

**New lectotypifications for *Inula acaulis* s.l.
(*Asteraceae/Inuleae*) and a new combination; *Inula acaulis*
subsp. *hakkiarica*, comb. & stat. nov.**

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Abstract

During a field study, the authors collected some *Inula* specimens from Bahçesaray (Van, Turkey). After carefully examination, it was determined that these specimens belonging to *Inula hakkiarica* which was defined by Nábelek. In the flora of Turkey, *I. hakkiarica* is seen as the synonym of *I. acaulis* var. *caulescens* which was also defined by Nábelek. However, pursuant to “the principle of priority,” previously published *I. hakkiarica* is the validly name. On the basis of identified morphological and chorological differences, the authors decided that *I. hakkiarica* should be revived and identified as a subspecies of *I. acaulis*. The picture, description, chorological information, and conservation status of *I. acaulis* subsp. *hakkiarica*, which is an endemic species for Turkey, were given. Also, these three names are lectotypified.

Key Words: *Asteraceae*, *Inula*, combination, lectotypification, Turkey

***Inula acaulis* s.l. (Asteraceae/Inuleae) için yeni lektotipifikasyon ve yeni bir aktarım ve konum; *Inula acaulis* subsp. *hakkiarica*, comb. & stat. nov.**

Özet

Yazarlar bir arazi çalışması esnasında Bahçesaray'dan (Van, Türkiye) bazı *Inula* örnekleri topladı. Yapılan dikkatli inceleme sonucu, bu örneklerin Nábelek tarafından tanımlanmış olan *Inula hakkiarica*'ya ait olduğu belirlendi. Türkiye Florası'nda *I. hakkiarica*, yine Nábelek tarafından tanımlanan *I. acaulis* var. *caulescens*'in sinonimi olarak görünmektedir. Oysa "öncelik ilkesi" gereğince, *I. hakkiarica* daha önce yayınlanmış olup geçerli isimdir. Belirlenen morfolojik ve yayılış farklılıklarına dayanarak, *I. hakkiarica*'nın yeniden canlandırılmasına ve *I. acaulis*'in bir alttürü olmasına karar verildi. Türkiye için endemik olan *I. acaulis* subsp. *hakkiarica*'nın resmi, betimlemesi, yayılış bilgisi ve koruma statüsü verildi. Aynı zamanda, bu üç ismin lektotipifikasyonu yapıldı.

Bulduru Sözcükleri: *Asteraceae*, *Inula*, yeni aktarım ve konum, lektotipifikasyon, Türkiye

Nomenclatural and historical circumstances of *Inula acaulis*

Inula acaulis Schott & Kotschy ex Boiss. was introduced to the scientific world in the unprecedented work titled "Flora Orientalis"(1). This species is easily distinguished from the other species in the genus thanks to its short stem. This species is known to grows in southern and eastern Turkey, but it also grows in Armenia (2, 3). Boissier defined the specimens collected in Turkey by Kotschy, Balansa, Bourgeau, Haussknecht, and Calvert as syntypes during the identification stage of the species (Table 1).

Table 1. Syntypes of *Inula acaulis* and the herbaria where they are preserved

<u>Kotschy 252 and 296</u> [Turkey, Niğde: Ulukışla] Iter Cilicium in Tauri alpes “Bulgar Dagħ” [Bolkar Dağı]. In summis jugis inter vallem Karli Boghas et Gusguta, alt. 7500 ped. [ca. 2285 m], Dieb. Aug. 1853.	Munchen (Barcode: M0096587, Kotschy 252 and 296 mixed) Kew (Barcode: K000009779, Kotschy 252 and 296, and Balansa 663 mixed) Brussels (Barcode: BR0000005328659, Kotschy 252 or 296, uncertain) Paris (Barcodes: P02707132, Kotschy 296 and Bourgeau s.n. mixed; P02707138, Kotschy 252; P02707139, Kotschy 252 and 296 mixed; P02707140, Kotschy 252 and 296, Balansa s.n., Bourgeau s.n. and Haussknecht s.n. mixed; P04084124, Kotschy 252 and 296 mixed; P04133857, Kotschy 252 or 296, uncertain)
<u>Balansa 663</u> [Turkey, Niğde: Ulukışla] Region alpine du Taurus, au-dessus de Boulgarmaden [Bolkar Dağı, Madenköy] Août.1855.	Kew (Barcode: K000675267, Balansa 663, Kotschy 252 and 296 mixed) Edinburgh (Barcodes: E00385794; E00588566) Paris (Barcodes: P02707133; P02707135; P02707142)
<u>Balansa s.n.</u> [Turkey, Kayseri: Tomarza] Region alpine de l’aslan Dach [Aslantaş village], ă 12 lieves ă l’ESE du Mount-arpei [Erciyes Mountain] (Cappadocie), 6 août. 1856.	Paris (Barcode: P02707140, Balansa s.n., Bourgeau s.n., Haussknecht s.n., Kotschy 252 and 296 mixed)
<u>Bourgeau s.n.</u> [Turkey, Bayburt] In paseuis ad Berdak, prope Baibout. 22 Julia 1862.	Paris (Barcodes: P02707132, Kotschy 296 and Bourgeau s.n. mixed; P02707140, Bourgeau s.n., Balansa s.n., Haussknecht s.n., Kotschy 252 and 296 mixed)
<u>Haussknecht s.n.</u> [Turkey, Kahramanmaraş] M. Beryt Dagħ [Berit Dağı], Cataoniae, alt. 8-9000 ped. [ca. 2440-2745 m], die 9.8.1865.	Edinburgh (Barcode: E00588564) Paris (Barcode: P02707140, Haussknecht s.n., Balansa s.n., Bourgeau s.n., Kotschy 252 and 296 mixed)
<u>Calvert & Zohrab s.n.</u> [Turkey, Erzurum] Turcicae in montibus Erzerum, May 1867.	Edinburgh (Barcode: E00588560)

As seen in Table 1, *I. acaulis* was found in 6 different syntype locations, and numerous specimens were collected from those locations. In the original publication, Boissier elaborately arranged the syntypes according to the chronological priority of collection. According to this arrangement, the first specimens of the species were collected in 1853 by Kotschy (1). Kotschy collected two different specimens at the same location and labelled them as “252” and “296.” Although they were assigned different numbers, these specimens were mounted on the cardboard in a mixed fashion (Fig. 1). In order to avoid confusion, small notes (“252” or “296”) were mounted on the specimens on certain cardboards (Fig. 2). It is still very confusing to differentiate between these two Kotschy specimens. This situation required making lectotypification for the taxon (4).

While identifying lectotypes for *Inula acaulis*, the authors adopted the chronological priority of collection of Boissier and preferred the Kotschy specimens. In the Paris herbarium, the only number on the label of cardboard with the barcode number P02707138 is “252”. One of the 3 specimens on this cardboard was selected as “lectotype” because there is no possibility of confusing it with Kotschy’s specimen number 296 (Fig. 3). The other two specimens as well as the specimens labelled as “252” in Paris (P02707139) and Munchen (M0096587) herbaria are regarded as “isolectotype” (4).

In 1910, 35 years after the publication of “*Inula acaulis*,” Czech botanist Nábelek collected *Inula* specimens at two different locations in southeast Turkey. The one dated 26.07.1910 was collected in “Halakur Dag” (Siirt province) and the one dated 30.07.1910 was collected in “inter Hoz et Chomar” (Hakkâri province).

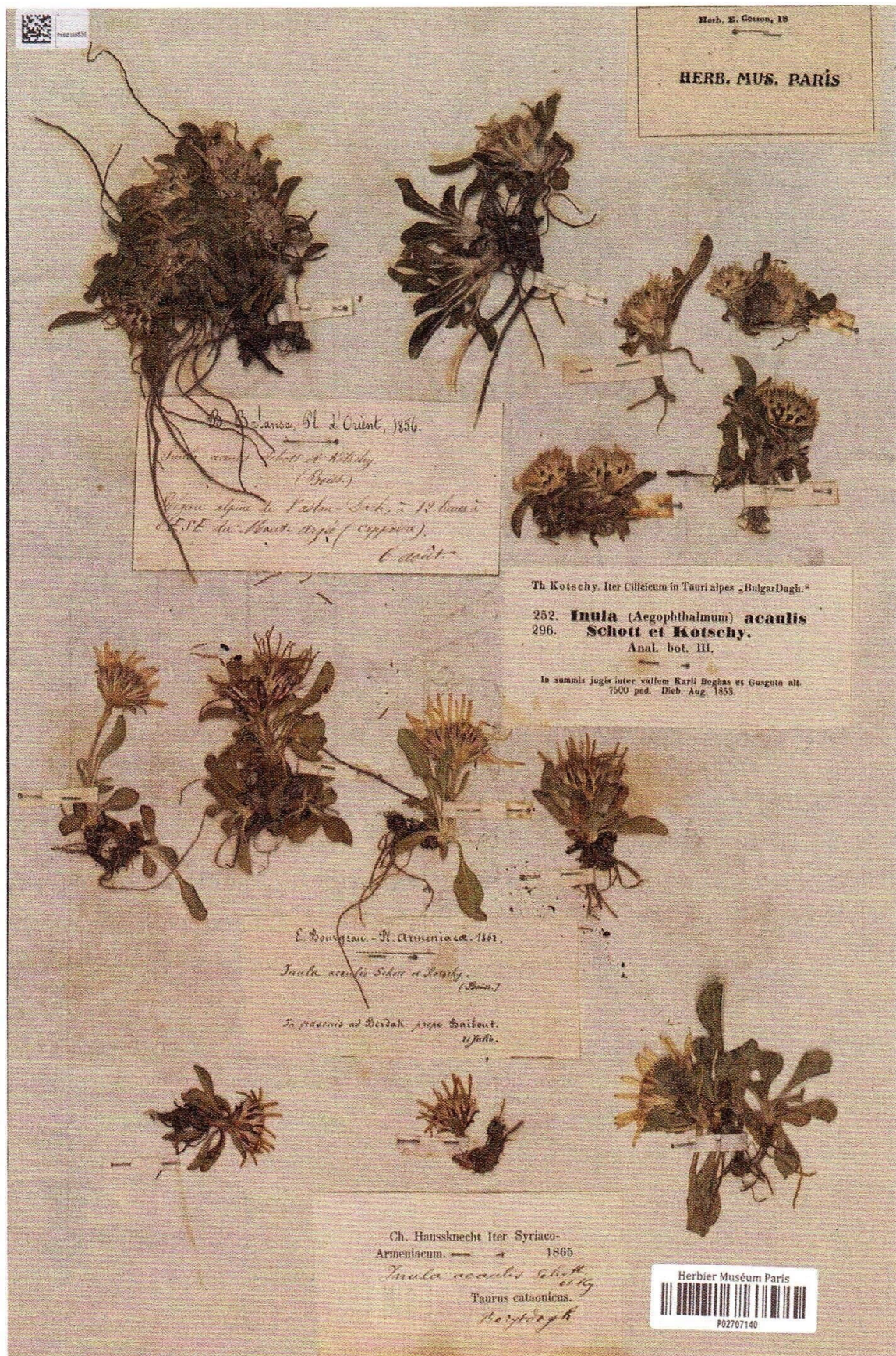


Figure 1. Four different syntype specimens of *Inula acaulis* mounted on the same cardboard

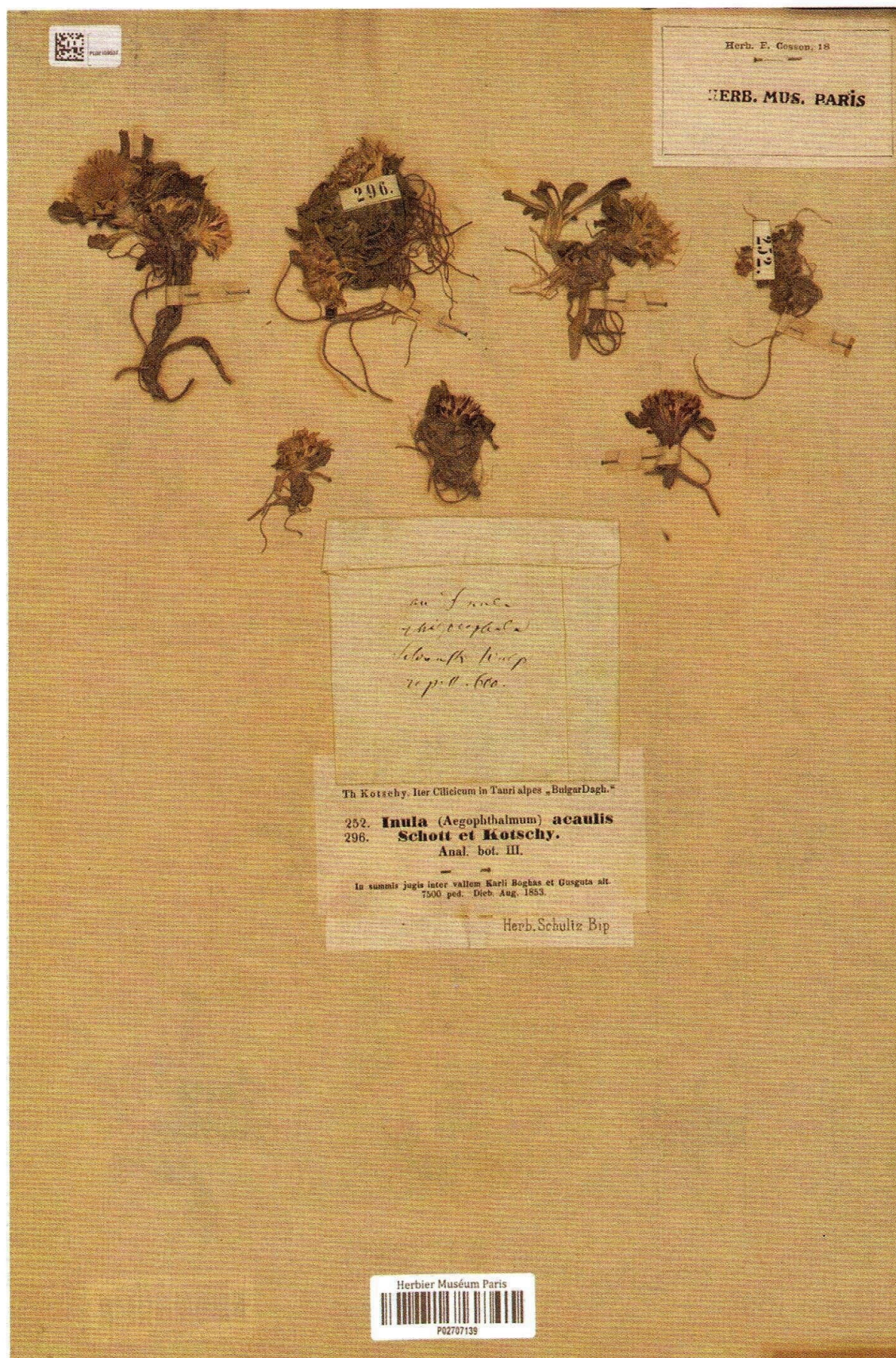


Figure 2. Specimens of *Inula acaulis* mounted on the same cardboard and labelled as 252 and 296

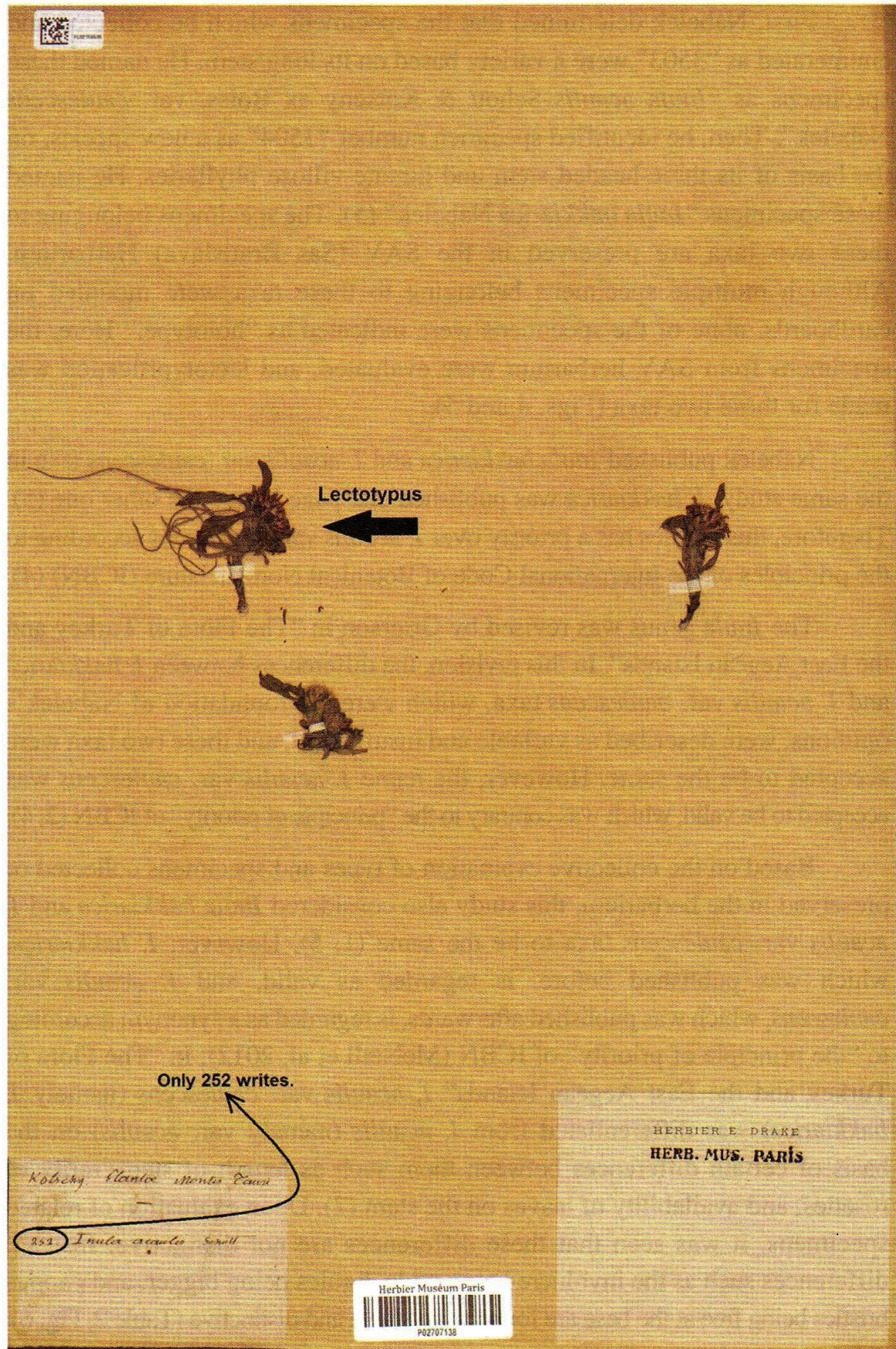


Figure 3. Lectotypus of *Inula acaulis* Schott & Kotschy ex Boiss. (indicated by an arrow)

First, Nábelek determined that the specimens which he collected and enumerated as “3503” were a variety based on its long stem. He named these specimens as “*Inula acaulis* Schott & Kotschy ex Boiss. var. *caulescens* Nábelek”. Then, he identified specimen number “3504” as a new species, on the basis of its three-headed stem and hirsute-villose phyllaries. He named these specimens “*Inula hakkiarica* Nábelek” (5). The specimens belonging to these two taxa are preserved in the SAV (Sas Bratislava) Herbarium. Although multiple specimens belonging to these taxa were mounted on cardboards, none of the specimens were indicated as “holotype.” Here, the specimens from SAV herbarium were evaluated, and lectotypification was made for these two taxa (Figs. 4 and 5).

Nábelek published *Inula hakkiarica* and *I. acaulis* var. *caulescens* taxa in the same study. *I. hakkiarica* was published one page before the other one (5). Therefore, this species has a priority over *I. acaulis* var. *caulescens* according to the principles of the International Code of Botanical Nomenclature (ICBN) (4).

The *Inula* genus was revised by Grierson in “The Flora of Turkey and the East Aegean Islands”. In this revision, the differences between *I. hakkiarica* and *I. acaulis* var. *caulescens* taxa, which were the foundation of Nábelek’s opinions, were described as variable and insufficient, and these two taxa were accepted to be the same. However, the name *I. acaulis* var. *caulescens* was accepted to be valid, which was contrary to the “principle of priority” of ICBN (2, 4).

Based on the collective evaluation of types and specimens collected or preserved in the herbarium, this study also considered *Inula hakkiarica* and *I. acaulis* var. *caulescens* taxa to be the same (1, 5). However, *I. hakkiarica*, which was published before, is regarded as valid, and *I. acaulis* var. *caulescens*, which was published afterwards, is regarded as a synonym according to “the principle of priority” of ICBN (McNeill et al. 2012). In “The Flora of Turkey and the East Aegean Islands” *I. acaulis* var. *caulescens* (namely *I. hakkiarica*) was differentiated from *I. acaulis* (namely var. *acaulis*) on the basis of certain differences between them such as length of stem, rarity of rosettes, and availability of leaves on the stem (2). Upon evaluation of related specimens, it was seen that these differences are not distinctive. Instead, differences such as the involucre being wide, ligules being bigger, and pappus bristles being free at the base are found to be stable and distinctive (Table 2, Fig. 6).

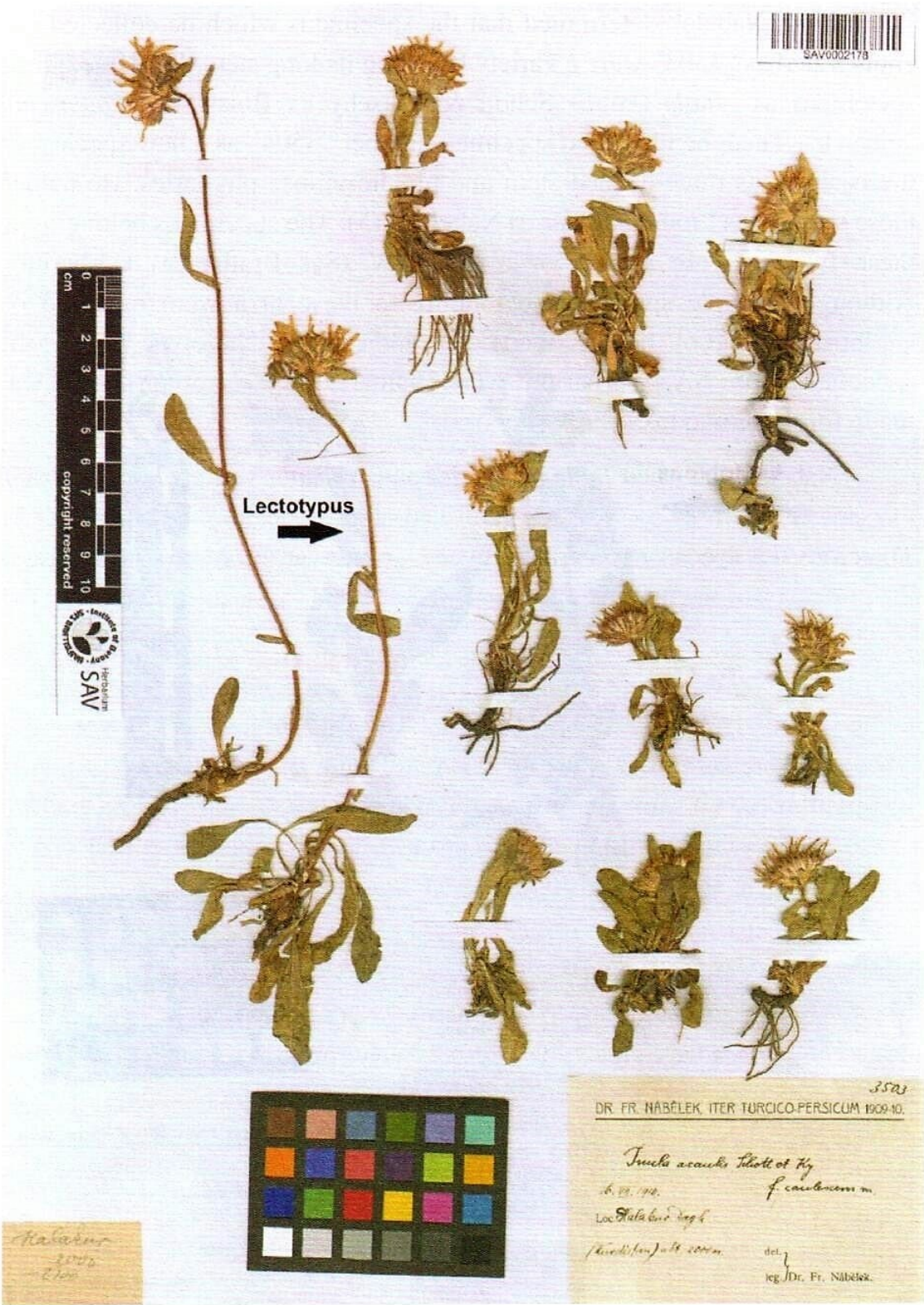


Figure 4. Lectotypus of *Inula acaulis* Schott & Kotschy ex Boiss. var. *caulescens* Nábelek (indicated by an arrow)



Figure 5. Lectotypus of *Inula hakkiarica* Nábelek (indicated by an arrow)

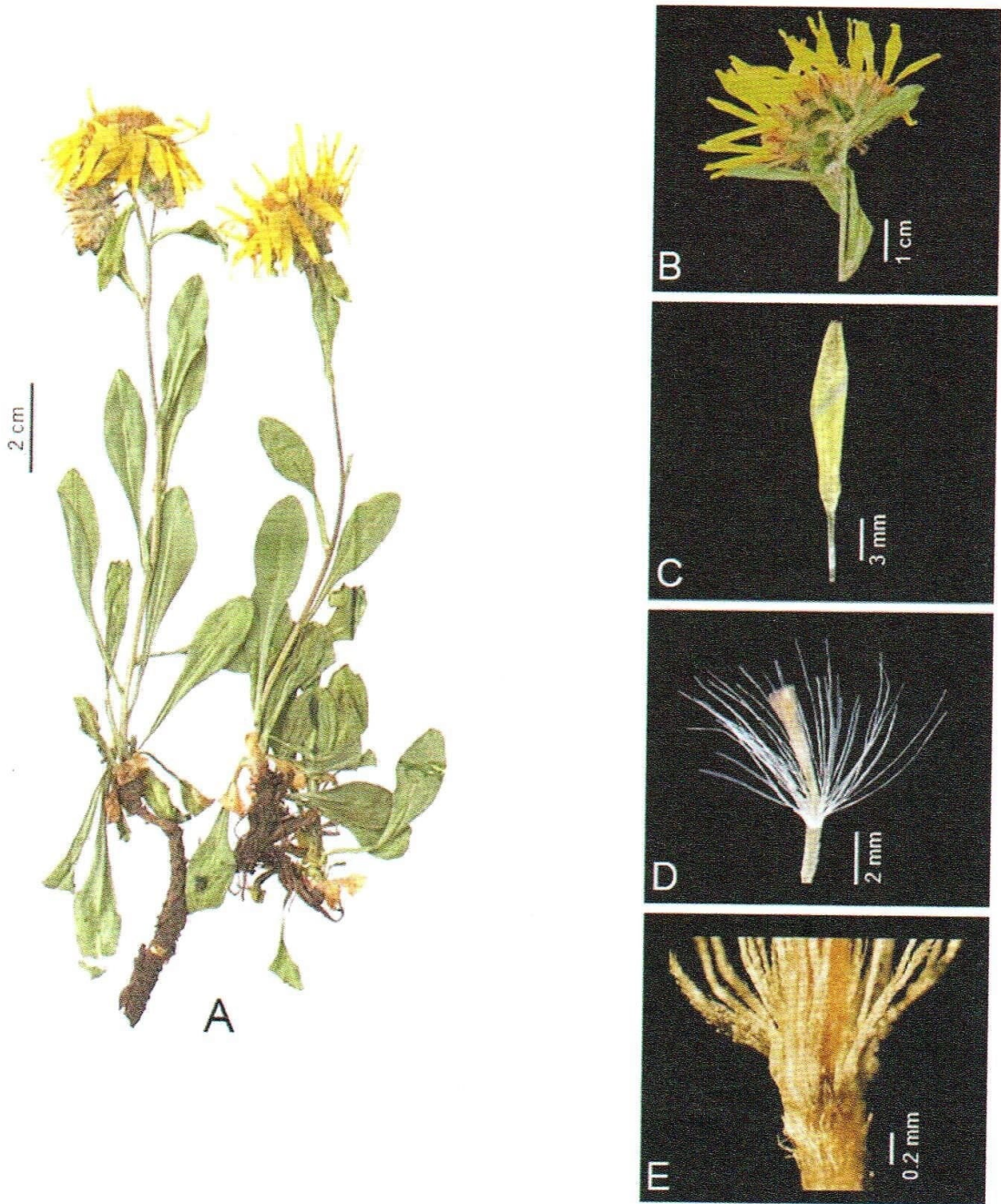


Figure 6. *Inula acaulis* Schott & Kotschy ex Boiss. subsp. *hakkiarica* (Nábelek) Hamzaoglu & Koç: A- habit; B- capitulum; C- ray flower; D- disc flower, pappus, and achene; E-pappus bristles with free base

Inula hakkiarica grows in the subalpine-alpine zone in south-eastern Turkey in the cities of Siirt, Van, and Hakkâri (Fig. 7). On the basis of identified morphological and chorological differences, this study concluded that *I. hakkiarica* is a subspecies of *I. acaulis* (Table 2, Figs. 6 and 7).

Table 2. Diagnostic characters between *Inula acaulis* subspecies

Characters	subsp. <i>acaulis</i>	subsp. <i>hakkiarica</i>
Involucre	1.5-2.5 cm broad	(2.2-)2.5-3.5 cm broad
Outer phyllaries	both surfaces glabrous, margin sometimes ciliate or hirsute	mostly spreading hirsute-villous on both surfaces, margin densely spreading hirsute-villous
Inner phyllaries	both surfaces and margin glabrous	mostly sparsely hirsute-villous above and glabrous below, margin densely spreading hirsute-villous especially to apex
Ligules	(6-)10-15 × 1-2.5 mm	16.5-20 × 3-4 mm
Pappus bristles	connate at base	free at base

Inula acaulis Schott & Kotschy ex Boiss., **Lectotypus** (**hoc loco designates**): [Turkey, C5 Niğde: Ulukışla] Iter Cilicium in Tauri alpes “Bulgar Dagħ” [Bolkar Dağı]. In summis jugis inter vallem Karli Boghas et Gusguta, alt. 7500 ped. [ca. 2285 m], Dieb. Aug. 1853, Kotschy 252 (P, P02707138-photo!) (Isolectotypi: P, P02707138-photo!; P, P02707139-photo!; M, M0096587-photo!).

- Involucre 1.5-2.5 cm broad; ligules (6-)10-15 × 1-2.5 mm; pappus bristles connate at base subsp. ***acaulis***
- Involucre (2.2-)2.5-3.5 cm broad; ligules 16.5-20 × 3-4 mm; pappus bristles free at base subsp. ***hakkiarica***

Inula acaulis Schott & Kotschy ex Boiss. subsp. ***hakkiarica*** (Nábelek) Hamzaoglu & Koç, **comb. & stat. nov.**

Basionym: *Inula hakkiarica* Nábelek in Publ. Fac. Sci. Univ. Masaryk 52: 5-6, 1925. **Lectotypus** (**hoc loco designates**): [Turkey, Hakkari] “distr. Hakkiari, in traiectu Tauri Armeni inter pagos Hoz et Chomar dit. Hasitha-Sattak, inter rupes graniticas alt. ca. 2300 m, legi 30.7.1910, F.Nábelek 3504 (SAV, SAV0002167-photo!) (Isolectotypus: SAV, SAV0002167-photo!).

= *Inula acaulis* Schott & Kotschy ex Boiss. var. *caulescens* Nábelek in Publ. Fac. Sci. Univ. Masaryk 52: 6, 1925. **Lectotypus** (**hoc loco designates**):

[Turkey, Siirt] “distr. Ramorân: Halakur Dar ad septentr ab oppido Ğeziret ibn-Ömer, ad nives tabascentes alt. ca. 2000 m, 26.7.1910, F.Nábelek 3503 (SAV, SAV0002178-photo!) (Isolectotypi: SAV, SAV0002178-photo!).

Description

Rhizomes perennial. Stems 2-18 cm tall, greenish or purplish, erect to ascending, with several sterile shoots, unbranched or sometimes branched only above, bearing sparsely and spreading hirsute-villous hairs. Basal leaves oblanceolate to spatulate, 2.5-5 × 0.6-1.5 cm, obtuse at apex, attenuate at base, margin entire and spreading hirsute-villous especially to base, finely glandular on both surfaces, sparsely hirsute-villous on midrib when young; cauline leaves similar, decreasing in size, acutish at apex, sometimes minutely auriculate. Capitula solitary or sometimes several, radiate. Involucre (2.2-)2.5-3.5 cm broad. Phyllaries subequal; outer oblong to oblanceolate, 8-17 × 2.2-4 mm, obtuse to acutish to apex, foliaceous, green, mostly spreading hirsute-villous on both surfaces, margin entire and densely spreading hirsute-villous; inner linear-lanceolate, 10-13 × 1.3-2 mm, acute to acuminate at apex, membranous or foliaceous only apex, usually purplish, mostly sparsely hirsute-villous above and glabrous below, margin entire and densely spreading hirsute-villous especially to apex. Flowers yellow; ray florets 25-35, 20-26 mm long, tube 5.5-7 mm long, ligules 16.5-20 × 3-4 mm, tridentate at apex; disc florets numerous, 7-9 mm long, 5-lobed, lobes 0.6-0.9 mm long, covered with glands to apex; styles with 2 lobes, lobes 1-1.3 mm long, anthers exerted from corolla, c. 3 mm long. Achenes 2.5-3.5 mm long, densely adpressed-puberulent; pappus uniseriate, straw-coloured, with 30-40 bristles, 6-9 mm long, scabrous, free at base.

Specimens examined

***Inula acaulis* Schott & Kotschy ex Boiss. subsp. *acaulis* – TURKEY.**
A7 Gümüşhane: Kaldırım dagh, in paseuis subalpinus, 16.08.1894, P. Sintenis 7415 (P, P02707130-photo!); between Erzincan and Kelkit, igneous slopes, ca. 2100 m, 01.08.1957, P.H. Davis 31903 & Hedge (ANK!; E, E00588553-photo!); **A8** [Bayburt] In paseuis ad Berdak, prope Baibout,

22.07.1862, Bourgeau s.n. (P, P02707132-photo!; P02707140-photo!); **A9** Kars: Mountain E of Kağızman, 18-19 km from Akçay to Cumaçay, marshy slopes, 2100 m, 17.07.1966, P.H. Davis 46776 (E, E00588552-photo!); **B5** [Kayseri: Tomarza] Region alpine de l'aslan Dach [Aslantaş village], ā 12 lieves ā l'ESE du Mount-argei [Erciyes Dağı] (Cappadocie), 06.08.1856, Balansa s.n. (P, P02707140-photo!); **B6** Adana: Saimbeyli, Naltaş köyü, Sarıpınar tepesi, 2000-2200 m, 28.07.2006, B. Bani 4653 (GAZI!); Kayseri: Sarız, Işık dağı (Binboğa), Keklikoluk kayası, 2400-1600 m, 11.09.1991, H. Duman 4431 & Z. Aytaç (GAZI!); Kahramanmaraş: [Göksun] Çardak, Kandil dağı, ca. 2100 m, P.H. Davis 20249 & R. Çetik (ANK!; E, E00588561-photo!); Engizek dağı, Körsulak çevresi, 2600-2700 m, 17.07.1987, H. Duman 3567 (GAZI!); M. Beryt Dagh [Berit Dağı], Cataoniae, ca. 2440-2745 m, 09.08.1865, Haussknecht s.n. (P, P02707140-photo!; E, E00588564-photo!); **B7** Erzincan: Erzincan-Refahiye arası, Karadağ R/L istasyonu yolu, 2756 m, alpin bozkır, Hamzaoğlu 6624 & Koç (GAZI!); Sipikordagh, in paseuis subalpinus humidis, 27.07.1890, P. Sintenis 3274 (P, P02707129-photo!; P, P02707136-photo!); Tunceli: Munzur dağı, above Ovacık, rocky slope, 2300 m, 19.07.1957, P.H. Davis 31402 & Hedge (ANK!; E, E00588562-photo!); **B8** [Erzurum] Turcicae in montibus Erzerum, ?.05.1867, Calvert & Zohrab s.n. (E, E00588560-photo!); **C4** Konya: Taşkent-Alanya arası, 24. km, 1700-1800 m, 16.07.1999, H. Duman 7070 & Z. Aytaç (GAZI!); Mersin: Anamur to Ermenek, Çamurlu Yayla-Olukçalı, 2000 m, 18.08.1949, P.H. Davis 16297 (ANK!; E, E00588565-photo!); **C5** Niğde: [Çamardı] In the Aladağlar, on Demirkazık, moist grazed exposed turf, 1590 m, 27.08.1965, G.W.D. Findlay 113 (E, E00588563-photo!); [Ulukışla] Iter Cilicium in Tauri alpes Bulgar Dagh [Bolkar Dağı], in summis jugis inter vallem Karli Boghas et Gusguta, ca. 2285 m, ?.08.1853, Kotschy 252 (P, P02707138-photo!; P02707139-photo!; M, M0096587-photo!); ibid., Kotschy 252 and 296 mixed or uncertain (P, P02707132-photo!, P02707140-photo!; P04084124-photo!; P04133857-photo!; K, K000009779-photo!; BR, BR0000005328659-photo!); ibid., Region alpine du Taurus, au-dessus de Boulgarmaden [Bolkar Dağı, Madenköy], ?.08.1855, Balansa 663 (P, P02707133-photo!; P02707135-photo!; P02707142-photo!; E, E00385794-photo!; E00588566-photo!; K, K000675267-photo!); **Inula acaulis** Schott & Kotschy ex Boiss. subsp. **hakkiarica** (Nábelek) Hamzaoğlu & Koç– TURKEY. **B9** Van: Bahçesaray,

Karapet geçidi, kalker kayalıkları, 2650 m, 27.07.2014, Koç 1760 & Hamzaoglu (GAZI!); Hoşap, Kepir dağı, bottom of stony gulley, 2800 m, 30.07.1954, P.H. Davis 23345 & O. Polunin (ANK!; E, E00588569-photo!); 20 km N.N.W. of Başkale, Güzeldere tepe, 2800-2900 m, 18.08.1967, Mitchell, Cheese & Watson 3668 (E, E00588555-photo!); Başkale, İspiriz dağı, edge of flush, ca. 3000 m, 31.07.1954, P.H. Davis 23683 & O. Polunin (ANK!; E, E00588568-photo!); **C9** [Siirt: Pervari] Halakur Dagh [Herekol Dağı], 2000 m, 26.07.1910, F. Nábelek 3503 (SAV, SAV0002178-photo!, SAV0002178-photo!); [Hakkari: Çukurca] Inter Hoz [Çığlı] et Chomar, ca. 2300 m, 30.07.1910, F. Nábelek 3504 (SAV, SAV0002167-photo!, SAV0002167-photo!); Karadağ, above Çölemerik, 2745 m, 13.08.1954, P.H. Davis 24320 & O. Polunin (ANK!; E, E00588556-photo!).

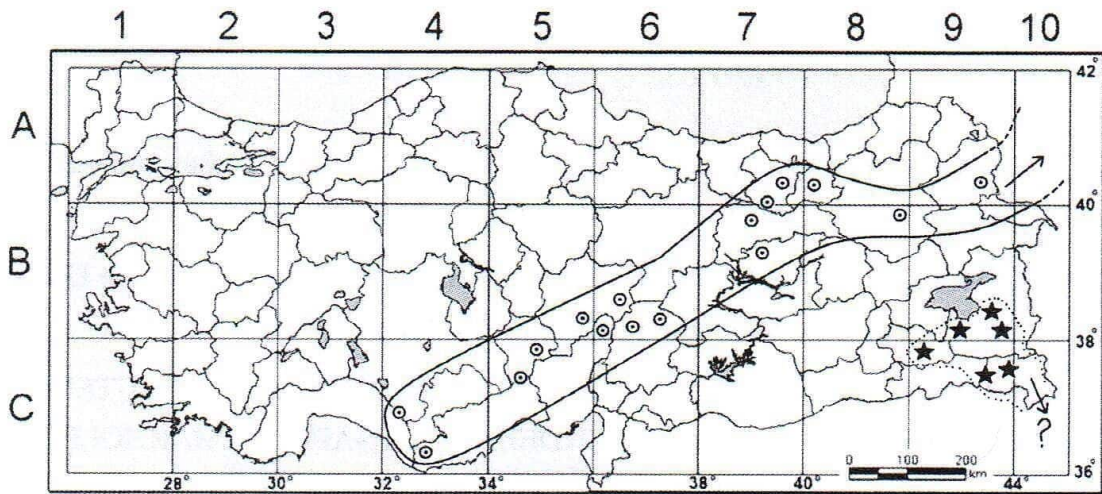


Figure 7. Distribution of *Inula acaulis* subsp. *acaulis* (⊙) and *I. acaulis* subsp. *hakkiarica* (★) in Turkey [according to grid system of P.H. Davis (6)]

Conservation status

According to the current data, *Inula acaulis* subsp. *hakkiarica* is endemic for Turkey and grows in subalpine and alpine zones in Hakkari, Van, and Siirt provinces (6), which cover an area (according to EOO) of approximately 14.000 km² (Fig. 7). This species has a discontinuous distribution because of settlements and farming areas. In addition, the subalpine and alpine areas, which are the preference of these subspecies, are sometimes used for dense grazing activities, which mean that the habitat of this taxon is

under the threat of being decreased and disturbed/destroyed in the future. Therefore, it is suggested that the taxon be classified as Vulnerable [VU (B1b-iii)] in accordance with the International Union for Conservation of Nature (IUCN) categories (7).

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