Botanical Journal of the Linnean Society, 2007, **153**, 61–66. With 3 figures

A new species of *Centaurea* L. (Cardueae: Asteraceae) from Turkey

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Received October 2005; accepted for publication May 2006

A new species of *Centaurea* L., ***C. kizildaghensis*** (Cardueae: Asteraceae), is described and illustrated from south Anatolia. It is restricted to the serpentine rocky slopes of Kızıl Dağ (C3 Konya–Derebucak, Çamlık), and is closely related to *C. pseudokotschyi* Wagenitz and *C. drabifolioides* Hub.-Mor., from which it differs in stem, leaf, and phyllary appendage characters. The diagnostic morphological characters are discussed. A new key is produced for Group G species for the flora of Turkey. © 2007 The Linnean Society of London, *Botanical Journal of the Linnean Society*, 2007, **153**, 61–66.

ADDITIONAL KEYWORDS: Compositae – sect. *Pseudoseridia* – taxonomy.

INTRODUCTION

Turkey, in particular the south-west and east of the country, is one of the main centres of diversity for the genus *Centaurea* L. (Wagenitz, 1986). It is also the third largest genus in terms of species numbers in Turkey, with 189 taxa occurring mainly in the Mediterranean and Irano-Turanian regions (Wagenitz, 1975; Davis, Mill & Tan, 1988; Wagenitz & Hellwig, 1996; Wagenitz, Ertuğrul & Dural, 1998; Güner, 2000; Duran & Duman, 2002; Türkoğlu, Akan & Civelek, 2003; Uzunhisarcıklı, Tekşen & Doğan, 2005). A considerable proportion of these taxa are endemic to the country or localized to a limited area, even a single mountain. The endemism value of *Centaurea* is about 60% in Turkey.

The taxonomy of the genus is complicated and needs further study. Some sections of the Turkish *Centaurea* have been revised, but others, such as sect. *Pseudoseridia* Wagenitz, have not been revised recently. This section currently comprises nine species in Turkey, with one, *C. isaurica* Hub.-Mor., still considered as imperfectly known (Wagenitz, 1975; Flamini *et al*., 2004), and one newly described by the first two authors (Uzunhisarcıklı *et al*., 2005). About seven species in this section are regional or local endemics.

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Specimens of a *Centaurea* species were collected from Kızıl Dağ, close to Derebucak District, in the south-west of Konya Province, Turkey. After careful examination, it was realized that it constituted a new, undescribed species that belonged to *Centaurea* sect. *Cheirolepis* or *Pseudoseridia*. At first sight, the new species looked very similar to *C. kotschyi* (Boiss. & Heldr.) Hayek before the pappus was investigated. Whereas the pappus of *C. kotschyi* (sect. *Cheirolepis*) is simple, plumose, and very long, the pappus of the new species is double (with an inner series of short bristles) and scabrous to barbellate. Our specimens are closely related to *C. pseudokotschyi* Wagenitz and *C. drabifolioides* Hub.-Mor., which belong to sect. *Pseudoseridia*. These specimens were compared with the isotype of *C. pseudokotschyi* in ANK and its protologue (Wagenitz, 1974). It was decided that our specimens represented a new species. The total number of *Centaurea* species known from Turkey has increased to 190.

SPECIES DESCRIPTION

CENTAUREA KIZILDAGHENSIS E. UZUNHİSARCIKLI, E. DOĞAN & H. DUMAN **SP. NOV.** SECT. *PSEUDOSERIDIA* WAGENITZ (FIGS 1–3)

Type: Turkey. C3 Konya: Derebucak, Çamlık, Kızıl Dağ, 1600–1700 m, serpentine rocky slopes, open area of a *Pinus nigra* Arn. forest, 12.viii.2003, H. Duman

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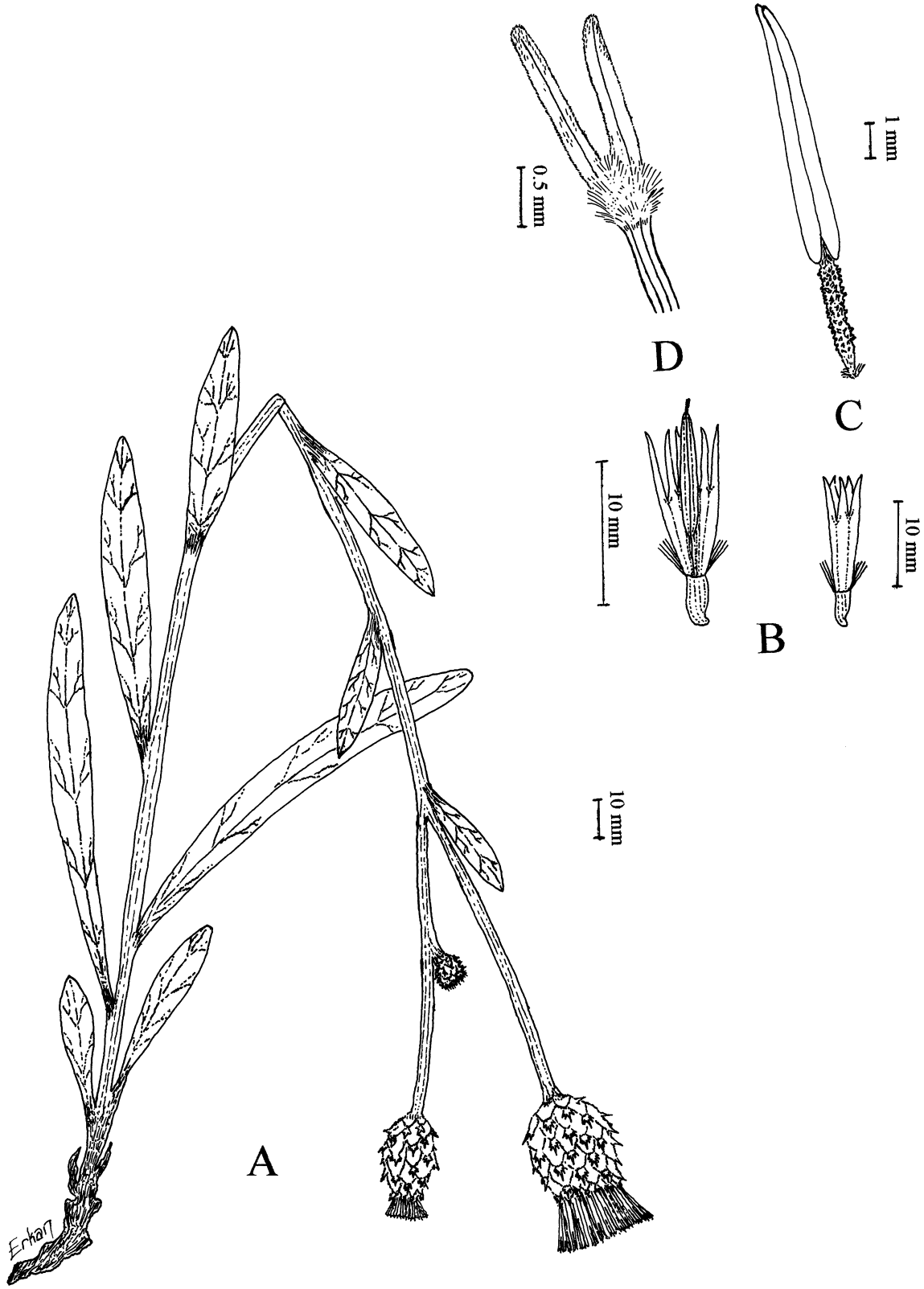


Figure 1. ***Centaurea kizildaghensis*** E. Uzunhisarcıklı, E. Doğan & H. Duman (H.Duman 9129): A, habit; B, floret; C, anther; D, style branches.

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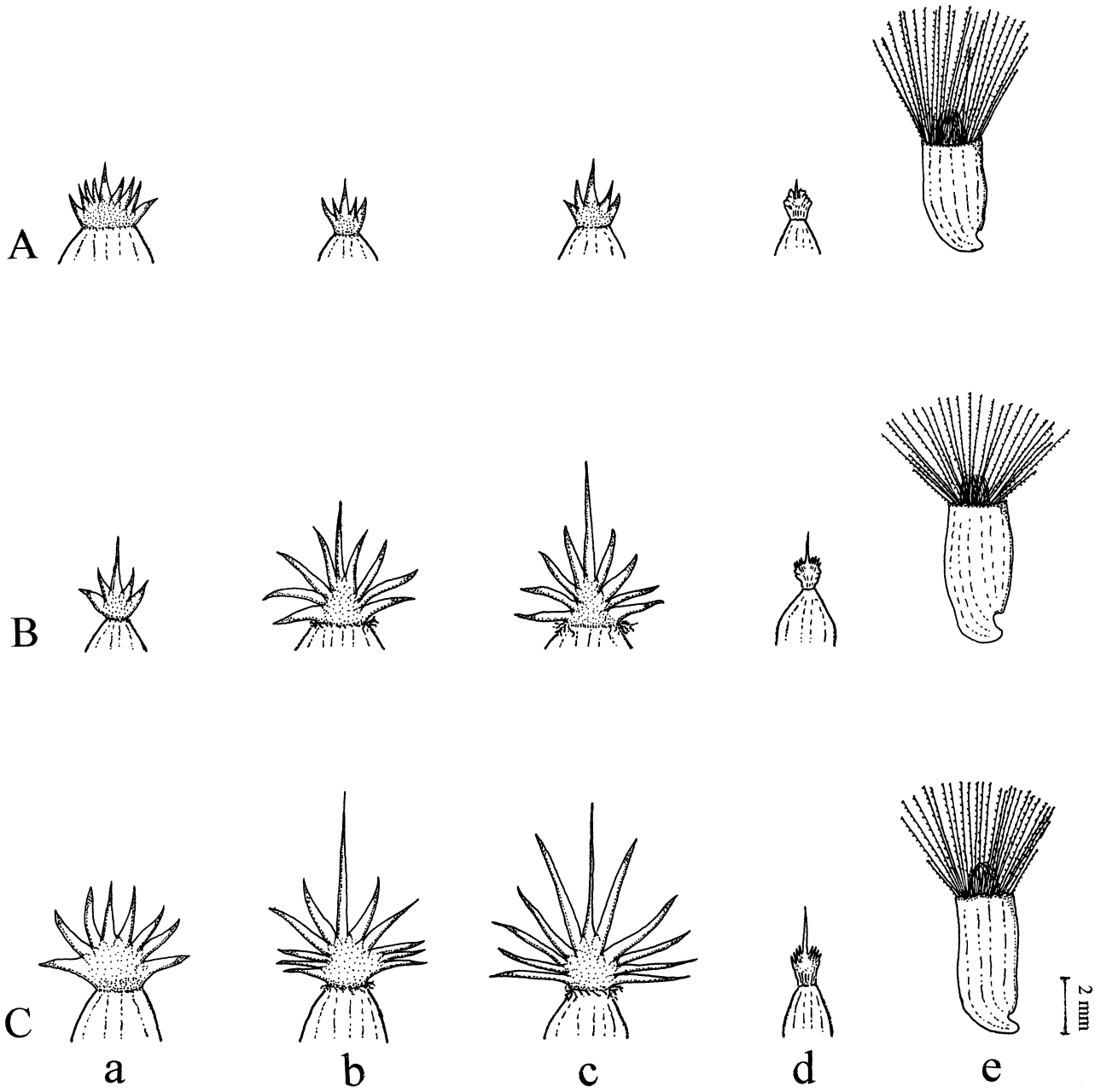


Figure 2. The character comparison of the phyllary appendages and achenes of ***Centaurea kizildaghensis*** with *C. pseudokotschyi* and *C. drabifolioides*. A, ***C. kizildaghensis***; B, *C. drabifolioides*; C, *C. pseudokotschyi*. a, outer phyllary appendages; b, c, median phyllary appendages; d, inner phyllary appendages; e, achenes.

9129 (holo. GAZI; iso. ANK, HUB); ibid., 21.vii.2005, MEU 2096 (paratype GAZI!).

Diagnosis: Affinis *C. pseudokotschyi* Wagenitz et *C. drabifolioides* Hub.-Mor. A *C. pseudokotschyi* caulibus erectis (non ascendentibus), foliis mediis et superioribus sessilibus (non semiamplexicaulibus), ciliis appendicum 2–4-jugis, *c*. 1 mm longis (non 5–6-jugis et 3–5 mm longis), appendicula in spinulam 1–1.5 mm longam (non 4–6 mm), acheniis 4–4.5 mm longis (non 5–6 mm) differt. A *C. drabifolioides* foliis mediis et superioribus non decurrentibus, appendicula in spinulam 1–1.5 mm longam (non 3–5 mm), ciliis *c*. 1 mm longis (non 1.5–3 mm longis), recedit.

Description: Perennial herb with a woody rootstock. STEMS erect, slightly striate, scarcely tomentose, 40–52 cm long and 1.5–2.5 mm in diameter, usually simple, sometimes 1–3 one-headed branches in upper part. LEAVES slightly tomentose or glabrous; lower

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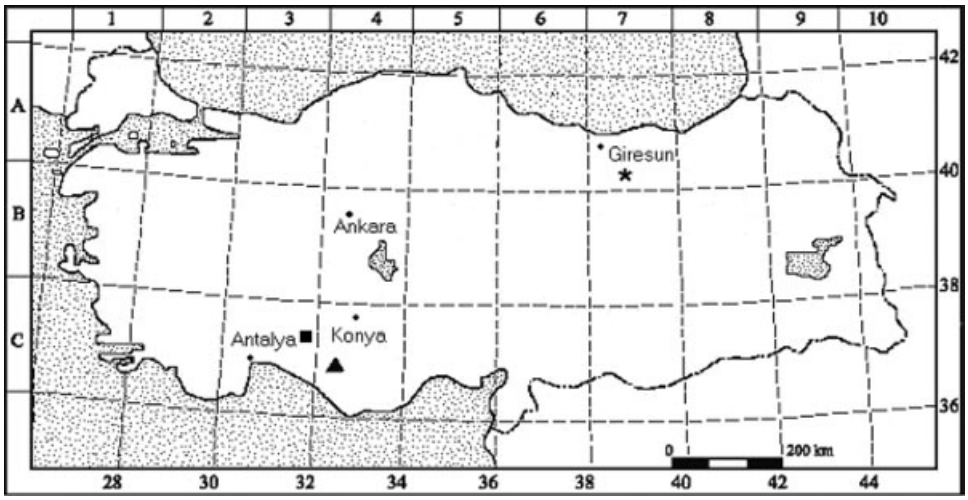


Figure 3. Geographical distribution of ***Centaurea kizildaghensis*** (■), *C. pseudokotschyi* (▲) and *C. drabifolioides* (★).

leaves with short petiolate, oblanceolate, 8–17 × 0.7–1.4 cm, apex acute, attenuate; median and upper leaves sessile, elliptic, 1.5–13 × 0.4–1.5 cm, margins entire, apex acute, sometimes with *c*. 1 mm long spinule. CAPITULA solitary at end of branches; involucre subglobose to cylindrical, base of involucre truncate, narrowed towards apex, 20–27 × 14–25 mm; phyllaries imbricate, glabrous; outer phyllaries ovate, 4.5–6 × 2.5–3 mm, appendages 2–2.5 × 2 mm; median phyllaries ovate-lanceolate, 9–12 × 4–4.5 mm, appendages 2–2.5 × 1.5–2.5 mm; inner phyllaries linear-lanceolate, 15–17 × 3.5–4.5 mm, appendages 1–1.5 × 0.5–1.5 mm; appendages triangular, non-totally concealing basal part of phyllaries, not decurrent, brownish, with 2–4 cilia on each side, cilia *c*. 1 mm long, ending in a slender 1–1.5 mm long spinule. FLORETS yellow, marginal not radiant; corolla tube glabrous, 10–15 mm long, lobes 4–5 mm, linear, with brown stripes along corolla tube; filaments 4–5 mm long, puberulent; anthers 7–9 × 0.5–1 mm; style 12.5–15 mm long, style shaft 11–13 mm long, style branches 1.5–2 mm long, hairy at base. Achenes oblong, 4–4.5 × 1.5–2 mm, whitish, glabrous; pappus biseriate, inner series 1–1.5 mm long, outer series 4–7.5 mm long, scabrous-barbellate, brownish.

Fl. 6–8, serpentine rocky slopes, open areas of a *Pinus nigra* Arn. forest, 1600–1700 m.

Specimens examined: C. pseudokotschyi: Turkey. C4 Antalya: Ak Dağ (Geyik Dağı'nın güneyinde), 28.viii.1947, *P. H. Davis & K. Karamanoğlu* 14359 (ANK). *C. drabifolioides*: A7 Giresun: Giresun-Şebin Karahisar, 8 km n Şebin Karahisar, 1300 m, 03.viii.1989, *M. Nydegger* 44650 (GAZI).

Conservation status: This species is known from a single locality (criterion B2 a), with an area of occupancy estimated to be less than 10 km^2 (criterion B2), so that it should be classified as 'Critically Endangered' (CR) (IUCN, 2001). The population consists of a few thousand individuals growing on the northern slope of the Kızıl Dağ.

Distribution and ecology: Flowering in June and July, fruiting in July and August, *C. kizildaghensis* grows in the Taurus Mountains in southern Turkey between 1600 and 1700 m elevation, on the slope of a serpentine hill with northern exposure, under the fairly open canopy of a *Pinus nigra* forest, on more or less deep soil with some serpentine rubble on the surface. The habitat is sun-exposed and dry. Amongst the most important associated species were *Koelaria macrantha* (Ledeb.) Schult., *Sideritis ozturkii* Aytaç & Aksoy (local endemic), *Asyneuma rigidum* (Willd.) Grossh., *Pimpinella tragium* Vill., *Polygonum setosum* Jack., *Saponaria pamphylica* Boiss. & Heldr. (endemic), *Pelargonium endlicherianum* Fenzl, *Aethionema spicatum* Post, *Bornmuellera kiyakii* Aytaç & Aksoy (local endemic), *Prometheum chrysanthum* (Boiss.) t'Hart (endemic), *Solidago virgaurea* L., and *Dactylis glomerata* L.

Etymology: This species takes its name from the Kızıl Dağ.

DISCUSSION AND CONCLUSION

Centaurea kizildaghensis is closely related to *C. pseudokotschyi* and *C. drabifolioides*. From *C. drabifolioides* it differs by the non-decurrent stem leaves (vs. decurrent), phyllary appendages ending in a 1–1.5 mm long spinule (vs. 3–5 mm), cilia *c*. 1 mm (vs. 1.5–3 mm). From *C. pseudokotschyi* it differs by the erect stem (vs. ascending), sessile median and upper leaves but not amplexicaul (vs. semiamplexicaul), the phyllary appendages with two to four pairs of cilia and

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ending in a 1–1.5 mm long spinule (vs. five to six pairs of cilia and 4–6 mm spinule), cilia *c*. 1 mm (vs. 3–5 mm). More detailed comparison of the new species with relevant species is given in Table 1 and Figure 2.

In the key of the Flora of Turkey (Group G), *C. marashica* E. Uzunhisarcıklı, M. Tekşen & E. Doğan, *C. isaurica* Hub.-Mor., and *C. kizildaghensis* may be inserted as follows:

29. Capitula large, involucre more than 20 mm broad.
    30. Leaves undivided.
        31. Involucre arachnoid; phyllary appendages with (3–)6–8 pairs of cilia (cilia 3–6 mm) and ending in a 6–9 mm spinule ..... ***C. helenioides***
        31. Involucre glabrous; phyllary appendages with two to four pairs of cilia (cilia *c*. 1 mm) and ending in a 1–1.5 mm spinule ..... ***C. kizildaghensis***
    30. Leaves pinnatipartite ..... ***C. antitauri***
29. Capitula smaller.
    32. Cauline leaves non-decurrent.
        33. Stem ascending; leaves semiamplexicaul; phyllary appendages with five to six pairs of cilia (cilia 3–5 mm) and ending in a 4–6 mm spinule ..... ***C. pseudokotschyi***
        33. Stem erect; leaves sessile; phyllary appendages with two to four pairs of cilia (cilia *c*. 1 mm) and ending in a 1–1.5 mm spinule ..... ***C. kizildaghensis***
    32. Cauline leaves decurrent.
        34. Capitula numerous, arranged corymbosely; leaves firm, cardboard-like, basal pinnatifid with 6–8(–10) pairs of segments ..... ***C. polypodiifolia***
        34. Capitula one or few; leaves papery, basal undivided or lyrate or rarely pinnatifid with two to five pairs of segments.
            35. Basal or lower stem leaves lyrate.
                36. Leaves grey tomentose ..... ***C. isaurica***
                36. Leaves sparsely pilose or scabrous.
                    37. Median and upper leaves linear-lanceolate, few ..... ***C. hermannii***
                    37. Median and upper leaves oblong or lanceolate-ovate, numerous... ***C. hakkariensis***
            35. All leaves undivided, basal sometimes with a pair of teeth or lobes.
                38. Leaves grey tomentose; involucre nearly cylindrical; phyllary appendages with three to four pairs of cilia.
                    39. Median and upper leaves with 0.5–2 mm long spinule at apex; phyllary cilia 1–1.5 mm, terminal spinule 1–2 mm ..... ***C. cheirolepidoides***
                    39. Median and upper leaves with 2.5–6 mm long spinule at apex; phyllary cilia 2–4 mm, terminal spinule 2–5 mm ..... ***C. marashica***
                38. Leaves scabrous; involucre ovate-oblong; phyllary appendages with five to ten pairs of cilia ..... ***C. drabifolioides***

Table 1. Comparison of ***Centaurea kizildaghensis*** with *C. pseudokotschyi* and *C. drabifolioides* using selected characters

Character	***C. kizildaghensis***	*C. pseudokotschyi*	*C. drabifolioides*
Stem	Erect	Ascending	Erect
Leaves	Non-decurrent, slightly tomentose or glabrous	Non-decurrent, scabrous or very slightly arachnoid	Decurrent, slightly scabrous
Median and upper leaves	Sessile, elliptic	Semiamplexicaul, lanceolate	Sessile, linear-oblong
Median leaves (cm)	4.5–13 × 0.7–1.5	3.5–5 × 0.5–1	3.5–6.5 × 0.4–0.6
Involucre (mm)	20–27 × 14–25	22–27 × 11–14	18–19 × 10–11
Phyllary appendage			
Spinule length (mm)	1–1.5	4–6	3–5
Cilia number (pairs)	2–4	5–6	5–10
Cilia length (mm)	*c*. 1	3–5	1.5–3
Achenes length (mm)	4–4.5	5–6	5

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