TÜBİTAK

Turkish Journal of Botany

http://journals.tubitak.gov.tr/botany/

Research Article

Turk J Bot
(2013) 37: 219-224
© TÜBİTAK
doi:10.3906/bot-1203-39

Dianthus vanensis (Caryophyllaceae), a new species from Turkey

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Received: 27.03.2012 • **Accepted:** 27.09.2012 • **Published Online:** 15.03.2013 • **Printed:** 15.04.2013

Abstract: *Dianthus vanensis* Behçet & İlçim is described as a new species. It is confined to Çatak District (Van) in Eastern Anatolia, Turkey. The diagnostic characters and taxonomic comments on the species are given. Notes are also presented on its ecology. A distribution map of new and related species is also provided.

Key words: *Dianthus*, taxonomy, flora, Turkey

1. Introduction

Caryophyllaceae is one of the largest angiosperm families. It comprises approximately 86 genera and almost 2200 species, which are distributed on all continents but concentrated in the Mediterranean and Irano-Turanian region. The species of the family are heliophytes that occur in dry, open habitats. Some members are restricted to mountainous regions (Johnson & Wilson, 1993; Fior et al., 2006). Traditionally, Caryophyllaceae are divided into 3 subfamilies: Alsinoideae, Caryophylloideae, and Paronychioideae (Pax & Hoffman, 1934; Bittrich, 1993; Rabeler & Bittrich, 1993; Fior et al., 2006).

The family Caryophyllaceae is important due to its medicinal and ornamental properties (Bakshi, 1984). In Turkey 32 genera, including over 470 native species, occur as species (Yıldız, 2002).

The genus *Dianthus* L. belongs to the tribe Silenoideae (Engler, 1887), which is one of the widespread genera in Caryophyllaceae. It is the next largest genera (*Silene* L. has 700 species) and contains almost 600 species throughout the world (Bağcı, 2008; Hamzaoğlu et al., 2011). It is widespread, mainly in Europe and Asia, with a few species in North and South Africa and North America. When the first revision of Turkish *Dianthus* was carried out by Reeve (1967), 67 species were reported. Since then, 6 species and 1 new variety have been described in Turkey (Davis et al., 1988; Güner, 2000; Aytaç & Duman, 2004; Vural, 2008; Yılmaz et al., 2011). Thus, the members of the *Dianthus* taxa in Turkey have reached 74. The East Anatolia region is one of the important floristic regions in Turkey. In recent years a number of species have been described or recorded (Behçet & Avlamaz, 2009; Doğan et al., 2010; Kandemir & Türkmen, 2010; Hamzaoğlu et al., 2011; Behçet & Rüstemoğlu, 2012).

The distribution in neighbouring countries is as follows: 78 species in the former USSR (Shishkin, 1995), 49 in the *Flora Iranica* area (Rechinger, 1988), 121 in Europe (Tutin, 1964), 19 in *Flora Palestina* (Post, 1932), and 3 species in Iraq (Rechinger, 1964).

For the scanning electron microscopy (SEM) studies, mature seeds were mounted using double-sided tape on SEM stubs and coated with gold in a Polaron SC502 sputter coater. They were examined with a JEOL JSM 5500 LV SEM (5 kV) at Kahramanmaraş Sütçü İmam University.

2. Species description

Dianthus vanensis Behçet & İlçim **sp. nov.** (Figures 1–5).

Type: Turkey. C9 Van: Çatak, Konalga village, Tanrıverdi hamlet, around Zevviçal, steppe, 2372 m, 25.vi.2010, *M.Mükemre* 300 (holotype: ANK; isotypes: VANF, GAZI, Bingöl Univ. Herb., Mustafa Kemal Univ. Herb.)

Diagnoses: *Dianthus vanensis* is closely related to *D. libanotis* and *D. crinitus* subsp. *crinitus*. It mainly differs from *D. libanotis* with its shorter herbaceous stems, 9–19 cm long (not robust, 40–60 cm), shorter leaves 15–40 × 1–2 mm (not 20–70 × 4–8 mm with spiny apex), and shorter calyx 30–32 mm (not 36–39 mm). *D. vanensis* differs from *D. crinitus* subsp. *crinitus* by barbulate petals (not ebarbulate), shorter leaves 15–40 mm long (not 20–50 mm); glabrous (not papillose-scabrous).

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Figure 1. Habit of *Dianthus vanensis* Behçet & İlçim (from holotype).

Description: Perennial, with woody rootstock. Flowering stem ascending-erect, 9–19 cm long, branched or not, 1–3-flowered, glabrous. Basal leaves few, 10–25 × 1–2 mm, linear to narrowly linear-lanceolate, acute, glabrous. Cauline leaves linear, acuminate, ±rigid, curved divaricate, canaliculate, 2–4 pairs, 15–40 × 1–2 mm, usually shorter than internodes, rarely equal; sheet 1–3 mm, membranous. Bracts 4–6, with scarious margin; outer 28–30 mm long, almost equal to calyx length, curved divaricate narrowed from just above the middle into a long acuminate-aristate apex, inner shorter, 15–17 mm long, partly purplish at base, narrower than outer. Calyx 30–32 × 5–5.5 mm, glabrous, greenish to purplish, cylindrical, teeth 7–10 mm, linear-lanceolate, mucro 1 mm long, with a narrow scarious, slightly ciliate at margin. Petal 35–37 mm long; limb 15 × 11 mm, barbulate, pinkish-purple,

Figure 2. a- General view of *Dianthus vanensis,* b- petal of *D. vanensis,* c- petal of *D. crinitus* subsp. *crinitus,* d- petal of *D. orientalis,* e- petal of *D. libanotis.*

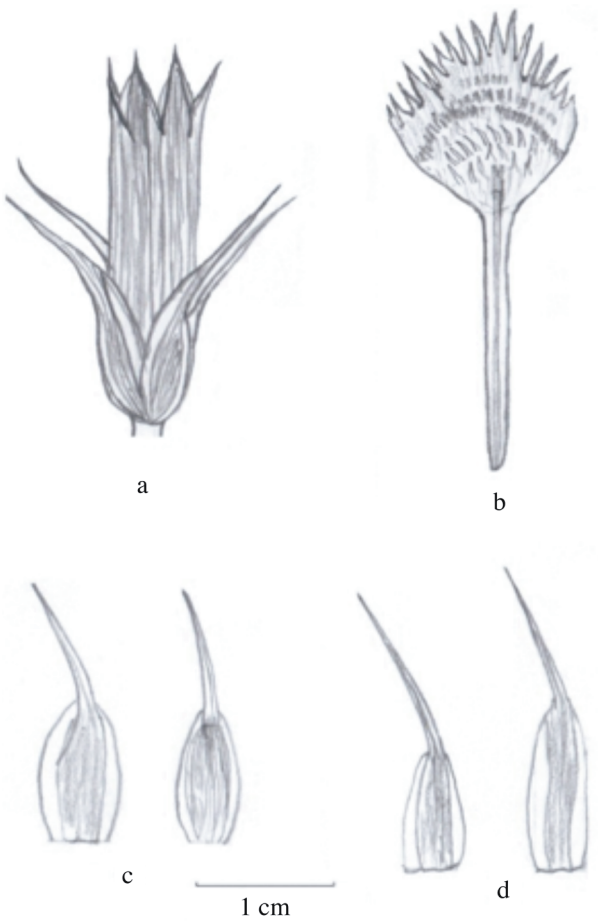

Figure 3. *Dianthus vanensis*. a- calyx, b- petal, c- inner bracts, d- outer bracts.

fimbriate for less than 1/3 its length. Stamens 10; filaments 20–25 mm long, glabrous, techa 2.0–2.1 × 0.8–0.9 mm. Ovaries 8–9 × 2–2.5 mm; styles 2, 10–10.5 mm long, shorter than petal. Seeds 3–4 × 2–2.5 mm.

3. Distribution and suggested conservation status

Dianthus vanensis is a local endemic species known only by type locality, C9 Van. The species is very rare in the area. Due to grazing and erosion, the species is strongly threatened by extinction in the wild if protection measures are not taken. Therefore, we recommend classification of *D. vanensis* as Critically Endangered (CR) (IUCN, 2010).

Dianthus vanensis grows on the steppe of Çatak District (Van Province) at an altitude of 2372 m. The vegetation in this area is very poor due to heavy grazing and soil erosion. Area vegetation is formed by herbaceous plants including *Gundelia tournefortii* L. var. *tournefortii, Salvia acrochlamys* Boiss. & Kotschy, *Euphorbia denticulata* Lam., *Hypericum scabrum* L., *Allium armenum* Boiss. & Kotschy, *Chaerophyllum macropodum* Boiss., *Verbascum cheiranthifolium* Boiss. var. *cheiranthifolium, Acantholimon armenum* Boiss. & Huet var. *balansae* Boiss. & Huet, *Bungea trifida* (Vahl.) C.A.Mey., *Delphinium kurdicum* Boiss. & Hohen., *Atraphaxis spinosa* L., *Saxifraga kotschyi* Boiss., *Galium kurdicum* Boiss. & Hoken, and *Ferulago angulata* (Schlecht.) Boiss. subsp. *angulata.*

Etymology: The specific epithet is derived from the name of the city, Van, where the type was collected.

This new species belongs to section *Fimbriati* Boiss., which forms fimbriate petals. According to Rechinger (1988), this section contains 28 species in *Flora Iranica* and 6 species in the *Flora of Turkey* (Reeve, 1966). The specimens were cross-checked with the keys provided by Reeve (1966) and the *Dianthus* accounts in the literature, including *Flora Iranica* (Rechinger, 1988) and the *Flora of Syria, Palestine and Sinai* (Post, 1933). We concluded that the closest species to our material seem to be *Dianthus*

Figure 4. Distribution map of *Dianthus vanensis* (Δ). *D. orientalis* subsp. *nassireddini*, (□); *D. crinitus* subsp. *crinitus*, (◊); and *D. libanotis*, (○).

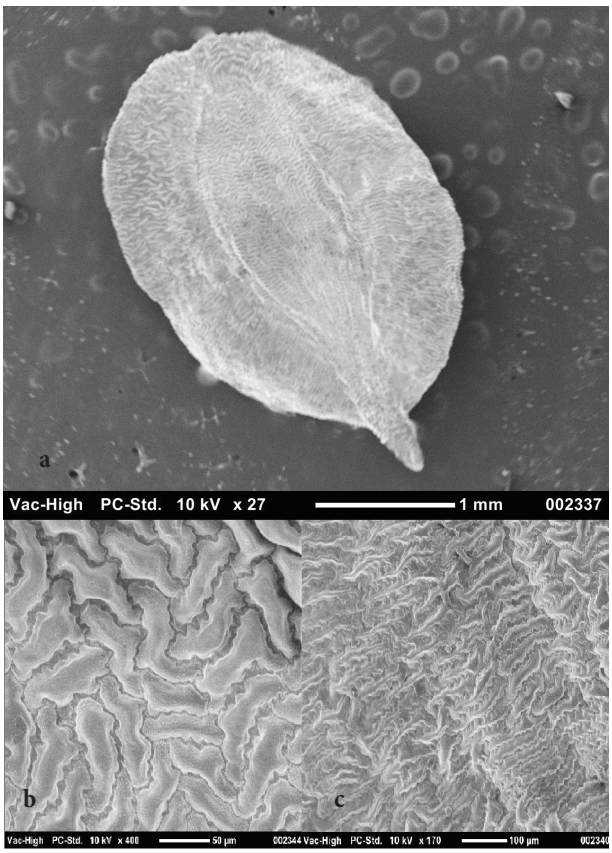

Figure 5. SEM image of *Dianthus vanensis* seed. a- side view, b- central cells, c- wing cells.

libanotis Labill, *D. crinitus* Sm. subsp. *crinitus*, and *D. orientalis* subsp. *nassireddini* (Stapf) Rech.f.

According to the *Flora of Turkey*, members of the section *Fimbriati* have ebarbulate petals. In addition, length of the bracts varies between 1/3 and 1/2 of the calyx length, except in *Dianthus libanotis*. As in *D. libanotis* this new species has barbulate petals and longer bracts. It is somewhat similar to *D. libanotis* in terms of floral characteristics; however, petal colour is different. Moreover, it is clearly distinguished from *D. libanotis* by its shorter herbaceous stems, 9–19 cm long (not robust, 40–60 cm), shorter leaves 15–40 × 1–2 mm (not 20–70 × 4–8 mm with spiny apex), shorter calyx 30–32 mm (not 36–39 mm), and pinkish-purple petals (not white petals).

Dianthus crinitus has 2 varieties, according to Reeve (1966). Later, Rechinger (1988) evaluated these varieties and preserved the names *Dianthus crinitus* var. *crinitus* as a subspecies and *Dianthus crinitus* var. *crosspetalus* as a species in *Flora Iranica*. Currently, *D. crinitus* has 6 subspecies in *Flora Iranica*. *D. vanensis* differs from *D. crinitus* subsp. *crinitus* by barbulate petals and longer bracts and shorter (15–40 mm long), glabrous leaves (not papillose-scabrous, 20–50 mm). A more detailed comparison of the species is given in the Table. According to Rechinger (1986), *D. orientalis* has 8 subspecies in *Flora Iranica*. This new species is related to *D. orientalis* Adams subsp. *nassireddini* (Stapf) Rech.f. from Iran and Iraq; however, it differs by clearly barbulate, 15 mm long petal lamina (not indistinctly barbulate, 5–6 mm) and a longer calyx 30–32 mm long (not 20–23 mm). A more detailed comparison of the species can be seen in the Table.

Dianthus vanensis has brown, broadly elliptic-ovate, winged shaped, 3–4 × 2–2.5 mm diameter seeds (Figure 4); however, the seed shape of *D. crinitus* var. *crinitus* is peltate

Table. Comparison of the diagnostic characteristics of *Dianthus vanensis, D. orientalis* subsp. *nassireddini, D. crinitus.* subsp. *crinitus*, and *D. libanotis.*

Characters	*D. vanensis*	*D. orientalis* subsp. *nassireddini*	*D. crinitus* subsp. *crinitus*	*D. libanotis*
Cauline leaves	15–40 × 1–2 mm, not spiny	20–70 × 0.5–3 mm, not spiny	20–50 × 1–1.5 mm, not spiny	20–70 × 3–8(12) mm, spiny
Bracts	4–6, not spiny	4(–6), not spiny	4–6, not spiny	(4–)6–8, spiny
Calyx	30–32 × 5–5.5 mm	20–23(–25) × 3–4 mm	(25–)30(–35) × 4–5 mm	36–39 × 4.5–5 mm
Calyx teeth length	7–10 mm	5 mm	7 mm	10–11 mm
Petal limb	barbulate, pinkish-purple, fimbriate for less than 1/3 its length	barbulate, rosa, fimbriate for less than 1/3 its length	ebarbulate, white, fimbriate for at least 1/2 its length	barbulate, white or white with reddish spots at base, fimbriate for at least 1/2 its length

(Yıldız, 2002). The back of the seed is flat convex, and its surface is finely granulated. Seed coat cells are irregular, sometimes "S" shaped, dentate (Figure 5).

These specimens were compared to the specimens of related taxa in the GAZI and Sütçü İmam Univ. Herb. herbaria (Appendix).

Key to *Dianthus vanensis* and related taxa:

1. Petals barbulate 2
1. Petals ebarbulate ..... **D. crinitus** subsp. **crinitus**
2. Calyx at least 30 mm 3
2. Calyx at most 25 mm ... **D. orientalis** subsp. **nassireddini**
3. Cauline leaves 1–2 mm wide; petal pinkish-purple, limb fimbriate for less than 1/3 its length ..... **D. vanensis**
3. Cauline leaves 3–8(–12) mm wide; petal white or white with reddish spots at base, limb fimbriate for at least 1/2 its length ..... **D. libanotis**

Appendix

Additional examined specimens. -*Dianthus crinitus* var. *crinitus*: C4 Konya; Ereğli, Halkapınar, around Yayıklı village, protected areas, 1250 m, 22.vi.1997, *Z.Aytaç* 7605 (GAZI); Manisa: south of Çırpıcı Dede Mountain, 1200 m, 21.vi.1984, *H.Duman* 1808 (GAZI); A6 Sivas: Yıldızeli, around Çakmakçı pass, 1720 m, steppe, 30.vii.1996, *A.A.Dönmez* 5343 (GAZI); A5 Amasya: Sarılar village, 850 m, limestone rocks, 23.vii.1993, *A.A.Dönmez* 3762 (GAZI); C2 Antalya: Elmalı-Korkuteli, 40 km, protected *Quercus coccifera* forest, limestone rocks, 1170 m, 30.vi.1996, *Z.Aytaç* 7425 (GAZI); A8 Erzurum: between Erzurum and İspir, 50 km, Eğerti village area, 2100–2200 m, 19.vii.1990 steppe, *Z.Aytaç* 5161 (GAZI); B5 Nevşehir: Göreme, volcanic tuff, borders of vineyards, 1130 m, 17.vi.1989, *M.Vural*, *Ü.Kol* & *N.Adıgüzel* 5161 (GAZI); B5 Nevşehir: Göreme, Topraktepe, 1000 m, 23.vi.1995, *M.Vural* 7325 (GAZI); A4 Ankara: Çubuk, Ovacık-Saracık villages, 1250–1380 m, 03.viii.1992, *E.Dündar s.n.* (GAZI); A4 Ankara: Ayaşbeli, forestation region, roadsides, 1100 m, 21.vii.1993, *Z.Aytaç* 6100 (GAZI). -***Dianthus orientalis*:** B9 Bitlis: Mt. Nemrut, 2000–2200 m, 20.viii.1983, *T.Ekim* 3295 (GAZI); C5 Mersin: Erdemli, Limonluk, Kayacı valley, 10 m, 31.vii.1995, above rocks, *Z.Aytaç* 7521 (GAZI); A8 Artvin: Yusufeli, Dereiçi village, stony slopes, 720 m, 20.v.1983 *A.Güner* 4796 (GAZI); A8 Rize: Çamlıhemşin, between Çatak village and Vanki plateau, *Picea orientalis* forest, 1400–2100 m, 22.viii.1981, *A.Güner* 4279 (GAZI), B9 Bitlis: Adilcevaz, Süte plateau, mountain steppe, 2000 m, 12.viii.1993, *Y.Altan* 5530 (GAZI); C10 Hakkari: Aruna crevice, ca. 2500 m, 27.vii.1983, *T.Ekim* 7998 (GAZI); B7 Erzincan: between Refahiye İmranlı, serpentine area, 1840 m, 15.viii.2001, *N.Adıgüzel* 4168 & *R.Reeves* (GAZI); B7 Erzincan: above Üzümlü, Keşiş Mountain, 2000–2250 m, 13.viii.2001, *N.Adıgüzel* 4126 & *R.Reeves* (GAZI); B7 Erzincan: between Refahiye and İmranlı, 100 m beyond Kayınboğazı crossroad, 1900 m, serpentine areas, 15.viii.2001, *N.Adıgüzel* 4179 & *R.Reeves* (GAZI); C6 Kahramanmaraş: Çimendağı, Uzunziyaret hill, 2100–2200 m, 14.x.1995, *Ö.Varol* 1192 (Sütçü İmam Univ. Herb.); C6 Kahramanmaraş: Engizek Mountain, Gici hill, 2000 m, 22.vii.1987 *H.Duman* 3654 (GAZI); A8: Erzurum: İspir-Çamlıkaya, İspir exit, Çoruh valley, stony steppe, 1170 m, 28.vii.1991, *A.Güner* (GAZI); C6 Kahramanmaraş: Çağlayancerit, Öksüz Mountain, Ziyaret Tree hill, north hillside, 1200–1300 m, 06.vii.1991, *Z.Aytaç & H.Duman* 4047 (GAZI).

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