

## *Dianthus goekayi* (Caryophyllaceae), a new species from Turkey

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*Dianthus goekayi* Kaynak, Yılmaz & Daşkın *sp. nova* (Caryophyllaceae) is described and illustrated from northwest Anatolia, Turkey. It resembles especially *D. erinaceus*, but differs it by its longer stems, inflorescence with 2–7 flowers, and papillose calyx tube. The stem and calyx of both species were examined and compared using scanning electron microscopy. The geographical distribution of *D. goekayi* is mapped.

*Dianthus* is a large genus, composed of about 300 species found in Europe, Asia, Africa and North America (Mabberley 2002). The first revision of Turkish *Dianthus* was by Reeve (1967), and he reported 67 species from the country. Since then, four species and one new variety have been described from Anatolia: *D. goerkii* (Davis *et al.* 1988), *D. nihatii* (Güner 2000), *D. aydogduii* (Menemen & Hamzoğlu 2000), *D. crinitus* var. *argaeus* (Aytaç & Duman 2004) and *D. aytachii* (Vural 2008). Thus, after the present report 72 species are known from Turkey.

Flowering specimens of *Dianthus* were collected from the southern part of Bursa around Soğukpınar in 2001 (ca. 20 individuals). Additional specimens were collected south of Bursa, around Harmancık, during field work for the project “Taxonomical revision of *Alyssum* L. species in West Anatolia” in 2008 (ca. 30 individuals). These materials were compared with specimens in ANK. For the scanning electron microscopy, selected representative materials were coated with gold-palladium for two minutes in a BAL-TEC SCD 005 sputter-coater. All

observations were made at the Uludağ University Science and Art Faculty Microscopy Laboratory on a Carl Zeiss Evo 40 scanning electron microscope using a voltage of 20 kV.

***Dianthus goekayi* Kaynak, Yılmaz & Daşkın, *sp. nova* (Figs. 1–4)**

*Species nova* *D. erinaceo proxima, aquo imprimis differt calyce papilloso, 2–7 floribus (non 1–2) et caule florifero 20–25 cm alto (non 4–8).*

HOLOTYPE: Turkey. A2 Bursa: Soğukpınar-Karaislah road, 3 km to Soğukpınar, 40°02'N, 29°07'E, 955 m, 12.VII.2001 Kaynak 12493 & Yılmaz (BULU). — PARATYPE: Turkey. A2 Bursa: Harmancık, Orhaneli to Harmancık, 820 m, 20.VII.2008 Kaynak 30308 & Kaynak (BULU).

ETYMOLOGY: This species is named in honor of Prof. Dr. Zeki Gökay Kaynak (Uludağ University). With Gönül Kaynak, he has collected plants in various regions of Anatolia for more than thirty years.

Perennial with woody rootstock, forming dense cushions. Sterile shoots short, densely

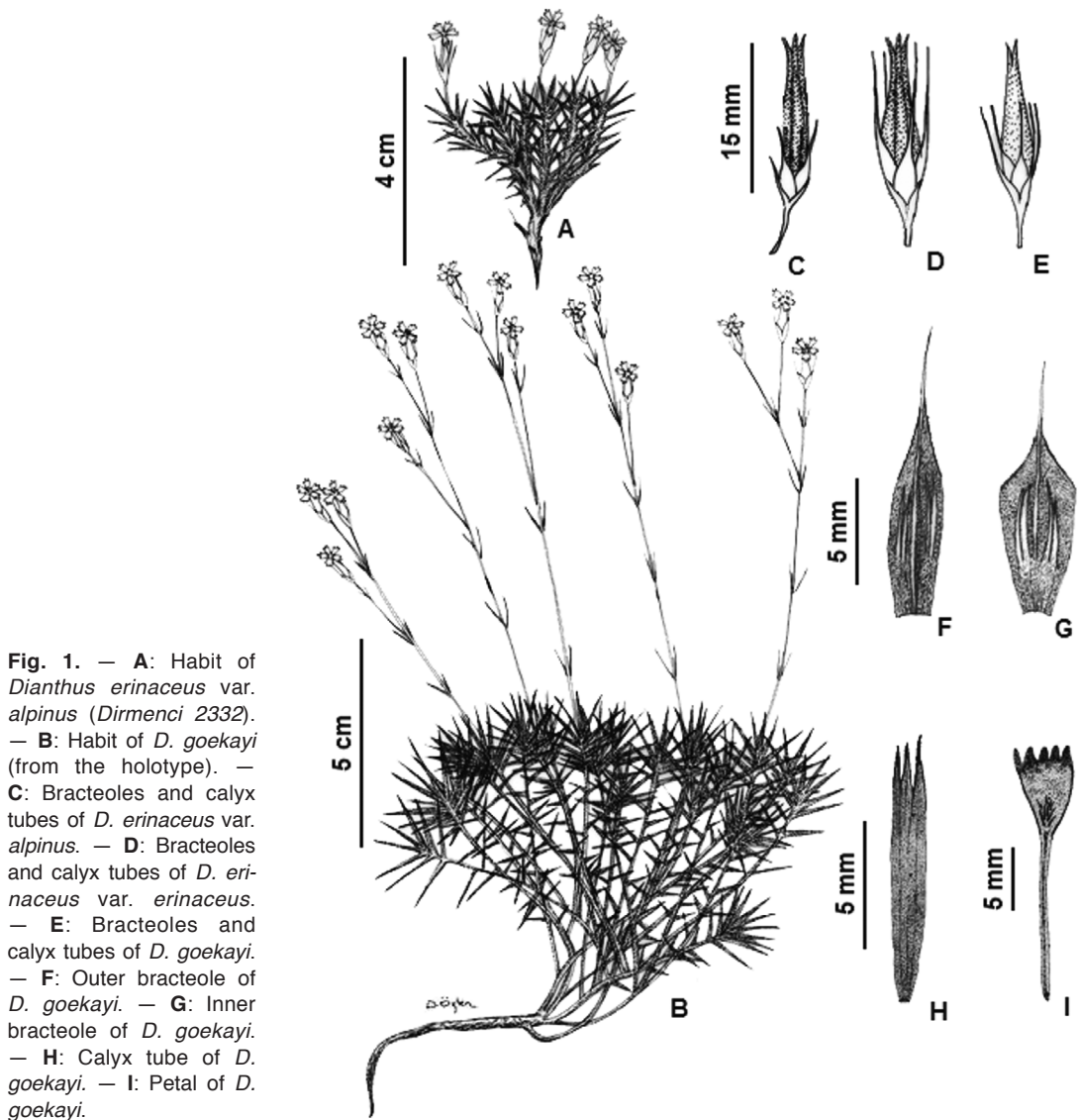
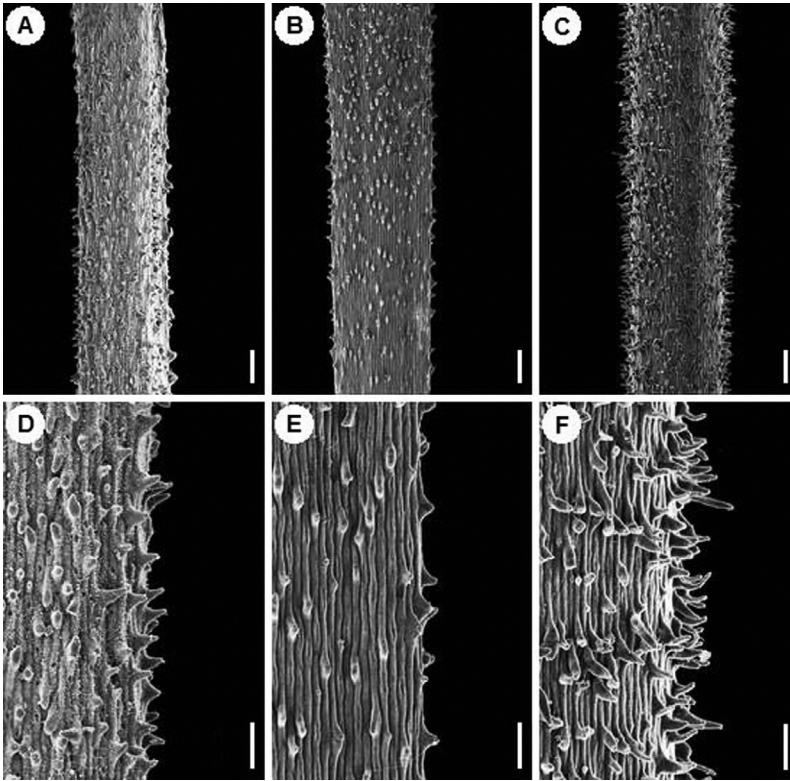


Fig. 1. — A: Habit of *Dianthus erinaceus* var. *alpinus* (Dirmenci 2332). — B: Habit of *D. goekayi* (from the holotype). — C: Bracteoles and calyx tubes of *D. erinaceus* var. *alpinus*. — D: Bracteoles and calyx tubes of *D. erinaceus* var. *erinaceus*. — E: Bracteoles and calyx tubes of *D. goekayi*. — F: Outer bracteole of *D. goekayi*. — G: Inner bracteole of *D. goekayi*. — H: Calyx tube of *D. goekayi*. — I: Petal of *D. goekayi*.

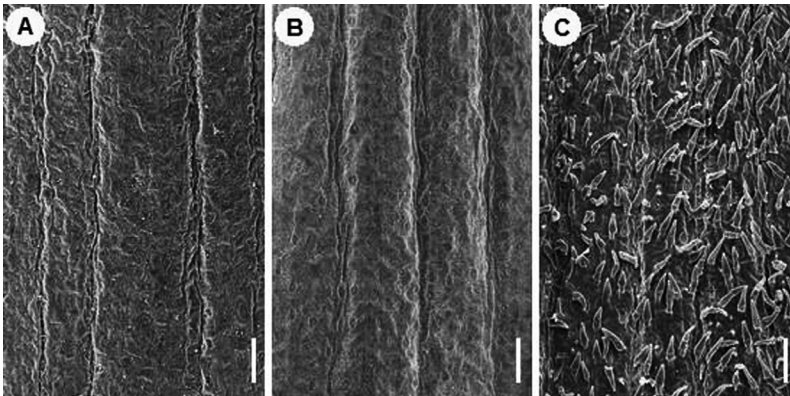
leaved. Flowering stem erect, 20–25 cm, branched in upper part 2–7 with long branches terminating in single flowers, covered by dense spinose leaves at base. Basal leaves 10–17 × 0.5–2 mm, linear to narrow linear-lanceolate, acuminate, very stiff, three-veined. Stem leaves 1–3 pairs, linear to narrow linear-lanceolate, 9–12 × 0.5–1 mm, shorter than internodes, sheaths 2–3 mm, two or three times as long as stem diameter. Bracteoles 4–6, oblong, densely papillose, margins scarious ciliate, aristate, straw-coloured, shorter than calyx. Calyx 12–14 × 2–3 mm, straw-colored, nearly cylindrical; teeth 4–5 mm,

acute, margin ciliate. Petal pinkish-purple or rose, usually shallowly crenulate-dentate, limb 4–5 mm, oblong, sparsely barbate. Flowering and fruiting between June and September.

**HABITAT ECOLOGY:** *Dianthus goekayi* grows on serpentine with dioritic and peridotitic soil, with some characteristic plants such as *Pinus brutia*, *Juniperus oxycedrus* subsp. *oxycedrus*, *Quercus coccifera*, *Phillyrea latifolia*, *Cistus creticus*, *Alyssum dudleyi*, *Linum pamphylicum* subsp. *olympicum*, and *Prometheum chrysanthum* subsp. *uludaghense* at an altitude of 800–1000 m.



**Fig. 2.** Micrographs of stem in general and closer view. — **A** and **D**: *Dianthus erinaceus* var. *erinaceus*. — **B** and **E**: *D. erinaceus* var. *alpinus*. — **C** and **F**: *D. goekayi*. Scale bars: **A–C** = 200  $\mu$ m, **D–F** = 100  $\mu$ m.



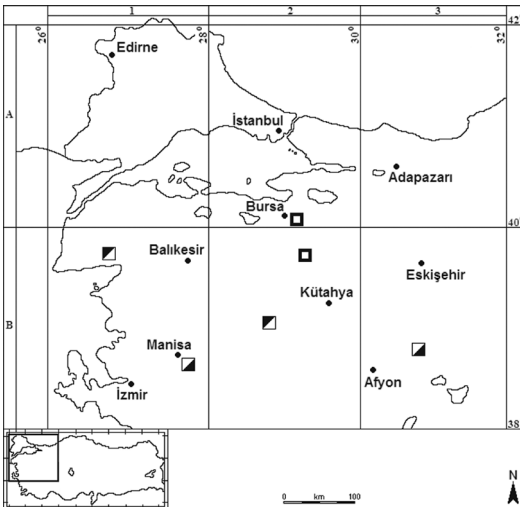
**Fig. 3.** Micrographs of calyx tube indumentum. — **A**: *Dianthus erinaceus* var. *erinaceus*. — **B**: *D. erinaceus* var. *alpinus*. — **C**: *D. goekayi*. Scale bars = 100  $\mu$ m.

REPRESENTATIVE SPECIMENS EXAMINED: — *Dianthus erinaceus* var. *erinaceus*. Turkey. B4 Afyon, Boyat, Asartepe-İnpazarcık, 1300 m, 1975, M. Vural 206 (ANK). — *Dianthus erinaceus* var. *alpinus*. Turkey. A1 Balıkesir, Kazdağı, *T. Dirmenci* 2332 (BULU).

*Dianthus goekayi* is closely similar to *D. erinaceus*, but differs e.g. by its longer flowering stems, 2–7 flowers, and by a papillose calyx tube (see Table 1).

*Dianthus erinaceus* is endemic to west Anatolia, and has two varieties: *D. erinaceus* var.

*erinaceus* and *D. erinaceus* var. *alpinus*. The distribution of these varieties overlaps in west Anatolia, but they grow in different localities. The varieties can be distinguished only by the number and length of the bracteoles (Table 1; Boissier 1867, Reeve 1967). In addition, our SEM observations indicate that *D. erinaceus* var. *erinaceus* differs from *D. erinaceus* var. *alpinus* by its more densely papillose indumentum. The indumentum on the stem surface is similar in *D. erinaceus* var. *erinaceus* and *D. goekayi*. How-



**Fig. 4.** Distribution map of *Dianthus erinaceus* var. *erinaceus* (▲), *D. erinaceus* var. *alpinus* (△) and *D. goekayi* (■) in Turkey. Modified from Reeve (1967).

ever, *D. goekayi* has a longer and denser indumentum (Fig. 2). Moreover, *D. goekayi* is clearly distinct from *D. erinaceus* var. *erinaceus* and *D. erinaceus* var. *alpinus* by its densely papillose calyx tubes (Fig. 3).

In the last ten years, several new taxa were collected and described from the area south of Uludağ Mountain i.e. *Alyssum dudleyi*, *Linum pamphylicum* subsp. *olympicum*, *Prometheum chrysanthum* subsp. *uludaghense* and *Centaurea kaynakiae*. These new taxa are associated usually with taxa distributed in west or southwest Anatolia (Adıgüzel & Reeves 2002, Yılmaz *et al.* 2003, Daşkın *et al.* 2009, Daşkın & Yılmaz

2009). Similarly, *D. goekayi* is geographically related to *D. erinaceus*. In the vicinity of the type and paratype localities we have not seen any individuals of *D. erinaceus* var. *erinaceus* or *D. erinaceus* var. *alpinus*. *Dianthus goekayi* is endemic to northwestern Anatolia and geographically isolated from *D. erinaceus* (Fig. 4).

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**Table 1.** Comparison of some morphological characters of *Dianthus goekayi*, *D. erinaceus* var. *erinaceus* and *D. erinaceus* var. *alpinus*.

	<i>D. goekayi</i>	<i>D. erinaceus</i> var. <i>erinaceus</i>	<i>D. erinaceus</i> var. <i>alpinus</i>
Stem	20–25 cm dense and long papillose	4–6 cm dense and short papillose	5–8 cm sparse and short papillose
Basal leaves	10–17 × 0.5–2 mm	15–21 × 1.5–2.5 mm	16–22 × 1.5–2.5 mm
Stem leaves	2–3 pairs shorter than internodes 9–12 × 0.5–1 mm	1 pair longer than internodes 7–8 × 0.5–1 mm	1 pair longer than internodes 7–8 × 0.5–1 mm
Inflorescence	with 2–7 flowers	with 1(2) flower(s)	with 1(2) flower(s)
Bracteoles	4–6, straw-colored	2–8, purple or straw-colored	6–8, purple or straw-colored
Calyx tube	12–14 × 2–3 mm papillose pale green or straw-colored	16–18 × 3–4 mm glabrous purple or straw-colored	17–18 × 3–4 mm glabrous purple or straw-colored

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