



***Dianthus sancarii* (Caryophyllaceae), a new species from eastern Turkey**

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Abstract

Dianthus sancarii Hamzaoglu & Koç sp. nov. (Caryophyllaceae) is described as a new species to science from East Anatolia (Bitlis province, Turkey). It is morphologically similar to *D. pallidiflorus* Ser. but differs mainly in its life form, inflorescence, pedicel length, epicalyx scale sizes, calyx length, claw sizes and collar/claw ratio. Its description, pictures, ecology and conservation status were given. Besides, additional information was given about *Dianthus pallidiflorus*, because it is not very well known in Turkey.

Key words: *Dianthus*, taxonomy, new species, East Anatolia, Turkey

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***Dianthus sancarii* (Caryophyllaceae), Türkiye'nin doğusundan yeni bir tür**

Özet

Dianthus sancarii Hamzaoglu & Koç sp. nov. (Caryophyllaceae) Doğu Anadolu'dan bilim dünyası için yeni bir tür olarak tanımlandı. Tür morfolojik olarak *D. pallidiflorus* Ser.'a benzer ancak ondan hayat formu, çiçekdurumu, pedisel boyu, epikaliks pulu ölçüleri, kaliks boyu, klav ölçüleri ve yaka/klav oranı ile farklıdır. Türün betimi, ayrıntılı morfolojik özelliklerini gösteren resmi, yayılış haritası, ekolojisi ve koruma durumunu gösteren IUCN tehlike sınıfı değerlendirmesi verildi. Ayrıca, Türkiye'de çok iyi bilinmediği için *Dianthus pallidiflorus* hakkında ek bilgi verildi.

Anahtar kelimeler: *Dianthus*, taksonomi, yeni tür, Doğu Anadolu, Türkiye

1. Introduction

The genus *Dianthus* L. (Caryophyllaceae) has about 600 species and it mostly grows in Asia and Europe (Dequan and Turland, 2001). It is the second genus with the highest number of species of the family Caryophyllaceae after *Silene* L., in Turkey. The final evaluation on the Turkish species of the genus *Dianthus* was made by Reeve (1967). As a result of this study, there were 67 species accepted in the second volume of the Flora of Turkey and the East Aegean Islands. The number of the species has risen to 81 by recent studies (Özhatay and Kültür, 2006; İlçim et al., 2013; Hamzaoglu and Koç, 2015; Hamzaoglu et al., 2014; 2015a; 2015b; 2015c).

2. Materials and methods

In the summer of 2015, during a botanical trip to Koruklu village in Tatvan district of Bitlis (Turkey), the authors collected some interesting flowering specimens of *Dianthus* (Caryophyllaceae). These specimens were thoroughly evaluated using the related literature (Reeve, 1967; Schischkin, 1985; Rechinger, 1988; Tutin & Walters, 1993) and with related species in the herbaria GAZI and ISTE. These specimens were not referable to any known *Dianthus* species. The materials were examined and the images were taken using a Leica EZ4 HD microscope and a Canon EOS60D digital camera. The macro-morphological characters were measured using a ruler with 0.5 mm accuracy and the micro-morphological characters were determined using an ocular micrometer.

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3. Results

3.1. *Dianthus sancarii* Hamzaoğlu & Koç, sp. nov. – Figure 1.

Type: Turkey, B9 Bitlis: Tatvan, above Koruklu village, 1990 m a.s.l., *Quercus* openings, damp places, 12 July 2015, Hamzaoğlu 7038 & Koç (holotype: GAZI; isotypes: GAZI, ANK, HUB).

Diagnosis: *Dianthus sancarii* is related to *D. pallidiflorus* Ser. It mainly differs from the related taxa for it has suffruticose habit (not herbaceous); sterile shoot leaves present (not absent), lower leaves persistent at flowering (not withered); flowers solitary (not 2–4(–6) together); outer epicalyx scales 10–14 × 2–3 mm (not 5–9 × 1.2–1.7 mm); calyx 12–16 mm long (not 10–13 mm long); limb 1/4 as long as petal and collar 1/5 as wide as claw (not limb 1/3 as long as petal and collar ± as wide as claw).

Description: Suffruticose, many-stemmed, glabrous. Stems erect or ascending, fragile, 25–50 cm tall, branching from basal and upper nodes, 8–11-nodes. Sterile shoot leaves linear, equal or longer than cauline leaves, loose, flattened in cross-section, margins scabrous, apex acute to acuminate. Cauline leaves linear, flattened in cross-section, margins scabrous; lower persistent at flowering; middle 20–35 × 1.2–1.8 mm, separate from stem, shorter than internodes, 3-veined, apex acuminate, sheaths up to 2 times as long as wide; upper similar but smaller, purplish at base, nodes ± swollen. Inflorescence many-flowered, cymose, flowers solitary; branches angled 15–30°, up to 12 cm long; pedicels 6–23 mm, greenish. Epicalyx scales 4–6, cartilaginous-herbaceous, indistinctly veined and purplish below, distinctly 3–5-veined and greenish above, apex acute-obtuse except arista; outer linear-lanceolate, 3/4 as long as to equal to calyx, 10–14 × 2–3 mm, with 0.3–0.5 mm scarios margins, arista 2/5–2/3 as long as scale, separate from calyx; inner oblanceolate, 3/5–4/5 as long as calyx, 9–13 × 2.2–3.4 mm, with 0.6–0.8 mm, scarios at margins, arista 1/4–1/3 as long as scale, ± separate from calyx. Calyx cylindric-lanceolate, 12–16 × 2.4–3.2 mm, distinctly 35–45-veined above, greenish, purplish towards apex; teeth triangular-lanceolate, 4–6 × 1.1–1.5 mm, 5–9-veined, with ciliate and scarios margins, apex acuminate and with mucronate. Petal 14–17 mm long; limb broadly obovate, 3.5–4.2 × 3.2–4 mm, 1/4 as long as petal, 2/3 exerted from calyx, unspotted, barbulate, whitish to cream, irregularly 6–9-toothed to apex, teeth broadly triangular, up to 1/5 as long as limb; claw 10.5–12.7 × 1.3–1.6 mm, collar 1/5 as wide as claw. Capsule shorter than calyx.

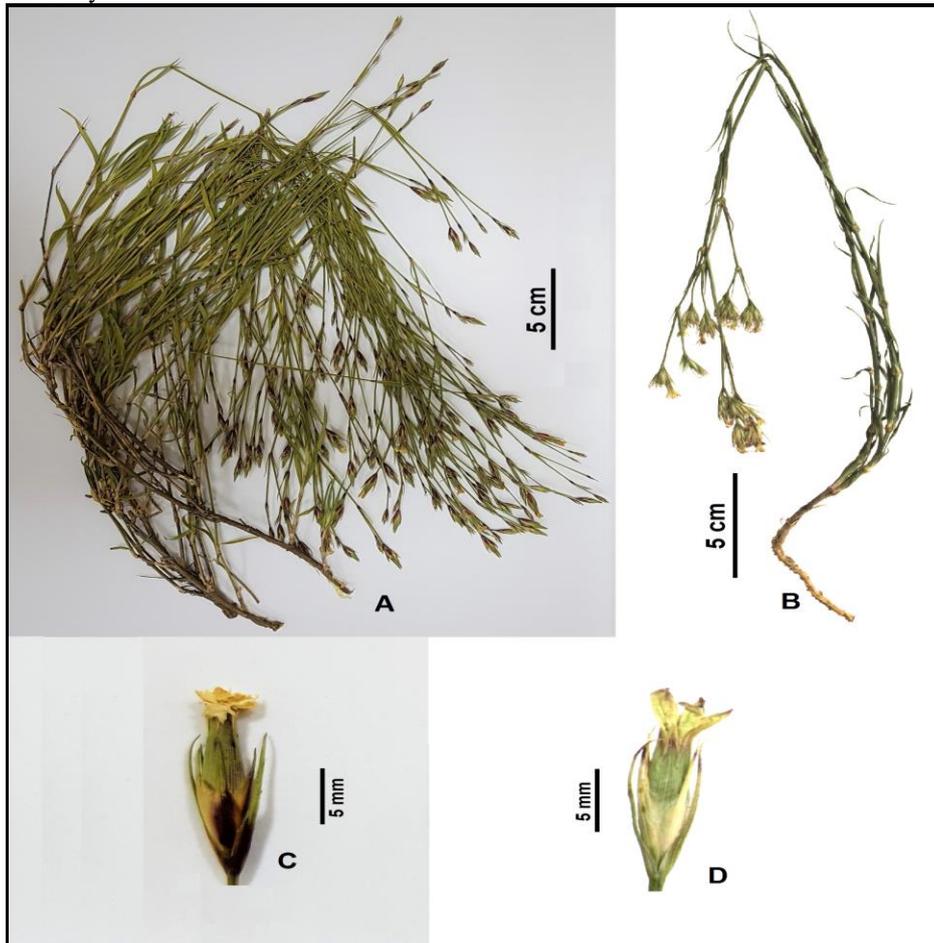


Figure 1. Habits and flowers: **A** and **C**. *Dianthus sancarii* (Hamzaoğlu 7038), **B** and **D**. *Dianthus pallidiflorus* (Hamzaoğlu 6592)

3.2. Distribution, ecology and suggested conservation status

Dianthus sancarii grows in the timber line of Tatvan district (Bitlis province), at altitude 1990 m a.s.l. in *Quercus* sp. openings (Figure 2). Phytogeographically the area is in the Irano-Turanian region. Habitat types of the area are calcareous steppes and deciduous forests.

The deciduous forest area is mainly characterized by *Quercus infectoria* G.Olivier subsp. *boissieri* (Reut.) O.Schwarz. The calcareous steppe is formed by usually chamaephyte and hemicryptophytes plants including *Achillea vermicularis* Trin, *Aethionema membranaceum* DC., *Alopecurus aucheri* Boiss., *Alyssum praecox* Boiss. & Balansa var. *praecox*, *Anthemis cretica* L. subsp. *albida* (Boiss.) Grierson, *Eremogone gypsophiloides* (L.) Fenzl, *Asperula xylorrhiza* Nabelek, *Bromus erectus* Huds, *Globularia trichosantha* Fisch. & C.A.Mey., *Grammosciadium pterocarpum* Boiss., *Gundelia tournefortii* L., *Helichrysum plicatum* DC. subsp. *plicatum*, *Hypericum scabrum* L., *Inula salicina* L., *Linaria kurdica* Boiss. & Hohen., *Onobrychis carduchorum* C.C.Towns., *Onosma polioxantha* Rech.f., *Paracaryum strictum* (K.Koch) Boiss., *Poa nemoralis* L., *Prangos pabularia* Lindl and *Scrophularia libanotica* Boiss. subsp. *libanotica* var. *libanotica*.

Dianthus sancarii is endemic to Tatvan district (Bitlis province) and belongs to the Irano-Turanian element. According to current data, the new species grows in an area of approximately 30 km² covering the area. The possible land-use changes can result in a detrimental effect in the future. However, there is not a threat on the population currently. For this reason, it is proposed that the species should be classified as “Not Evaluated” (NE) according to the International Union for Conservation of Nature (IUCN) red list criteria (IUCN, 2017).

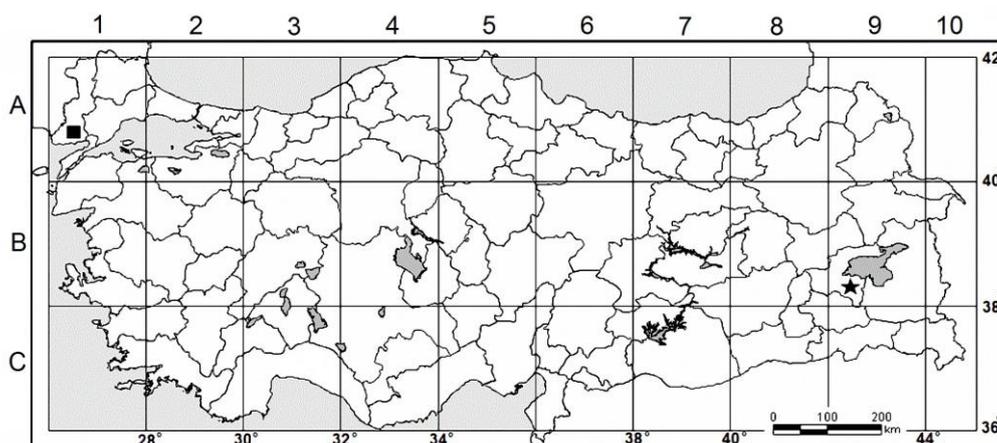


Figure 2. Distribution map of *Dianthus sancarii* (★) and *Dianthus pallidiflorus* (■) in Turkey

3.3. Phenology

The flowering of the species starts from mid-July. The capsule of the species starts ripening about at the end of August.

3.4. Etymology

The new species was named in the honour of the eminent Turkish biochemist and molecular biologist Prof. Dr. Aziz Sancar, who was born in Savur district (Mardin province, Turkey) in 1946 (UNC School of Medicine, USA). He was awarded the Nobel Prize in Chemistry along with Tomas Lindahl and Paul Modrich for their mechanistic studies of DNA repair, in 2015.

3.5. Taxonomic remarks

Dianthus sancarii belongs to the section *Dentati* Boiss. and it is very similar to *D. pallidiflorus* (Table 1). These species are particularly similar in their flower characteristics because of their having glabrous calyx, and whitish, toothed and barbulate petals, containing 4–6 epicalyx scales (Reeve, 1967; Schischkin, 1985; Rechinger, 1988; Tutin and Walters, 1993; Greuter and Rous, 2002; Özhatay and Kültür, 2006). Although there are some similarities, there are distinctive morphological differences between these taxa such as the life forms, inflorescences, epicalyx scales sizes, calyx length and collar/claw ratio (Figure 1 and Table 1).

Dianthus pallidiflorus grows in Greece, Bulgaria, Ukraine, Crimea and the north-east of Turkey (Figure 2). The species blooms in June-August and prefers grassy slopes at altitudes of between 50-100 m a.s.l. *D. pallidiflorus* is distributed in the Euro-Siberian phytogeographic region, where a relatively humid climate prevails. However, *D.*

sancarii grows in the Bitlis province, east of Turkey. It prefers *Quercus* openings at altitude 1990 m a.s.l. and it is distributed in Irano-Turanian phytogeographic region, where a semi-arid climate prevails.

Dianthus sancarii looks similar to *D. orientalis* because of its suffruticose habit. Moreover, these species have overlapping distribution areas (Reeve, 1967). However, *D. orientalis* belongs to the section *Fimbriati* Boiss. by reasons of having fimbriate and barbulate petals. In addition, the petals of *D. sancarii* are whitish and only 2/3 portion of the limb exerted from the calyx, whereas the petals of *D. orientalis* are purplish and the whole limb as well as a portion of the claw exerted from the calyx.

Table 1. The distinguishing features between *Dianthus sancarii* and *D. pallidiflorus*.

Characters	<i>D. sancarii</i>	<i>D. pallidiflorus</i>
Habit	suffruticose, chamaephyte	herbaceous, hemicryptophytes
Sterile shoot leaves	present	absent
Lower leaves	persistent at flowering	withered at flowering
Inflorescences	flowers solitary, pedicels 6–23 mm long	flowers 2–4(–6) together, pedicels up to 2 mm long
Epicalyx scale	outer 10–14 × 2–3 mm, inner 9–13 × 2.2–3.4 mm	outer 5–9 × 1.2–1.7 mm, inner 6–9 × 1.6–2 mm
Calyx	12–16 mm long; teeth 4–6 mm long	10–13 mm long; teeth 3–4 mm long
Petal	limb 1/4 as long as petal; collar 1/5 as wide as claw	limb 1/3 as long as petal; collar ± as wide as claw
Habitat	<i>Quercus</i> openings and damp places	grassy slopes
Altitude	1990 m a.s.l.	c. 50–100 m a.s.l.
Distribution	Irano-Turanian region	Euro-Siberian region

3.6. Additional specimens seen

***Dianthus pallidiflorus*:** Turkey, A1 Edirne: Between Havsa to Edirne, 95 m a.s.l., 26 June 2012, grassy slopes, Hamzaoğlu 6370, Aksoy & Koç (GAZI); *ibid.*, 7 August 2012, Hamzaoğlu 6592, Aksoy & Koç (GAZI); Edirne: Between Edirne and Kapıkule, [c. 50-80 m], Uncultivated land, 5 October 1966, Collector? (ISTE-10420).

4. Conclusions and discussion

Dianthus pallidiflorus was included in the list of Turkish plants as a new record in 2002 (Greuter & Rous). However, the description of the species was not given in this publication. The description of the species is very short in the original publication and Flora Europaea (Candolle, 1824; Tutin & Walters, 1993). Therefore, a detailed description of the species was given below according to the examined specimens.

Dianthus pallidiflorus Ser. – Figure 1.

Literature: Candolle, Prodr. 1: 358, 1824; Tutin & Walters, Flora Europaea, vol. 1: 244, 1993.

Type: [Russia, Volgograd] “Sarepta [Krasnoarmeysky]”, Collector? (LE).

≡ *Dianthus campestris* subsp. *pallidiflorus* (Ser.) Schmalh., Fl. Sredn. Yuzhn. Rossii 1: 447 (1895).

= *Dianthus maeoticus* Klokov, Sc. Mag. Biol. 1927: 13 (1927).

Description: Perennial herbs, many-stemmed, glaucous. Stems erect or ascending, 20-60 cm tall, scabrous and purplish below, glabrous above, branching from basal, middle and upper nodes, 9–17-nodes. Sterile shoot leaves absent at flowering. Cauline leaves linear, glabrous, flattened to canaliculate in cross-section, margin scabrous; lower withered at flowering; middle 15–50 × 0.8–1.5 mm, ± adpressed to stem, shorter or longer than internodes, 3-veined, apex acuminate, sheaths as long as wide; upper similar but smaller, greenish at base, nodes usually swollen. Inflorescence many-flowered, cymose, flowers 2–4(–6) together; branches angled 15–30°, up to 5 cm long, glabrous; pedicels up to 2 mm long, greenish. Epicalyx scales 4, cartilaginous-membranaceous, glabrous, veinless below, indistinctly 3–5-veined above, apex acute-obtuse except arista; outer linear to lanceolate, straw-colored, 1/2–4/5 as long as calyx, 5–9 × 1.2–1.7 mm, with 0.3–0.6 mm scarious margins, arista 2/5–2/3 as long as scale, separate from calyx; inner lanceolate, greenish,

1/2–4/5 as long as calyx, 6–9 × 1.6–2 mm, with 0.6–0.8 mm, scarious at margins, arista 1/3–1/2 as long as scale, ± adpressed to calyx. Calyx cylindric-lanceolate, 10–13 × 2–3.5 mm, distinctly 35–40-veined above, glabrous, greenish to straw-colored; teeth triangular, 3–4 × 1.1–1.4 mm, 5–7-veined, glabrous, with ciliate and scarious margins, apex acuminate and with mucronate. Petal 11–16 mm long; limb cuneate, 3.5–5 × 2.5–3.5 mm, 1/3 as long as petal, ± 2/3 exerted from calyx, unspotted, barbulate, whitish to yellowish-green, irregularly 3–9-toothed to apex, teeth broadly triangular, up to 1/6 as long as limb; claw 7.5–11 × 1–1.2 mm, collar ± as wide as claw. Capsule shorter than calyx. Seeds broadly elliptic, brownish-black, 1.3–2 × 1–1.3 mm.

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