin (Melander and Wingstrand, 1953) for 30 min at 60 °C, and finally, crushed in 45% acetic acid.

### 3. Results

*Pilosella ilgazensis* Vladimirov, Coşkunçelebi & Kit Tan, sp. nov. (Figure 1).

**Type:** Turkey, A4 Çankırı: Ilgaz mountain, by tower left (west) of the pass from Ilgaz to Kastamonu, subalpine vegetation on W-exposed slope, c. 2050 m, 41°03'13"N, 33°42'49"E, 12.07.2007, K. Coşkunçelebi 659 & V.

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**Figure 1.** *Pilosella ilgazensis*: a- whole plant, b- synflorescence and indumentum of capitula (photos: V Vladimirov).

Vladimirov (holotype: KTUB; isotypes: C, KTUB, SOM (163493).

**Paratypes:** Turkey, A5 Kastamonu, Ilgaz Da., E of pass, 1st ridge and high summit, 2000 m and lower slopes of summit, lemon, 19.07.1969, J. Darrah 60 (E!), cited in *Flora of Turkey and the East Aegean Islands* (Sell and West, 1975) under *P. macrotricha*; Turkey, A5 Kastamonu, Ilgaz mountain, alpine meadows at c. 2450 m, 29.07.1982, Y. Akman, E. Yurdakul, M. Demirörs s.n. (ANK 12177!).

**Diagnosis:** *Pilosella ilgazensis* is morphologically similar to *Pilosella macrotricha* and *P. balansae*, but it mainly differs from them by the lower number of capitula (not more than 5) and cauline leaves (not more than 5), smaller stature (not more than c. 24 cm), the somewhat compact synflorescence, and denser indumentum of involucre bracts (nearly hiding the bracts).

**Description:** Herbaceous perennial without stolons. Stem 1(2), 12–24-cm tall, c. 1.5-mm thick at base, with moderate to dense, patent, ±evenly distributed white simple eglandular hairs 8–12-mm long, often with blackish thickened base, and moderate to dense (in the upper part) stellate hairs. Rosulate leaves 6–10, outer 1.5–2.5 × 0.7–0.9 cm, often withered at anthesis; the inner 4.5–7 × 0.7–1.1 cm, lanceolate to linear-lanceolate, broadest in the upper one-third with sparse stellate hairs above, sparse to dense stellate hairs below, and moderate to dense, 5–8-mm long, white simple eglandular hairs on both surfaces. Cauline leaves 2–4, decreasing in size upward, the lower linear-lanceolate, the upper bract-like, with indumentum as the rosette leaves. Synflorescence cymose with 1–3(4) heads, often additionally with 1(2) aborted head(s). Acladium

8–18 mm, branches 1–2, 4–10(20)-mm long. Peduncles with dense stellate hairs and moderate to dense, 10–12-mm long, white simple eglandular hairs, often with blackish thickened base. Capitula 1.5–2.5 cm in diameter. Involucre 9–11 × 6.5–8 mm, broadly cylindrical; involucre bracts lanceolate, acute at apex, the outer 4 × 0.5 mm, the inner 6–7 × 0.7–0.8 mm, covered with moderate to dense stellate hairs and dense sericeous, 4–6-mm long simple eglandular hairs. Ligules 12–15-mm long, not ciliate at apex, pale yellow. Achenes c. 2.5 (up to 2.8)-mm long, blackish-brown; pappus 4–4.5 mm, dirty-white. Flowering and fruiting July–August.

In the key to *Pilosella* in *Flora of Turkey and the East Aegean Islands* (Sell and West, 1975), *P. ilgazensis* may be inserted as follows, with some modifications:

1. Stems with hairs up to 18 mm
2. Capitula (1)2–3(4), involucre indumentum very dense, nearly hiding the phyllaries; stems 12–24-cm high ..... *P. ilgazensis*
2. Capitula more than 5, involucre indumentum not hiding the phyllaries; stems usually more than 40-cm high ..... *P. macrotricha*
1. Stem with hairs not more than 8 mm ..... (see Sell and West, 1975)

**Distribution and habitats:** The species grows in subalpine grasslands and in *Juniperus sibirica* scrub and, so far, is known only from Ilgaz mountain, which belongs to the mountain range of the same name; it is among the largest ranges in N Anatolia and spreads from west to east. The area is well known to botanists for its rich flora and is one of the biodiversity hotspots of Anatolia. It lies

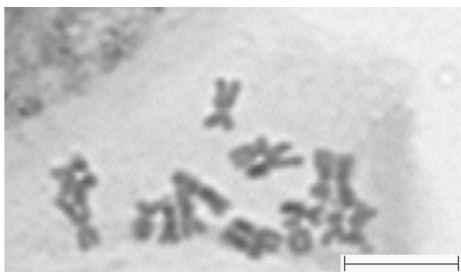
in the transitional zone between Inner Anatolia and the Black Sea region. The higher altitudes are covered with alpine meadows and steppe (Akman et al., 1983), and c. 217 Turkish endemics occur in the area (Yurdakulol and Yildiz, 2002). Material of *Pilosella ilgazensis* was collected from the summit area, which is a national park.

**Chromosome number:** Five plants from the locus classicus were investigated karyologically. They all proved to be diploid with  $2n = 2x = 18$  (Figure 2). In spite of the great floristic richness of Turkey, only 15% of the vascular plant taxa have been investigated in terms of chromosome number, but the rate is increasing with newly published data from Turkey.

#### 4. Discussion

Morphologically *Pilosella ilgazensis* is somewhat intermediate between *P. alpicola* s.l. and *P. echioides* s.l., the former being distributed in the mountains of Central, East, and Southeast Europe (Szeląg, 2008) and the latter in large areas of Europe and Asia, including Turkey (Zahn, 1921–23). However, the diploid chromosome number, the morphology of the species, and its known distribution do not suggest a recent hybridogenous origin. Although it keys out in Turkish Flora (Sell and West, 1975) as *Pilosella* × *macrotricha*, it clearly differs from *Pilosella macrotricha* and *Pilosella balansae* (Boiss.) S.Bräut. & Greuter by its smaller stature, 1–3(4) capitula (usually 10–20 in the other 2 species) and pattern of branching of synflorescence, and smaller number (2–4) of cauline leaves.

Somewhat similar is *Hieracium leontocephalum*, described by the Austrian botanist Eugen von Halácsy based on material collected by Lujo Adamović from Mt Olympus in Greece. It belongs to *Hieracium* subg. *Pilosella*, as treated in most of the Central- and South-European botanical literature (e.g., Zahn, 1921–23), or to the genus *Pilosella* Vaill., a generic concept accepted in the British and Scandinavian Floras as well as some recent accounts on Compositae (e.g., Bremer, 1994; Bräutigam and Greuter, 2007; Lack, 2007; Greuter, 2008). The latter generic concept is also favored by the present authors. In the treatment of *Hieracium* s.l. for Ascherson & Grabner's *Synopsis der Mitteleuropäischen Flora*, Zahn (1922–30) thought the



**Figure 2.** Metaphase plate of *Pilosella ilgazensis*. Scale bar = 5  $\mu$ m.

taxon did not merit specific rank and included it in the synonymy of *Hieracium macrotrichum* subsp. *balansae*. This opinion was later followed by other authors (e.g., Bräutigam and Greuter, 2007), and the name *Hieracium leontocephalum* has been somewhat ignored. Surprisingly, the species has not been recollected in Greece since the original gathering. Moreover, it was omitted from Buttler's (1991) account of *Hieracium* for the *Mountain Flora of Greece*. This suggests that the species is either overlooked in the field or very rare (or extinct) on this relatively well-explored mountain in Greece.

*Pilosella brzovecensis* (Horvat & Pawł.) Soják, described from Bistra mountain, Brzovec peak in the Republic of Macedonia, resembles *P. ilgazensis*, and *P. leontocephala* even more closely, in general habit and the main morphological characters—long, patent sericeous hairs on stem (up to 15–16-mm long), densely floccose and long villous involucre, and lack of glandular hairs in indumentum (Pawłowski, 1963). However, *P. ilgazensis* clearly differs from the other 2 species by its lower stature and few capitula.

*Pilosella bonaquae* (Buttler & W. Lippert) S. Bräut. & Greuter, described from Greece, is characterized by the dense villous indumentum of long eglandular dentate hairs up to 7 mm, numerous stellate, and few glandular hairs on the involucre (Buttler, 1991). These characters suggest it may be related but not identical to *P. ilgazensis*. It differs from *P. ilgazensis* by the taller stems, shorter simple eglandular hairs on the stem (up to 5 mm), the presence of glandular hairs in the involucral indumentum, and the lax synflorescence.

For a more detailed comparison of *Pilosella ilgazensis* with morphologically similar species, see the Table.

In the original description of *Hieracium leontocephalum*, Halácsy placed the species in *Hieracium* sect. *Echinina* Nägeli & Peter (Halácsy, 1906). The same sectional affiliation was proposed for *Pilosella brzovecensis* (sub *H. brzovecense*; Pawłowski, 1963). *Pilosella ilgazensis* seems to be a relatively isolated diploid species with no close relatives in Asia Minor (Anatolia). Morphologically, *Pilosella ilgazensis* is intermediate between *P. alpicola* s.l. and *P. echioides* s.l. It resembles the taxa from *P.* sect. *Alpicolinae* (Nägeli & Peter) Szeląg distributed in the mountains of Central, East, and Southeast Europe (Zahn, 1923; Szeląg, 2008) by size and habit, occurrence in montane and subalpine belts, and especially by the presence of dense simple eglandular hairs in the indumentum of the capitula. The nearest occurrences of representatives from this group are *P. rhodopea* (Griseb.) Szeląg and *P. petraea* F.W.Schultz & Schultz-Bip. on the Balkan Peninsula, especially in the high mountains Rila, Pirin, and Stara Planina, Bulgaria. However, the Turkish plants differ from the presumably related European taxa

Table. Comparison of the main morphological characters of *Pilosella ilgazensis* with other similar species.

Characters	<i>P. leontoccephala</i> (WU0405683; 405691)	<i>P. ilgazensis</i> (SOM, KTUB)	<i>P. przevicensis</i> (KRAM 11481!)	<i>P. macrotricha</i> (P 00706945; P 00706946)	<i>P. balansae</i> (WU)*	<i>P. bonaquiae</i> (Wlippert 18443; M 0030972)	
Height of aerial parts	29–32 cm	12–24 cm	25–35 cm	40–55 cm	c. 70 cm	44–50 cm	
Thickness of stem at base	1.5–1.7 mm	c. 1.5 mm	1.8–2.2	2–2.5 mm	3–3.5 mm	-	
Indumentum of stem	With dense stellate and somewhat dense simple eglandular hairs, patent, 8–16-mm long, with broadened black base, almost smooth	With moderate to dense stellate and simple eglandular hairs, patent to erectopatent, 8–12-mm long, with broadened black base, almost smooth	With dense stellate and simple, erectopatent eglandular hairs, 13–16-mm long, smooth, with a broadened base	With sparse to moderate stellate hairs and dense in the lower part to very sparse in the upper part simple eglandular hairs, 5–15(18)-mm long, somewhat erectopatent, with broadened base, ±smooth	With sparse to moderate stellate hairs and dense simple eglandular hairs, 4–12-mm long, somewhat erectopatent, with broadened base, ±smooth	With dense stellate and eglandular dentate hairs up to 5 mm	
Distribution of leaves on stem	Mostly crowded at base, with 3–4 cauline leaves decreasing in size upward	Mostly crowded at base, with 2–4 cauline leaves in the lower 1/2 of stem	Crowded in the lower 1/3 of stem; cauline leaves 4–5, decreasing in size upward	Crowded near the base or in the lower 1/3 of the stem, cauline leaves 4–11, ±gradually decreasing in size upward	Crowded in the lower 1/2 of the stem, cauline leaves 11–12, gradually decreasing in size upward	Crowded at base, with 1 large cauline leaf near base	
Indumentum of leaves	With moderate stellate and dense rigid simple eglandular hairs on the upper surface; dense stellate and simple eglandular hairs on the lower surface; simple hairs are 4–7-mm long; smooth	With few stellate hairs and moderate to dense rigid simple eglandular hairs on the upper surface; sparse to dense stellate and moderate to dense simple eglandular hairs beneath; simple hairs are 5–7-mm long; smooth	With dense stellate and rigid simple eglandular hairs above; very dense stellate and dense eglandular hairs beneath; simple hairs are 7–8-mm long; smooth	With no or single stellate hairs and dense rigid simple eglandular hairs on the upper surface; moderate stellate and dense simple eglandular hairs beneath; simple hairs are 6–12-mm long; smooth	With no or single stellate hairs and dense rigid simple eglandular hairs on the upper surface; moderate stellate and dense simple eglandular hairs beneath; simple hairs are 4–5-mm long; smooth	With few to moderate stellate and dense rigid eglandular dentate hairs above; dense stellate and few to moderate eglandular dentate hairs beneath; simple hairs up to 4 mm long	
Shape of synflorescence	Compact	Sub-compact to lax or capitula single	Compact	Lax, deeply branched	Lax, deeply branched	Lax, somewhat deeply branched	
Number of capitula per synflorescence	3–5, with additional 1–3 aborted heads	1–3, sometimes with additional 1(2) aborted heads	4–8	5–15	11–12	6–7	
Length of involucre	10–12 mm	9–11 mm	8–9 mm	6–8 mm	9–11 mm	8–9.5 mm	
Indumentum of involucre	With very dense stellate and simple (smooth) eglandular hairs, 6–7-mm long; indumentum completely hides the involucre bracts	With moderate to dense stellate and dense sericeous, 4–6-mm long simple (smooth) eglandular hairs; indumentum nearly completely hides the involucre bracts	With very dense stellate and simple (smooth) eglandular hairs, 5–7-mm long; indumentum nearly completely hides the involucre bracts	With dense to moderate stellate hairs, sparse to moderate simple eglandular hairs, and sparse eglandular hairs; eglandular hairs 2–4.5-mm long; involucre bracts not hidden by the indumentum	With dense (but not very dense!) stellate and simple eglandular hairs and sparse glandular hairs, mainly in the upper part of involucre bracts; eglandular hairs 4–6-mm long; involucre bracts not hidden by the indumentum	With dense stellate and simple eglandular hairs up to 7-mm long and few glandular hairs, mainly in the upper part of involucre bracts	

\*Based on specimen: P.Sintenis: Her orientale 1892, no. 4591 (WU). *Hieracium balansae* Boiss. Paphlagonia. Wilajet Kastambuli. Tossia, in Mte Belloroa, 9.7.1892. leg. P. Sintenis, det. J. Freym.

by the absence of glandular hairs anywhere on the plant, stems moderately to densely covered with long (up to 10–12 mm) white eglandular hairs, and leaves densely covered with robust simple eglandular hairs on both surfaces. For comparison, *P. alpicola* F.W.Schultz & Schultz-Bip. has some glandular hairs in the synflorescence, and the long eglandular hairs are much denser in the upper part of stem and beneath the capitula, and *Pilosella petraea* has more capitula (usually 5–10). In addition, the leaf indumentum of the taxa from *Pilosella* sect. *Alpicolinae* is different; the long robust simple eglandular hairs are usually confined to the upper surface, the stellate hairs are dense on the lower surface and absent or very sparse on the upper surface, and glandular hairs are often present. *Pilosella ilgazensis* resembles taxa from *P. echioides* s.l. in the indumentum of stem and leaves; however, it clearly differs by its smaller size and much fewer capitula.

*Hieracium* sect. *Macrotrichina* was designated as a separate section based on *H. macrotrichum* Boiss. (Nägeli and Peter, 1885). This probably covers the morphological distinctiveness of these species but was not accepted by Zahn (1921–23, 1922–30). However, until the overall infrageneric taxonomy of *Pilosella* is better resolved, we prefer to assign the new species to *Pilosella* sect. *Echininae* (Nägeli & Peter) Schljakov, which was proposed for *Hieracium leontocephalum* and *H. brzovecense*. Obtaining viable seeds or living plants from the type localities of *Pilosella leontocephala* and *P. bonaquae* in Greece, and *P. brzovecensis* in Macedonia is highly desirable and may help to better resolve the relationships between these taxa.

While preparing this article we realised the name *Hieracium leontocephalum* has not been typified. We took this opportunity to designate a lectotype and propose a new combination under *Pilosella*.

*Pilosella leontocephala* (Halácsy) Vladimirov, Coşkunçelebi & Kit Tan **comb. nova**. Basionym: *Hieracium leontocephalum* Halácsy, Österr. Bot. Z. 56(5/6): 210 (1906).

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- Lectotype** (designated here): 'Mt. Olympus Thessaliae, 27.07.1905, leg. L.Adamović, iter graeco-turcicum, a. 1905 (no. 428), det. E. de Halácsy' (WU 040568!).
- Isolectotype**: WU 040569! Images of both herbarium sheets available at website: <http://herbarium.univie.ac.at/database/search.php>.
- In the protologue, Halácsy did not mention any herbarium specimen and provided only locality information based on the material collected by L Adamović in 1905. Two herbarium sheets from Halácsy's collection at WU were collected by L Adamović in 1905, and one of them bears Halácsy's handwritten description of the species with a reference to specimen 'a. 1905, no. 428'. This suggests that Halácsy based his description on these 2 sheets and the one bearing no. 428 is designated here as the lectotype. Both herbarium sheets had been viewed by Zahn and erroneously included in *Hieracium macrotrichum* subsp. *balansae* Boiss. (Zahn, 1922–30).

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