



Dianthus burdurensis (Caryophyllaceae), a new species from South-western Turkey

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Abstract

Dianthus burdurensis is here described as a new species from Burdur province (Turkey). Its distribution, habitat, and IUCN category are also given, as well as a macro- and micromorphological comparison with the related species *D. masmenaeus* Boiss.

Keywords: Burdur, new carnation, section *Dentati*, species description, taxonomy.

Introduction

Dianthus Linnaeus (1753: 409) is the second largest genus, after *Silene* Linnaeus (1753: 416), in the family *Caryophyllaceae* Juss., including approximately 300 species which are mainly distributed in European Mediterranean area and in Asia (Reeve 1967, Bittrich 1993, Vaezi *et al.* 2014).

The more comprehensive study on *Dianthus* species concerning the Turkish flora was carried out about 50 year ago by Reeve (1967), who recognized 67 species. After Reeve (1967) nine new records were added to the flora by Davis *et al.* (1988), Güner (2000) and Özhatay & Kültür (2006). The *Dianthus* species in Flora of Turkey and the East Aegean Islands can be distinguished by the number and structure of epicalyx scales and flower characteristics such as calyx and petal features as reported, e.g., by Reeve (1967), Gemici & Leblebici (1995), Menemen & Hamzaoglu (2000), Aytaç & Duman (2004), Vural (2008), Yılmaz *et al.* (2011), and İlçim *et al.* (2013).

As part of the preparation of the revision of *Dianthus* and *Minuartia* Linnaeus (1753: 89) for TÜBİTAK KBAG-111T873 and KBAG-113Z260, field surveys in Burdur (South-western Turkey) allowed to find an unusual population which appears to be morphologically well different from the other taxa included in *Dianthus* sect. *Dentati* Boissier (1867: 480). Taxonomical investigations carried out on living plants led to establish that the population found can be proposed as a distinct species, named *D. burdurensis*.

Materials and methods

Field surveys in the Province of Burdur are carried out, as well as analysis of literature (Reeve 1967, Davis *et al.* 1988, Güner 2000, Özhatay & Kültür 2006) and examination of specimens preserved at the herbaria ANK, GAZI, and HUB (acronym according to Thiers 2015+). The pictures were prepared using a CANON EOS 60D digital camera, while seed surfaces were displayed through a LEO 440 Scanning Electron Microscope. The vegetative characteristics were measured with a ruler with 0.5 mm accuracy and the floral characteristics were determined using an ocular micrometer.

Taxonomic treatment

Dianthus burdurensis Hamzaoglu & Koç, *sp. nov.* (Fig. 1–2)

Type:—TURKEY. **Burdur**: Between Yeşilova and Salda village, N slopes of Eşeler Mountain, small dry meadows in forest clearings, 37°29'08"N, 29°39'09"E, 1590 m a.s.l., 23 August 2014, Koç & Hamzaoglu 7170 (holotype GAZI!, isotypes GAZI!, ANK!, HUB!).

Diagnosis:—*Dianthus burdurensis* is similar to *D. masmenaeus* Boissier (1856: 51) from which differs in usually lacking of sterile shoots leaves, and in having the withered lower leaves, the inflorescence (3–)5–9(–13)-flowered, petals 11.5–15.5 mm long, and the limbs creamish-white.

Description:—*Perennial*, solitary or few-stemmed herbs. *Stems* erect, slender at base, 25–45 cm tall, simple or rarely branching from upper nodes, 6–9-noded, glabrous above and usually puberulous below, greenish or sometimes purplish at base. *Leaves* linear, flattened in cross-section, glabrous, margins scabrous, with ciliate and scarious near base, apex 3-acuminate; sterile shoot leaves absent or very rarely present at flowering, if present, linear and loosely arranged; lower withered after anthesis, 20–35 × 1–2 mm; middle 30–50 × 1–2 mm, adpressed to stem, shorter than or as long as internodes, thin, 3-veined, sheaths 2–2.5 times as long as wide; upper adpressed to stem, greenish at base, nodes ± swollen. *Inflorescence* usually simple or rarely branched, flowers in clusters, each one (3–)5–9(–13)-flowered; pedicels 0–1.5 mm, glabrous, greenish. *Bracts* greenish to straw-colored, linear-subulate to lanceolate, as long as or shorter than flowers. *Epicalyx scales* 4–6, herbaceous, greenish or straw-colored; outer usually distinctly 5–7-veined, glabrous, 2/5–3/5 as long as calyx, linear-lanceolate, 6.0–8.5 × 1.5–2.0 mm, with scarious (0.3–0.5 mm) margins, apex acute-obtuse except arista, arista 1/3–1/2 as long as scale, separated from calyx; inner usually distinctly 7–9-veined, glabrous, 1/2–2/3 as long as calyx, linear-oblong-lanceolate, 7.0–11.0 × 1.8–2.5 mm, with ciliate and scarious (0.4–0.6 mm) margins, apex acute-obtuse except arista, arista 1/3–2/5 as long as scale. *Calyx* oblong-lanceolate, 9.5–16.0 × 2.2–3.2 mm, distinctly 40–45-veined, glabrous, greenish or straw-colored; teeth triangular-lanceolate, 2.5–4.0 × 1.5–2.0 mm, glabrous, 7–9-veined, with ciliate and scarious margins, apex acuminate and mucronate, greenish or sometimes purplish tinged towards apex. *Petals* 11.5–15.5 mm long; limb obovate to cuneate, 3.5–5.5 × 2.5–3.5 mm, about 1/3 as long as petal, about 2/3 exerted from calyx, unspotted, barbulate, creamish-white above, greenish beneath, completely greenish-yellow in dried, 4–7-toothed, teeth irregular, broadly triangular, up to 1/6 as long as limb; claw 8.0–10.0 × 1.0–1.2 mm, collar as wide as claw. *Capsule* shorter than calyx. *Seeds* ovate, 2.0–2.8 × 1.2–1.7 mm, blackish.

Etymology:—The specific epithet is derived from the name of the city, Burdur, where the holotype was collected.

Vernacular name:—“Burdur Karanfili” (Turkish).

Distribution and habitat:—*Dianthus burdurensis* is known only from the type locality, Eşeler Mountain, Yeşilova, Burdur, where it grows at altitude of 1590 m on dry meadows in oak forest clearings.

Phenology:—Flowering time July–August, fruiting August–September.

Conservation status:—On the basis of IUCN red list categories and criteria (IUCN 2014), *Dianthus burdurensis* cover an area (EOO) of about 30 km². The new species is here assessed as Critically Endangered (CR, B1a).

Seed Morphology:—*Dianthus burdurensis* has seed ovate, 2.0–2.8 × 1.2–1.7 mm, black, granular; dorsal surface convex, with regular rectangular cells, tuberculate, with 5–7 teeth per margin, teeth clear S-undulate; ventral surface flat, with regular rectangular cells, papillate, with 3–5 teeth per margin, teeth S-undulate, not clear; apex beaked. *D. burdurensis* seeds are similar to *D. masmenaeus* ones concerning the shape of apex, color and dorsal surface. However, the *D. masmenaeus* seeds differ in size (2.3–3.0 × 1.0–1.3 mm) and have long, irregular rectangular/square-shaped ventral cells, 5–9 teeth containing ventral surface cells with V-undulate, and apparent teeth (Fig. 2).

Taxonomical notes (Table 1):—*Dianthus burdurensis* is related to *D. masmenaeus* in its habit and limb hairiness (Reeve 1967). It mainly differs from the latter taxa by the lower leaves withered after anthesis (not persistent in *D. masmenaeus*), flowers in clusters, (3–)5–9(–13)-flowered [flowers in fascicles, 2–4(–7)-flowered in *D. masmenaeus*], outer epicalyx scales 2/5–3/5 as long as calyx (1/2–4/5 as long as calyx in *D. masmenaeus*); petals 11.5–15.5 mm long (not 14–25 mm long as in *D. masmenaeus*); limbs creamish-white above (not pink as in *D. masmenaeus*); claws 8–10 mm long (not 10–16.5 mm long as in *D. masmenaeus*).

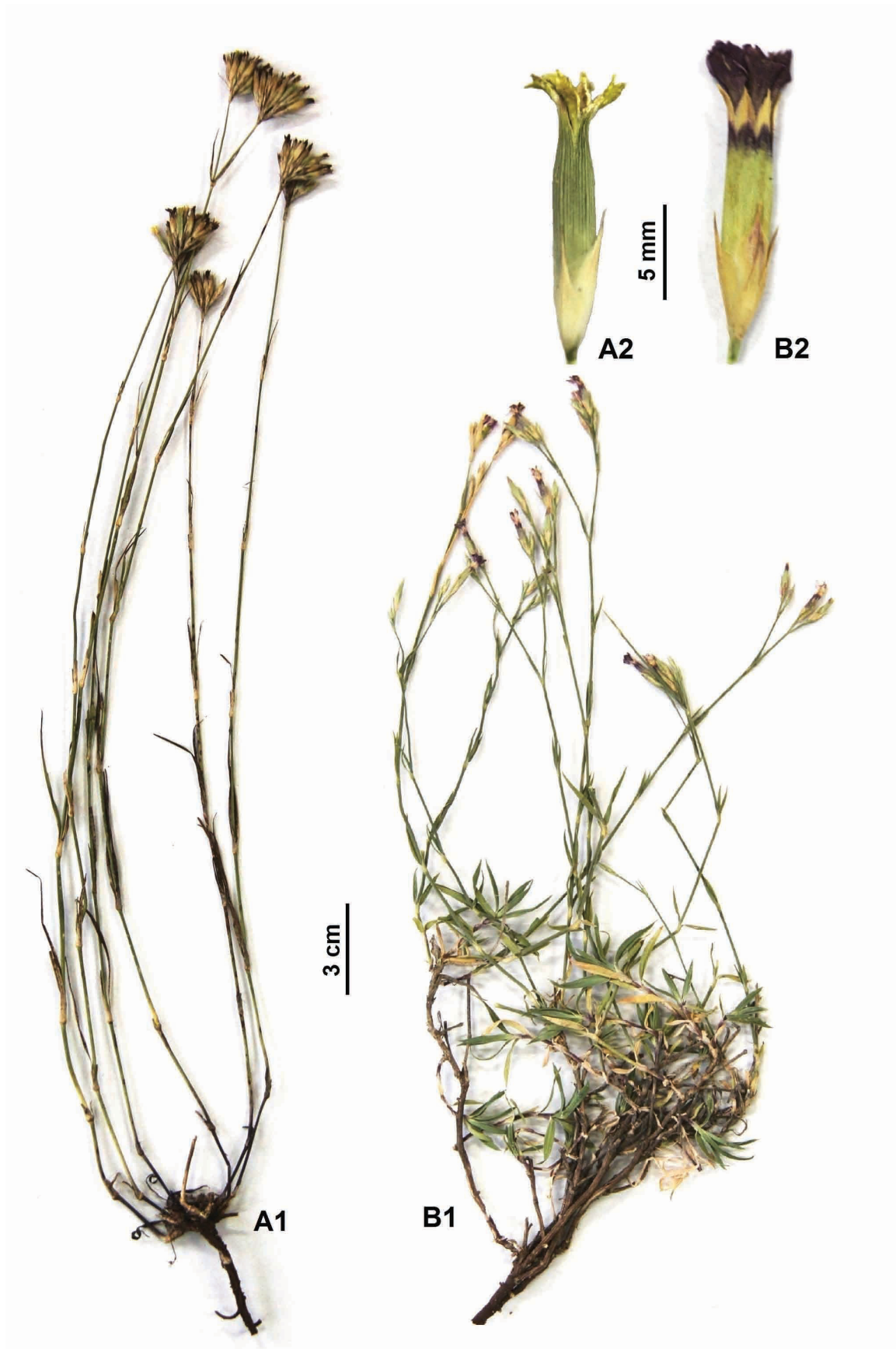


FIGURE 1. Morphological comparison of *Dianthus burdurensis* (A) and *D. masmenaeus* (B). 1: Habit. 2: Flower.

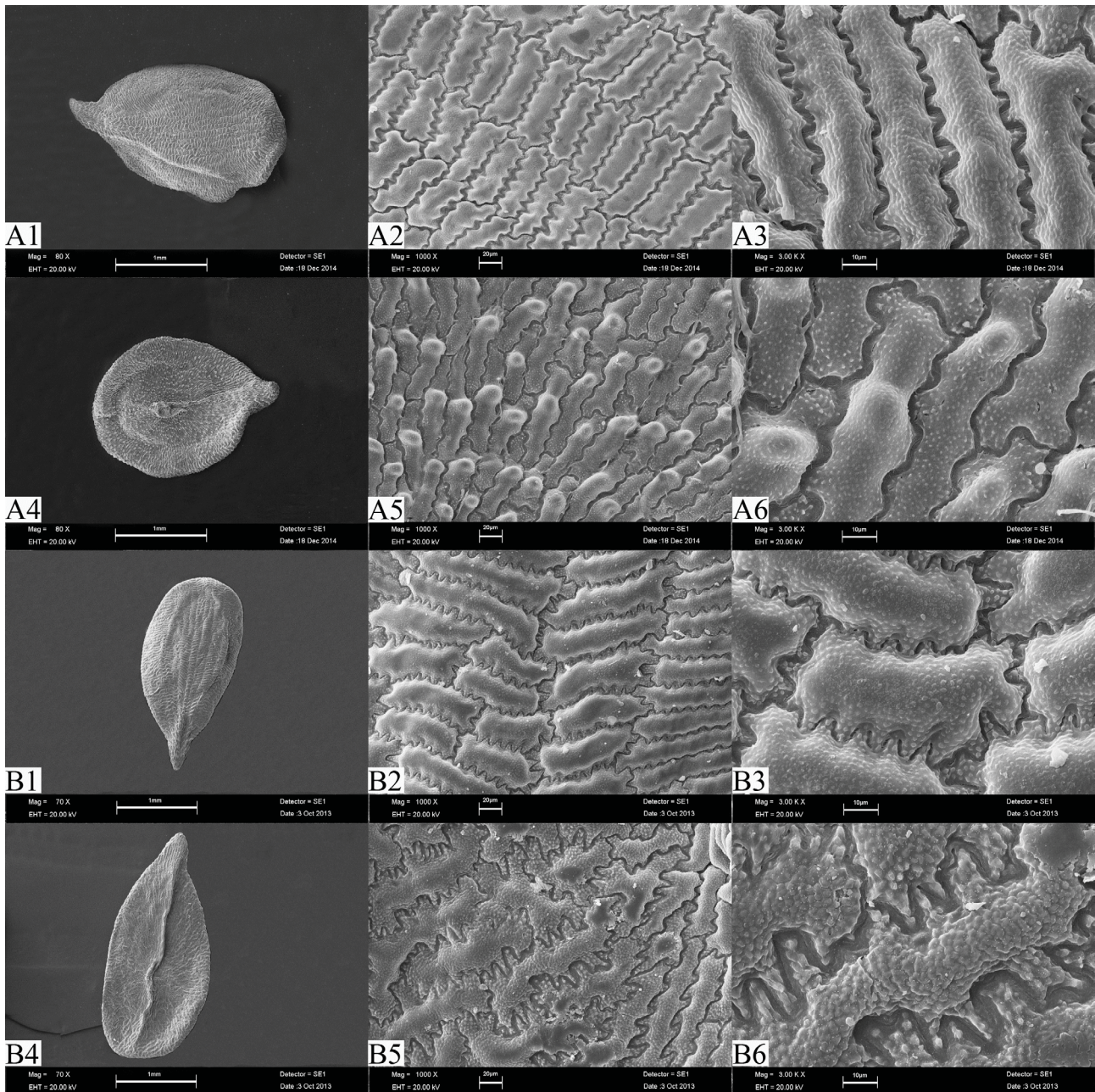


FIGURE 2. SEM photographs of the seed coat. *Dianthus burdurensis* (A) and *D. masmeneus* (B). 1–3: Dorsal surface. 4–6: Ventral surface (Scale bars: 1 and 4 = 1 mm, 2 and 5 = 20 μ m, 3 and 6 = 10 μ m).

Specimens Examined:—*Dianthus masmeneus* Boiss. TURKEY. Kayseri: Pınarbaşı, above Kaynar, Hınzır Mountain, Kurudere, 1900 m, 21 September 1980, *Çelik 1570* (ANK!); Malatya: Doğanşehir, Erkenek town, around Radar, 1800 m, 4 July 1987, steppe, *Aktoklu 663* (HUB!); Adana: Tufanbeyli, above Tozlu village, towards Ziyaret Tepe, 1995 m, 15 July 2008, steppe, , *Aksoy, Budak & Hamzaoğlu 5233* (GAZI!); Sivas: Between Kangal and Hekimhan, around Höyükü R/L station, 1930 m, 26 June 2010, calcareous rocks, *Budak, Koç & Hamzaoğlu 5778*, (GAZI!); Niğde: Pozantı, above Hamidiye village, Karanfil Dağı (Masmeneu Dagh), 1860 m, 18 July 2014, rocky slopes, *Koç & Hamzaoğlu 7092* (GAZI!) (*locus classicus*).

TABLE 1. Diagnostic characters between *Dianthus burdurensis* and *D. masmenaesus*.

	<i>D. burdurensis</i>	<i>D. masmenaesus</i>
Stems	erect, slender at base, 25–45 cm tall	Usually ascending to decumbent, robust at base, 10–30 cm tall
Sterile shoot leaves	Usually absent or very rarely present at flowering, if present, linear and loosely arranged	always present at flowering, linear to elliptic and densely arranged
Lower leaves	withered after anthesis	persistent after anthesis
Sheaths of middle leaves	2.0–2.5 times as long as wide	1.0–1.5 times as long as wide
Inflorescences	flowers in capitate clusters, (3–)5–9(–13)-flowered	flowers in fascicles, 2–4(–7)-flowered
Outer scales	2/5–3/5 as long as calyx	1/2–4/5 as long as calyx
Petals	11.5–15.5 mm long	14–25 mm long
Limbs	3.5–5.5 × 2.5–3.5 mm, creamish-white above, greenish beneath, completely greenish-yellow in dried	4.5–8.5 × 3.0–6.5 mm, pink above, usually greenish beneath, completely purplish in dried
Claws	8–10 mm long	10.0–16.5 mm long
Habitat	small dry meadows in oak forest clearings	rocky slopes, calcareous rocks, steppes

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References

- Aytaç, Z. & Duman, H. (2004) Six new taxa (Caryophyllaceae) from Turkey. *Annales Botanici Fennici* 41: 213–223.
- Bittrich, V. (1993) Caryophyllaceae Juss. In: Kubitzki, K., Rohwer, J. & Bittrich, V. (Eds.) *The Families and Genera of Vascular Plants, Magnoliid, Hamamelid, and Caryophyllid Families*, vol. 2. Springer, Berlin, pp. 206–236.
- Boissier, P.E. (1856) *Diagnoses plantarum orientalium novarum*, ser. 2, part 5. Lipsia [Leipzig], 177 pp.
- Boissier, P.E. (1867) *Flora Orientalis*, Vol. 1, Geneva, 1017 pp.
- Davis, P.H., Mill, R.R. & Tan, K. (1988) *Flora of Turkey and the East Aegean Islands (Suppl. 1)*, vol. 10. Edinburgh University Press, Edinburgh, pp. 71–72.
- Gemici, Y. & Leblebici, E. (1995) Seven new species for the Flora of Turkey. *Candollea* 50 (1): 41–50.
- Güner, A. 2000. *Dianthus* L. In: Güner, A., Özhatay, N., Ekim, T. & Başer, K.H.C. (Eds.) *Flora of Turkey and the East Aegean Islands (Suppl. 2)*, vol. 11. Edinburgh University Press, Edinburgh, pp. 48–49.
- İlçim, A., Behçet, L. & Mükemre, M. (2013) *Dianthus vanensis* (Caryophyllaceae), a new species from Turkey. *Turkish Journal of Botany* 37: 219–224.
- IUCN (2014) *Guidelines for Using the IUCN Red List Categories and Criteria. Version 11, February 2014*. Available at <http://jr.iucnredlist.org/documents/RedListGuidelines.pdf> (accessed 9 December 2014)
- Linnaeus, C. (1753) *Species Plantarum*. L. Salvius, Stockholm, 1200 pp.
- Menemen, Y. & Hamzaoğlu, E. (2000) A new species of *Dianthus* (Caryophyllaceae) from Salt Lake, Central Anatolia, Turkey. *Annales Botanici Fennici* 37: 285–287.
- Özhatay, N. & Kültür, Ş. (2006) Check-list of additional taxa to the supplement Flora of Turkey III. *Turkish Journal of Botany* 30: 281–316.
- Reeve, H. (1967) *Dianthus* L. In: Davis, P.H. (Ed.) *Flora of Turkey and the East Aegean Islands*, vol. 2. Edinburgh, Edinburgh University Press, pp. 99–131.
- Vaezi, J., Behroozian, M., Memariani, F. & Joharchi, M.R. (2014) *Dianthus pseudocrinitus* (Caryophyllaceae), a new species from Northeast of Iran identified by morphological and molecular data. *Phytotaxa* 156 (2): 59–73. <http://dx.doi.org/10.11646/phytotaxa.156.2.1>
- Vural, C. (2008) A new species of *Dianthus* (Caryophyllaceae) from mount Erciyes, Central Anatolia, Turkey. *Botanical Journal of the Linnean Society* 158: 55–61.
- Yılmaz, O., Kaynak, G., Daşkın, R. & Meriçlioğlu, A. (2011) *Dianthus goekayi* (Caryophyllaceae), a new species from Turkey. *Annales Botanici Fennici* 48: 74–78.