

Centaurea kaynakiae (Asteraceae), a new species from Turkey

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Centaurea kaynakiae Daşkın & Yılmaz *sp. nova* (Asteraceae) is described and illustrated from northwest Anatolia, Turkey. It is closest to *C. odyssei*, but differs by its distinctly petiolate and longer basal and median leaves, and spheroidal rather than prolate pollen grains.

Key words: Asteraceae, *Centaurea*, new species, taxonomy

Turkey is one of the important centers for diversity of the genus *Centaurea* (Wagenitz 1986). In terms of species numbers the genus is also one of the largest genera in the country. The Turkish species are divided into 34 sections. Of these, section *Pteracantha* includes two species, *C. odyssei* and *C. xylobasis*, which are local endemics and found only in the northwest Anatolia and Samos Island, respectively. The members of this section have a woody rootstock forming small cushions; the leaves are tomentose, mostly pinnatilobed to pinnatifid and the lobes end in a yellow mucro or spinule. The flowers are yellow and the involucre is cylindrical. The phyllary appendages form a pungent spine with 1–4 pairs of lateral spinules near the base (Wagenitz 1975). In this paper we describe a new species in this small section.

Flowering and fruiting *Centaurea* specimens were collected from the southern part of the Uludağ Mountain (Bursa) in 2005 and 2006. Available herbarium specimens of *Centaurea odyssei* and the digital photographs of the type

specimens in LD (Lund, Sweden) were examined.

Pollen for examination by light microscopy was prepared according to the Wodehouse method (Wodehouse 1935). Pollen grains of the new species and *C. odyssei* were taken from herbarium material kept at BULU (Herbarium of Uludağ University). Measurements were taken with a Leica DM 4000 M microscope. The pollen measurements were based on at least 30 samples.

For scanning electron microscopy, the pollen grains and selected representative material were transferred directly to a double-sided tape-affixed stub and were coated with gold-palladium, with a BAL-TEC SCD 005 sputter. The micrographs were obtained using an EVO 40 CARL ZEISS microscope at 30 kV.

Centaurea kaynakiae Daşkın & Yılmaz, *sp. nova* (Fig. 1)

Affinis C. odyssei Wagenitz, sed differt foliis basalibus petiolatis, 40–70 mm longis (non

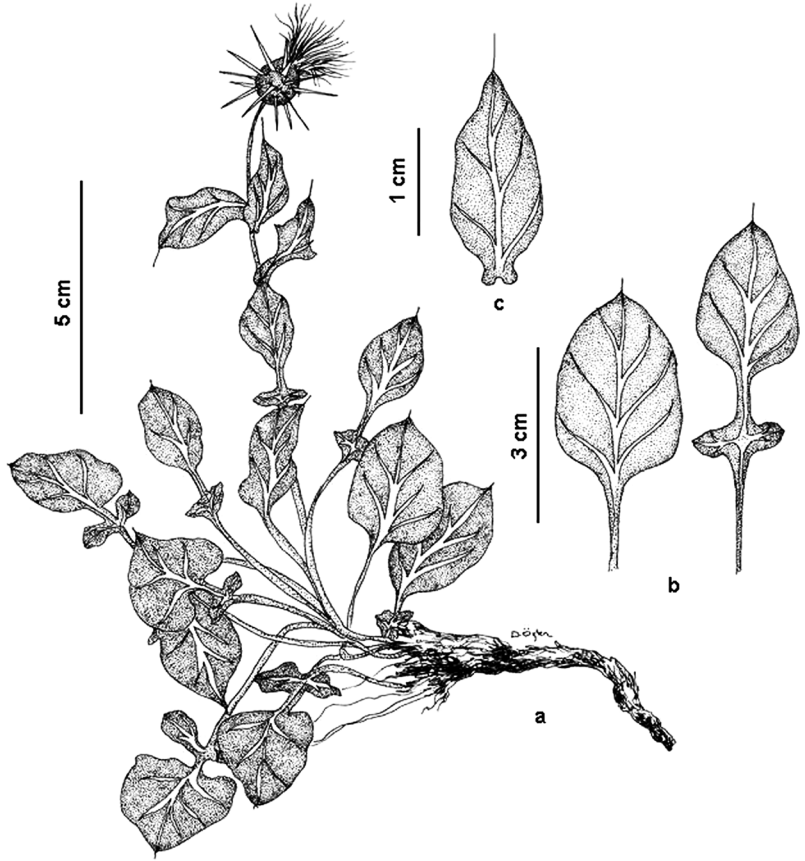


Fig. 1. *Centaurea kaynakiae* (from the holotype). — **a:** Habit. — **b:** Basal and median leaves. — **c:** Upper leaves.

20–35 mm), *foliis mediis petiolatis, pinnatilobatis, 30–60 mm longis (non 17–20 mm).*

TYPE: Turkey. B2 Bursa: Uludağ, Keles, Sorgun-Boğazova, 5 km, 1024 m, 39°54'N, 29°20'E, 1024 m, 10.VII.2006 *Kaynak & Daşkın* 28079 (holotype BULU).

Perennial, profusely branched woody rootstock with numerous sterile and fertile shoots forming a loose cushion. Flowering stems 10–20 cm, erect, ascending, simple, adpressed grey-tomentose and foliate. Leaves densely adpressed grey-tomentose on both surfaces. Basal and lower leaves distinctly petiolate, 40–70 × 8–12 mm, entire or mostly pinnatifid with 1 pair of short segments, terminal lobes clearly larger than lateral segments, ovate-lanceolate to orbicular, 10–27 × 10–12 mm, acute-acuminate to shortly mucronate. Median leaves petiolate, pinnatilobed, 30–60 × 10–15 mm. Upper leaves sessile, entire, shortly decurrent, lobes ending with a yellow 1–8

mm long spinule. Involucre 20–22 × 9–13 mm, almost cylindrical, arachnoid-floccose on upper part. Median phyllaries 16–20 mm long, including 10–12 mm long apical appendage. Appendages patent to recurved, brown, with 3–5 pairs of lateral 1–4 mm long spinules at base and ending in a yellow, up to 15 mm long spine. Innermost phyllaries ca. 13 mm long, straw-colored, with 3–4 mm long apical appendage. Corolla yellow, 18–20 mm long, marginal not radiant; corolla lobes filiform, 5–6 mm long. Receptacle with long hairs. Achenes 3–3.5 mm long, brown, slightly angular. Pappus 3.5–4 mm long, scabrous; inner row 1 mm long. Flowering in June–July.

ETYMOLOGY: This species is named in honour of Prof. Dr. Gönül Kaynak, the adviser of the authors' Ph.D. thesis.

Centaurea kaynakiae grows mainly on rocky slopes at 1000–1100 m, together with *Cerastium banaticum*, *Petrorhagia prolifera*, *Velezia rigida*, *Sedum acre*, *Hieracium bornmuellleri*, *Asy-*

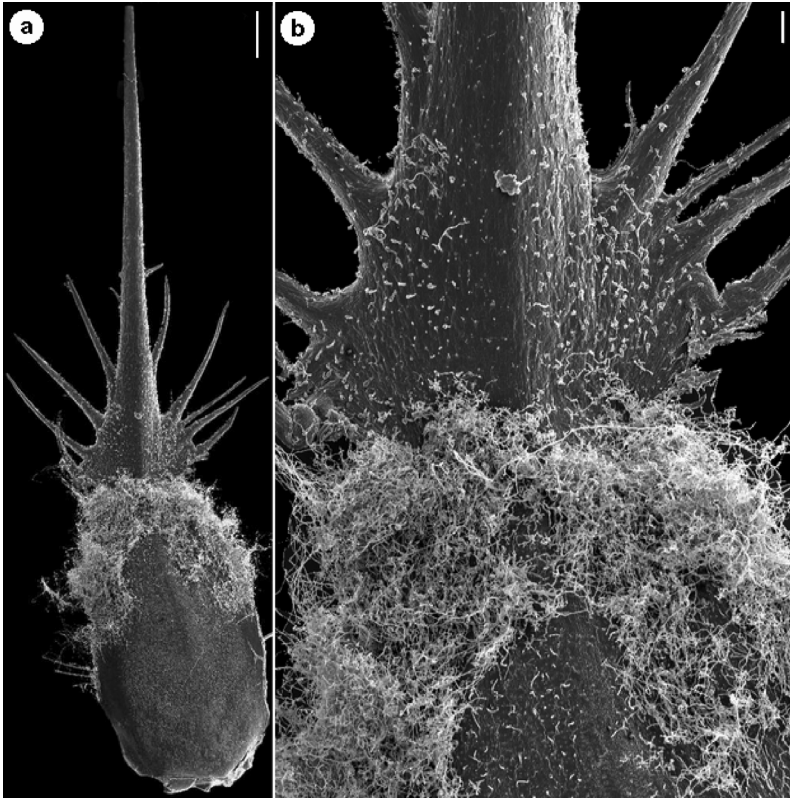


Fig. 2. SEMs showing a median phyllary of *Centaurea kaynakiae* (from the holotype). — **a:** General view (scale bar: 1 mm). — **b:** Close-up of appendage base (scale bar: 200 μ m).

neuma linifolium subsp. *linifolium*, *A. virgatum* subsp. *cichoriiforme*, *Sideritis sipylea*, *Micromeria myrtifolia* and *Euphorbia taurinensis*.

Centaurea kaynakiae is closely similar to *C. odysesei* (see Table 1). However, it differs clearly by the distinctly petiolate basal and median leaves. They are entire or pinnatilobed, with one pair of short segments. While the terminal lobes of basal leaves are ovate-orbicular in *C. kaynakiae*, those of *C. odysesei* are lanceolate to triangular. In addition, the appendages of *C. kaynakiae* are 10–16 mm long, with 3–5 pairs of

lateral spinules at base (Fig. 2).

There are also differences in the pollen size and shape of the two species (Table 2 and Fig. 3). The measurements of equatorial axis, colpus width, pore length, pore width, mesocolpium and apocolpium are similar, but the length of the polar axis and colpus are certainly different. The pollen grains are spheroidal in *C. kaynakiae* and prolate in *C. odysesei*.

Centaurea kaynakiae and *C. odysesei* have local distributions in northwest Anatolia. The former is restricted to the southern part of the

Table 1. Comparison of some morphological characters of *Centaurea kaynakiae* and *C. odysesei*.

	<i>C. kaynakiae</i>	<i>C. odysesei</i>
Stems	not densely foliate	densely foliate
Basal leaves	40–70 × 8–12 mm, distinctly petiolate, entire or pinnatifid with 1 pair of segments	20–35 × 8–15 mm, not petiolate, pinnatifid with 1–2 pairs of segments
Terminal lobes	ovate-orbicular, 10–27 × 10–12 mm	lanceolate to triangular, 5–15 × 2–15 mm
Median leaves	30–60 × 10–15 mm, petiolate, pinnatilobed	17–20 × 10–12 mm, not petiolate, pinnatifid
Appendages	10–16 mm with 3–5 pairs of lateral spinules at base	16–17 mm with 1–4 pairs of lateral spinules at base

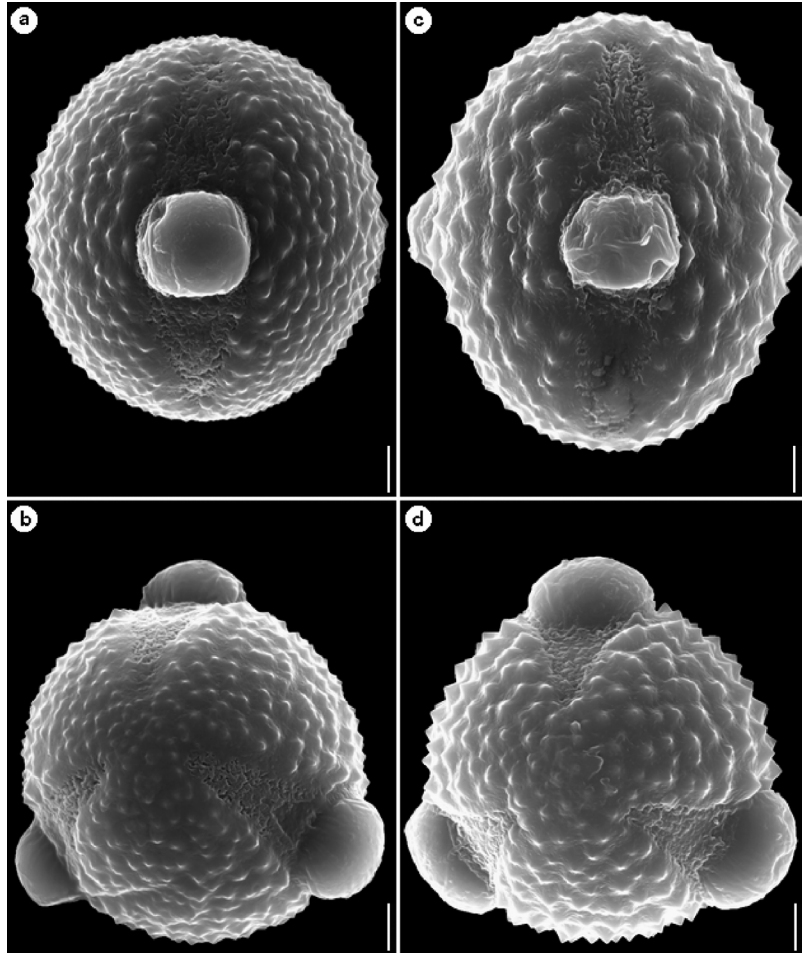


Fig. 3. SEMs of pollen grains of *Centaurea kaynakiae* (a and b, from the holotype) and *C. odyssei* (c and d, from *T. Dirmenci* 2310, BULU). — a and c: Equatorial view. — b and d: Polar view. Scale bars: 4 μ m.

Uludağ Mountain, while *C. odyssei* is found only in Kazdağı (Trojan Ida).

ADDITIONAL SPECIES EXAMINED. — *Centaurea kaynakiae* (paratype). **Turkey.** B2 Bursa: Uludağ, Keles, Sorgun çıkışı, *Pinus* ormanı açıklıklı kayalık yamaçlar, 1000 m, G.

Kaynak & Ö. Yılmaz 26300 (BULU). — *Centaurea odyssei*. **Turkey.** B1 Balıkesir: Mt. Ida (Kazdağı), in marmor. Mont. Szu Szus-Dagh, *Sintenis* 507 (holotype LD, digital image seen). Edremit-Kazdağ, Beypınar, *Pinetum myrtillosum*, *C. Regel* 7168 (EGE). Kaz Dağı, Susuz Tepe, 1600 m, *F. Satıl* & *T. Dirmenci* 2310 (BULU).

Table 2. Comparison of some palynological characters (means \pm SDs, and ranges). All dimensions in μ m.

	<i>C. kaynakiae</i>	<i>C. odyssei</i>
Polar axis (P)	32.28 \pm 1.30 (29.65–35.23)	45.80 \pm 4.22 (39.15–49.38)
Equatorial axis (E)	30.79 \pm 1.13 (28.08–32.58)	29.70 \pm 0.78 (28.41–30.78)
P/E	1.05	1.54
Colpus length	27.71 \pm 1.65 (24.25–30.52)	33.98 \pm 1.43 (32.20–35.97)
Colpus width	9.28 \pm 1.01 (7.06–10.34)	7.97 \pm 0.96 (6.39–9.29)
Pore length	8.87 \pm 0.79 (7.56–10.03)	8.51 \pm 0.26 (8.23–8.76)
Pore width	8.85 \pm 1.56 (5.76–10.34)	6.24 \pm 0.23 (6.01–6.48)
Mesocolpium	19.54 \pm 1.03 (17.45–21.62)	19.40 \pm 0.95 (18.13–20.96)
Apocolpium	9.84 \pm 1.95 (7.27–14.09)	10.63 \pm 1.74 (9.15–14.83)

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