



Taxonomic revision of the genus *Convolvulus* L. (Convolvulaceae) in Turkey

Candan AYKURT*, Hüseyin SÜMBÜL

Department of Biology, Faculty of Science, University of Akdeniz, Antalya, Turkey

Abstract

The genus *Convolvulus*, which is represented with 33 species (36 taxa) in the Flora of Turkey, was evaluated to be comprised of 39 taxa, three of which are hybrid, in this study. Morphological characters of the 39 *Convolvulus* taxa, which were collected and examined in situ at different localities in Turkey during the period of 2006-2010, were investigated. Additionally, the threat categories of each taxon according to IUCN were evaluated. *C. pulvinatus* was indicated as a synonym of *C. phrygius* in the List of Turkey Plants (Vascular Plants); the reasons for the combination of these species were discussed in the present study. Keys to species, subspecies and varieties, and synonymy, detailed morphometric descriptions, illustrations and distribution maps are provided for most of the taxa.

Key words: *Convolvulus*, revision, taxonomy, threat category, Turkey

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Türkiye *Convolvulus* L. (Convolvulaceae) cinsinin taksonomik revizyonu

Özet

Türkiye Florası'nda 33 tür (36 takson) ile temsil edilen *Convolvulus* cinsi, bu çalışmayla 3 tanesi hibrit olmak üzere toplam 39 takson olarak değerlendirildi. Türkiye'nin farklı lokasyonlarından 2006-2010 yıllarında arasında toplanan *Convolvulus* cinsine ait 39 taksona ait morfolojik karakterler incelendi. Ayrıca, her taksonun tehlike kategorisi IUCN kriterlerine göre belirlendi. Türkiye Bitkileri Listesi (Damarlı Bitkiler)'nde *C. phrygius* türünün sinonimi olarak belirtilen *C. pulvinatus* türünün, sinonim yapıma nedenleri bu çalışmada ayrıntılı biçimde tartışıldı. Türlerle, alttürlerle ve varyetelere ait teşhis anahtarları, bu taksonların sinonimleri, ayrıntılı morfolojik betimleri, çizimleri ve çoğu taksona ait yayılış haritaları sunuldu.

Anahtar kelimeler: *Convolvulus*, revizyon, taksonomi, tehlike kategorisi, Türkiye

1. Introduction

Convolvulaceae are a large family, comprising approximately of 58 genera and 2000 species (Staples and Yang, 1998), exhibiting a large diversity of morphological characters and occupying a broad range of ecological habitats (Stefanović et al., 2002). Convolvulaceae members are primarily tropical plants, with many of the genera endemic to tropical zones of individual continents (Austin, 1998). *Convolvulus* L., the second largest genus of the family, has about 250 species distributed in the temperate and tropical regions of the world (Cronquist, 1981). The *Convolvulus* species were revised by Parris (1978) in the 'Flora of Turkey and East Aegean Islands'. As stated in the "Flora of Turkey", there were 32 species, 3 imperfectly known species in Turkey, and one more species, which was described later (Davis et al., 1988); and 9 of them were endemic to Turkey. Twenty three species are recognized in *Flora Europaea* (Stace, 1972), 11 species and 1 natural hybrid in the Flora of Cyprus (Meikle, 1985), 57 in Flora Iranica (Rechinger, 1979), 22 in Lebanon and Syria (Mouterde, 1986), 21 in Palestine (Feinbrun-Dothan, 1978), 21 in Israel (Danin, 2004), 17 in California (Munz and Keck, 1975) and 7 in China (Rhui-cheng and Staples, 1995). According to Al-Alawi (1987), the probable centre of diversity for the genus *Convolvulus* is in South-Eastern Asia (Turkey, Iraq and Iran) owing to the presence of a large number of species, several of which are endemic to that region. Indeed, according to Sa'ad (1967) the most primitive ancestor of the species was distributed in Iran, Afghanistan, Pakistan and the Arabian Peninsula.

In Turkey, the first and the only revision study concerning the *Convolvulus* species had been carried out by the late botanist Kamil Karamanoğlu in 1964. In his revision study, he indicated that approximately 25-30 species of the genus *Convolvulus* were spread around in Turkey and he described the 22 most commonly encountered species among them (Karamanoğlu, 1964).

Sa'ad described 118 species of the genus *Convolvulus* in her work named 'The *Convolvulus* Species of the Canary Isles, the Mediterranean Region and the Near and the Middle East' and she divided these species into three different categories; sectioned as '*Acanthocladi* Boiss.', '*Inermes* Boiss.' and '*Convolvulus*' based on the presence of spines and their outer appearances. She divided

* Corresponding author / Haberleşmeden sorumlu yazar: Tel.: +902423102237; Fax.: +902423102237; E-mail: candan@akdeniz.edu.tr

these categories into 12 subsections and 4 series based on their habits and their significant morphological characters such as inflorescence. She treated the spiny shrublet species as *Acanthocladi*. Carine et al. (2004) reported in their studies, in which they evaluated the phylogenetic associations of the *Convolvulus* species spread in Macaronesia from a molecular point of view, that the *Acanthocladi* would not be a monophyletic group as suggested by Sa'ad but were highly polyphyletic and that the spine characters of the spiny shrublet species in the Canary Islands, Western and the Eastern Mediterranean were non-homologous, thus procuring them to evaluate the species under two taxonomic titles. Consequently the perennial nonclimbing species, most of which are shrubs and sub-shrubs with sessile leaves, were included in clade A; and the annual or perennial herbs and suffrutescent plants typically with a climbing or trailing characters and petiolate leaves were included in clade B (Carine et al., 2004).

The genus *Convolvulus*, which is represented with 33 species (36 taxa) in the Flora of Turkey, was evaluated as 39 taxa, three of which are hybrid, in the present study. The morphological characters of the 39 taxa of the *Convolvulus* genus were investigated in the context of this study. The morphological measurements and the observations were carried out on approximately 2000 herbarium specimens, which were collected during field trips and dried as stated in the herbarium techniques. In addition, a large number of herbarium specimens of the genus *Convolvulus* that were present in remarkable herbaria in Turkey were also evaluated in this study.

2. Materials and methods

This study is mainly based on the examination of nearly 2000 herbarium specimens, which were collected from different localities in Turkey between 2006 and 2010, in addition to the *Convolvulus* specimens and the *Convolvulus* collections from several herbaria in Turkey including mainly AKDU, as well as ANK, GAZI, HUB, ISTE, ISTF, EGE, MUH and VANF (acronyms according to Thiers (2008). Besides, the photographs of all the *Convolvulus* samples in Berlin-Dahlem Botanical Museum (B) and Royal Botanic Garden (E) were obtained and the photoprahps belonging to the numerous herbarium samples including 23 types of the genus *Convolvulus* were evaluated.

Many of the species were studied in the field, particularly noting down the habit, flower colour and the indumentum type. The morphological measurements were made on the herbarium materials comprised of specimens collected from their natural habitats in this study. These specimens were identified using the Flora of Turkey (Parris, 1978; Davis, 1988), the flora of various countries (namely Post, 1932; Stace, 1972; Meikle, 1985; Rechinger, 1979; Mouterde, 1986; Feinbrun-Dothan, 1978; Munz and Keck, 1975; Rhui-cheng and Staples, 1995) and other studies on this genus (including Sa'ad, 1967; Karamanoğlu, 1964; Stace, 1971). The threat category assessment of each taxon was made as stated in the IUCN criteria (IUCN, 2001). Also Guidelines for Using the IUCN Red List Categories and Criteria were used for the assessments (IUCN, 2008). The descriptions of the species which their threat categories were evaluated as CR, VU and NT are given in the text. Some species like *C. arvensis* are widespread and collected from numerous localities in almost every region in Turkey. Therefore, locations of every species are not provided in the text. The distribution maps and the line drawings are provided for most of the taxa.

3. Results

3.1. Diagnostic key to the genus *Convolvulus* in Turkey

- 1 Stem erect, ascending or prostrate, sometimes cushion forming perennials, shrublets or shrubs; leaves usually attenuate at base; filaments entire.....Group A
- 1 Stem generally climbing or trailing, annuals or perennials; leaves generally distinctly petiolate; filaments with sessile glands at the base of dilated part.....Group B

Group A

- 1 Leaves cuneate, truncate or slightly cordate at base, elliptic to broadly ovate.....2
- 1 Leaves attenuate at base, linear-lanceolate to spatulate.....5
- 2 Bracteoles absent.....5. *C. aucheri*
- 2 Bracteoles present.....3
- 3 Stem and leaves pilose; sepals green at apex20. *C. pilosellifolius*
- 3 Stem and leaves with lanate indumentum; sepals concolor4
- 4 Leaves markedly reticulate veined on lower surface; outer sepals 10–15 x 2–2.5 mm; seeds hairy.....2. *C. reticulatus*
- 4 Leaves not markedly veined; outer sepals 8–10 x 3.5–4.5 mm; seeds glabrous.....1. *C. lanatus*
- 5 Stem and leaves pilose or with hispid indumentum.....6
- 5 Stem and leaves greyish, only with adpressed-sericeous indumentum14
- 6 Stem usually erect, sometimes ascending, 15–100 cm.....7
- 6 Stem procumbent and cushion forming.....10
- 7 Outer sepals mucronate.....8
- 7 Outer sepals acuminate or caudate.....9
- 8 Outer sepals 2–2.2 mm long; corolla white, ovary and capsule hairy.....3. *C. chondrilloides*
- 8 Outer sepals 3–6 mm long; corolla pink; ovary and capsule glabrous.....4. *C. dorycnium*
- 9 Inflorescence terminal (3–9 flowered cymes) and axillary (single flowered); peduncle 0–6 mm.....6. *C. calvertii*
- 9 Inflorescence dichasium, 1–4 flowered; peduncle 1–16 cm.....8. *C. cantabrica*
- 10 Usually acaulescent or stem very short; flowers at base and rose-pink; outer sepals 2.5–3.5 mm long.....16. *C. assyricus*
- 10 Caulescent; inflorescence terminal and axillary cymes; outer sepals longer than 6 mm.....11
- 11 Outer sepals spreading-hairy12
- 11 Outer sepals adpressed-hairy or glabrous.....13

- 12 Stem and leaves with adpressed-sericeous and spreading-hispid indumentum; stigma longer than style.....6. *C. calvertii*
- 12 Stem and leaves with pilose hairs; stigma shorter than style18. *C. cataonicus*
- 13 Outer sepals ovate-lanceolate, 6–8 mm long, green at apex; stigma and style approximately equal.....17. *C. libanoticus*
- 13 Outer sepals obovate-oblong, 11–13 mm long; stigma half about style.....19. *C. carduchorum*
- 14 Sepals with adpressed-sericeous indumentum (no other hair type present)15
- 14 Sepals villose or adpressed-sericeous and spreading-pilose indumentum together.....18
- 15 Outer sepals pouched at base.....11. *C. holosericeous*
- 15 Outer sepals not pouched at base.....16
- 16 Sepals green at apex; petals glabrous at apex7. *C. lineatus*
- 16 Sepals concolor or purplish at the apex; petals hairy at apex.....17
- 17 Outer sepals 10.5–12 mm long, usually purplish at the apex.....12. *C. × turcicus*
- 17 Outer sepals 18–20 mm long13. *C. × peshmenii*
- 18 Outer sepals oblong, acute or mucronulate.....15. *C. phrygius*
- 18 Outer sepals lanceolate to broadly-obovate, acuminate or caudate.....19
- 19 Erect or ascending, sometimes loose-cushion forming perennials, shrubs or shrublets; stem 3–50 cm; flowers pedicellate (0.5–4 mm).....20
- 19 Dwarf shrublet forming dense, moos-like cushion; stem very short, sometimes acaulescent; flowers sessile.....14. *C. compactus*
- 20 Erect or ascending, sometimes broom-like branched shrublets or shrubs.....9. *C. oleifolius*
- 20 Loose-cushion forming perennials.....10. *C. × pseudocompactus*

Group B

- 1 Plant annual.....2
- 1 Plant perennial5
- 2 Corolla blue, distinctly 5-lobed, yellow at base, 7–10 mm long.....3
- 2 Corolla pink or tri-colored; not distinctly 5-lobed, 8–25 mm long.....4
- 3 Leaves sessile, usually linear-lanceolate; bracteoles membranous, 1.5–3 mm long; outer sepals membranous, 4–4.5 mm long.....22. *C. pentapetaloides*
- 3 Leaves petiolate, usually ovate; bracteoles herbaceous, 5–15 mm long; outer sepals herbaceous, 6–7 mm long.....23. *C. siculus*
- 4 Leaves entire; corolla tri-colored, 20–25 mm long; ovary hairy.....*24. *C. tricolor*
- 4 Leaves lobed; corolla pink, 8–10 mm long; ovary glabrous.....27. *C. coelesyriacus*
- 5 Stem erect or ascending.....6
- 5 Stem climbing.....7
- 6 Leaves elliptic to ovate, with densely villose indumentum.....21. *C. persicus*
- 6 Leaves hastate or linear-hastate, glabrous.....35. *C. pseudoscammonia*
- 7 Leaves hastate or sagittate14
- 7 Leaves not hastate or sagittate, dentate, lobed or undulate at margins8
- 8 Leaves lobed (lobes sometimes reach to midrib).....9
- 8 Leaves dentate or undulate.....10
- 9 Stem and leaves pilose; corolla 30–40 mm long.....25. *C. althaeoides*
- 9 Stem and leaves with only adpressed-sericeous indumentum; corolla 20–30 mm.....26. *C. elegantissimus*
- 10 Stem and leaves spreading-pilose or with recurved-hairs11
- 10 Stem and leaves velutinous or with tomentose indumentum12
- 11 Outer sepals membranous at margins; corolla pink-purple.....28. *C. stachydfolius*
- 11 Outer sepals not membranous at margins; corolla white.....31. *C. cassius*
- 12 Outer sepals acute or mucronate, tomentose; corolla pink.....29. *C. galaticus*
- 12 Outer sepals acuminate, spreading-pilose; corolla cream or yellow.....13
- 13 Corolla yellow.....32. *C. betonicifolius*
- 13 Corolla white.....30. *C. germaniciae*
- 14 Outer sepals 4–4.5 mm long.....33. *C. arvensis*
- 14 Outer sepals 8–16 mm long.....15
- 15 Stem and leaves hairy; outer and inner sepals ± equal; sepals hairy.....32. *C. betonicifolius*
- 15 Stem and leaves glabrous; inner sepals distinctly longer than outer sepals, sepals completely glabrous34. *C. scammonia*

3.2. *Convolvulus lanatus* Vahl, Symb. Bot. (Vahl) i. 16. 1790. Figures 1-A, 2.

Type: [Egypt] in Aegypto inferiori et monte Sinai, Forsskal (holotype: C).

Synonym: = *C. el-arishensis* Boulos, Bull. Fac. Sci., Cairo Univ. No. 34 (New Rec. Fl. Egypt) 77 (1958).

Woody-based, densely lanate-tomentose, greyish shrubs. Stem erect or ascending, 10–40 cm, branched from the base, especially old branches spinulose in winter period. Leaves elliptic, lanceolate or oblanceolate-elliptic, 7–25 × 5–10 mm, slightly acute, smooth at margins, cuneate at base, sessile, lanate-tomentose; lower leaves spatulate or oblanceolate-elliptic, 5–65 × 3–12

mm, obtuse or slightly acute, attenuate at base. Inflorescence axillary, 2–15 flowered cymes; flowers sessile; peduncle 5–25 mm or wanting. Bracts broadly ovate to elliptic-lanceolate, 10–12 × 6–8 mm, acute, tomentose. Bracteoles similar to bracts, ovate, 8–10 × 4–6 mm. Sepals acuminate, villose, erect at flowering and fruiting period; outer sepals elliptic-ovate, 8.5–10 × 3.5–4.5 mm. Middle sepal elliptic-lanceolate, 8–8.5 × 2–2.5 mm. Inner sepals elliptic-lanceolate, 7.5–8 × 2–2.5 mm. Corolla white, 17–25 mm long; bands densely hairy; petals pubescent at the apex. Filaments entire at margin, 4–10 mm. Anthers sagittate with retuse apex, 2 mm long. Ovary ovate, 0.75 × 0.5 mm, glabrous. Style 4–4.5 mm, glabrous. Stigma 5–5.5 mm, slightly longer than style. Capsule elliptic-ovate, shorter than calyx, 4–4.5 × 3–3.5 mm, glabrous, with 2 locule, 2–3 seeded; pericarp coriaceous, fragile. Seeds elliptic-ovate, 2.5–3 × 1.5–2 mm, dark brown or black, undulate. *Saharo-Sindian element*.

Phenology: Flowering between April and June; fruiting between June and August.

Distribution and ecology: Egypt, Kuwait, Oman, Palestine, Turkey (the Mediterranean Region). Sea shores, 0–10 m.

Conservation status: NT

Remarks: In Flora Orientalis, *C. lanatus* was classified in section *Spinescentes*, which was comprised of the species with spines (Boissier, 1879). According to Sa'ad, this species was included in subsect. *Serospinescentes* Sa'ad; one of the subsections of sect. *Acanthocladi* Boiss. Some of the old shoots of *C. lanatus*, which is the type species of this subsection, have spines, but young shoots of this species are spineless (Sa'ad, 1967). Any *C. lanatus* species from Turkey were not evaluated in the study by Sa'ad and Turkey was not considered within the distribution map of the species. Carine et al. (2004) indicated in their studies that the sample of sect. *Acanthocladi* included in the analysis was highly polyphyletic on the contrary to Sa'ad's observations (1967) and that the spine characters of the species from the Canary Islands, the western Mediterranean and the eastern Mediterranean were of a non-homologous structure.

During the field studies, we observed that the old branches of this species terminate with spinule in winter time; but, these spinules do not exist during the flowering period. *C. lanatus* is the only species with spines in Turkey among the taxa of the genus *Convolvulus*.

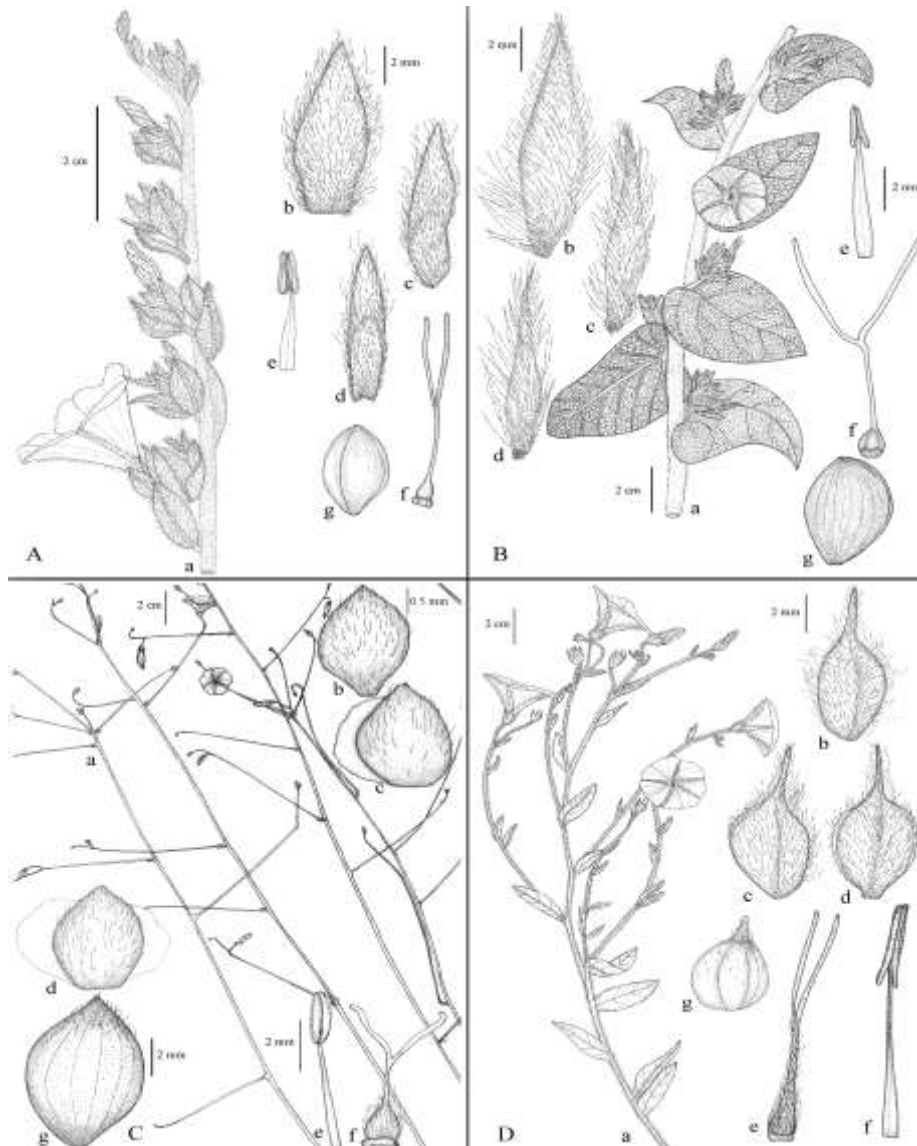


Figure 1. A: *C. lanatus*: a- Habit, b- Outer sepal, c- Middle sepal, d- Inner sepal, e- Stamen, f- Pistil, g- Capsule; B: *C. reticulatus* subsp. *reticulatus*: a- Habit, b- Outer sepal, c- Middle sepal, d- Inner sepal, e- Stamen, f- Pistil, g- Capsule; C: *C. chondrilloides* var. *chondrilloides*: a- Habit, b- Outer sepal, c- Middle sepal, d- Inner sepal, e- Stamen, f- Pistil, g- Capsule; D: *C. aucheri*: a- Habit, b- Outer sepal, c- Middle sepal, d- Inner sepal, e- Stamen, f- Pistil, g- Capsule

3.3. *Convolvulus reticulatus* Choisy subsp. *reticulatus*, Prodr. [A. P. de Candolle] 9: 399. 1845. Figures 1-B, 2.

Lectotype: Turkey in Mesopotamia detexit, ad Euphratem superiorem, *Aucher* 1408 (G).

Woody-based, densely tomentose-lanate, greyish perennials. Stem generally prostrate, sometimes ascending, 25–100 cm, branched. Leaves oblanceolate-ovate to elliptic-rounded, 4–60 × 4–45 mm, slightly acute or obtuse, entire, sessile, slightly cordate or truncate at the base, densely lanate-tomentose, all veins markedly raised on lower surface; lower leaves spatulate-oblanceolate, 50–80 × 10–30 mm, obtuse, attenuate at the base. Inflorescence axillary, 2–6 flowered cymes; flowers sessile; peduncle 5–35 mm. Bracts oblanceolate-ovate, 8–15 × 2–5 mm, acuminate, lanate. Bracteoles linear or linear-lanceolate, 7–10 × 0.5–3 mm, acuminate, not exceeding the calyx, lanate. Sepals narrowly lanceolate, acuminate, long and bright sericeous, erect at flowering and fruiting period; outer sepals 10–15 × 2–2.5 mm; middle sepal 9–14 × 1–2 mm; inner sepals 8–13 × 1–1.5 mm. Corolla white or pale pink, 10–20 mm long; bands densely hairy; petals glabrous at the apex. Filament entire at margin, 6–10 mm. Anthers sagittate with retuse apex, 2 mm long. Ovary ovate, 1.5–1.75 × 1–1.5 mm, glabrous. Style 4–4.5 mm, glabrous. Stigma 6–6.5 mm, approximately 1.5 times longer than style. Capsule ovate, shorter than calyx, 4–5 × 4–5 mm, glabrous, with 2 locule, 1–2 seeded; pericarp coriaceous, sclerotic. Seeds obovate, 3–4 × 2–3 mm, dark brown or black, hairy. *Iran-Turan element*.

Phenology: Flowering between June and July; fruiting between July and August.

Distribution and ecology: Iran, Iraq, Turkey (East Mediterranean, South-East and East Anatolia Regions). Steppe, limestone and sandy slopes, fallow fields, 'desert' (110–1200 m).

Conservation status: NT

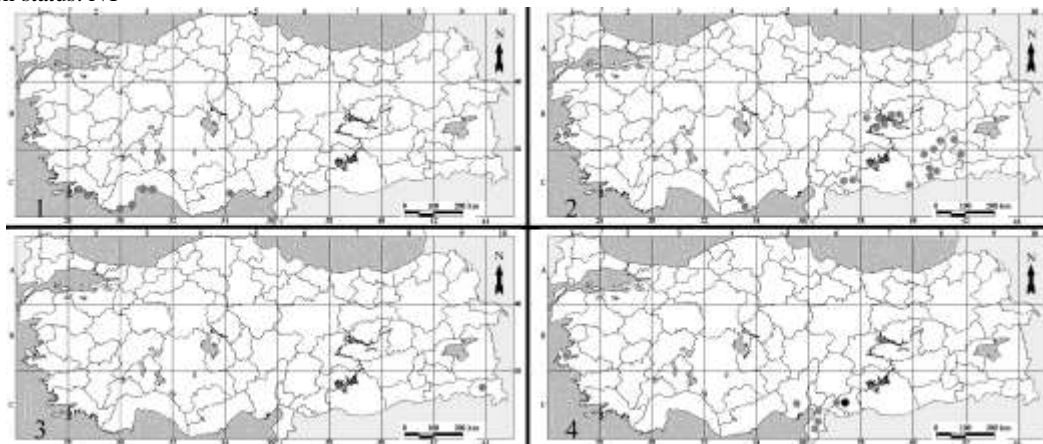


Figure 2. Distribution areas of *C. lanatus* (1), *C. reticulatus* subsp. *reticulatus* (2), *C. chondrilloides* var. *chondrilloides* (3) and *C. aucheri* (4) in Turkey

3.4. *Convolvulus chondrilloides* Boiss. var. *chondrilloides* Diagn. Pl. Orient. ser. 1, 11: 83. 1849. Figures 1-C, 2.

Type: Iran in Persia australi, *Aucher* 4941 (syntype: E photo!).

Woody-based, perennials. Stem erect, rigid, divaricately branched, 50–120 cm, glabrous except for basal 3–4 cm which are white tomentose-lanate. Leaves linear to linear-lanceolate, 10–50 × 1–5 mm, acute, entire, sessile, attenuate at base, sparsely pilose on upper surface; lower leaves oblanceolate-spatulate, densely lanate-tomentose, all veins markedly raised on lower surface; 50–80 × 10–12 mm, acute or obtuse, attenuate at base, tomentose. Inflorescence axillary and terminal, 2–6 flowered cymes, cymes branched as monochasium or dichasium; peduncle 2–6.5 mm; pedicel 3–6 mm, much longer and thicker in fruiting period. Bracts linear, 2–6 × 0.2–1 mm, sparsely pilose on upper surface and margin. Bracteoles linear-triangular, 1–1.5 × 0.5–0.6 mm, sparsely pilose, amplexicaule at base, shorter than pedicel. Sepals broadly ovate, mucronate, moderately hirsute, slightly dehiscent in flowering period; outer sepals 2–2.2 × 1.5–2 mm; middle sepal 1.8–2.2 × 2–2.2 mm, one half membranous towards margin; the membranous part glabrous; inner sepals 1.8–2.2 × 2.5 mm, with the both half membranous towards margin; the membranous part glabrous. Corolla white, 9–10 mm long; bands densely hairy; petals glabrous at the apex. Filaments entire at margin, 4–5 mm. Anthers sagittate with retuse apex, 2 mm long. Ovary ovate-globose, 1 × 1 mm, scattered hairy. Style 1.5–2 mm, sparsely hairy. Stigma 2 mm, equal or slightly shorter than style. Capsule ovate, longer than calyx, 4–4.5 × 3–3.5 mm, scattered hairy towards the apex, with 1 locule, 1 seeded; pericarp coriaceous, sclerotic. Seeds semi-globose, 2–2.5 × 2.5–3 mm, dark brown, globous, smooth. *Iran-Turan Element*.

Phenology: Flowering June; fruiting between July and August.

Distribution and ecology: Iraq, Iran, Turkey (North Anatolia Region). Shaly slopes (1850 m).

Conservation status: CR B1ab(i, iii)

Remarks: The only record proving the distribution of this variety in Turkey could be reached from the Flora of Turkey and Eastern Aegean Islands. No sample of this variety has been detected in any of the extensive herbaria including VANF in Turkey. Also, there is no record of previous collections of this variety by different botanists from Turkey. In order to collect this variety, the field studies were carried out around Hakkari in the years 2009 and 2010. This variety which could not be collected during the field trips in 2009 was eventually collected in the locality between Hakkari and Otluca in 2010. In the field trips, *Convolvulus chondrilloides* var. *chondrilloides*, whose distribution area in Turkey is quite limited, was found and it was estimated as Critically Endangered (CR) by IUCN (2001). According to our present knowledge, this variety only known across one locality between Hakkari and Otluca Village.

3.5. *Convolvulus dorycnium* L., Syst. Nat., ed. 10. 2: 923. 1759.

Type: Hb. Linn. 21850.

Woody-based, perennials. Stem erect, rigid, divaricately branched; 40–100 cm, short-adpressed hirsute, lanate-tomentose at base. Leaves lanceolate to linear-lanceolate, 7–30 × 1–5 mm, acute, entire, sessile, attenuate at base, short hirsute or scattered pilose;

lower leaves lanceolate, 10–95 × 2–20 mm, acute, attenuate at base, dense-scattered pilose or tomentose. Inflorescence dichasium, axillary 1–8 flowered, peduncle 2–5 mm; pedicel usually very short (0.5–3) mm, much longer and thicker in fruiting period. Bracts and bracteoles linear, adpressed hirsute. Sepals erect at flowering and fruiting period. Corolla pale pink or pink, 10–25 mm long; bands hairy; petals glabrous at the apex. Filaments entire at margin, 5–10 mm. Anthers sagittate with retuse apex, 2 mm long. Ovary ovate-globous, 1–1.2 × 1–1.2 mm, glabrous. Style 3–7 mm, glabrous. Stigma 5–6 mm. Capsule broadly elliptic to globose, longer than calyx, 3.5–5.5 × 3.5–4.5 mm, glabrous, with 2 locule, 1 seeded; pericarp coriaceous, sclerotic. Seeds broadly ovate to elliptic, 2–3 × 2–2.5 mm, dark brown, short-hirsute.

- 1 Outer sepals obovate, 3–3.5 × 2–2.5 mm, mucronatesubsp. *dorycnium*
- 1 Outer sepals oblong-ovate, 5–6 × 1.5–2 mm, acute or acuminatesubsp. *oxysepalus*

3.5.1. *Convolvulus dorycnium* L. subsp. *dorycnium* Figures 3-A, 4.

Stem 40–80 cm. Stem leaves lanceolate to linear-lanceolate, 10–30 × 1.5–5 mm, scattered pilose. Pedicel 0.5–1 mm. Bracteoles 0.7–2 × 0.2–1 mm, equal or longer than pedicel. Sepals obovate, mucronate, adpressed pilose; outer sepals 3–3.5 × 2–2.5 mm; middle sepal 3–3.5 × 2.2–2.5 mm, one half membranous towards margins; the membranous part glabrous; inner sepals 3–3.5 × 2.5–3 mm, with the both half membranous towards margins; the membranous parts glabrous. Corolla 10–16 mm long. Filaments 5–10 mm. Ovary ovate-globous, 1–1.2 × 1–1.2 mm, glabrous. Style 3–3.5 mm. Stigma 5–5.5 mm, 1.6 times longer than the style. Capsule broadly obovate-globose, 3.5–4.5 × 3.5–4.5 mm. Seeds broadly ovate. *Mediterranean element.*

Phenology: Flowering between May and June; fruiting between June and July.

Distribution and ecology: Aegean Islands, Cyprus, Greece, North Africa, Turkey (Aegean Region). Waste lands (0–150m).

Conservation status: CR B2ab(i, iii)

Remarks: The distribution area of this taxon is only limited to one locality in B2 square (Manisa) in Turkey and the number of mature individuals is under 50. Therefore, its conservation status is evaluated as CR. The main threat factor of this subspecies is cultivated activities on vineyards by local people.

3.5.2. *Convolvulus dorycnium* L. subsp. *oxysepalus* (Boiss.) Rech.f., Öst. Bot. Zeitschr. 94: 170 (1948). Figures 3-B, 4.

Lectotype: [Palestine] ad Tiberiadem, *Boissier* (G).

Synonym: ≡ *C. dorycnium* L. var. *oxysepalus* Boiss., Fl. Or. 4: 92 (1875).

Stem 60–100 cm. Stem leaves linear-lanceolate, 7–30 × 1–4 mm, adpressed hirsute. Pedicel 1–3 mm. Peduncle 2–5 cm. Bracteoles 1–2.5 × 0.2–1 mm, usually shorter than pedicel. Outer sepals oblong-ovate, 5–6 × 1.5–2 mm, acute or acuminate, adpressed hirsute. Middle sepal obovate-onlong, 4–5 × 1.5–2 mm, mucronate, adpressed hirsute, one half membranous towards margins; the membranous parts glabrous. Inner sepals obovate-onlong, 4–4.5 × 2–3 mm, mucronate, adpressed hirsute, with the both half membranous towards margin; the membranous part glabrous. Corolla 15–25 mm long. Filaments 8–10 mm. Style 6.5–7 mm. Stigma 6–6.5 mm, slightly shorter than the style. Capsule obovate-elliptic, 5–5.5 × 4–4.5 mm. Seeds ovate-elliptic, 2–3 × 2–2.5 mm. *East Mediterranean element.*

Phenology: Flowering between May and June; fruiting between June and July.

Distribution and ecology: Cyprus, Iran, Khorassan, Syria, Turkey (East Mediterranean, South-East Anatolia, East Anatolia Regions). Fallow fields, roadsides, stony and shaly slopes (0–1800 m).

Conservation status: NT

Remarks: These two subspecies are quite similar to each other with respect to their habit characteristics; but they display distinct differences especially in the shape of their sepals. The outer sepals of *C. dorycnium* subsp. *dorycnium* are obovate, acute at apex; and the inner sepals are broadly obovate, mucronulate at apex. The outer sepals of *C. dorycnium* subsp. *oxysepalus* are, on the other hand, oblong-ovate and acute to acuminate; while the inner sepals are obovate-onlong and acute at the apex.

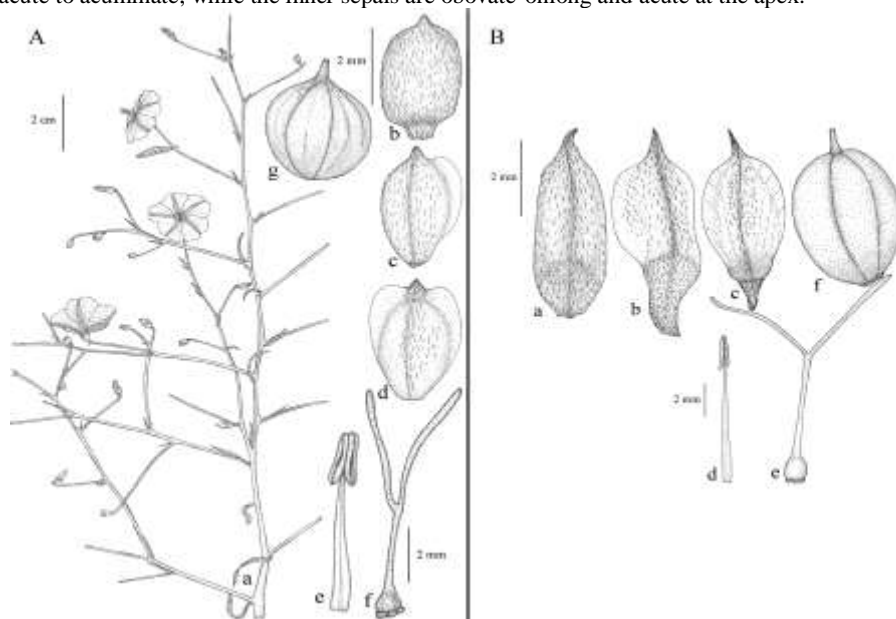


Figure 3. A: *C. dorycnium* subsp. *dorycnium*: a- Habit, b- Outer sepal, c- Middle sepal, d- Inner sepal, e- Stamen, f- Pistil, g- Capsule; B: *C. dorycnium* subsp. *oxysepalus*: a- Outer sepal, b- Middle sepal, c- Inner sepal, d- Stamen, e- Pistil, f- Capsule.

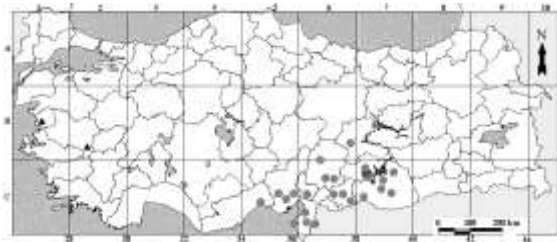


Figure 4. Distribution areas of *C. dorycnium* subsp. *dorycnium* (▲) and *C. dorycnium* subsp. *oxysepalus* (●) in Turkey

3.6. *Convolvulus aucheri* Choisy, Prodr. [A. P. de Candolle] 9: 402. 1845. Figures 1-D, 2.

Lectotype: [Turkey C6 Gaziantep] *Aucher* 1405 (type: E photo!)

Woody based, densely villose, tomentose, greyish perennials. Stem erect, rigid, divaricately branched; 30–80 cm, villose, tomentose. Leaves elliptic-lanceolate, 8–40 × 4–15 mm, acute, sessile, truncate, long villose-tomentose; lower leaves coriaceous, 20–30 × 4–6 mm, oblanceolate, semi-amplexicaule at the base, sparsely adpressed hairy and slightly tomentose at margins. Inflorescence axillary, 2–5 flowered; pedicel 5–20 mm, much longer and thicker at fruiting period. Bracteoles absent. Middle and inner sepals broadly obovate, 7.5–8.5 × 3.5–4.5 mm, acuminate, villose. One half of the middle sepal and the both half of the inner sepals membranous towards margin; the membranous part glabrous or glabrescent. Corolla white, 20–25 mm long; bands villose; petals glabrous at the apex. Filaments entire at margin, 6–8 mm. Anthers sagittate with retuse apex, 4–4.2 mm long. Ovary ovate, 1–1.25 × 1–1.25 mm, villose. Style 3.5–4 mm, villose. Stigma 6–6.5 mm, 1.6 times longer than style. Capsule broadly ovate-globose, shorter than calyx, 3.5–4 × 3.5–4 mm, villose towards the apex, with 2 locule, 1 seeded; pericarp coriaceous, sclerotic. Seeds ovate-oblong, 3.5–4 × 2.5–3 mm, brown, sparsely white hairy. *East Mediterranean element*.

Phenology: Flowering between May and June; fruiting between June and July.

Distribution and ecology: Syria, Turkey (East Mediterranean and South-East Anatolia Regions). Stony, limestone ve serpentine slopes (800–1700 m).

Conservation status: VU B1ab(i)

Remarks: This species is clearly different from the other species of the genus *Convolvulus* distributed in Turkey due to the lack of bracteoles. During field studies, *C. aucheri* was collected from a single location, but this species also distributes around Gaziantep excluding Hatay as stated in the Flora of Turkey. Therefore, its conservation status was evaluated as VU.

3.7. *Convolvulus calvertii* Boiss., Diagn. Pl. Orient. ser. 2, 3: 124. 1856. Figures 5-A, 6.

Lectotype: [Turkey A8 Erzurum] in Armenia prope Tortoum, *Calvert* (1282) (G, isotype: E photo!).

Synonyms: =*C. bracteosus* Juz., Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk S.S.S.R. 12: 217 (1950). =*C. sericocephalus* Juz. in Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk S.S.S.R. 12: 219. 1950. =*C. tauricus* (Bornm.) Juz., Bot. Mater. Gerb. Bot. Inst. Komarova Akad. Nauk S.S.S.R. 12: 214 (1950).

Woody-based, greyish perennials. Stem usually prostrate or subprostrate, rarely erect, branched from base, 3–20 cm, adpressed sericeous and long-spreading hirsute. Leaves lanceolate, 10–35 × 2–5 mm, acute, sessile, attenuate at base, adpressed sericeous and long-spreading hirsute; lower leaves triangular, 5–25 × 2.5–5 mm, coriaceous, imbricate, sericeous at apex, sparsely hairy or glabrous towards the base. Inflorescence terminal (3–9 flowered cymes) and axillary (single flowered); peduncle wanting or to 6 mm; pedicel 1–4 mm. Bracts linear, 10–15 × 1–2 mm, indumentum similar to leaves. Bracteoles linear, 3–5 × 0.2–0.5 mm, longer than pedicel, indumentum similar to leaves. Sepals ovate, long-acuminate, long-spreading hirsute, erect in flowering and fruiting period; outer sepals 7.5–8.5 × 3.5–4.5 mm; middle sepal 6.5–7.5 × 3–4 mm; inner sepals 6.5–7.5 × 2.5–3.5 mm; one half of the middle sepal and the both half of the inner sepals membranous towards margin; the membranous part glabrous. Corolla white or pale pink, 10–20 mm long, persistent in fruiting period; bands densely hairy; petals glabrous at the apex. Filaments entire at margin, 6–8 mm. Anthers sagittate with retuse apex, 2 mm long. Ovary ovate, 1.5–2 × 1–1.5 mm, dense-villose. Style 2.5–3 mm, villose. Stigma 5–5.5 mm, approximately 2 times longer than style. Capsule ovate to broadly ovate, shorter than calyx, 4.5–5.5 × 4–5 mm, villose towards the apex, with 2 locule, 2–3 seeded; pericarp coriaceous, sclerotic. Seeds ovate-elliptic, 3.5–4.5 × 1.7–2.5 mm, velutinous-sericeous. *Iran-Turan element*.

Phenology: Flowering between May and July; fruiting between July and August.

Distribution and ecology: Iran, the Caucasus, the Crimea, Turkey (East-Blacksea and East Anatolia Regions). Steppe, stony and shaly slopes (915–2600 m).

Conservation status: NT

3.8. *Convolvulus lineatus* L., Syst. Nat., ed. 10. 2: 923. 1759. Figures 5-B, 6.

Lectotype: [Sicily] Hifpaniae, Siciliae, Mediterranei maritimis. (Hb. Linn. 218/43).

Synonyms: =*C. lineatus* var. *angustifolius* Kotschy, Ins. Cyp. 285 (1865). =*C. intermedius* Loisel, J. Bot. (Desvaux) 2: 264 (Not. 40) (1809).

Mediterranean and Iran-Turan element.

Phenology: Flowering between April and July; fruiting between June and August.

Distribution and ecology: Caucasus, Lebanon, Iran, North Africa, Southern Europe, Syria, Turkey. Roadsides, fallow fields, shaly, sandy, calcareous and limestone slopes, steppe (450–2300 m).

Conservation status: LC

3.9. *Convolvulus cantabrica* L., Sp. Pl. 1: 158. 1753. Figures 5-C, 6.

Lectotype: [Italy, Sicily, Narbonne & Verona] (Hb. Linn. 218/48, photo!)

Synonyms: =*C. cardiosepalus* Boiss., Fl. Orient. [Boissier] 4(1): 96. (1875). =*C. dorycnioides* De Not., Repert. Fl. Ligust.: 283 (1844). =*C. euxinus* Petrov, Byull. Moskovsk. Obshch. Isp. Prir., Otd. Biol. 1935, n. s. xlv. 142 (1935).

Mediterranean element.

Phenology: Flowering between April and August; fruiting between June and September.

Distribution and ecology: the Balkans, Caucasus, Eastern Aegean Islands, Iran, Mediterranean Countries, Turkey (Marmara, Aegean, Mediterranean, Inner Anatolia and Blacksea Regions). Roadsides, shaly, sandy, calcareous and limestone slopes, macchies, edge of *Pinus brutia* woodlands (7-2300 m).

Conservation status: LC

Remarks: *C. cantabrica* has a widespread habitat in Turkey. If the individuals of this species that were collected from different areas were evaluated from a morphological perspective, the differences of the indumentum and the shape of the sepals could be visualized clearly. The outer sepals of this species are oblanceolate-ovate and acute to acuminate at the apex. The outer sepals of the specimens especially collected from Adana and Hatay environs usually have a much longer green-acuminate part at the apex.

During the field trips, numerous individuals of this species are collected from different localities and habitats. It is observed that the density of the indumentum of these individuals shows differences according to their habitats. The existence of adpressed-pilose on upper side of the stem and of spreading-pilose at the base of the stem is typical for this species.

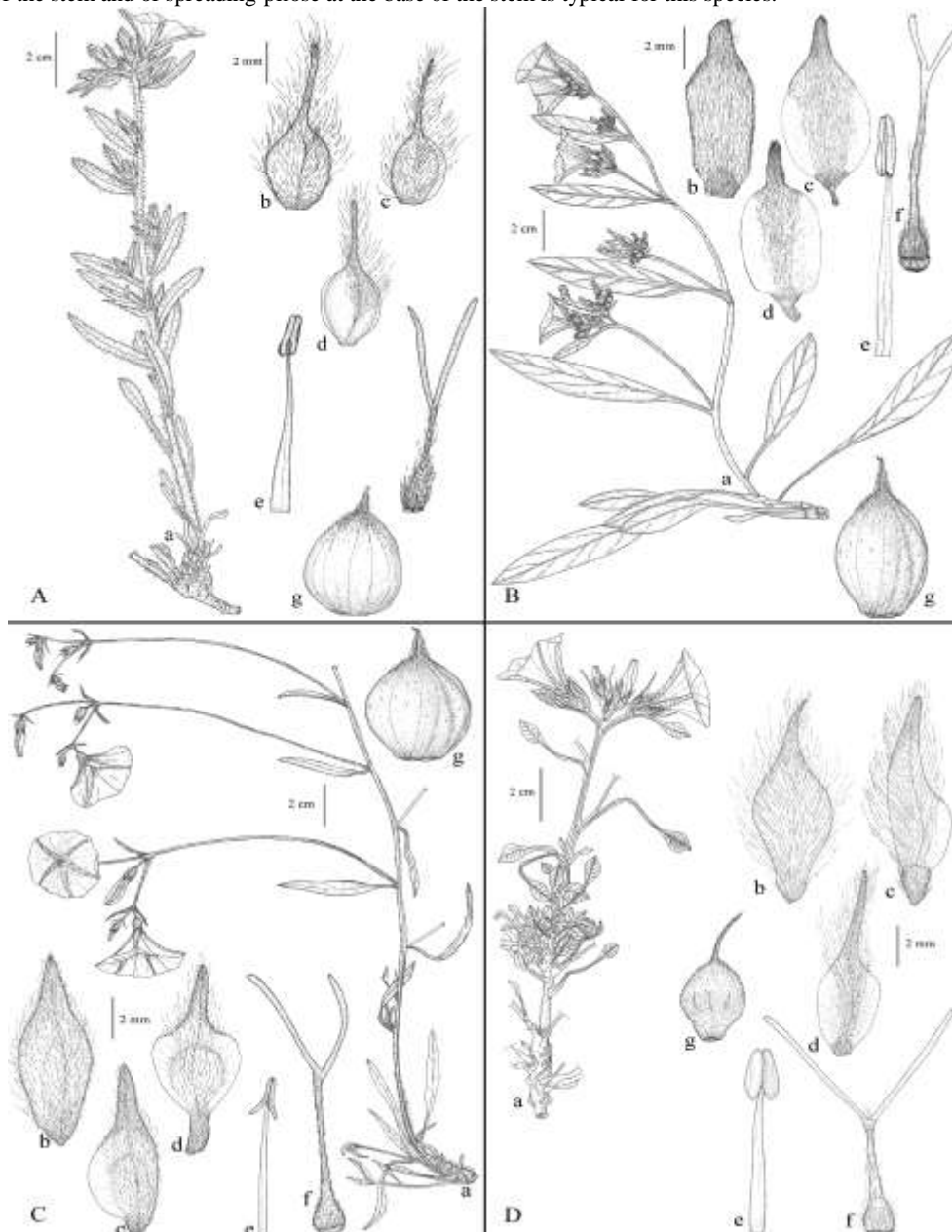


Figure 5. A: *C. calvertii*: a- Habit, b- Outer sepal, c- Middle sepal, d- Inner sepal, e- Stamen, f- Pistil, g- Capsule; B: *C. lineatus*: a- Habit, b- Outer sepal, c- Middle sepal, d- Inner sepal, e- Stamen, f- Pistil, g- Capsule; C: *C. cantabrica*: a- Habit, b- Outer sepal, c- Middle sepal, d- Inner sepal, e- Stamen, f- Pistil, g- Capsule; D: *C. compactus*: a- Habit, b- Outer sepal, c- Middle sepal, d- Inner sepal, e- Stamen, f- Pistil, g- Capsule

It was observed that the stem of the individuals particularly collected from high altitudes is covered with dense and spreading hairs all over and those collected from low altitudes is covered with less frequent and adpressed hairs. The corolla of *C. cantabrica* is usually pink, but some individuals that were encountered in İstanbul, Çanakkale, Edirne and Kırklareli environs have white corollas.

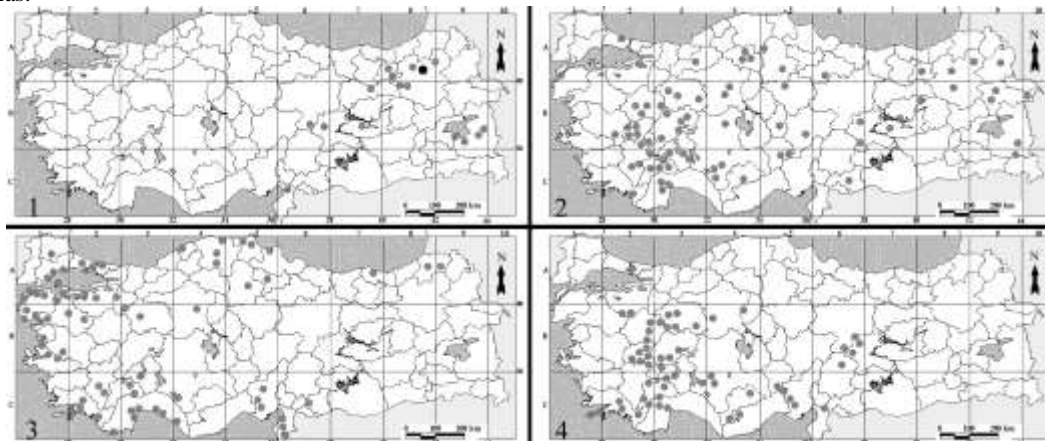


Figure 6. Distribution areas of *C. calvertii* (1), *C. lineatus* (2), *C. cantabrica* (3) and *C. compactus* (4) in Turkey

3.10. *Convolvulus oleifolius* Desr., in Lam. Encyc. iii. 552. 1789.

Type: Described from East Mediterranean Countries (P-Tourn. 74).

Woody-based, perennials, shrublets or shrubs. Stem 10–50 cm, prostrate, erect or ascending, silvery-silky indumentum. Leaves linear, oblanceolate or oblanceolate-spathulate, 10–60 × 1.5–7 mm, acute or obtuse, attenuate at the base, adpressed-sericeous; occasionally sparsely pilose at the base; the basal leaves resemble to the cauline leaves, sometimes dense clustered and imbricate at the base of stem, sometimes semi-amplexicaule and scarious margin at the base. Inflorescence axillary and terminal, solitary or 2–8 flowered cymes (especially dichasia); pedicel 0.5–4 mm or wanting; peduncle 5–60 mm. Bracts similar the cauline leaves, 6–15 × 0.5–1 mm, adpressed-sericeous sometimes with sparsely soft and spreading hairs. Bracteoles linear, 3–20 × 0.2–1 mm, longer than pedicel. Sepals erect at flowering and fruiting period; outer sepals elliptic-lanceolate to obovoid-lanceolate, 8–12 × 2.5–4.5 mm, long acuminate to caudate, scattered villose, usually black dotted. Middle sepal elliptic-lanceolate, 8–11.5 × 3–5 mm, long acuminate to caudate, with the right and the left half unequal, one half membranous towards margin; the membranous part glabrous or glabrescent. Inner sepals elliptic-lanceolate to obovoid-lanceolate, 8–11 × 3–5 mm, long acuminate to caudate, with the both half membranous towards margin; the membranous part glabrous or glabrescent. Corolla pale pink or rose pink, 15–25 mm long, with hairy bands on the outside; petals pubescent at the apex. Stamens unequal, 9.5–14 mm long; filaments entire at margin; anthers oblong with retuse apex, 2.5–3 mm long. Ovary ovoid-conical, 1.5–2 × 1–1.5 mm, hairy, surrounded by a glabrous disc at the base; style 5–6 mm, hairy; stigma lobes filiform, 5.5–6 mm. Capsule ovoid to conical, 4–5 × 3–5 mm, glabrescent towards base, hairy above, bilocular, 2- or 4- seeded; seeds ovoid, 3–3.5 × 2–3 mm, densely hairy; pericarp coriaceous, sclerotic.

- 1 Rigid, broom-like branched, usually erect, shrublets or shrubs, leaves dense clustered at the base of stem.....
..... var. *deserti*
- 1 Prostrate or ascending, woody based perennials, stem branched from the base, leaves scattered on the stem.....
..... var. *oleifolius*

3.10.1. *C. oleifolius* Desr. var. *oleifolius*

Type: ‘vient du Levant & est cultivée au Jardin du Roi’ (P).

Woody-based, perennials. Stem 10–50 cm high, prostrate or ascending, branched from the base, adpressed-sericeous. Leaves oblanceolate to oblanceolate-spathulate, numerous and scattered on the stem. Inflorescence axillary and terminal, solitary or 2–3 flowered dichasia. Outer sepals elliptic-lanceolate with green acuminate apex, 9–10.5 × 3–4.5 mm, scattered villose. Corolla pale pink, 20–25 mm long. Filaments 8–11 mm long; anthers oblong, 3 mm long. Ovary ovoid, 1.5–2 × 1–1.5 mm, hairy; style 5–5.5 mm long, hairy; stigma lobes 6 mm long. *Mediterranean element*.

Phenology: Flowering between April and June; fruiting between June and July.

Distribution and ecology: Aegean Islands, Crete, Cyprus, Egypt, Greece, Libya, Malta, Palestine, Sicily, Turkey (Mediterranean Region). Rocky slopes, macchies (0–50 m).

Conservation status: CR B2ab(i, v); C2a(i)

Remarks: The distribution area of this taxon is only limited to a single location in Turkey and the number of mature individuals are less than 50 (Aykurt and Sümbül, 2010); therefore, its conservation status was evaluated as CR. The major threat factors for this variety distributed on the rocky slopes overlooking the sea and in frigana between Finike and Demre are overgrazing and construction work of possible road widening. A great number of field studies were carried out between Finike and Demre. Unfortunately, 10–15 individuals of this variety could be observed in just one location.

3.10.2. *C. oleifolius* Desr. var. *deserti* Pamp., Archivio Bot., 12: 41. 1936.

Type: [Cyrenaica] Pampanini (FI).

Synonym: = *C. cyprius* (non Boiss.) Chapman., Cyprus Trees and Shrubs, 63 (1949).

Rigid, broom-like, much branched shrublets or shrubs. Stem 10–50 cm, erect or ascending, adpressed-sericeous. Leaves linear, oblanceolate or oblanceolate-spatulate and dense clustered at the base of stem; the branches sometimes leafless towards the base. Inflorescence axillary and terminal, solitary or 3–8 flowered cymes (often dichasia). Outer sepals elliptic-lanceolate with long, green acuminate apex, 8–12 × 2.5–3 mm, long and scattered villose. Corolla white, pale pink, or rose pink, 15–20 mm long. Filaments 7–11 mm long; anthers oblong, 2.5–3 mm long. Ovary ovoid, 2 × 1.5 mm, hairy; style 5.5–6 mm long, hairy; stigma lobes 5.5–6 mm long. *Mediterranean element*.

Phenology: Flowering between April and June; fruiting between June and July.

Distribution and ecology: Cyprus, Libya, Turkey (Mediterranean and Aegean Regions). Macchie, phrygana stony, sandy, limestone and dry rocky slopes, under *Pinus brutia* and sand dunes (0-250 m).

Conservation status: NT

Remarks: Numerous specimens of *C. oleifolius* were collected during the field trips of the “Taxonomical Studies on genus *Convolvulus* L. (*Convolvulaceae*) in Turkey” project. It was resolved that the specimens of *C. oleifolius* would be evaluated as two different varieties, which are *C. oleifolius* var. *oleifolius* and *C. oleifolius* var. *deserti* as the results of field observations, morphological and palynological studies indicated (Aykurt and Sümbül, 2010).

3.11. *Convolvulus* × *pseudocompactus* C. Aykurt & Sümbül, *Nordic J. Bot.*, 39(4): 408-416. 2011. (*C. oleifolius* Desr. var. *deserti* Pamp. × *C. compactus* Boiss.).

Type: [Turkey C1 Muğla] Datça, between Marmaris and Datça, stony slopes, 80 m, 7.v.2006, C. Aykurt (1006) and N. Kemaloğlu (AKDU).

Phytogeographical Region: Mediterranean Element

Phenology: Flowering between May and June.

Distribution and ecology: Endemic to Turkey (Mediterranean Region). Stony slopes (80 m).

Remarks: Three new hybrid taxa, which are *C. × turcicus*, *C. × pseudocompactus* and *C. × peshmenii*, were introduced within the context of the “A Taxonomic Investigation on *Convolvulus* L. (*Convolvulaceae*) Species in Turkey” project. These hybrid taxa and their parents were investigated in detail by morphological and palynological studies. Individuals of the hybrid taxa and their parents were sympatrically distributed. Particularly the habit, leaf and the sepal characteristics display intermediary features between hybrid individuals and their parents. As a result of the palynological studies, the pollen grains of the hybrid individuals were observed to be highly dehydrated; although in contrast, the rate of the dehydrated pollen fraction ranged between 4 and 8% in the parental taxa (Aykurt and Sümbül, 2011 a, b).

3.12. *Convolvulus holosericeus* M.Bieb., *Fl. Taur.-Caucas.* 1: 147. 1808.

Type: [Crimea] habitat in Tauriae maontibus calcereis, *Marschall von Bieberstein* (LE).

Woody-based, loose-cushion forming, adpressed-sericeous perennials. Stem prostrate or ascending, 10–50 cm, simple or branched. Leaves linear-lanceolate to lanceolate, 20–55 × 2–7 mm, acute, sessile, attenuate at the base; the basal leaves linear-lanceolate to spatulate, 20–60 × 4–15 mm, acute or obtuse, attenuate at the base, semi-amplexicaule or amplexicaule and scarious margin at the base. Inflorescence axillary and terminal; pedicel 1–15 mm or wanting; peduncle 7–50 mm. Bracts similar the leaves, 6–20 × 1–4 mm. Bracteoles linear, 1.5–7 × 0.2–2 mm. Sepals slightly or completely dehiscent at fruiting period; outer sepals broadly obovate to semi-globose, pouched at the base or convex. 7–17 × 6–15 mm, long acuminate, short-adpressed sericeous. Middle sepal ovate to semi-globose, 6.5–13 × 5.5–10 mm, long acuminate or long mucronate, convex or one half pouched, the other half membranous towards margin; inner sepals broadly ovate, 6–12 × 5–9 mm, caudate or long mucronate, with the both half membranous towards margin; the membranous part glabrous or glabrescent. Corolla usually white, cream, pale yellow, rarely pale pink, 20–30 mm long, bands hairy; petals pubescent at the apex. Filaments entire at margin, 6–13.5 mm. Anthers oblong with retuse apex, 2.5–4 mm long. Ovary ovoid to semi-conical, 1.5–2 × 1.5–2 mm, adpressed sericeous. Style 6.5–9 mm, adpressed sericeous; stigma 5.5–6 mm, approximately ½ or 2/3 about style. Capsule broadly ovoid-conical or ovoid, 5–7 × 4–7.5 mm, sparsely hairy towards base, bilocular, 1– or 4– seeded; seeds ovoid-elliptic, 3.5–5 × 2.5–3.5 mm, bright-, white-sericeous. *Iran-Turan element*.

- 1 Outer sepals pouched at base, 7–11 × 6–9 mm; capsule broadly ovate-globose, 5–7 × 6–7.5 mm subsp. *holosericeus*
 1 Outer sepals pouched or convex at base, 10–17 × 9–15 mm; capsule ovate, 6–8 × 4–5 mm subsp. *macrocalycinus*

3.12.1. *C. holosericeus* M.Bieb. subsp. *holosericeus* Figures 7-A, 8.

Synonym: = *C. holosericeus* M.Bieb. var. *brevifolia* Trautv., *Acta Horti Petrop.* 4:168 (1876).

Phenology: Flowering between May and July; fruiting between June and August.

Distribution and ecology: The Balkans, Caucasus, Crimea, Turkey (Marmara (Anatolian Part), Aegean, Mediterranean, Blacksea, Inner-, Southeast- and East Anatolian Regions). Shaly, sandy, calcareous, igneous, stony and limestone slopes, steppe, loose woodlands and macchies, roadsides (130-2700 m).

Conservation status: LC

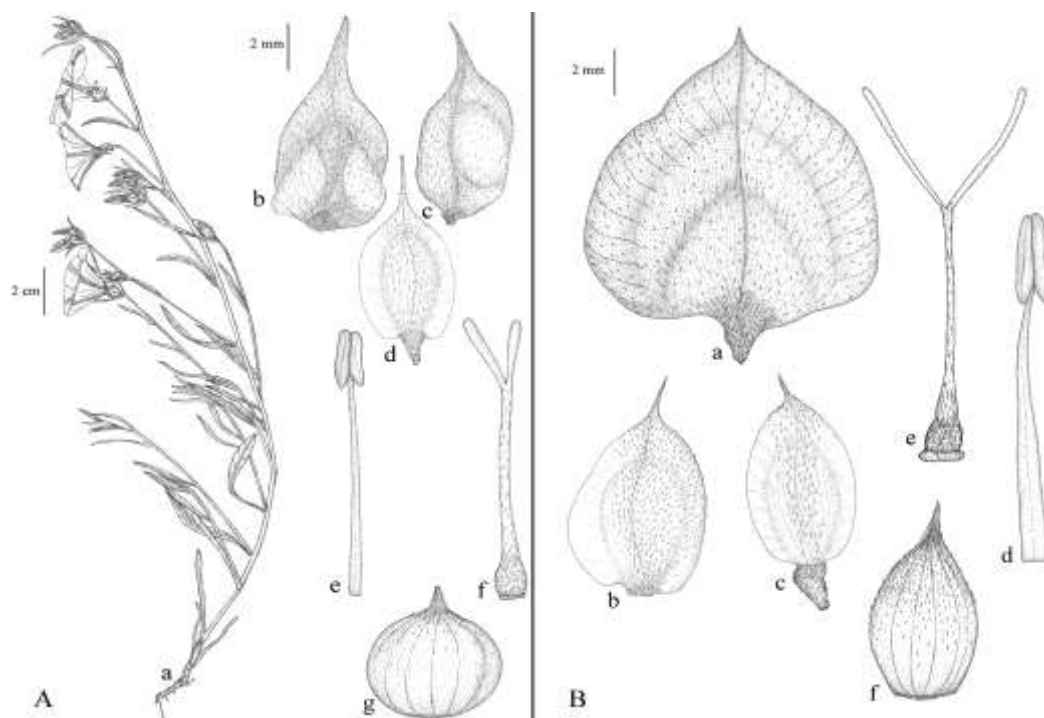


Figure 7. A: *C. holosericeus* subsp. *holosericeus*: a- Habit, b- Outer sepal, c- Middle sepal, d- Inner sepal, e- Stamen, f- Pistil, g- Capsule; B: *C. holosericeus* subsp. *macrocalycinus*: a- Outer sepal, b- Middle sepal, c- Inner sepal, d- Stamen, e- Pistil, f- Capsule

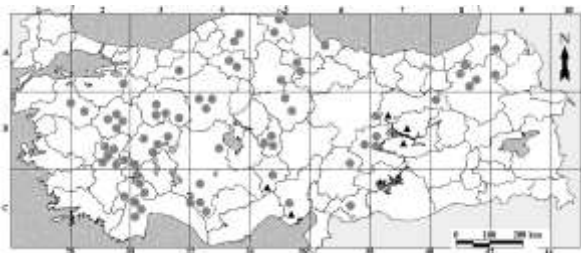


Figure 8. Distribution areas of *C. holosericeus* subsp. *holosericeus* (●) and *C. holosericeus* subsp. *macrocalycinus* (▲) in Turkey

3.12.2. *C. holosericeus* M.Bieb. subsp. *macrocalycinus* Hausskn. & Bornm. ex Bornm., Mitt. Thür. Bot. Ver. N. F. 6: 66. 1894. Figures 7-B, 8.

Lectotype: [Turkey B7 Elazığ] Kharput (Harput) von Mardin (Miadun, in montosis, 3.v.1889, *Sinten* 427 (LD, isotype: E photo!, K, LD, WU).

Leaves linear-lanceolate to lanceolate, 20–40 × 4–7 mm. Inflorescence 1–9 flowered cymes. Bracteoles longer than pedicels. Sepals dehiscent at fruiting period; outer sepals 10–17 × 9–15 mm, convex or pouched, purplish. Middle 8–13 × 7–10 mm, one half convex or pouched, the other half membranous towards margin; inner sepals 7–12 × 6–8 mm. Corolla usually white or cream. Filaments 11–13.5 mm; anthers 3.5–4 mm. Style 8–9 mm; stigma 5–6 mm, 2/3 about the style. Capsule ovoid, 6–8 × 4–5 mm; pericarp coriaceous, fragile. Seeds 4.5–5 × 3–3.5 mm. *Endemic*.

Phenology: Flowering between May and July; fruiting between June and August.

Distribution and ecology: Turkey (East Mediterranean and East Anatolian Regions). Shaly, sandy, calcareous and limestone slopes, steppe (800–1600 m).

Conservation status: NT

Remarks: These two subspecies display differences particularly in the shape and the size of their sepals, capsules and seeds. The leaves covered with short and adpressed sericeous structures are usually linear or narrowly lanceolate in *C. holosericeus* subsp. *holosericeus* and spatulate-lanceolate or lanceolate in *C. holosericeus* subsp. *macrocalycinus*. However, the leaf character is not useful for the identification of the subspecies due to the presence of high variation. This character shows intermediacy between these subspecies especially where their distribution areas are close to each other.

3.13. *Convolvulus* × *turcicus* C. Aykurt & Sümbül, Ann. Bot. Fen., 48(5): 428–434. 2011. (*C. holosericeus* M.Bieb. subsp. *holosericeus* × *C. compactus* Boiss.)

Holotype: [Turkey B3 Eskişehir] Seyitgazi, 2 km from Seyitgazi to Cevizli road, steppe, 1117 m, 7.vi.2008, *C. Aykurt* (2172), *N. Kemaloğlu* (AKDU).

Phytogeographical Region: Iran-Turan element.

Phenology: Flowering between May and July.

Distribution and ecology: Endemic to Turkey (Inner and East Anatolian Regions). Stony slopes and steppe (1075–1120 m).

Remarks: It was indicated within the context of the present study that this taxon was introduced for the first time (Aykurt and Sümbül, 2011a) and that *C. × turcicus* was encountered in the B3 square in the map of Turkey. Then in years, this taxon was also collected in areas corresponding to B6 and C3/B3 in the map where it was distributed along with its parents sympatrically and the distribution areas for *C. × turcicus* and its parents were given in Figure 9.

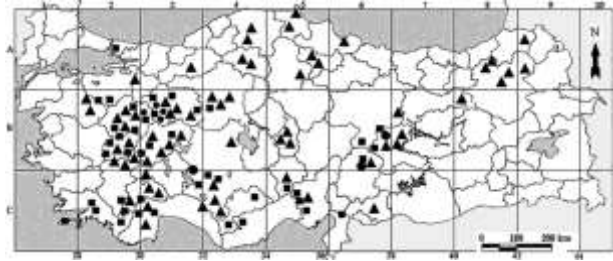


Figure 9. Distribution areas of *C. × turcicus* and its parents: *C. × turcicus* (●), *C. holosericeus* subsp. *holosericeus* (▲) and *C. compactus* (■) in Turkey.

3.14. *Convolvulus × peshmenii* C.Aykurt & Sümbül, *Nordic J. Bot.* 39(4): 408-416. 2011, (*C. holosericeus* M.Bieb. subsp. *macrocalycinus* Hausskn. & Bornm. ex Bornm. × *C. compactus* Boiss.).

Holotype: [Turkey C5 Adana] Pozanti, 5-6 km from Pozanti to Adana, under *Pinus brutia*, 945 m, 09.vi.2007, C. Aykurt (1495), N. Kemaloğlu (AKDU).

Phytogeographical Region: East Mediterranean Element.

Phenology: Flowering between May and June.

Distribution and ecology: Endemic to Turkey (Mediterranean Region). Under *Pinus brutia* woodland (945 m).

3.15. *Convolvulus compactus* Boiss., *Diagn. Pl. Orient. ser. 1, 4:* 40. 1844. Figures 5-D, 6.

Lectotype: [Turkey] in Caria interiori, 1843, *Pinard* (G, type: E photo!).

Synonyms: =*C. cochlearis* Griseb., *Spic. Fl. Rumel. ii.* 76, in nota. (1844). =*C. parnassicus* Boiss. & Orph., *Diagn. Pl. Orient. ser. 2, 3:* 125 (1856). =*C. compactus* subsp. *parnassicus* (Boiss. & Orph.) Sa'ad, *Convolv. Sp. Canar. Isl., Medit. Reg., etc.* 141 (1967). =*C. konyacus* Sa'ad, *Convolv. Sp. Canar. Isl., Medit. Reg., etc.* 142 (1967), holotype: E photo!. =*C. boissieri* Steud. subsp. *compactus* (Boiss.) Stace, *Bot. J. Linn. Soc.* 64(1): 58 (1971). =*C. boissieri* Steud. subsp. *parnassicus* (Boiss. & Orph.) Kuzmanov, *Fl. Narodna Republ. Bulg.* 8: 451 (1982).

Mediterranean and Iran-Turan Element.

Phenology: Flowering between May and July; fruiting between June and August.

Distribution and ecology: Balkans, Turkey (Marmara, Aegean, Inner Anatolia, Mediterranean and East Anatolian Regions). Shaly, sandy, calcareous, limestone and serpentine slopes, steppe, edges of macchie and under *Pinus brutia* (80-2135 m).

Conservation status: LC

Remarks: It could be possible that the individuals of this species could be shown to display morphological variations considering the wide distribution area of the species and its limitations with respect to the altitude. The characteristics displaying the highest variation are the shapes of the leaves and the sepals. The shape of the leaves, covered with adpressed sericeous indumentum, is spatulate to linear. Outer sepals are oblong-lanceolate to broadly ovate, 6–17 × 3–6 mm in size, and sometimes purplish-brown color could be observed at the apex. In addition, the length of the style and the stigma and their ratio to each other displayed differences. It was observed that these characteristics could be quite variable even in individuals, which are dispersed in the same geographical area.

During the field studies, the most different population of this species was observed in the C5 square around Pozanti. *C. compactus* generally prefers steppes, stony and shaly slopes as habitats and normally it is not distributed under dense *Pinus brutia* woodlands. But, one of the populations of this species was observed to inhabit an area between Pozanti and Tekir (the C5 square) under *Pinus brutia* and this population was evaluated morphologically in detail. The individuals of this population are different from the other individuals, which were evaluated within this study, especially in terms of their bracteoles (distinctly exceeding the calyxes), inflorescence (always terminates with a single flower), capsules (oblong and sericeous thoroughly) and seeds (elliptic and 4–4.5 × 2.5 mm in size). All of these differences could still not make it possible to think of the population as a new taxon considering the wide range of the areas of distribution and the morphological varieties among the individuals of this species. It just allowed to extend the description of *C. compactus*.

3.16. *Convolvulus phrygius* Bornm., *Repert. Spec. Nov. Regni Veg.* 5: 168. 1908. Figures 10-A, 11.

Type: [Turkey B3 Eskişehir] Eski-Scheher ad viam versus Tschifteler (Çifteler), 13.v.1901, *Warbung & Endlich* (type: B photo!).

Synonym: =*C. pulvinatus* Sa'ad, *Convolv. Sp. Canar. Isl., Medit. Reg., etc.* 148 (1967) (holotype: B photo!).

Woody-based, usually cushion-forming shrublets. Stem ascending or prostrate, 0.5–12 cm, branched from the base, adpressed sericeous. Leaves linear-lanceolate to linear-spatulate, 8–25 × 2–5 mm, acute or mucronate, rarely obtuse, attenuate at base, adpressed sericeous and sparsely long-pilose together, basal leaves 4–30 × 1–4 mm, obtuse or acute, semi-amplexicaule and scarious margin at base; dead leaves persistent at base. Inflorescence axillary and terminal, cymes 1–5 flowered; flowers sessile or pedicel very short (0.5–3 mm); peduncle 3–15 mm. Bracts 10–14 × 1–3 mm; bracteoles linear-lanceolate, equal or exceeding the calyx. Sepals erect at flowering and fruiting period, oblong, acute or mucronate, adpressed sericeous or adpressed sericeous and spreading pilose together; outer sepals 5.5–11 × 1.5–3.5 mm, green sometimes green-purplish. Middle sepal 5.5–10 × 1.5–3.5 mm,

one half membranous towards margin; inner sepals 5–10 × 1.5–3.5 mm, with the both half membranous towards margin; the membranous part glabrous. Corolla white, 15–25 mm long, bands; petals pubescent at the apex. Filaments entire at margin, 8.5–11 mm, Anthers oblong with retuse apex, 2–2.5 mm long. Ovary ovoid, 1–1.5 × 1–1.5 mm, villose. Style 4–4.5 mm, villose; stigma 9.5–10 mm, 2 times longer than style. Capsule ovoid to narrowly ovoid, 4–4.5 × 2–3 mm, shorter than calyx, long pilose towards apex, glabrous at base; 2 locular, 2–3 seeded; pericarp coriaceous, slightly membranous, fragile. Seeds ovoid-elliptic, 3–3.5 × 2–2.5 mm, dark brown-black, velutinous-sericeous. *Endemic. Iran-Turan Element.*

Phenology: Flowering between May and June; fruiting between June and July.

Distribution and ecology: Turkey (Inner Anatolia and Mediterranean Regions). Shaly, calcareous and limestone slopes, steppe (850–1415 m).

Conservation status: NT

Remarks: According to the Flora of Turkey, *C. phrygius*, closely related to *C. pulvinatus* Sa'ad. *C. pulvinatus*, which was indicated as a synonym of *C. phrygius* (Aykurt, 2012), was described by Sa'ad (1967). *C. pulvinatus* was distinguished morphologically from *C. boissieri* Steud. and *C. konyacicus* Sa'ad, which were specified as close relatives, by Sa'ad (1967). *C. konyacicus* was described as a new endemic species by Sa'ad in her study, however, this species was evaluated as a synonym of *C. compactus* in the Flora of Turkey (Parris, 1978). *C. boissieri* is closely related to *C. compactus* and it distributes in Albania, Bulgaria, Greece and Spain. Interestingly, *C. phrygius* was not mentioned in Sa'ad's study although *C. phrygius* is the closest species of *C. pulvinatus* and it was introduced by Bornmüller in 1908 to the world of science.

A great number of specimens were collected from the type localities of *C. phrygius* and *C. pulvinatus* and other distribution areas of both species. The collected specimens were examined morphologically and palynologically in detail. As a result of the morphological measurements and evaluations, it was determined that these specimens belonging to two species are quite similar to each other and even these species could not be considered as two different species.

These species, indicated as being closely related in the Flora of Turkey, were distinguished from each other especially in their sepal characteristics (shape, length and indumentum) and their inflorescence by Parris (Parris 1978).

The lengths of the outer sepal in *C. phrygius* were measured as 5.5–11 mm in the present study. The outer sepals sometimes may be covered with only sericeous indumentum and sometimes may also have sparse and spreading pilose-hairs in addition to the sericeous indumentum in some individuals that were collected from the same geographical area. Also, it was observed that the outer sepals sometimes could be covered with sericeous and spreading-pilose hairs together.

The outer sepals of the individuals collected from the type locality of *C. pulvinatus* are similar to each other in terms of their morphology and their lengths range between 5.5–10 mm and the indumentum type of the sepals are dominantly sericeous, but sparsely or densely pilose hairs could also be found in different individuals of the same population. Furthermore, the inflorescence of the two species is the same. Flowers are single or 2–3 flowered cymes are present at the axillary; single or 2–5 flowered cymes are present at the terminal. During the field studies, the individuals of these species were collected during the fruiting period and morphological differences were not observed in the capsule and the seed characteristics of *C. pulvinatus* and *C. phrygius*. The distribution area of *C. phrygius* was given in Figure 11.

3.17. *Convolvulus assyricus* Griseb., Spic. Fl. Rumel. 2(4): 75, in nota. 1844. Figures 10-B, 11.

Type: [Turkey] in Anatolia orientali, *Doniotti* s. n. (holotype: GOET).

Synonym: =*C. strigulosus* Boiss., Diagn. Pl. Orient. ser. 1, 11: 83. (1849).

Woody-based, dwarf cushion-forming shrublets. Stem generally absent, rarely 0–6.5 cm, ascending or prostrate, branched from the base, long pilose-hirsute. Leaves linear-lanceolate to linear-spathulate, 2–50 × 1–5 mm, clustered at base, the outers very small and coriaceous, 2–50 × 1–5 mm, imbricate, acute, attenuate at base, semi-amplexicaule and scarious margin at base; upper surface glabrous or sparsely hair, lower surface long pilose-hirsute, one veined; dead leaves persistent at base. Flowers at base; 1-flowered; sessile or pedicel very short (0.5 mm). Bracts resemble to leaves, 10–15 × 0.5–1 mm; bracteoles linear, 7–10 × 0.2–0.5 mm, exceeding the calyx. Sepals erect at flowering and fruiting period; outer sepals oblong-lanceolate, 2.5–3.5 × 2–2.5 mm, acute, spreading hirsute towards apex and at margin. Middle and inner sepals ovoid, 2.5–3.5 × 2–2.5 mm, mucronate, one-half of the middle sepal and both-half of the inner sepals membranous towards margin; the membranous part glabrous or glabrescent. Corolla rose pink, 25–30 mm long, bands hairy; petals glabrous at the apex. Filaments entire at margin, 6–8 mm. Anthers oblong with retuse apex, 3 mm long. Ovary ovoid, 1–1.5 × 1–1.5 mm, hirsute-villose. Style 4–5 mm, sparsely long hirsute; stigma 9–11 mm, 2 times longer than style. Capsule ovoid, 4.5–5.5 × 4–5 mm, spreading hirsute except the base; 1locular, 1–2 seeded; pericarp coriaceous, fragile. Seeds elliptic, 3–3.5 × 2–2.5 mm, brown, short-white hairy. *Endemic. Iran-Turan Element.*

Phenology: Flowering between May and June; fruiting between June and July.

Distribution and ecology: Turkey (Inner Anatolian Region). Shaly, stony and igneous slopes and steppe (750–2060 m).

Conservation status: NT

3.18. *Convolvulus libanoticus* Boiss., Diagn. Pl. Orient. ser. 1, 11: 82. 1849. Figures 12-A, 13.

Lectotype: [Lebanon] in excelsis siccis Libani supra Cedros, *Boissier* (G, type: E photo!).

Synonyms: =*C. cantabrica* subsp. *radicosus* (Heldr. & Sart.) Maire, Cat. Pl. Moroc. [Jahandiez & Maire], 588 (1934). =*C. radicosus* Heldr. & Sart., Diagn. Pl. Orient. ser. 2, 3: 124 (1856) (neotype: B photo!).

Loose-cushion forming, woody based perennials. Stem usually ascending, sometimes prostrate, 4–20 cm, short-adpressed pilose, branched from base. Leaves linear-lanceolate to lanceolate, 25–60 × 3–4 mm, acute, attenuate at base, upper surface glabrous, lower surface and margins adpressed pilose; basal leaves linear-lanceolate to linear-spathulate, 15–65 × 2.5–4 mm, enlarged at the base, semi-amplexicaule or amplexicaule and scarious at the base; adpressed pilose except inner surface, sometimes hairy only at margins. Inflorescence axillary and terminal, cymes 2–20 flowered; pedicel 1.5–3 mm; peduncle 10–45 mm. Bracts linear, 10–15 × 1–1.5 mm; bracteoles filiform, 4–6 × 0.3–0.5 mm, longer than pedicels. Sepals erect at flowering and fruiting period, ovate-lanceolate, with green acuminate part; outer sepals 6–8 × 2–3 mm, adpressed pilose, sometimes hairy only at apex. Middle and inner

sepals 5–7 × 2.5–3 mm, usually hairy only at the apex, one-half of the middle sepal and both-half of the inner sepals membranous towards margin. Corolla white, 13–18 mm long, bands hairy; petals glabrous or hairy at the apex. Filaments entire at margin, 6–8 mm, Anthers oblong with retuse apex, 2 mm long. Ovary narrowly ovate, 1–1.5 × 0.5–1 mm, glabrous. Style 4–4.5 mm, adpressed pilose; stigma 4.5–5 mm, equal to style. Capsule ovate, 5–5.5 × 3.5–4.5 mm, sparsely hairy towards apex, with 2 locule, usually 2 seeded; pericarp coriaceous, fragile. Seeds ovate, 3–4 × 2–3 mm, brown, densely short-white hairy. *East Mediterranean Element*.

Phenology: Flowering between June and August; fruiting between July and September.

Distribution and ecology: Greece, Israel, Lebanon, Turkey (Mediterranean and Aegean Regions). Limestone and serpentine slopes, alpine steppe (1525-2670 m).

Conservation status: NT

3.19. *Convolvulus cataonicus* Boiss. & Hausskn. ex Boiss., Pl. Or. Nov. dec. i. 5. 1875. (Figures 12-B, 13)

Type: [Turkey C6 Kahramanmaraş] in agris regionis inferioris montis Berytdagh Cataoniae, (3.vii.1865), 1525 m, *Haussknecht* (holotype: E photo!).

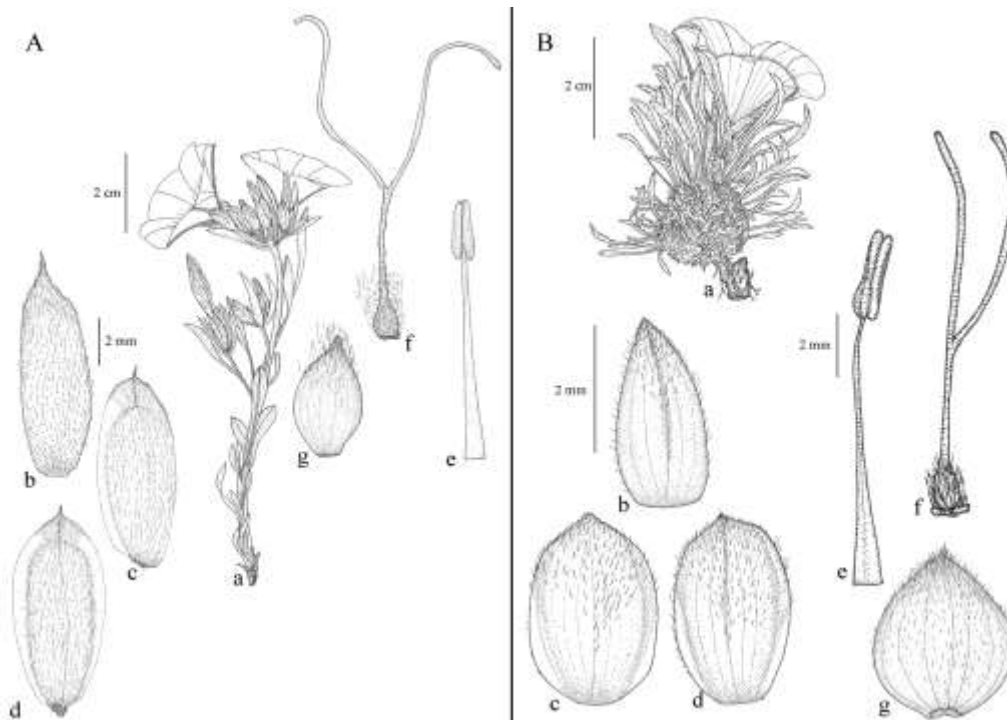


Figure 10. A: *C. phrygius*: a- Habit, b- Outer sepal, c- Middle sepal, d- Inner sepal, e- Stamen, f- Pistil, g- Capsule; B: *C. assyricus*: a- Habit, b- Outer sepal, c- Middle sepal, d- Inner sepal, e- Stamen, f- Pistil, g- Capsule

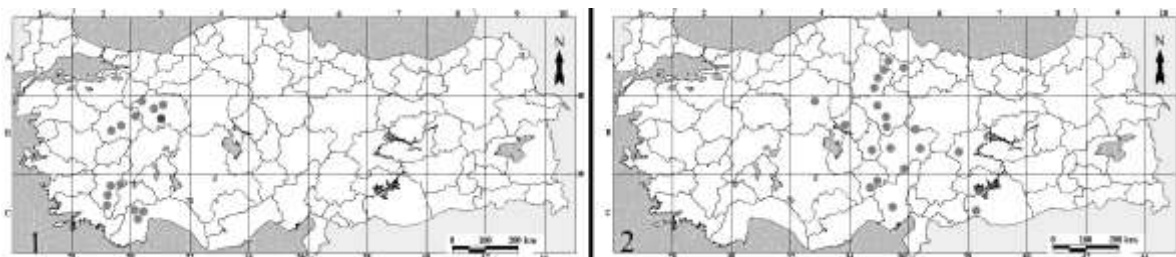


Figure 11. Distribution areas of *C. phrygius* (1) and *C. assyricus* (2) in Turkey

Synonyms: =*C. huber-morathii* P.H.Davis, Notes Roy. Bot. Gard. Edinburgh 24: 24 (1962). =*C. abdallahii* Sa'ad, Convolv. Sp. Canar. Isl., Medit. Reg., etc. 114 (1967)

Loose-cushion forming, woody based perennials. Stem ascending or prostrate, 5–30 cm, branched from base; adpressed and spreading pilose together. Leaves linear-lanceolate 20–30 × 3–4 mm, acute, attenuate at base, upper surface usually with sparsely hairy, lower surface and margins pilose; basal leaves linear-lanceolate to linear-spathulate, 45–90 × 2–4 mm, enlarged at the base, semi-amplexicaule or amplexicaule and scarious at the base; lower surface and margins pilose, inner surface sparsely hairy or glabrous. Inflorescence axillary and terminal, cymes 1–20 flowered; pedicel 1–3 mm; peduncle 10–50 mm. Bracts linear, 10–20 × 1–1.5 mm, equal or slightly exceeding the calyx; bracteoles filiform, 8–11 × 0.2–0.5 mm, longer than pedicels. Sepals erect at flowering and fruiting period, obovate, with green acuminate part, spreading pilose; outer sepals 8–15 × 2–3 mm; middle and inner sepals 7.5–14 × 2.5–3.5 mm, membranous towards margin; membranous part glabrous. Corolla white, 15–18 mm long, bands hairy; petals glabrous or hairy at the apex. Filaments entire at margin, 6.5–10 mm; anthers oblong with retuse apex, 2 mm long. Ovary narrowly ovate, 1–1.5 × 1–1.5 mm, spreading or adpressed pilose. Style 6–9 mm, spreading or adpressed pilose; stigma 3.5–5 mm, half about

the style. Capsule narrowly ovate, 4–6 × 2.5–3 mm, sparsely pilose, with 1– or 2 locule, usually 1–2 seeded; pericarp coriaceous, slightly membranous, fragile. Seeds elliptic, 3.5–4 × 1.75–2 mm, brown, short-white hairy. *Endemic. Iran-Turan Element.*

Phenology: Flowering between April and July; fruiting between July and September.

Distribution and ecology: Turkey (Mediterranean, Blacksea and East Anatolian Regions). *Acantholimon* and *Astragalus* steppe, stony and shaly slopes, under open *Pinus nigra* (900-1650 m).

Conservation status: NT

Remarks: *C. cataonicus* is closely related to *C. carduchorum*, which are endemic to Turkey. These species, which are similar to each other with respect to their habit characteristics, are distinguished from each other in terms of the differences of the indumentum types of particularly the stem, leaves and the sepals. Long and spreading pilose hairs are dominant in *C. cataonicus*, whereas on the other hand, the hairs of *C. carduchorum* are quite sparse and adpressed. One of the distinct differences of the two species is the shape and the color of the sepals. The sepals of *C. cataonicus* are obovate, with spreading pilose hairs, acuminate at the apex and green in color. The sepals of *C. carduchorum* are more rectangular shaped than the sepals of *C. cataonicus* with thoroughly glabrous or sparsely adpressed-pilose hairs at the apex. Additionally, brown-purple coloration is clearly evident in the sepals of *C. carduchorum*.

3.20. *Convolvulus carduchorum* P.H.Davis, Notes Roy. Bot. Gard. Edinburgh 24: 24. 1962. Figures 12-C, 13.

Type: [Turkey B9] Bitlis-Tatvan, 1700 m, disturbed steppe, 30.vi.1954, *Davis & O. Poulin*, D. 22382 (holotype: E photo!).

Synonyms: =*C. glabrescens* P.H.Davis & Hub.-Mor., Notes Roy. Bot. Gard. Edinburgh 24: 27 (1962). =*C. anatolicus* Sa'ad, Convolv. Sp. Canar. Isl., Medit. Reg 135 (1967). =*C. orophilus* Sa'ad, Convolv. Sp. Canar. Isl., Medit. Reg., etc. 147 (1967), etc.

Loose-cushion forming, woody-based perennials. Stem ascending or prostrate, 3.5–26 cm, branched from base; sparsely adpressed pilose. Leaves linear-lanceolate, 10–70 × 1.5–4 mm, obtuse to acute, attenuate at base, enlarged at the base, semi-amplexicaule and scarios margin at the base, pilose; basal leaves linear to spatulate, 10–80 × 1–5 mm, enlarged at the base, semi-amplexicaule or amplexicaule and scarios margin at the base, pilose, inner surface sparsely hairy or glabrous. Inflorescence axillary and terminal, cymes 1–6 flowered; pedicel 1–6 mm; peduncle 6–25 mm. Bracts linear, 7–25 × 1–1.5 mm; bracteoles linear, 6–7 × 0.75–1 mm, longer than pedicels. Sepals erect at flowering and fruiting period, obovate-oblong, 11–13 × 2.5–5 mm, mucronate; outer sepals sparsely pilose towards apex, distinctly brown-purplish coloured, slightly membranous at the margins. Middle and inner sepals glabrous and membranous towards margin. Corolla white, 18–20 mm long, bands hairy; petals hairy at the apex. Filaments entire at margin, 8–10 mm; anthers oblong with retuse apex, 2 mm long. Ovary narrowly ovate, 2.5–3 × 1.5–2 mm, sparsely pilose at the apex.

Style 8.5–9 mm, sparsely pilose; stigma 4–4.5 mm, half about the style. Capsule ovate, 6–7 × 3.5–4 mm, sparsely pilose at the apex, with 2 locule, usually 1–3 seeded; pericarp coriaceous, fragile. Seeds elliptic, 3.5–4 × 1.5–2 mm, brown, short-white hairy. *Endemic. Iran-Turan Element.*

Phenology: Flowering between June and July; fruiting between July and August.

Distribution and ecology: Turkey (East Anatolian Region). *Acantholimon* and *Astragalus* steppe, alpine pastures, on serpentine, igneous and stony slopes (1700-2100 m).

Conservation status: NT

3.21. *Convolvulus pilosellifolius* Desr., in Lam. Encyc. iii. 551. 1789. Figures 12-D, 13.

Type: [East Mediterranean Countries] P-Tourn. 70

Perennial, usually woody-based herbs. Stem ascending or prostrate, 30–60 cm, simple or branched; adpressed or spreading pilose, more densely hairy at the base. Leaves elliptic to lanceolate, 15–80 × 5–15 mm, acute, sessile, truncate, entire, scattered pilose; lower leaves resemble to cauline leaves, usually smaller. Inflorescence axillary and terminal, dichasium, cymes 1–6 flowered; pedicel 2–5 mm; peduncle 20–30 mm. Bracts lanceolate, 6–10 × 2–3 mm; bracteoles linear, 2–4 × 0.5–1 mm, equal or slightly longer than pedicels. Sepals erect at flowering and fruiting period, ovate, acute, green at the apex, adpressed or spreading hirsute; outer sepals 5–7 × 2–3 mm; middle sepal 5–6.5 × 2–3.5 mm, with one half membranous toward the margin; inner sepals 5–6.5 × 2–3.5 mm, membranous, sparsely hairy towards apex; membranous parts glabrous. Corolla pale pink, 10–15 mm long, bands hairy; petals glabrous at the apex. Filaments entire at margin, 6–8 mm; anthers oblong with retuse apex, 2 mm long. Ovary ovate-globose, 1–1.5 × 1–1.5 mm, glabrous. Style 3–4 mm, glabrous; stigma 5–6 mm, 1.5 times longer than style. Capsule ovate-elliptic, 3.5–4 × 3–3.5 mm, glabrous, with 2 locule, usually 1–2 seeded; pericarp coriaceous, fragile. Seeds ovate-elliptic, 2–3 × 1.5–2 mm, light brown, white hairy. *Iran-Turan Element.*

Phenology: Flowering time June; fruiting between June and July.

Distribution and ecology: Afghanistan, Africa, Iran, northern Iraq, northern Syria, Pakistan, The Sinai Peninsula, Turkey (South East and East Anatolian Regions) United Arab Emirates. Road- and field sides, calcareous and sandy slopes (350-1200 m).

Conservation status: NT

3.22. *Convolvulus persicus* L., Sp. Pl. 1: 158. 1753. Figures 14-A, 15.

Type: [North Iran] In Persia, ad maris Caspici litus (Hb. Linn. 218/53).

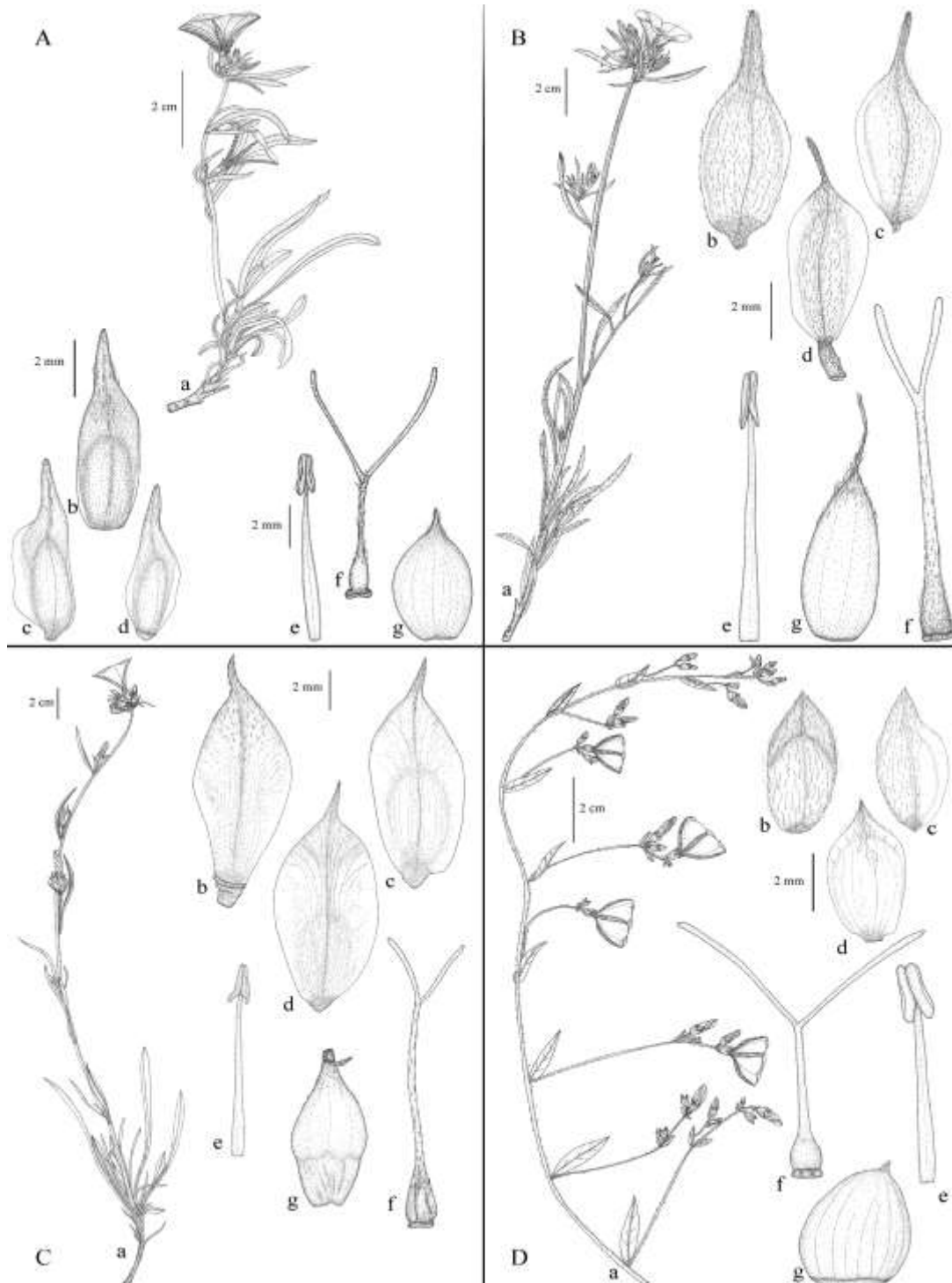


Figure 12. A: *C. libanoticus*: a- Habit, b- Outer sepal, c- Middle sepal, d- Inner sepal, e- Stamen, f- Pistil, g- Capsule; B: *C. cataonicus*: a- Habit, b- Outer sepal, c- Middle sepal, d- Inner sepal, e- Stamen, f- Pistil, g- Capsule; C: *C. carduchorum*: a- Habit, b- Outer sepal, c- Middle sepal, d- Inner sepal, e- Stamen, f- Pistil, g- Capsule; D: *C. pilosellifolius*: a- Habit, b- Outer sepal, c- Middle sepal, d- Inner sepal, e- Stamen, f- Pistil, g- Capsule

Woody-based, densely wooly-sericeous, greyish perennials. Stem erect or ascending, 10–50 cm, branched, densely wooly-tomentose. Leaves elliptic to broadly ovate, 20–40 × 10–30 mm, obtuse, sometimes slightly retuse at the nerved on lower surface; basal leaves usually rounded or obovate-spatulate, 6–15 × 2–5 mm, attenuate at the base or short petiolate (2 mm). Inflorescence axillary, 1–6 flowered cymes, pedicel 5–10 mm, peduncle 15–40 mm. Bracts similar to cauline leaves, 15–30 × 10–20 mm. Bracteoles elliptic-rounded, sometimes quite small, 2–7 × 1–5 mm, shorter than pedicel. Sepals erect or slightly dehiscent at fruiting period, broadly ovate or ovate, obtuse to acute, densely wooly; outer sepals 9–12 × 8–11 mm. Middle sepal 9–12 × 8–11 mm, one half glabrous towards margin at the base; inner sepals 9–11 × 8–10 mm, glabrous except apex and margins. Corolla white, 25–40 mm long, bands densely hairy; petals glabrous at the apex. Filaments with sessile glands towards the base of dilated part, 10–15 mm. Anthers sagittate with acute apex, 5 mm long. Ovary ovoid-globose, 2–2.5 × 1.5–2 mm, glabrous. Style 10–13 mm, glabrous; stigma 2.5–3 mm, glabrous, ¼ or 1/5 about style.

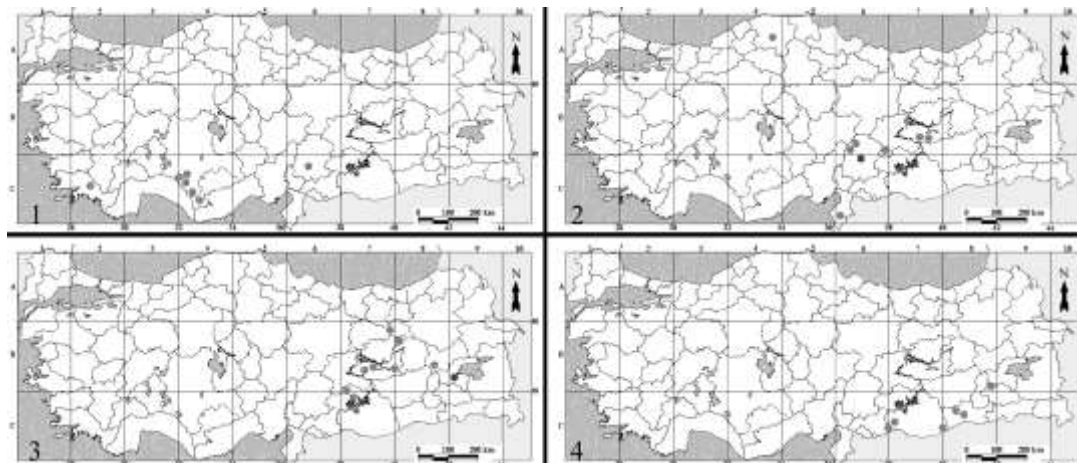


Figure 13. Distribution areas of *C. libanoticus* (1), *C. cataonicus* (2), *C. carduchorum* (3) and *C. pilosellifolius* (4) in Turkey

Capsule broadly ovate-globose, approximately equal to calyx, 8–10 × 8–10 mm, glabrous, with 2-locular, usually 1– 2 seeded; pericarp sclerotic. Seeds obovate, 3–3.5 × 2.5–3 mm, dark brown or black, tuberculate. *Iran-Turan Element*.

Phenology: Flowering between June and July; fruiting between July and August.

Distribution and ecology: Bulgaria, Iran, Romania, Turkey (Marmara Region). Sandy dunes and hills near sea level (0-10 m).

Conservation status: CR B1ab(i, iii, iv)

Remarks: *C. persicus*, which is distributed in the coastal Blacksea area in the Marmara Region in Turkey and also in Bulgaria, Iran, Romania and Lake Hazer, is a quite isolated species taxonomically. *C. persicus* is distinctly different from the other species included in Group A, which consist of generally erect, ascending or prostrate (never climbing or trailing) perennials or shrubs, owing to its filaments with sessile glands towards the base, are dentate and its ratio of stigma-style (1/4-1/5). This species resembles the species included in Group B owing to the characteristics mentioned above. Although *C. persicus* resembles the species in Group A on account of its outer appearance, it is evaluated in Group B because of its filament and pistil characteristics. The most serious threats for this species whose distribution areas are limited with sand dunes in Kilyos and Şile in Marmara Region in Turkey are human pressure and misuse of sand dunes.

3.23. *Convolvulus pentapetaloides* L., Syst. Nat., ed. 12. 2: 229. 1767. Figures 14-B, 16.

Type: [Majorika] (Hb. Linn. 218/41).

Synonym: =*C. tricolor* subsp. *pentapetaloides* (L.) O.Bolòs & Vigo, Collect. Bot. (Barcelona) 14: 90 (1983).

Mediterranean Element.

Phenology: Flowering between March and April; fruiting between April and May.

Distribution and ecology: Cyprus, Iran, Iraq, Northwest Africa (?), Southern Europe, Syria, Turkey (Marmara, Aegean and Mediterranean Regions). Calcareous and rocky slopes, under *Olea europae* and *Ceratonia siliqua*, macchie (10-130 m).

Conservation status: LC

3.24. *Convolvulus siculus* L. subsp. *siculus*, Sp. Pl. 1: 156. 1753. Figures 14-C, 16.

Type: [Sicily] (Hb. Linn. 218/40, photo!).

Synonym: =*C. flexuosus* Pomel, Nouv. Mat. Fl. Atl. 84. (1875).

Mediterranean Element.

Phenology: Flowering between March and April; fruiting between April and May.

Distribution and ecology: Mediterranean Countries, Turkey (Mediterranean and Aegean Regions). Calcareous and rocky slopes, under *Olea europae* and *Ceratonia siliqua*, macchie (0-450 m).

Conservation status: LC

***3.25. *Convolvulus tricolor* L. subsp. *tricolor*, Sp. Pl. 1: 158. 1753. Figures 14-D.**

Type: Described from Sicily.

Synonyms: *C. pseudotricolor* Bertol., Fl. Ital. ii. 450 (1835). *C. maroccanus* Batt., Bull. Soc. Bot. France 58: 187 (1911). *C. tricolor* subsp. *hortensis* (Batt.) Maire, Bull. Soc. Hist. Nat. Afrique N. 19: 61 (1928).

Mediterranean Element.

Phenology: Flowering between May and June; fruiting between May and June.

Distribution and ecology: Northwest Africa, Southern Europe, Turkey (Marmara Region). Road sides and fallow fields.

3.26. *Convolvulus althaeoides* L., Sp. Pl. 1: 156. 1753. Figures 16, 17-A.

Type: [Southern Europe] Habitat in Europa meridionali (Hb. Linn. 218/26, photo!).

Synonym: =*C. italicus* Roem. & Schult., Syst. Veg., ed. 15 bis [Roemer & Schultes] 4: 266 (1819).

Mediterranean Element.

Phenology: Flowering between March and June; fruiting between June and July.

Distribution and ecology: Cyprus, East Aegaen Islands, Lebanon, Palestine, Southern Europe, Syria, Turkey (Marmara, Aegean and Mediterranean Regions). Road sides, limestone, sandy and stony slopes (0-150 m).

Conservation status: LC

Remarks: In contrary to what is set forth in some references (Davis, 1978; Stace, 1972; Sa'ad, 1967), it is very difficult to differentiate between *C. althaeoides* and *C. elegantissimus* based on whether their leaves are lobed to midrib or not since this characteristic shows variations for both species. During the examination of the specimens from both species in our study, it was observed that the upper leaves divided nearly to the midrib and the lobes of the leaves gradually decreased towards the base of stem. In some cases, the upper leaves of *C. elegantissimus* were undulate at the margins instead of being lobed. The indumentum type of the leaves would be the most important characteristic for identifying both species. The leaves of *C. elegantissimus* are covered with adpressed silvery-silky indumentum and the leaves of *C. althaeoides* are covered with pilose hairs.

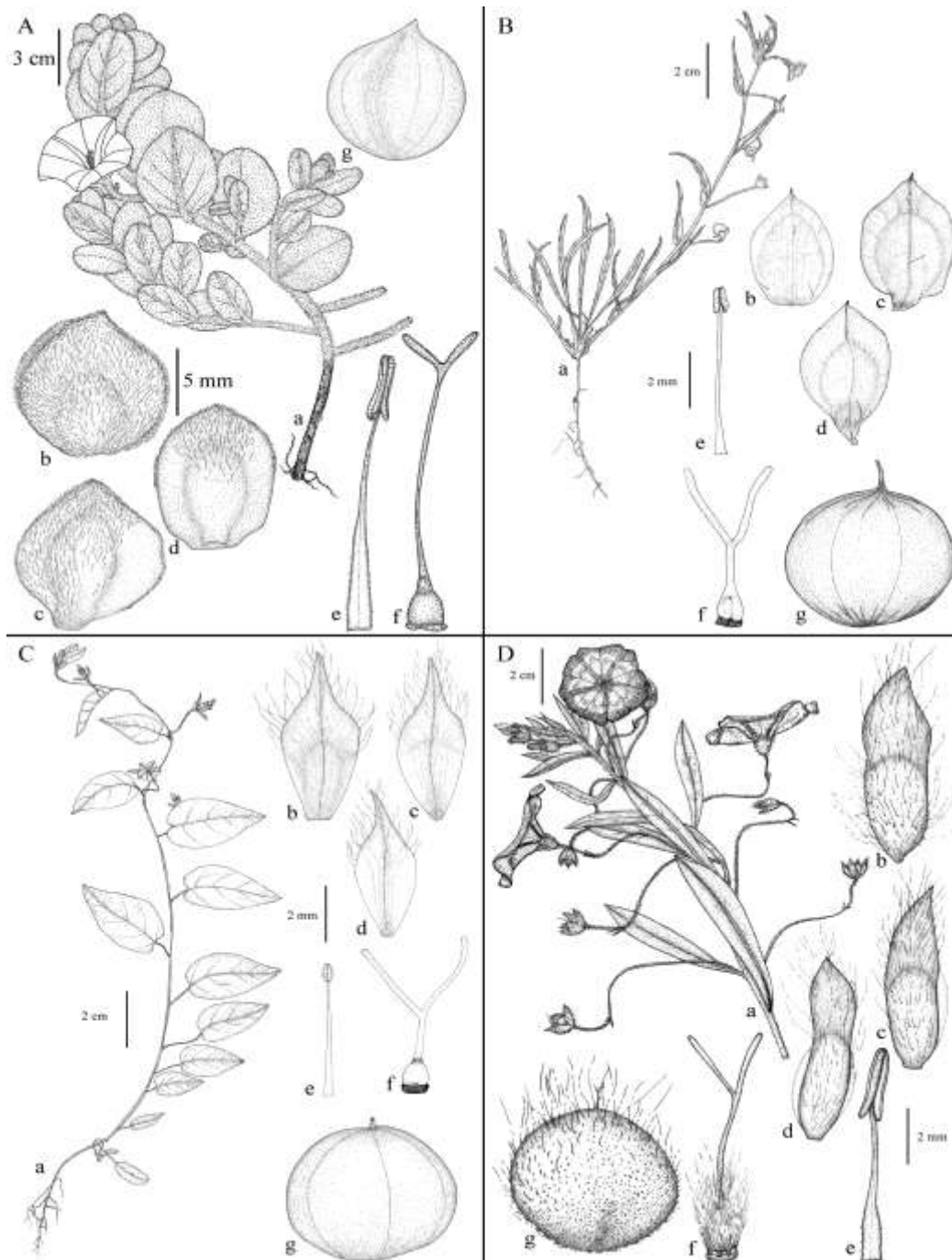


Figure 14. A: *C. persicus*: a- Habit, b- Outer sepal, c- Middle sepal, d- Inner sepal, e- Stamen, f- Pistil, g- Capsule; B: *C. pentapetaloides*: a- Habit, b- Outer sepal, c- Middle sepal, d- Inner sepal, e- Stamen, f- Pistil, g- Capsule; C: *C. siculus* subsp. *siculus*: a- Habit, b- Outer sepal, c- Middle sepal, d- Inner sepal, e- Stamen, f- Pistil, g- Capsule; D: *C. tricolor* subsp. *tricolor*: a- Habit, b- Outer sepal, c- Middle sepal, d- Inner sepal, e- Stamen, f- Pistil, g- Capsule.

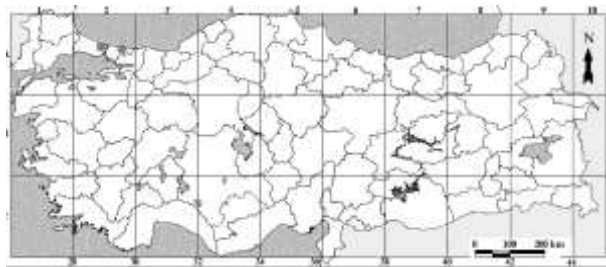


Figure 15. Distribution areas of *C. persicus* in Turkey

3.27. *Convolvulus elegantissimus* Mill., Gard. Dict., ed. 8. n. 22. 1768. Figures 16, 17-B.

Type: Described from Sicily (Hb. Linn. 218/27).

Synonyms: =*C. tenuissimus* Sm., Prodr. Fl. Graec. [Sibth. & Sm.] 1: 134 (1806). =*C. altheoides* L. var. *pedatus* Choisy, Prodr. [DC.] 9: 409 (1845). =*C. altheoides* L. subsp. *tenuissimus* (Sm.) Stace, Bot. J. Linn. Soc. 64(1): 59 (1971). =*C. altheoides* L. subsp. *elegantissimus* (Mill.) Quézel & Santa, Nouv. Fl. Algérie: 758 (1963).

Mediterranean Element.

Phenology: Flowering between April and June; fruiting between June and July.

Distribution and ecology: East Mediterranean Countries, Southeast Europe, Northern Africa, Turkey (Marmara, Aegean and Mediterranean Regions). Roadsides, sandy, limestone and rocky slopes, macchie (0-300 m).

Conservation status: LC

3.28. *Convolvulus coelesyriacus* Boiss., Diagn. Pl. Orient. ser. 1, 11: 85. 1849. Figures 17-C, 18.

Type: [Lebanon] in cultis Coelesyriae inter Hasbeyae et Rascheyae et colui e seminibus relatis (holotype: G).

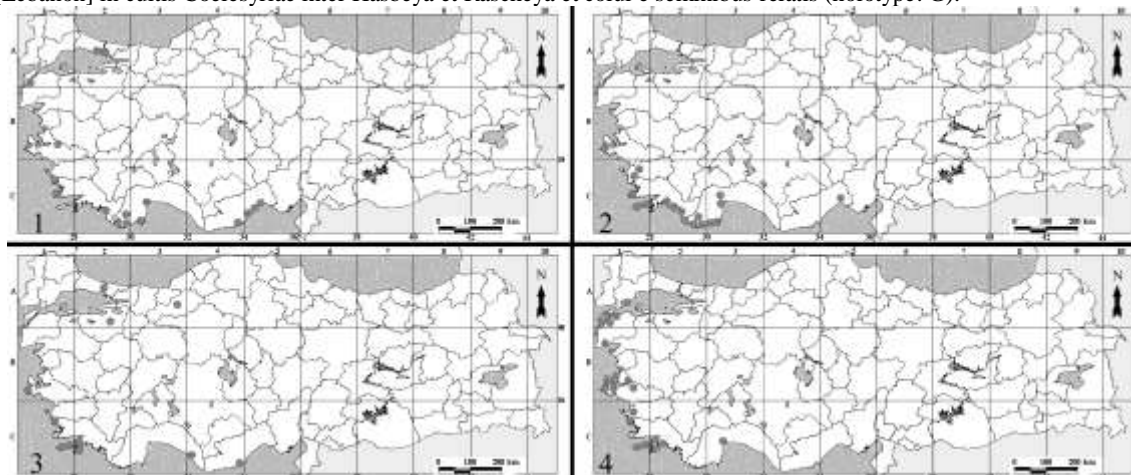


Figure 16. Distribution areas of *C. pentapetaloides* (1), *C. siculus* subsp. *siculus* (2), *C. altheoides* (3) and *C. elegantissimus* (4) in Turkey

Synonym: =*C. sintenisii* Boiss., Fl. Orient. [Boissier] Suppl. 349 (1888).

Trailing or ascending, slender annuals; stem 5–50 cm, simple or branched, recurved–adpressed pilose. Upper leaves ovate-triangular or hastate, 5–15 × 4–10 mm, acuminate, lobed at margins, lobes linear or linear-lanceolate, petiolate (1.5–3 mm), cordate at base; especially recurved–adpressed pilose at margins and on midrip at lower surface; upper surface sparsely recurved–adpressed pilose; middle and lower leaves cordate or reniform, 20–35 × 20–40, obtuse, rounded at apex, slightly lobed, petiolate (5–80 mm), cordate at base. Flowers axillary (single flowered); peduncle 5–15 mm, pilose; pedicel 5–10 mm, recurved-adpressed pilose; much thicker, longer (reach to 30 mm) and reflexed at fruiting period. Bracts similar to cauline leaves; bracteoles linear, 1.5–3 × 0.5–1 mm, shorter than pedicels. Sepals dehiscent at fruiting period, retuse and mucronulate at apex; outer sepals broadly obovate-cordate, 4.5–6 × 3–4 mm, slightly membranous at margins, spreading pilose. Middle sepal broadly obovate-cordate, 4.5–6 × 3–4 mm, one half membranous at margin, spreading pilose; inner sepals cordate, 4–5.5 × 3–4.5 mm, membranous at margins, scattered pilose only on midrip; membranous parts glabrous. Corolla pink, pink-purple, sometimes slightly 5-lobed, 8–10 mm long; bands hairy, petals glabrous except bands at apex. Filaments with sessile glands at the base of dilated part, 5–5.5 mm; anthers oblong with retuse apex, 1.5–2 mm. Ovary ovate, 1–1.5 × 1–1.5 mm, glabrous. Style 4–4.5 mm, glabrous; stigma 2–2.5 mm, approximately half about style. Capsule globose-cordate, 4–6 × 4–6 mm, glabrous, with 2 locule, 4 seeded; pericarp coriaceous, slightly fragile. Seeds ovate, slightly 2-pouched, 3.5–4.5 × 2–3 mm, light brown, tuberculate. *Mediterranean Element.*

Phenology: Flowering between March and April; fruiting between April and May.

Distribution and ecology: Cyprus, Israel, Lebanon, Palestine, Syria, Turkey (Mediterranean region). Rocky slopes, under *Olea europaea* and *Pinus brutia*, loose macchie (0-150 m).

Conservation status: VU B1a

Remarks: *C. coelesyriacus* was recorded for the first time by Sorger, Kit-Tan and Mann, who collected this species from Kaş (Antalya) (Davis et al., 1988). We collected this species from five different localities in the C2, C4 and the C5 squares of Turkey

during the field studies and the threat category of this species was evaluated as VU considering its area of distribution and the number of mature individuals.

3.29. *Convolvulus stachydifolius* Choisy, Prodr. [A. P. de Candolle] 9: 408. 1845. Figures 17-D, 18.

Lectotype: In Syria ex Alep ad Mossul, *Olivier* (G-DC).

Synonym: =*C. quadrifolius* Hochst., Wanderungen [Lorent.] 335 (1845). =*C. stachydifolius* Choisy var. *villosus* Hallier fil., Bot. Jahrb. 18: 107 (1894).

Iran-Turan Element.

Phenology: Flowering between April and June; fruiting between June and July.

Distribution and ecology: Iran, Iraq, Khorasan, Lebanon, Palestine, Syria, Turkey (Southeast and East Anatolian Regions). Road- and field sides, shaly, sandy, calcareous and limestone slopes (350-1000 m).

Conservation status: LC

3.30. *Convolvulus galaticus* Rost. ex Choisy, Prodr. [A. P. de Candolle] 9: 408. 1845. Figures 18, 19-A.

Lectotype: [Turkey A/B4 Ankara] in Syria ad Ancyre (1794), *Rostan* (G-DC).

Synonym: =*C. agrophilos* K.Koch, Linnaea 22: 745 (1849).

Phytogeographical Region: Iran-Turan Element.

Phenology: Flowering between May and August; fruiting between July and September.

Distribution and ecology: Iran, Lebanon, Turkey (Marmara, Mediterranean, Inner and East Anatolian Regions). Road- and field sides, shaly, sandy, calcareous and limestone slopes, steppe (800-2650 m).

Conservation status: LC

3.31. *Convolvulus germaniciae* Boiss. & Hausskn. ex Boiss., Fl. Orient. [Boissier] 4(1): 104. 1875.

Type: [Turkey C6 Kahramanmaraş] hab. in agris ad Giaur Göl prope Marasch (Germanicium) Cataoniae, (21.vii.1865?), *Haussknecht* (holotype: E photo!).

Phytogeographical Region: East-Mediterranean Element.

Phenology: Flowering between June and July; fruiting between July and August.

Distribution and ecology: Endemic to Turkey (Mediterranean Region). Road- and fieldsides (500 m).

Conservation status: CR D (Aykurt and Sümbül, 2011c).

3.32. *Convolvulus cassius* Sam. ex Rech.f., Ark. Bot. ser. 2, 1: 314. 1950. Figures 18, 19-B.

Type: [Turkey C6 Hatay] prov. Antiochia, 30 km S. of Antiochia (Antakya), 8.vi.1938, *Dinsmore* 10127 (holo. S, iso K).

Trailing or climbing, spreading pilose perennials; stem to 3 m, branched from base, dense-spreading pilose. Leaves broadly ovate, 10–45 × 10–50 mm, acute and mucronulate, dentate, petiolate (5–20 mm), cordate at base, spreading pilose; lower leaves resemble to cauline leaves, 40–70 × 30–60 mm, usually longer petiolate (30–45 mm). Flowers axillary (1–3 flowered cymes); peduncle 10–100 mm; pedicel 5–15 mm, much thicker, longer and reflexed at fruiting period. Bracts similar to cauline leaves; bracteoles linear, lanceolate, 5–15 × 1–4 mm, equal or shorter than pedicels. Sepals erect or slightly dehiscent at fruiting period; outer sepals oblong, 9–11 × 3.5–4.5 mm, mucronate with green apex, spreading pilose; middle sepal oblong-ovate, 9–11 × 4–5.5 mm, mucronate with green apex, one half broadly membranous at margin, spreading pilose; inner sepals broadly obovate, 8.5–10.5 × 5–6 mm, with green acuminate part, broadly membranous at margins, spreading pilose; membranous parts glabrous. Corolla white, 30–40 mm long; bands hairy towards apex, petals glabrous except bands at apex. Filaments with sessile glands at the base of dilated part, 10–13 mm; anthers oblong with retuse apex, 4 mm. Ovary ovate, 1–1.5 × 1–1.5 mm, dense and long pilose. Style 10–11 mm, lower part sparsely hairy, upper part glabrous; stigma 4–4.5 mm, approximately half about style. Capsule globose, 6–8 × 6–8 mm, dense-spreading pilose, with 2 locule, 4 seeded; pericarp coriaceous, sclerotic. Seeds ovate, 3–4 × 2–3 mm, brown, slightly tuberculate or smooth. *East-Mediterranean Element*.

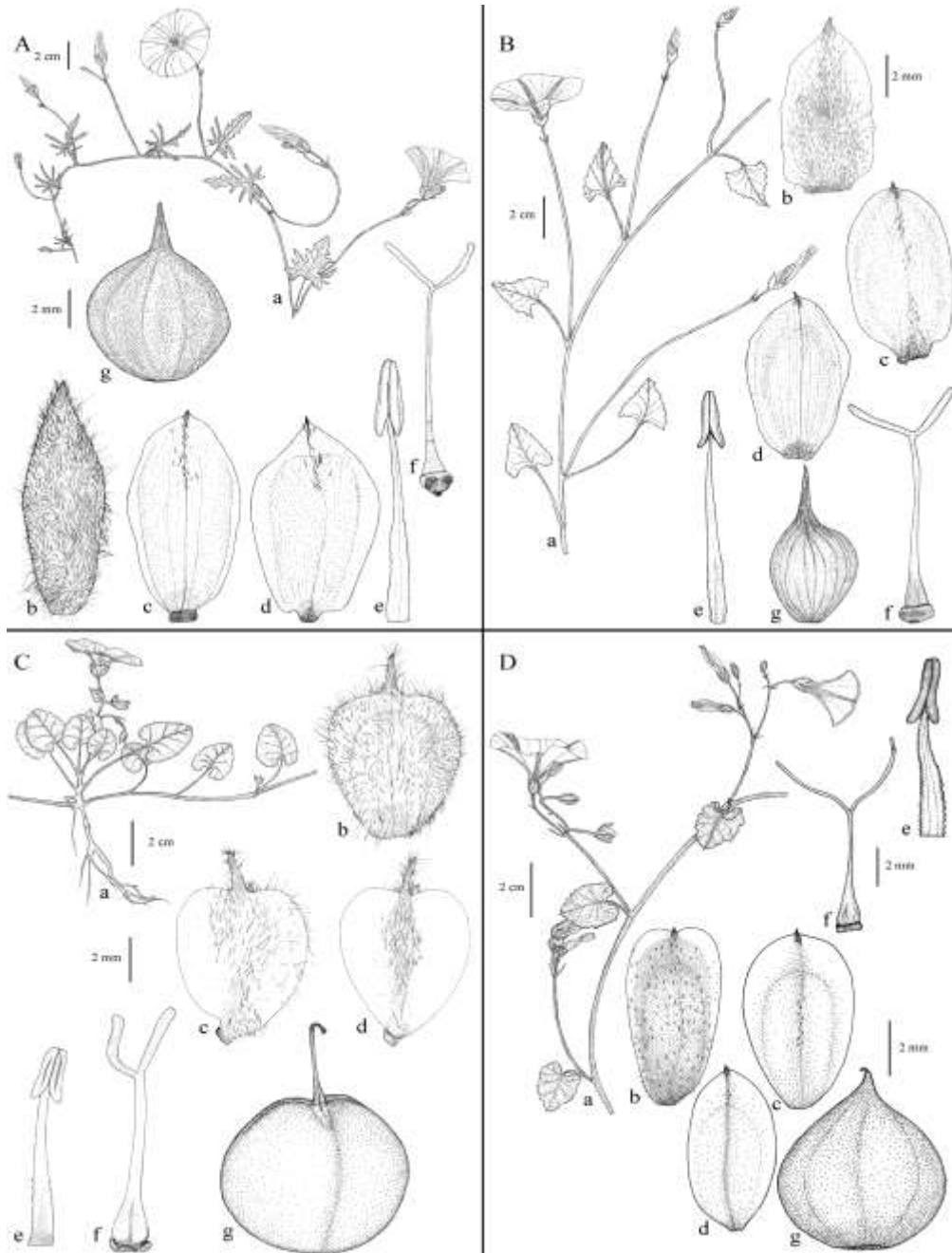


Figure 17. A: *C. althaeoides*: a- Habit, b- Outer sepal, c- Middle sepal, d- Inner sepal, e- Stamen, f- Pistil, g- Capsule; B: *C. elegantissimus*: a- Habit, b- Outer sepal, c- Middle sepal, d- Inner sepal, e- Stamen, f- Pistil, g- Capsule; C: *C. coelesyriacus*: a- Habit, b- Outer sepal, c- Middle sepal, d- Inner sepal, e- Stamen, f- Pistil, g- Capsule; D: *C. stachydifolius*: a- Habit, b- Outer sepal, c- Middle sepal, d- Inner sepal, e- Stamen, f- Pistil, g- Capsule

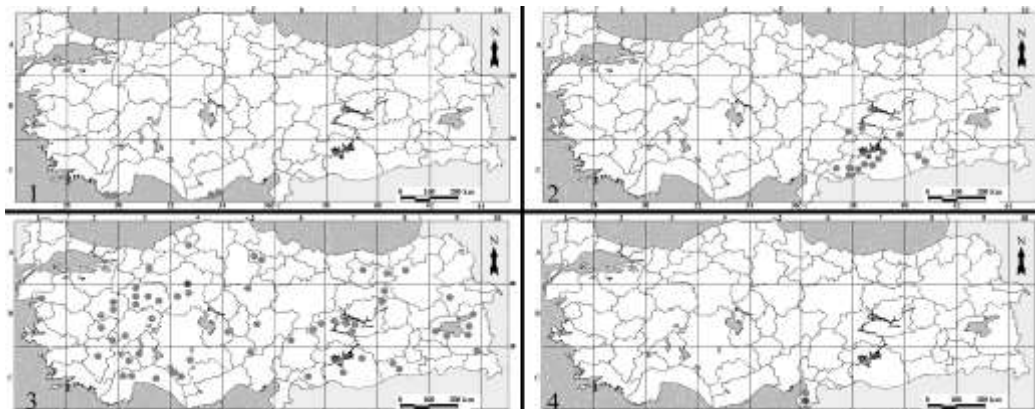


Figure 18. Distribution areas of *C. coelesyriacus* (1), *C. stachydifolius* (2), *C. galaticus* (3) and *C. cassius* (4) in Turkey

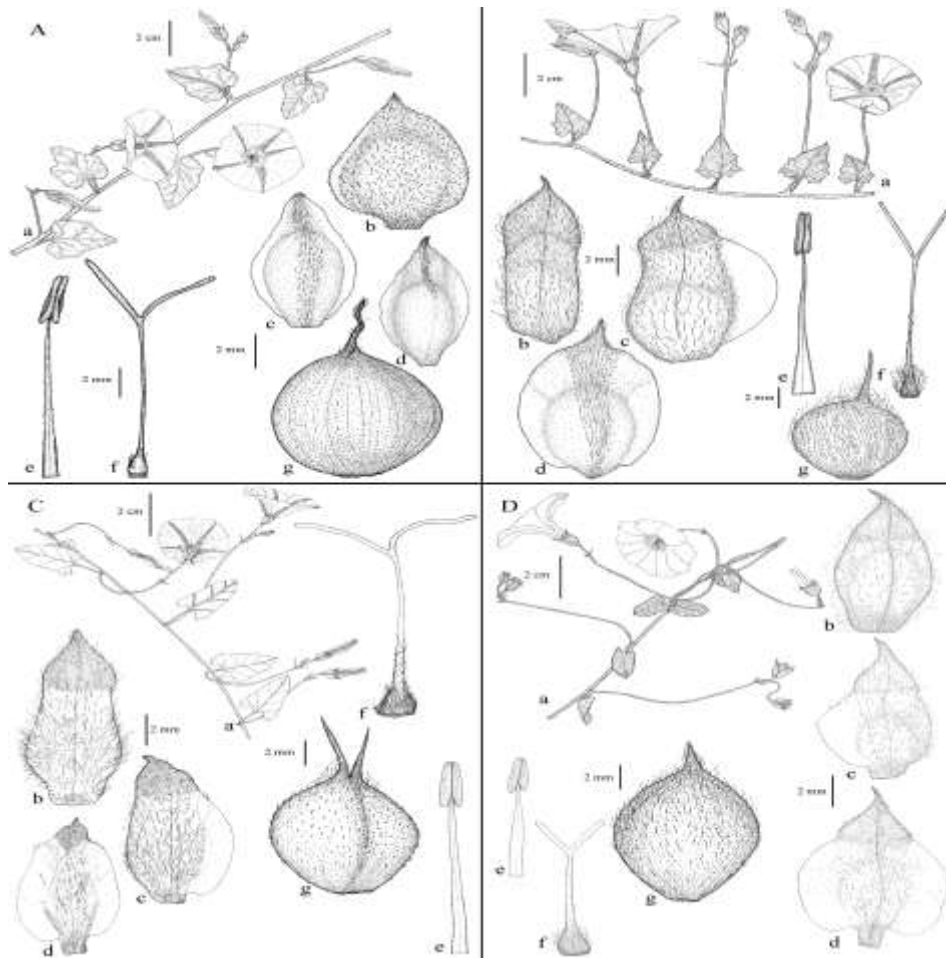


Figure 19. A: *C. galaticus*: a- Habit, b- Outer sepal, c- Middle sepal, d- Inner sepal, e- Stamen, f- Pistil, g- Capsule; B: *C. cassius*: a- Habit, b- Outer sepal, c- Middle sepal, d- Inner sepal, e- Stamen, f- Pistil, g- Capsule; C: *C. betonicifolius* subsp. *betonicifolius*: a- Habit, b- Outer sepal, c- Middle sepal, d- Inner sepal, e- Stamen, f- Pistil, g- Capsule; D: *C. betonicifolius* subsp. *peduncularis*: a- Habit, b- Outer sepal, c- Middle sepal, d- Inner sepal, e- Stamen, f- Pistil, g- Capsule

Phenology: Flowering between May and June; fruiting between June and July.

Distribution and ecology: Syria and Turkey (Mediterranean Region). Roadsides and fallow fields (250-800 m).

Conservation status: VU B1b(i, iv)

Remarks: This species could be collected from three different localities from Hatay (C6 square) during the field studies carried out over three years. The threat category of this species was evaluated as VU considering its limited distribution area and few mature individuals in these areas. The future of this species, which prefers to grow along the roads and edges of fields, is threatened by the fact that its area of distribution is near agricultural areas and there are possible construction work of road widening in the area where it is collected.

C. cassius resembles *C. betonicifolius* subsp. *betonicifolius* especially in terms of its indumentum type and corolla; but, it is clearly different from this subspecies because of the shape of its leaves. The leaves of *C. cassius* are broadly ovate, dentate at margins and cordate at the base; the leaves of *C. betonicifolius* subsp. *betonicifolius* are hastate and entire or slightly undulated at margins. In addition to these, the capsules of *C. cassius* are included in the calyx during the fruiting period; and the capsules of *C. betonicifolius* subsp. *betonicifolius* exceed the calyx.

3.33. *Convolvulus betonicifolius* Mill., Gard. Dict., ed. 8. n. 20. 1768.

Type: Described from Africa.

- 1 Leaves densely or sparsely pilose, acute or acuminate, hastate; basal lobes usually dentatesubsp. *betonicifolius*
- 1 Leaves tomentose, obtuse or mucronulate, usually cordate at base.....subsp. *peduncularis*

3.33.1. *C. betonicifolius* Mill. subsp. *betonicifolius* Figures 19-C, 20.

Synonyms: =*C. hirsutus* M.Bieb., Fl. Taur.-Cauc. 1: 422 (1808). =*C. sibthorpii* Roem. & Schult., Syst. Veg., ed. 15 bis [Roemer & Schultes] 4: 285 (1819). =*C. amoenus* K.Koch, Linnaea 19: 19 (1846). =*C. hirsutus* M.Bieb. var. *virescens* Boiss., Fl. Orient. 4: 105 (1875). =*C. armenus* Boiss. & Kotschy ex Boiss., Fl. Orient. 4 (1): 105 (1875). =*C. betonicifolius* Mill. var. *betonicifolius* Sa'ad, Convolv. Sp. Canar. Isl., Medit. Reg., etc. 220 (1967). =*C. betonicifolius* Mill. var. *armenus* Sa'ad, Convolv. Sp. Canar. Isl., Medit. Reg., etc. 220 (1967). =*C. aleppensis* Sa'ad, Convolv. Sp. Canar. Isl., Medit. Reg., etc. 209 (1967).

Mediterranean and Iran-Turan Element.

Phenology: Flowering between April and August; fruiting between July and September.

Distribution and ecology: The Balkans, The Caucasus, The Crimea, Cyprus, Iraq, Iran Israel, Lebanon, Palestine, Syria and Turkey. Road- and field sides, shaly, sandy, calcareous and limestone slopes, steppe (7-2000 m).

Conservation status: LC

3.33.2. *C. betonicifolius* Mill. subsp. *peduncularis* (Boiss.) Parris, Fl. Turkey 6: 217. 1978. Figures 19-D, 20.

Type: [Turkey C7 Şanlıurfa] in Mesopotamia inter Orfa et Sierek (Siverek), *Kotschy* 58 (holotype: G, isotype: BM, E photo!, W).

Synonyms: =*C. peduncularis* Boiss., *Diagn. Pl. Orient. ser. 1, 11: 84 (1849)* (type: E photo!). =*C. hirsutus* M.Bieb. var. *tomentosus* Boiss., *Fl. Or. 4: 105 (1875)*.

Iran-Turan Element.

Phenology: Flowering between May and August; fruiting between June and September.

Distribution and ecology: Iraq, Lebanon, Syria and Turkey (East and Southeast Anatolian Regions). Road- and field sides, shaly, sandy, calcareous and limestone slopes (660-2125 m).

Conservation status: LC

Remarks: The subspecies of *C. betonicifolius* differ from each other due to the type of their indumentum and the shape of their leaves. The stem, leaves and the branches of *C. betonicifolius* subsp. *betonicifolius* are covered sparsely to densely with pilose hairs; the leaves are acute to acuminate at the apex and sagittate or hastate at the base; and the lobes at the base are usually dentate. In *C. betonicifolius* subsp. *peduncularis*, the stem, leaves and the branches are covered generally with tomentose hairs; however the leaves are different from *C. betonicifolius* subsp. *betonicifolius* due to their obtuse or mucronate apex, as well as their cordate and lobe-less basis. However, it is possible that the individuals showing morphologically intermediate characteristics in both species were distributed sympatrically. It was observed that for the specimens belonging to *C. betonicifolius* subsp. *peduncularis*, which were collected by us in this study, the peduncles were up to 25 cm, the cymes were generally with 4–5 flowered dichasia. The peduncles of *C. betonicifolius* subsp. *betonicifolius* were shorter than the peduncles of *C. betonicifolius* subsp. *peduncularis* and its cymes contained fewer flowers. The outer sepals size of *C. betonicifolius* subsp. *betonicifolius* were measured as 10–16 × 3.5–5 mm; whereas the size of the outer sepals in *C. betonicifolius* subsp. *peduncularis* were 8–10 × 4–4.5 mm.

3.34. *Convolvulus arvensis* L., Sp. Pl. 1: 153. 1753.

Type: Described from Europe. (Hb. Linn. 218/1).

Synonyms: =*C. auriculatus* Desr., *Encyc. iii. 540 (1792)*. =*C. cherleri* Agardh ex Roem. & Schult., *Syst. Veg.*, ed. 15 bis [Roemer & Schultes] 4: 261 (1819). =*C. corcicus* Roem. & Schult., *Syst. Veg. 4: 256 (1819)*. =*C. arvensis* L. var. *linearifolius* Choisy, *DC., Prodr.*, 9: 407 (1845). =*C. fisherianus* Petrov, *Bull. Soc. Nat. Mosc. 44: 147 (1935)*. =*C. longipedicellatus* Sa'ad, *Convolv. Sp. Canar. Isl., Medit. Reg., etc. 233 (1967)*.

Cosmopolitan in temperate and subtropical regions.

Phenology: Flowering between April and September; fruiting between July and September.

Distribution and ecology: Cosmopolitan in temperate and subtropical regions. Roadsides and fallow fields, slopes, steppe (0-3050 m).

Conservation status: LC

Remarks: *C. arvensis* is one of the taxonomically problematic species of the genus *Convolvulus*. This species was placed into various taxa by several researches. Even some individuals of this species were introduced to science as new species. *C. arvensis* was evaluated in the form of three varieties, named *C. arvensis* var. *arvensis*, *C. arvensis* L. var. *linearifolius* Choisy and *C. arvensis* L. var. *villosus* Choisy by Sa'ad (1967) because of the differences in the shape of its leaves and the indumentum types. In the same research, *C. longipedicellatus* was introduced as a new species, which was endemic to Turkey and it was indicated that this species displayed differences from *C. arvensis* especially in terms of its more densely haired branches, leaves and outer sepals and in terms of its much longer pedicels. The term *C. longipedicellatus* was used as a synonym for *C. arvensis* in the Flora of Turkey and also in the present study. According to the Flora of Cyprus (Meikle, 1985), two different varieties of *C. arvensis* that were named as *C. arvensis* var. *arvensis* and *C. arvensis* var. *linearifolius* were identified in Cyprus.

We collected numerous *C. arvensis* individuals from different localities and altitudes in every region of Turkey during our field excursions. It was observed that these individuals displayed differences especially in their leaf shapes and indumentum types. If the large ecological tolerance of this species is taken into consideration, we do not see it fit to evaluate this species under different subspecies. The sepal shapes, sizes and the indumentum type, which are the important diagnostic characteristics of the genus *Convolvulus*, were similar to each other among the examined specimens. The other important diagnostic characteristics such as the structure, size and the indumentum type of the capsules, the style-stigma ratio and the indumentum type of the ovaries and the styles did not show distinct differences among the investigated specimens of *C. arvensis*.

3.35. *Convolvulus scammonia* L., Sp. Pl. 1: 153. 1753. Figures 20, 21-A.

Type: Hb. Linn. 218/4.

Mediterranean element.

Phenology: Flowering between April and July; fruiting between June and September.

Distribution and ecology: East Aegean Islands, Palestine, Iraq, the Crimea, Lebanon, Syria and Turkey (Marmara, Blacksea, Aegean, Mediterranean, Southeast and East Anatolian Regions). Road- and field sides, shaly, sandy, calcareous, limestone and rocky slopes, macchie (0-1540 m).

Conservation status: LC

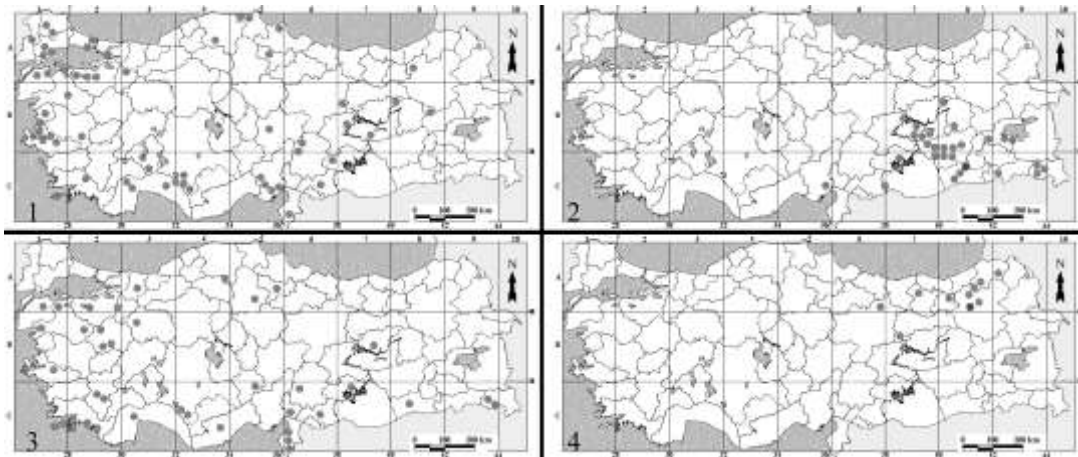


Figure 20. Distribution areas of *C. betonicifolius* subsp. *betonicifolius* (1), *C. betonicifolius* subsp. *peduncularis* (2), *C. scammonia* (3) and *C. pseudoscammonia* (4) in Turkey

3.36. *Convolvulus pseudoscammonia* K.Koch, Linnaea 22: 746. 1849. Figures 20, 21-B.

Type: [Turkey A8 Erzurum] im Gaue Sber auf Porphyr und Kalk, 1067-1219 m, *C. Koch* (B, destroyed).

Synonyms: =*C. cappadocicus* Hausskn. & Sint. ex Woronow, Monit. Jard. Bot. Tiflis x. 31 (1908). ≡*C. scammonia* L. var. *pseudoscammonia* (K.Koch) Sa'ad, Convolv. Sp. Canar. Isl., Medit. Reg., etc. 242 (1967).

Woody-based, glabrous shrublets; stem rigid, erect or ascending, 30-80 cm, branched; previous shoots persistent. Leaves hastate or linear-lanceolate, 20–60 × 0.7–10 mm, acute or acuminate, shortly petiolate (1.5–3 mm); basal lobes acute (1.5–5 mm broad) or absent, wider towards lower parts of stem; lower leaves longer petiolate (to 20 mm). Flowers axillary, 1–3 flowered cymes; peduncle 50–90 mm; pedicel 5–15 mm, much thicker and longer at fruiting period. Bracts similar to cauline leaves; bracteoles filiform, 2.5–3.5 × 0.2–0.5 mm, shorter than pedicels. Sepals 7–9 × 4–5 mm, retuse and mucronulate; middle sepal oblong-obovate, 8.5–10.5 × 4–5 mm, obtuse or rounded at apex; inner sepals oblong-obovate, 9–11 × 4.5–5.5 mm, mucronulate. Corolla usually pale yellow, yellow or cream, 20–25 mm long; bands glabrous, petals glabrous at apex. Filaments with sessile glands at the base of dilated part, 12–13.5 mm; anthers oblong with retuse apex, 4 mm. Ovary narrowly ovate, 1.5–2 × 1–1.5 mm. Style 14–14.5 mm; stigma 1–1.5 mm, approximately 1/11–14 about style. Capsule ovate, 9–11 × 4–6 mm, exceeding the calyx, with 2 locule, 1–2 seeded; pericarp sclerotic. Seeds broadly ovate-triangular, 4.5–5.5 × 3.5–4.5 mm, light brown or brown, tuberculate. *Endemic. Iran-Turan Element.* Phenology: Flowering between June and July; fruiting between July and August.

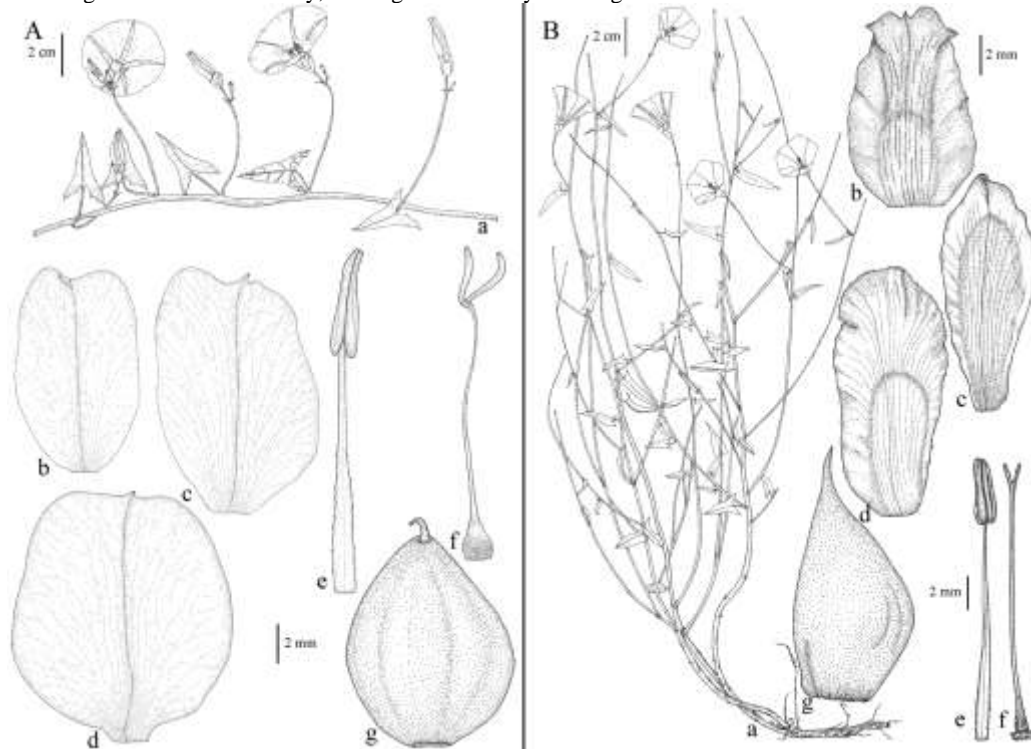


Figure 21. A: *C. scammonia*: a- Habit, b- Outer sepal, c- Middle sepal, d- Inner sepal, e- Stamen, f- Pistil, g- Capsule; B: *C. pseudoscammonia*: a- Habit, b- Outer sepal, c- Middle sepal, d- Inner sepal, e- Stamen, f- Pistil, g- Capsule

Distribution and ecology: Turkey (East Blacksea and East Anatolian Regions). Serpentine, stony and limestone slopes (450-1450 m). Conservation status: NT

4. Conclusions

39 taxa of the genus *Convolvulus*, 3 of which are hybrid, were identified in Turkey in the present study. 10 of the 39 taxa that were evaluated, which are *C. × pseudocompactus*, *C. holosericeus* subsp. *macrocalycinus*, *C. × turcicus*, *C. × peshmenii*, *C. phrygius*, *C. assyricus*, *C. cataonicus*, *C. carduchorum*, *C. germaniciae*, *C. pseudoscammonia*, are endemic to Turkey. *C. galaticus*, a species that was specified as being endemic in the Flora of Turkey, is also dispersed to Iran and Lebanon (Rechinger, 1979; Mouterde, 1986). Therefore, this species is not considered as being endemic to Turkey in the present study.

It is possible to divide the *Convolvulus* taxa, that is distributed in Turkey into two different groups based on their habits and whether the filaments are dentate or not. As a result of the detailed morphological studies on a great number of specimens, it was established that the filament is the most important character for the separation of *Convolvulus* taxa into two groups. The filaments of the species may be entire or have sessile glands at the base. The filaments of the species included in the first group (Group A) are entire, whereas, the filaments of the species in second group are dentate due to the presence of sessile glands towards the base. Group A includes the species with erect, ascending or prostrate stems, the occasionally cushion-forming perennials, shrubs or shrublets with respect to their habits. Also, the leaves are generally attenuate at the base in Group A, and sometimes the leaves of such species as *C. lineatus* may even be long and attenuate towards the base as if it is a petiole.

Group B contains typically climbing annuals or perennials. Only *C. persicus* and *C. pseudoscammonia* do not fit this generalization with their erect or ascending stems, but their generative characteristics in terms of both the filaments and the style-stigma ratio resemble those of Group B. Then again, the *C. pseudoscammonia* is erect and woody-based shrublets. On the other hand, *C. scammonia* is typically a climbing perennial. After all, these species are very closely related and *C. pseudoscammonia* was described as a variety of the *C. scammonia* under the name of *C. scammonia* var. *pseudoscammonia*. *C. scammonia* and *C. pseudoscammonia* resemble each other in terms of their leaves, sepals, ovaries, pistils, capsules and seed characters in addition to their habits and the filaments in both species are dentate. Therefore, *C. pseudoscammonia* classifies in the second group despite its erect shrublet form and is known to be related to *C. scammonia*, which is a climbing perennial species. This situation distinctively indicates that the filament character is very convenient in grouping the taxa of the genus *Convolvulus*.

Table 1. The phytogeographical regions, IUNC Threat Categories and endemism status of the *Convolvulus* taxa distributed across Turkey

Taxa	Phytogeographical Region	IUCN Threat Category	Endemism Status
1. <i>C. lanatus</i>	Saharo-Sindian element	NT	-
2. <i>C. reticulatus</i> subsp. <i>reticulatus</i>	Iran-Turan element	NT	-
3. <i>C. chondrilloides</i> var. <i>chondrilloides</i>	Iran-Turan element	CR	-
4. <i>C. dorycnium</i> subsp. <i>dorycnium</i>	Mediterranean element	CR	-
5. <i>C. dorycnium</i> subsp. <i>oxysepalus</i>	East Mediterranean element	NT	-
6. <i>C. aucheri</i>	Mediterranean element	VU	-
7. <i>C. calvertii</i>	Iran-Turan element	NT	-
8. <i>C. lineatus</i>	Mediterranean and Iran-Turan element	LC	-
9. <i>C. cantabrica</i>	Mediterranean element	LC	-
10. <i>C. oleifolius</i> var. <i>oleifolius</i>	Mediterranean element	CR	-
11. <i>C. oleifolius</i> var. <i>deserti</i>	Mediterranean element	NT	-
12. <i>C. × pseudocompactus</i>	Mediterranean element	-	+
13. <i>C. holosericeus</i> subsp. <i>holosericeus</i>	Iran-Turan element	LC	-
14. <i>C. holosericeus</i> subsp. <i>macrocalycinus</i>	Iran-Turan element	NT	+
15. <i>C. × turcicus</i>	Iran-Turan element	-	+
16. <i>C. × peshmenii</i>	East Mediterranean Element	-	+
17. <i>C. compactus</i>	Mediterranean and Iran-Turan Element	LC	-
18. <i>C. phrygius</i>	Iran-Turan element	NT	+
19. <i>C. assyricus</i>	Iran-Turan element	NT	+
20. <i>C. libanoticus</i>	East Mediterranean Element	NT	-
21. <i>C. cataonicus</i>	Iran-Turan element	NT	+
22. <i>C. carduchorum</i>	Iran-Turan element	NT	+
23. <i>C. pilosellifolius</i>	Iran-Turan Element	NT	-
24. <i>C. persicus</i>	Iran-Turan Element	NT	-
25. <i>C. pentapetaloides</i>	Mediterranean Element	LC	-
26. <i>C. siculus</i> subsp. <i>siculus</i>	Mediterranean Element	LC	-
27. <i>C. tricolor</i> subsp. <i>tricolor</i>	Mediterranean Element	-	-
28. <i>C. althaeoides</i>	Mediterranean Element	LC	-
29. <i>C. elegantissimus</i>	Mediterranean Element	LC	-
30. <i>C. coelesyriacus</i>	Mediterranean Element	VU	-
31. <i>C. stachydifolius</i>	Iran-Turan Element	LC	-
32. <i>C. galaticus</i>	Iran-Turan Element	LC	-
33. <i>C. germaniciae</i>	East Mediterranean Element	CR	+
34. <i>C. cassius</i>	East Mediterranean Element	VU	-
35. <i>C. betonicifolius</i> subsp. <i>betonicifolius</i>	Mediterranean and Iran-Turan Element	LC	-
36. <i>C. betonicifolius</i> subsp. <i>peduncularis</i>	Iran-Turan Element	LC	-
37. <i>C. arvensis</i>	Cosmopolitan in temperate and subtropical regions	LC	-
38. <i>C. scammonia</i>	Mediterranean element	LC	-
39. <i>C. pseudoscammonia</i>	Iran-Turan Element	NT	+

Although, *C. persicus*, which is reported as a “taxonomically isolated species” in the Flora of Turkey, has erect or ascending stems, its filaments have sessile glands at the base and are dentate. Indeed this species, which resembles climbing species especially with its style-stigma ratio, was evaluated in the second group in the present study. In light of all these data, the filament character was used in the classification of the species of the genus *Convolvulus* into two main groups. In addition to this character, leaf and habit features were also considered during grouping.

The 39 taxa of the genus *Convolvulus* that are encountered in Turkey were evaluated phytogeographically in this study and 18 of them were indicated to be Iran-Turan elements, 16 to be Mediterranean elements, 1 to be a Saharo-Sindian element and 4 to be multi-regional. Table 1 shows the phytogeographical regions, IUNC Threat Category and endemism status of the *Convolvulus* taxa that are distributed across Turkey.

Some collected and examined specimens: 1. *C. lanatus*: C2 Muğla: Ortaca, Sarigerme, sandy shores, 10 m, 17.v.2009, *C. Aykurt 2443*. C2/3 Antalya: Demre, Beymelek, sandy shores, 2 m, 12.v.2009, *C. Aykurt 2431*. C3 Antalya, Lara, sand dunes, 5 m, 14.v.2007, *C. Aykurt 1439*. Antalya: Finike, Kumluca-Finike road, 5 km to Finike, sand dunes, 1 m, 13.iv.2009, *C. Aykurt 2383*. Antalya: Finike, Sahilkent, sand dunes, 2 m, 12.v.2009, *C. Aykurt 2433*. 2. *C. reticulatus* subsp. *reticulatus*: B7 Elazığ: Keban, 1 km after from the turnout of Malatya, slopes, 1100 m, 25.vi.2008, *C. Aykurt 2296*, *N. Kemaloğlu*. Elazığ: Keban, Soğanlı, 5 km to Keban, road sides and slopes, 839 m, 25.vi.2008, *C. Aykurt 2293*. Elazığ: Pertek-Elazığ road, 1 km after from the turnout of Meşeliköy, slopes, 890 m, 2.vii.2009, *C. Aykurt 2907*. Malatya: Hekimhan, Yazlıhan-Hekimhan road, 35 km to Hekimhan, slopes, steppe, 900 m, 3.vii.2009, *C. Aykurt 2910*. Tunceli: Pertek, Tunceli-Pertek road, entrance of Pertek, slopes, 1070 m, 2.vii.2009, *C. Aykurt 2906*. B8 Batman: Kozluk, 7 km from Kozluk to Baykan, slopes, 700 m, 28.vi.2009, *C. Aykurt 2826*. Diyarbakır: Silvan, Silvan-Bitlis road, before the Hasun Cave City, slopes, 924 m, 28.vi.2009, *C. Aykurt 2824*. C4 Mersin: 10 km from Mut to Silifke, dunes, 119 m, 07.vi.2007, *C. Aykurt 1483*. C6 Gaziantep: between Gaziantep and Nizip arası, 27 km to Gaziantep, field- and roadsides, slopes, 650 m, 23.vi.2008, *C. Aykurt 2242*. Gaziantep: Gaziantep-Nizip road, exit of Gaziantep city centre, steppe, 824 m, 23.vi.2008, *C. Aykurt 2239*. C7 Şanlıurfa: between Şanlıurfa and Viranşehir, field- and roadsides, 600 m, 23.vi.2008, *C. Aykurt 2250*. C8 Mardin: Mardin-Mazıdağı road, exist of Mardin city centre, roadsides, 930 m, 24.vi.2008, *C. Aykurt 2254*. Mardin: Mazıdağı, Yeşilköy, field- and roadsides, 825 m, 24.vi.2008, *C. Aykurt 2261*. 3. *C. chondrilloides* var. *chondrilloides*: C9 Hakkari: Hakkari-Otluca road, shaly slopes, 1820 m, 28.vi.2010, *C. Aykurt 3046*. 4.1. *C. dorycnium* subsp. *dorycnium*: B2 Manisa: Alaşehir, 20 km from Alaşehir to Kemaliye, fallow fields, 150 m, 13.vi.2009, *C. Aykurt 2693*. 4.2. *C. dorycnium* subsp. *oxysepalus*: B/C6 Kahramanmaraş: Göksun-Kahramanmaraş road, 30 km to Kahramanmaraş, between Çağlayan and Suçatı villages, roadsides, slopes 710 m, 26.vi.2008, *C. Aykurt 2319*. C5 Adana: Adana: Pozantı-Adana old road, entrance of Adana, roadsides, slopes, 21.vi.2008, 150 m, *C. Aykurt 2227*. C6 Gaziantep: Fevzipaşa (İslahiye), roadsides, slopes, 565 m, 26.vi.2008, *C. Aykurt 2322*. Gaziantep: between Gaziantep and Nizip arası, 27 km to Gaziantep, road- and fieldsides, slopes, 650 m, 23.vi.2008, *C. Aykurt 2241*. Gaziantep: Gaziantep-Nizip road, exist of Gaziantep city centre, steppe, 824 m, 23.vi.2008, *C. Aykurt 2240*. Gaziantep: Karkamış, road of Karkamış dam, road- and fieldsides, 349 m, 23.vi.2008, 37 412133 D 40 80541 K, *C. Aykurt 2247*. Hatay: Hassa, 20 km from Kırkhan to Hassa, roadsides, 260 m, *C. Aykurt 2682*. Kırkhan, İskenderun-Hatay road, 15 km to Kırkhan, roadsides, 95 m, *C. Aykurt 2662*. Hatay: Kırkhan-Gaziantep road, 32 km to Hassa, roadsides, slopes, 200 m, 22.vi.2008, *C. Aykurt 2238*. C7 Şanlıurfa: between Birecik and Suruç, 20 km to Şanlıurfa, road- and fieldsides, 700 m, 23.vi.2008, *C. Aykurt 2248*. Şanlıurfa: Hilvan, Şanlıurfa-Diyarbakır road, 8 km to Hilvan, road- and fieldsides, 665 m, 28.vi.2009, *C. Aykurt 2821*. 5. *C. aucheri*: C6 Hatay: Kisecik to NATO Radar Station, serpentine slopes, 885 m, 7.vi.2009, *C. Aykurt 2665*. 6. *C. calvertii*: A8 Bayburt: Bayburt to Aşkale, 2 km to Örence village, steppe and slopes, 1673 m, 2.vii.2009, *C. Aykurt 2892*, *N. Kemaloğlu*, *M. Kemaloğlu*. B8 Erzurum: Aşkale, Bayburt to Erzurum, 10 km to Pırnakapan, steppe and slopes, 2260 m, 2.vii.2009, *C. Aykurt 2893*. B9 Van: Özalp, between Özalp and Emek villages, steppe, 2004 m, 30.vi.2009, *C. Aykurt 2842*. 9.1. *C. oleifolius* var. *oleifolius*: C3 Antalya: Finike, 5 km from Finike to Demre, stony slopes, macchies, 47 m, 12.v.2009, *C. Aykurt 2429*. Antalya: Finike, 5 km from Finike to Demre, stony slopes, macchies, 47 m, 28.iv.2010, *C. Aykurt 2957*. 9.2. *C. oleifolius* var. *deserti*: B1 İzmir: Çeşme, Liman district, phrygana, 4 m, 13.v.2008, *C. Aykurt 1950*. C1 Muğla: Datça, Gebekum, coastal sands, 5 m, 2.vi.2009, *C. Aykurt 2637*. Muğla: Datça, Gebekum, road of windmill, under *Pinus brutia*, sandy slopes, 16 m, 2.vi.2009, *C. Aykurt 2638*. Muğla: Datça, between Marmaris and Datça, stony slopes, 80 m, 26.v.2008, *C. Aykurt 2041*. Muğla: 44 km from Datça to Marmaris, stony slopes, 07.v.2006, *C. Aykurt 1007*. C2 Muğla: Marmaris, Datça-Marmaris road, 33 km to Marmaris, slopes, 50 m, 2.vi.2009, *C. Aykurt 2639*. C3 Antalya: Finike, 7 km from Finike to Demre, rocky slopes, macchies, 40 m, 28.iv.2010, *C. Aykurt 2955*. Antalya: Finike, 12 km from Finike to Demre, rocky slopes, macchies, 40 m, 28.iv.2010, *C. Aykurt 2956*. 10. *C. × pseudocompactus*: C1 Muğla: Datça, between Marmaris and Datça, stony slopes, 80 m, 7.v.2006, *C. Aykurt 1006*. Muğla: Datça, between Marmaris and Datça, stony slopes, 80 m, 26.v.2008, 35 580941 D 40 69447 K, *C. Aykurt 2039*. 11.2. *C. holosericeus* subsp. *macrocalycinus*: B7 Elazığ: Harput, 1 km to the turnout of Buzluk Cave, slopes, 25.vi.2008, 1460 m, *C. Aykurt 2286*. Elazığ: Harput, slopes, 25.vi.2008, 1454 m, *C. Aykurt 2285*. Elazığ: Pertek-Elazığ road, 3 km after from Salkaya, slopes, 1060 m, 2.vii.2009, *C. Aykurt 2909*. C5 Adana: Pozantı, 7 km from Pozantı to Adana, open *Pinus nigra* forests, edge of woodlands, 945m, 6.vi.2009, *C. Aykurt 2652*. Niğde: Ulukışla, 2 km after from the turnout of Maden, stony and rocky slopes, 1046m, 08.vi.2007, *C. Aykurt 1487*. 12. *C. × turcicus*: B3 Afyon: Seyitgazi, Afyon-Kırka road, 2 km to Kırka, steppe, 1079 m, 15.vi.2009, *C. Aykurt 2706*. Eskişehir: Seyitgazi, 2 km from Seyitgazi, steppe, 1117 m, 15.vi.2009, *C. Aykurt 2711*. Eskişehir: Seyitgazi, environs of Sarayören village, slopes, 1075 m, 15.vi.2009, *C. Aykurt 2713*. Kütahya: Merkez, 1 km from Kütahya to Eskişehir, limestone slopes, 930 m, 6.vi.2008, *C. Aykurt 2140*. C3/B3 Konya: Debent, 1030 m, 10.vii.2011, *C. Aykurt 3070*. B7 Malatya: Hekimhan, 6 km from Hekimhan to Kangal, roadsides and slopes, 1121 m, 25.vi.2008, *C. Aykurt 2300*. B6 Kahramanmaraş: Elbistan, between Darende and Elbistan, steppe, 1351 m, 25.vi.2008, *C. Aykurt 2310*. B6 Malatya: Hekimhan, 6 km from Hekimhan to Kangal, steppe and slopes, 1121 m, 3.vii.2009, *C. Aykurt 2913*. B6 Malatya: Hekimhan, 6 km from Hekimhan to Kangal, steppe and slopes, 1121 m, 27.vii.2009, *C. Aykurt 2923*. 13. *C. × peshmenii*: Adana: 28 km from Pozantı to Adana, under *Pinus brutia*, 945 m, 09.vi.2007, *C. Aykurt 1495*. 15. *C. phrygius*: B2 Kütahya: 18 km from Kütahya to Eskişehir, slopes, 991 m, 06.vi.2008, *C. Aykurt 2153*. Kütahya: Kütahya-Eskişehir road, exit of Kütahya, limestone slopes, 930 m, 6.vi.2008, *C. Aykurt 2143*. Kütahya: 15 km from Kütahya to Eskişehir, limestone slopes, 990 m, 6.vi.2008, *C. Aykurt 2152*. B3 Eskişehir: Eskişehir-Seyitgazi road, the slopes after from the Eskişehir Cemetery, 912 m, 7.vi.2008, *C. Aykurt 2166*. Eskişehir: Eskişehir-Ankara road, the slopes at the exit of Eskişehir, 920 m, 16.vi.2009, *C. Aykurt 2717*. Eskişehir: between Kütahya and Eskişehir, 500 m after from the turnout of Takmak Village, limestone slopes, 895 m, 6.vi.2008, *C. Aykurt 2161*. C2 Denizli: Denizli-Burdur road, 1 km to Salda Pass, steppe,

1280 m, 20.v.2008, *C. Aykurt 2018*. Denizli: Denizli-Burdur road, 2 km to Salda Pass, steppe, 1280 m, 20.v.2008, *C. Aykurt 2016*. Denizli: Honaz Mountain National Park, slopes, 1177m, 19.vii.2007, *C. Aykurt 1513*. Denizli: Honaz, 3-4 km after from the entrance of Honaz Mountain National Park, slopes, 1167 m, 11.v.2008, *C. Aykurt 1928*. Denizli: Honaz, 2.5 km after from the entrance of Honaz Mountain National Park, rocky slopes, 1160 m, 23.v.2008, *C. Aykurt 2025*. Denizli: Tavas, 4 km to Cankurtaran, open *Pinus nigra* forests, rocky slopes, 1100 m, 23.v.2008, *C. Aykurt 2026*. Denizli: Yeşilove, Yeşilove-Karamanlı road, 1240 m, step, 22.v.2008, *C. Aykurt 2015*. Eskişehir: Eskişehir-Gediz road, exit of Eskişehir, 900 m, 7.vi.2008, *C. Aykurt 2165*. Eskişehir: Seyitgazi, northeast of Sarayören Village, slopes, 1116 m, 15.vi.2009, *C. Aykurt 2714*. Eskişehir: Seyitgazi, after 1 km from Sarayören Village, slopes, 1057 m, 15.vi.2009, *C. Aykurt 2715*. C3 Antalya: Korkuteli, Korkuteli-Fethiye old road, Aga Mountain, slopes, steppe, 1215 m, 22.vi.2009, *C. Aykurt 2815*. Antalya: Korkuteli, environs of the Korkuteli Dam, open slopes, 1250 m, 3.vi.2008, *C. Aykurt 2055*. Antalya: Korkuteli, 4 km from Korkuteli to Kızılcaadağ, slopes, 1200 m, 3.vi.2008, *C. Aykurt 2048*. Antalya: Korkuteli, around Dereköy Village, slopes, 1124 m, 36 243597 D 41 10501 K, *C. Aykurt 2216*. Antalya: Korkuteli, 3 km from Korkuteli to Dereköy, stony slopes, 1080 m, 3.vi.2008, *C. Aykurt 2077*. Antalya: Korkuteli, around Yazır Village, 920 m, 03.vi.2008, *C. Aykurt 2045*. Antalya: Korkuteli, between Korkuteli and Kızılcaadağ, around the turnout of Yukarıkaraman, slopes, 1415 m, 4.vi.2008, *C. Aykurt 2067*. **16. C. assyricus:** A5 Amasya: Merzifon, Merzifon-Çorum road, 38 km to Çorum, slopes, 800 m, 18.vi.2009, *C. Aykurt 2771*. Çorum: Çorum-Yozgat road, 20 km to Alaca, slopes, steppe, 1100 m, 18.vi.2009, *C. Aykurt 2781*. Çorum: Kuşsarayı Village, steppe, fallow fields, 1117 m, 18.vi.2009, N 40 60745 E 35 10537, *C. Aykurt 2774*. B5 Nevşehir: Avanos, Kalaba-Avanos road, 8 km to Avanos, igneous slopes, 1180 m, 18.vi.2009, *C. Aykurt 2796*. Nevşehir: Avanos, 1.5 km from Kabala to Avanos, fallow fields, 1189 m, 18.vi.2009, *C. Aykurt 2793*. Yozgat: Boğazlıyan, Yozgat-Boğazlıyan road, 9 km to Boğazlıyan, slopes, 1280 m, 18.vi.2009, *C. Aykurt 2792*. Yozgat: between Çorum and Yozgat, after from Çalatlı Village, 6.5 km to Yozgat, slopes, 1250 m, 18.vi.2009, *C. Aykurt 2787*. Yozgat: 2 km from Yozgat to Boğazlıyan, slopes, 1200 m, 18.vi.2009, *C. Aykurt 2788*. B6 Malatya: Darende, between Hekimhan and Darende, after 7-8 km from Ayvalı, steppe, 1516 m, 25.vi.2008, *C. Aykurt 2306*. C5 Niğde: around Çamardı, steppe, 1600 m, 09.vi.2007, 1600 m, *C. Aykurt 1505*, N. Kemaloğlu (AKDU). Niğde: 3 km to Demirkazık, steppe, 1553m, 09.vi.2007, *C. Aykurt 1501*. **17. C. libanoticus:** C3/4 Konya: Seydişehir, Antalya-Akseki road, after 2 km from the Bozkır turnout, slopes, 1525 m, 06.vi.2007, *C. Aykurt 1462*. Konya: Seydişehir, Antalya-Akseki road, after 2 km from the Bozkır turnout, slopes, 1525 m, 06.vi.2009, *C. Aykurt 2643*. C4 Karaman: 10 km to Ermenek, roadsides, 06.vi.2007, *C. Aykurt 1471*. Konya: Bozkır road, slopes, 1663 m, 06.vi.2007, *C. Aykurt 1463*, N. Kemaloğlu (AKDU). Konya: after from Taşkent, Balbeli Pass, stony slopes, steppe, 1825 m, 06.vi.2007, *C. Aykurt 1469*. **18. C. cataonicus:** B6 Kahramanmaraş: Göksun, Elbistan-Göksun road, 13 km to Göksun, slopes, 26.vi.2008, 1414 m, *C. Aykurt 2314*. Kahramanmaraş: Göksun, 3 km to Fındık Village, forests and open *Pinus nigra* forests, 26.vi.2008, 1354 m, *C. Aykurt 2317*. B7 Elazığ: Sivrice, road of Gözeli Village, *Acantholimon* and *Astragalus* steppe, 1594 m, 24.vi.2008, *C. Aykurt 2276*. Elazığ: Sivrice, Gözeli Köyü-Elazığ road, 30 km to Elazığ, slopes, 24.vi.2008, *C. Aykurt 2282*. Elazığ: Sivrice, 1 km west of Kavak Village, slopes, 1628 m, 24.vi.2008, *C. Aykurt 2277*. C6 Hatay: between Kisecek and NATO Radar Station, steppe, 1400 m, 7.vi.2009, *C. Aykurt 2666*. **19. C. carduchorum:** B7 Elazığ: Baskil, Baskil-Sarıtaş Köyü road, 2 km to Sarıtaş, *Acantholimon* and *Astragalus* steppe, 1772 m, 24.vi.2008, *C. Aykurt 2283*. B8 Tunceli:Pülümür, Erzincan-Tunceli road, 10 km to Pülümür, slopes, 1970 m, 2.vii.2009, N 39 52776 E 39 88838, *C. Aykurt 2896*. Tunceli: Pülümür, between Erzincan and Tunceli, 8 km to Pülümür, slopes, 1924 m, 2.vii.2009, *C. Aykurt 2899*. **20. C. pilosellifolius:** C6/7 Gaziantep: Nizip-Karkamış road, around Çakıroğlu Village, roadsides, 370 m, 23.vi.2008, *C. Aykurt 2243*. C7/8 Şanlıurfa: Ceylanpınar, fallow fields, 356 m, 23.vi.2008, *C. Aykurt 2252*. C8 Mardin: Mardin-Mazıdağı road, exit of Mardin City centre, roadsides, 930 m, 24.vi.2008, *C. Aykurt 2255*. **21. C. persicus:** A2(E)İstanbul: Sarıyer, Gümüşdere beach, sandy dunes, 6 m, 23.v.2009, *C. Aykurt 2509*. A2(A) İstanbul: Şile, Sofular village, coastal sandy dunes, 5 m, 04.vii.2009, İ. Genç (ISTF). **27. C. coelesyriacus:** C2 Antalya: Kaş, Demre-Kekova road, 3 km after the turnout of Kekova, open macchie, stony slopes, 118 m, 13.iv.2009, *C. Aykurt 2390*, N. Kemaloğlu. Antalya: Kaş, Kaş-Kalkan road, exit of Kaş, under *Olea europae*, 1-2 m, 27.iii.2008, *C. Aykurt 1759*. C4 İçel: Kanlıdivane, 1.5 km after from the turnout of Kanlıdivane, macchie, 75 m, 09.iv.2008, *C. Aykurt 1810*. İçel: Kızıkalesi, 3 km to Adamkayalar, macchie and rocky areas, 23 m, 13.iv.2008, *C. Aykurt 1825*. İçel: Silifke-Aydıncık road, 2 km to Akdere, macchie, under *Pinus brutia* woodland, 72 m, 13.iv.2008, *C. Aykurt 1828*. **30. C. germaniciae:** C6 Kahramanmaraş: Türkoğlu, Gavur Lake environs, roadsides and fallow fields, 500 m, 26.vi.2008, *C. Aykurt 2321*. Kahramanmaraş: Türkoğlu, Gavur Lake environs, roadsides and fallow fields, 500 m, 8.vi.2009, 37 302377 D 41 21357 K, *C. Aykurt 2682b*. **31. C. cassius:** C6 Hatay: Altınözü, between Altınözü and Yiğityolu, 18 km to Yiğityolu, roadsides and fallow fields, 326 m, 8.vi.2009, *C. Aykurt 2678*. Hatay: Altınözü, between Altınözü and Yiğityolu, 4 km to Yiğityolu, roadsides and fallow fields, 662 m, 8.vi.2009, *C. Aykurt 2679*. Hatay: İskenderun, between Hacıahmetli and Karagöz villages, roadsides, slopes, 250 m, 7.vi.2009, *C. Aykurt 2659*. **35. C. pseudoscammonia:** A8 Artvin: Yusufeli, Demirkent Village, slopes, 1330 m, 1.vii.2009, *C. Aykurt 2882*. Artvin: Yusufeli, 2 km to Demirkent, slopes, 565 m, 1.vii.2009, *C. Aykurt 2880*. Artvin: Yusufeli, 40 km from Yusufeli to İspir, Sarikonaklar environs, slopes, 660 m, 1.vii.2009, *C. Aykurt 2883*. Artvin: Yusufeli, 7 km from Yusufeli to İspir, slopes, 660 m, 1.vii.2009, *C. Aykurt 2883*. Erzurum: İspir, between Artvin and İspir, 10 km to İspir, rockt slopes, 1150 m, 1.vii.2009, *C. Aykurt 2887*. Erzurum: Tortum, 8 km from Tortum to Uzundere, slopes, steppe, 1420 m, 1.vii.2009, *C. Aykurt 2868*.

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