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Cephalaria aytachii (Dipsacaceae), a new species from central Anatolia, Turkey

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Cephalaria aytachii R.S. Göktürk & Sümbül *sp. nova* (Dipsacaceae) is described from central Anatolia, Turkey. It is illustrated in line drawings, its diagnostic morphological characters are given, and its pollen structure is examined.

Key words: *Cephalaria*, Dipsacaceae, new species, taxonomy

Introduction

During fieldwork for the *Turkish Endemic Plant Project* in 1993, material of a rare and handsome species was collected by Z. Aytaç *et al.*, in Sivrihisar (Eskişehir). On further visits to the same locality in September 1994, August 1996 and August 2001, more material was gathered providing a range of specimens with good flowers and mature fruits. These specimens were checked in the herbaria of ANK, GAZI, HUB, ISTF, and ISTE against *Flora of Turkey* (Matthews 1972, Davis *et al.* 1988, Duman 2001), *Flora Europaea* (Ferguson 1976), *Flora of the USSR* (Shishkin & Bobrov 1957), *Flora Iranica* (Lack 1991), *Monographia Genus Cephalaria* (Szabó 1940) and the *Flora of Turkey Check-List* (Özhatay *et al.* 1999). The result was that the specimens represent a species new to science.

In total 70 herbarium specimens (ca. 103 individuals) were collected from the three adjacent localities and deposited in AKDU (herbarium of the Biology Department of Akdeniz University), GAZI and HUB.

Pollen structure was examined using a light microscope and SEM (Wodehouse 1935, Sokal & Rohlf 1969).

Description

Cephalaria aytachii R.S. Göktürk & Sümbül, *sp. nova* (Fig. 1)

Affinis Cephalariae uralensis sed caulis retrose-pilosus in parte inferiore (non retrose-hirsutus vel subhirsutus in parte inferiore), pars media et superior sparsim pubescens (non glaber), folia coriacea (non subcoriacea), margine revoluta, etc.

TYPE: Turkey. B3 Eskişehir: Sivrihisar, 8 km from Sivrihisar to Afyon, south of Aşağıkepen village, chalk hills, 900–950 m, 26.VIII.2001, N39°22´17´´, E31°29´17´´, *R.S. Göktürk 4742* & *Z. Aytaç* (holotype AKDU, isotypes ANK, HUB, GAZI).

Slender, erect perennial herbs. Stem 20–60 cm tall, simple or branched from base, densely puberulent and retrorse-pilose hairy in lower part, sparsely puberulent in middle

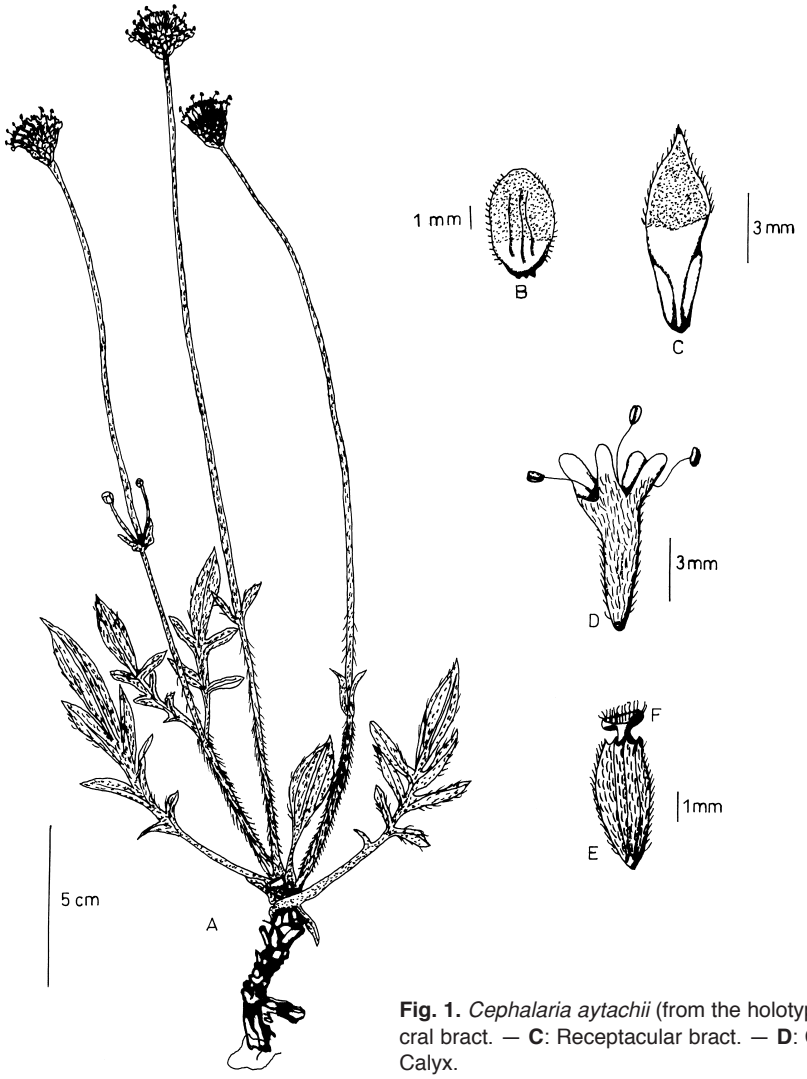

Fig. 1. *Cephalaria aytachii* (from the holotype). — **A**: Habit. — **B**: Involucral bract. — **C**: Receptacular bract. — **D**: Corolla. — **E**: Involucel. — **F**: Calyx.

and upper part. Leaves coriaceous, densely puberulent and sparsely setose on both surfaces, with a revolute margin, entire and acute or acuminate at apex. Lower leaves simple or pinnatisect; simple leaves oblanceolate, 2–5 × 0.7–1.5 cm; pinnatisect leaves ovate-lanceolate in outline, 3–10 × 1–3 cm, with 4–10 lanceolate or oblong-lanceolate segments, 0.3–2.2 × 0.1–0.3 cm, terminal segment larger than lateral ones, lanceolate or broadly lanceolate, 1.5–4.5 × 0.4–1.1 cm. Cauline leaves pinnatisect, ovate-lanceolate in outline, 1–8 × 0.4–0.8 cm, with 2–8 oblong or linear-lanceolate segments, 0.3–1.5 × 0.1–0.3 cm, terminal segment larger than lateral ones, lanceolate or broadly lanceolate, 1–3 × 0.1–0.8 cm. Upper leaves simple or pinnatisect; simple leaves sessile, linear to linear-lanceolate, 0.8–2.5 × 0.1–0.2 cm; pinnatisect leaves narrowly lanceolate in outline, 1.1–3.0 × 0.3–0.6 cm, with 2–4 segments in lower part, of linear-lanceolate segments 2–4 × 1 mm, terminal segment larger than lateral ones, linear to linear-lanceolate, 1–2 × 0.1–0.4 cm. Peduncle 8–25 cm long. Capitula subglobose, 16–20 mm in diameter in flower, 10–15 mm in diameter in fruit; corolla 8–13 mm long, yellow or pale yellow, densely adpressed pilose outside. All bracts with reddish-purple margins. Involucral bracts oblong, 4–6 × 2–3 mm, pubescent outside, margin ciliate, obtuse at apex. Receptacular

bracts lanceolate or oblong-lanceolate, 7–10 × 2 mm, pubescent outside, margin ciliate, acute or subacute at apex. Involucel 5–8 mm long in fruit, narrowly ovate-oblong, 4-angled, brown, pilose, with 8 minute equal teeth at apex. Flowering June–September, fruiting September.

Pollen morphology. Pollen grains are sphaeroidal triporate, P/E: 1.07. Polar axis 99.483 μm, equatorial axis 92.304 μm. AMB shape triangular, obtuse, convex. Pori large and short, Plg/Plt: 2.49 μm. Exine 5.123 μm. Structure intectate. Sculpture echinulate, sometimes baculate (Fig. 2).

ETYMOLOGY. The new species is named in honour of Zeki Aytaç (Gazi University, Ankara) who was one of the collectors of the type specimens.

ADDITIONAL SPECIMENS EXAMINED (paratypes). **Turkey**. B3 Eskişehir: Sivrihisar, Aşağıkepen köyü çevresi, kireçli topraklar, 900–950 m, 20.VI.1993, *H. Duman (5244) & Z. Aytaç* (flowering specimens, GAZI); B3 Eskişehir: Sivrihisar, Aşağıkepen köyü çevresi, kireçli topraklar, 900–950 m, 26.IX.1994, *Z. Aytaç 6756* (fruiting specimens, GAZI); B3 Eskişehir: Sivrihisar, 6 km from Sivrihisar to Afyon, southeast of Aşağıkepen village, chalk hills, 900 m, 13.VIII.1996, *R.S. Göktürk 4010* (AKDU).

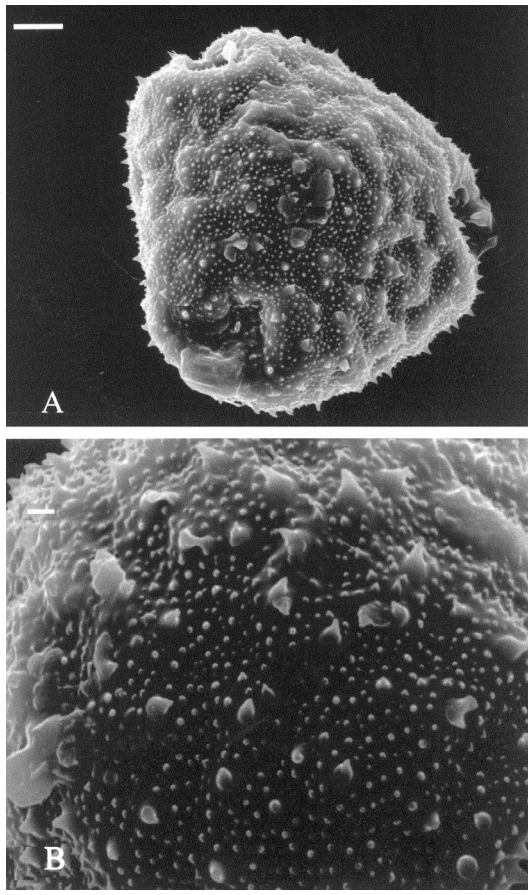

Fig. 2. Scanning electron micrographs of pollen grains. — **A**: General view. — **B**: Close-up. Scale bars: **A**: 10 μm, **B**: 2 μm.

Discussion

The new species is relatively close to *Cephalaria uralensis* (Murray) Roemer & Schultes, but differs from it by the characters listed in Table 1.

Since *Cephalaria* was revised for Turkey by Matthews (1972), five new species have been described from the country: *C. scoparia* Contandr. & Quézel, *C. dirmilensis* Hub.-Mor. (Davis *et al.* 1988), *C. gazipashensis* Sümbül, *C. peshmenii* Sümbül (Sümbül 1991), and *C. ekimiana* R.S. Göktürk & Sümbül (Göktürk & Sümbül 1997). The total number of species of *Cephalaria* reported from Turkey is now 35, of which 11, including *C. aytachii*, belong in the Irano–Turanian phytogeographic element. Two new species have been described from Greece, namely *C. tenuiloba* Strid (Strid 1981) and *C. fanourii* Perdetzoglou & Kit Tan (Perdetzoglou & Kit Tan 1995).

DISTRIBUTION AND ECOLOGY. Endemic to central Anatolia (Fig. 3). The new species is associated with endemic plants such as *Alyssum niveum*, *Sideritis gulendamii*, *Salvia aytachii*, *Matthiola anchoniifolia*, *Taraxacum farinosum*, *Salvia wiedemannii*, *Scutellaria orientalis* subsp. *pectinata*, *Cosunia halysensis*, *Gypsophila sphaerocephala* var. *cappadocica*, and some non-endemics such as *Glaucium corniculatum* subsp. *reflactum*, *Globularia orientalis*, *Androsace villosa* and *Arnebia densiflora*.

CONSERVATIONAL STATUS. Because *Cephalaria aytachii* is known only from three adjacent localities and the populations are small, it should be regarded as belonging in the CR (Critically Endangered) category (IUCN 1994).

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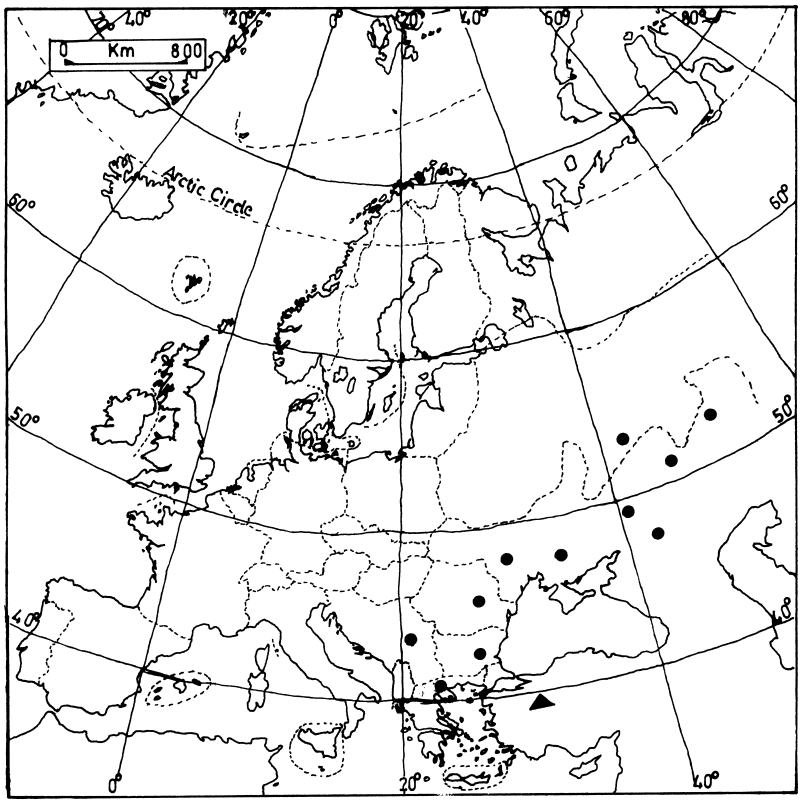

Fig. 3. Geographic distribution of *Cephalaria aytachii* (▲) and *C. uralensis* (●).

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Table 1. Morphological comparison of *Cephalaria aytachii* and *C. uralensis*.

Taxon characters	*C. aytachii*	*C. uralensis*
Stem	retrorse-pilose hairy in lower part, sparsely puberulent in middle and upper part	retrose-hirsute or subhirsute in lower part, glabrous in upper part
Leaves	coriaceous, margin revolute, densely puberulent and sparsely setose on both surfaces	subcoriaceous, margin not revolute, densely hirsute or subhirsute and pubescent
Simple lower leaves	oblanceolate, acute	spathulate, obtuse or subobtuse
Terminal segments of lower and cauline leaves	lanceolate or broadly lanceolate	oblong, oblanceolate or oblong-linear
Cauline leaves	ovate-lanceolate in outline	oblong-lanceolate or ovate-oblong in outline
Lateral segments of cauline leaves	oblong or linear-lanceolate	oblong-linear
Upper leaves	pinnatisect and simple	only pinnatisect
Capitula	16–20 mm in flower	ca.15 mm in flower
Involucral bracts	oblong, 4–6 × 2–3mm	ovate, 3.5–9 × 3–5 mm
Involucel	5–8 mm long in fruit, pilose, 8 minute equal teeth	ca. 5 mm long in fruit, hirsute, with 4 teeth and very short intermediate teeth
Distribution	central Anatolia	Bulgaria?, Greece, Jugoslavia, Romania, and Russia

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