



Research article

The Genus *Dichodon* (Caryophyllaceae) in Turkey

Mustafa Keskin*¹ ¹ Marmara University, Institute of Pure and Applied Sciences, Biology Program, 34722, Goztepe, Istanbul, Turkey

Abstract

Dichodon (Bartl. ex Rchb.) Rchb. is a small genus and was formerly included in *Cerastium*. However, the first specimens of this genus were introduced to the literature as *Stellaria*. *Dichodon*, taxonomically, remains in between *Cerastium* and *Stellaria* genera. Although there are 16 identified species worldwide, the status of some of them is doubtful. There are three species identified so far in Turkey. In this study, the taxonomic status of the species belonging to the genus *Dichodon* is discussed. A species previously mentioned as a synonym has been validated. The distribution of all species in Turkey is shown on the maps and scientific Turkish names are suggested for the species. In addition, a new identification key was proposed for the first time and herbarium photographs of the species were added to the study.

Keywords: *Cerastium*; *Dichodon*; distribution; key; new combination; Turkey

1. Introduction

The Genus *Dichodon* was first published by Reichenbach (1841a). *D. anomalum* and *D. cerastoides* was reported again by Reichenbach (1841b).

After this genus was published, it was generally accepted by most floras as a subgenus of the genus *Cerastium* (Cullen, 1967). Later, Ikonnikov (1973, 1976) was the first author to accept *Dichodon* as separate genus from *Cerastium* basically based on the number of stylus.

There are 16 species which are mostly treated as synonyms of *Cerastium* reported under the generic name *Dichodon* according to The Plant List database (2013).

Finally, a published study stated that the genus *Dichodon* includes five species without specific name (Hernandez-Ledesma et al., 2015).

Species delimitation in *Dichodon* is uncertain and requires more detailed investigation to address the taxonomic problems (Arabi et al., 2018).

The biggest reason for this uncertainty in the genus *Dichodon* can be explained by its similarity to the genus *Cerastium* and *Stellaria*. In addition, low number of species and

limited distribution is another factor. Finally, the lack of current studies focusing on the distinction between the genera stands out as another problem. There is a need for monographic work around the world.

2. Materials and methods

The investigated specimens were obtained during both field studies and herbarium works.

Herbarium specimens from various herbaria such as E, ANK, GAZI, HUB, EGE, ISTE, ISTF, ISTO, VANF, HARRAN and KNYA were also used for detailed morphological studies. Measurable morphological features of each species were noted in detail and photographs of the specimens were taken.

The maps presented in the article have been prepared in the light of the data obtained during the herbarium studies and the samples collected by the author during his field trips.

3. Results

3.1. *Dichodon* (Bart. ex Reich.) Reichenbach, Deut. Bot. Herb.-Buch 205 (1841). *üçboynuz* (proposal).

* Corresponding author.

E-mail address: trifolium@hotmail.com (M. Keskin).<https://doi.org/10.51753/flsrt.1000995> Author contributions

Received 26 September 2021; Accepted 09 January 2022

Available online 01 April 2022

2718-062X © 2022 This is an open access article published by Dergipark under the [CC BY](https://creativecommons.org/licenses/by/4.0/) license.

Syn.: *Cerastium* subg. *Dichodon* (Bartling ex Reichenbach 785 (1832). *Cerastium* sect. *Dichodon* (Bartling ex Reichenbach 785 (1832). *Stellaria* [unranked] *Dichodon* Bartl. ex Rchb., Fl. Germ. Excurs.: 785 (1832). *Provancheria* B.Boivin, Naturaliste Canad. 93: 644 (1967).

Lectotype: *Dichodon viscidus* (M.Bieb.) Holub.

Annuals, biennials, or perennials herbs. Stems glabrous or glandular hairy at upper parts of stem; strict, ascending, or prostrate. Leaves somewhat fresh, linear-lanceolate or spatulate. Bracts herbaceous. Inflorescences a few flowered. Pedicels strict or recurved at fruiting time. Sepals ovoid to lanceolate, usually membranous at edges on inner parts; entire to narrowly membranous on outers parts. Petals 5 pieces, white, sub entire to deeply cutting. Styles 3. Stamens (5-) 10. Capsules oblong to cylindrical; opening 6 teeth; teeth strict, sub recurved to circinate. Seeds more with tuberculate.

3.2. Identification key for Turkish *Dichodon* species

1. Perennials; stems prostrate with non-flowered branches, caespitose

1. Annuals; stems strict, only a few branch

cerastoides

2. Stems densely glandular-viscid; alar pedicels 12-45 mm; petal 2-times longer than sepal

viscidus

2. Stems only inflorescence area glandular; alar pedicels 8-12 mm; petal slightly longer than sepal

kotschyi

3.3. *Dichodon cerastoides* (L.) Rchb., Icon. Fl. Germ. Helv. 5: f. 4915 (1841).

Perennials. Stems 5-25 cm, shallow striate, caespitose; glabrous to hairy sometimes glandular-viscid. Leaves 7-25 × 1.5-3 mm, linear to lanceolate, glabrous to hairy at upper. Inflorescence 3-7 flowered rarely 1-flowered. Bracts ovoid to lanceolate. Pedicel 10-25 mm, usually glandular, sometimes shortly hairy, or almost glabrous; recurved at fruiting times. Sepal 4-7 mm, linear to lanceolate, one nerved, membranous at edges; loosely hairy or almost glabrous. Petal 8-15 mm, obovoid, deeply notched; longer than sepal or almost equal to sepal; clav glabrous. Stamen 10; filaments glabrous. Styles 3. Capsule 10-12 mm, cylindrical, opening with 6-teeth; teeth sub recurved. Seeds cordate-globose with tuberculate.

a. Plants glabrous or loosely hairy with or without a few glandular hairs

var. *cerastoides*

a. Plants glandular-viscid

var. *argaeum*

3.3.1. var. *cerastoides* / üçboynuz (proposal). Fig. 1 & 2

Syn. *Alsine multicaulis* E.H.L.Krause, Deutschl. Fl., ed. 2. 5: 68 (1901). *Centunculus alpinus* Scop., Fl. Carniol., ed. 2. 1: 321 (1771). *Cerastium cerastoides* (L.) Britton, Mem. Torrey Bot. Club v. 152 (1894). *Cerastium elegans* Fisch. ex Ser., Prodr. 1: 400 (1824). *C. lagascanum* C.Vicioso, Anales Jard.

Bot. Madrid 6(2): 27 (1946). *C. lapponicum* Crantz, Inst. Rei Herb. 2: 402 (1766). *C. nivale* D.Don ex Nyman, Consp. Fl. Eur. 1: 110 (1878). *C. refractum* All., Fl. Pedem. ii. 117 (1785). *C. rupestre* Fisch. ex Ser., Prodr. 1: 417 (1824). *C. stellarioides* Hartm., Handb. Skand. Fl. 181 (1820). *C. stellarioides* Hegetschw., Fl. Schweiz 434 (1838). *C. trigynum* Vill. var. *brachypetala* Lange, Meddel. Grønland 3: 244 (1909). *C. trigynum* Vill., Prosp. Hist. Pl. Dauphiné 48 (1779). *Provancheria cerastioides* (L.) B.Boivin, Naturaliste Canad. xciii. 645 (1966). *Stellaria cerastoides* L., Sp. Pl. 1: 422 (1753).

Lectotype: Herb. Linn. No.584/10 (LINN! <<http://linnean-online.org/6101/>> accessed: 12.09.2021>). Flowering time: 5-9. month.



Fig. 1. General view of *Dichodon cerastoides* var. *cerastoides*.



Fig. 2. Distribution of *Dichodon cerastoides* var. *cerastoides* in Turkey.

3.3.2. var. *argaeum* (Boiss. & Balansa) M. Keskin comb. nov. / rana üçboynuz (proposal). Fig. 3 & 4

Syn. *Arenaria argaea* (Boiss. & Balansa) Shinnars, Sida 1: 50 (1962). *Cerastium argaeum* Boiss. & Balansa, Diagn. Pl. Orient. ser. 2, 6: 38 (1859). *Dichodon argaeus* (Boiss. & Balansa) Ikonn., Novosti Sist. Vyssh. Rast. (New Delhi) 10: 142 (1973).

Type: in regione alpina superiori montis Argaei Cappadociae alt. 3650 m, Fl. Aug. cl. Balansa.

Flowering time: 2-8. Month 3

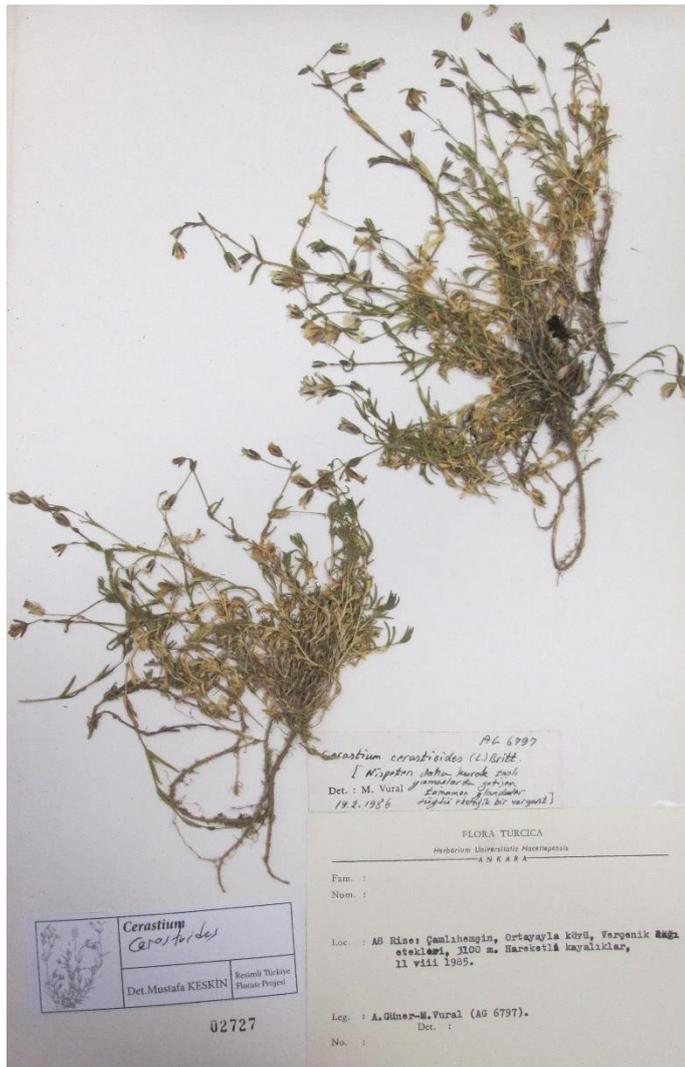


Fig. 3. General view of *Dichodon cerastoides* var. *argaeum*.



Fig. 4. Distribution of *Dichodon cerastoides* var. *argaeum* in Turkey.

3.4. *Dichodon viscidus* (M.Bieb.) Holub, Folia Geobot. Phytotax. 9(3): 273 (1974). / guddeli üçboynuzotu. (proposal). Fig. 5 & 6

Syn. *Arenaria anomala* (Waldst. & Kit. ex Willd.) Shinnars, Sida 1: 50 (1962). *Cerastium anomalum* Waldst. & Kit. ex Willd., Sp. Pl. ed. 4: 2(1): 812 (1799). nom. illeg. *C. dubium* (Bastard) O.Schwarz, Mitt. Thüring. Bot. Ges. i. 98 (1949). *C. mauritanicum* Pomel, Nouv. Mat. Fl. Atl. 206 (1874). *Dichodon anomalum* (Willd.) Reichenb., Icon. Fl. Germ. 5: 34 (1841). *D. anomalus* Rchb., Icon. Fl. Germ. Helv. 5: 34 (1841). nom. illeg. *D. dubium* (Bastard) Ikonn., Novosti Sist. Vyssh. Rast. 10: 141 (1973). *Holosteum dichotomum* K.Koch, Linnaea 15(6): 708 (1842). *Provancheria dubia* (Bastard) B.Boivin, Naturaliste Canad. xciii. 644 (1966). *Stellaria anomala* Rchb., Fl. Germ. Excurs. 785 (1832). nom. illeg. *S. dubia* Bastard, Suppl. Essai Fl. Maine-et-Loire 24 (1812). *S. viscida* M. Bieb., Fl. Taur.-Caucas. 1: 342 (1808).

Lectotype: *Dichodon dubium* (Bastard) Ikonn. (= *Dichodon viscidus* (M.Bieb.) Holub) (Bas. *Stellaria dubia* Bastard) by Ikonnikov: "Novosti Sistematiki Vysshikh Rastenii 10: 141 (1973)".

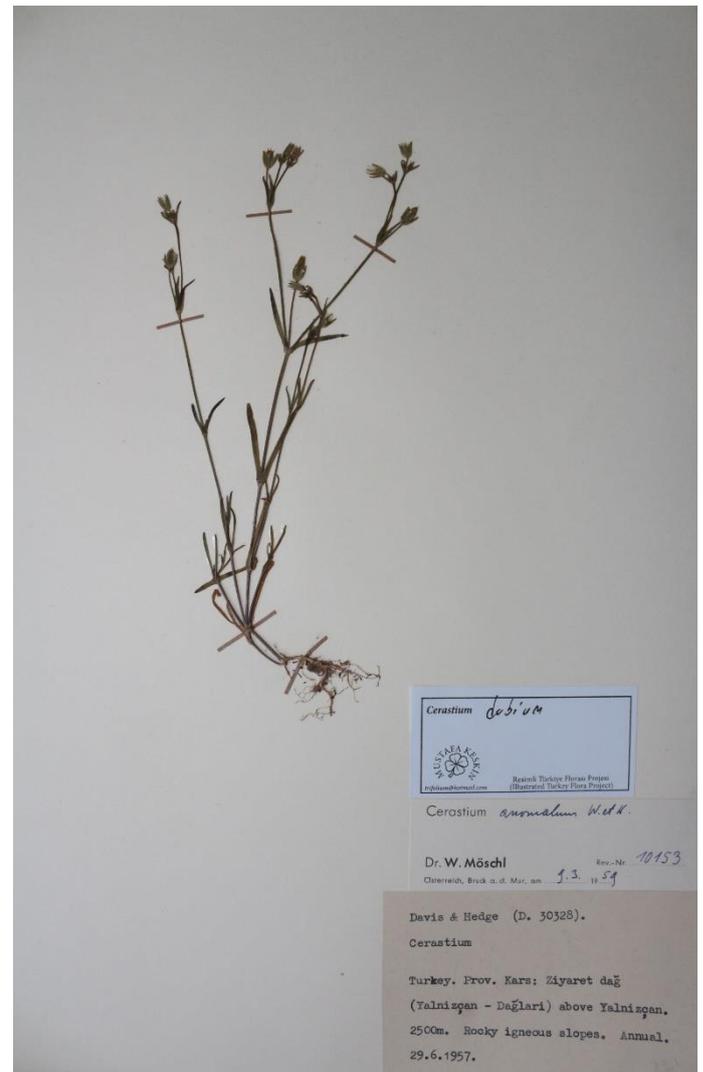


Fig. 5. General view of *Dichodon viscidus*.

herbarium photographs were added to the study.

Table 1

The distinction between *Cerastium* and *Dichodon*.

	<i>Cerastium</i>	<i>Dichodon</i>
Style	(4-) 5	3
Petal	At most notched to middle, usually less	deeply notched
Capsule teeth	(8-) 10	6
Seed surface	tuberculate or colliculate	typical verrucate type

It was understood that *D. viscidus* is the most common species in the genus *Dichodon* in Turkey. This species is often known as *Cerastium dubium* (syn.: *C. anomalum*). However, the first name of this species, *Stellaria viscida*, was ignored because a false first specimen was studied for years. This mistake was noticed and corrected by Holub (1974). Therefore, in this article, *Dichodon viscidus* is used as the real name of the species.

The species *D. cerastoides* is a perennial, usually ground cover, and grows in an ascending form. This species is more likely to be distributed because it generally likes to grow at high altitudes. While *Dichodon argaeum* (syn.: *Cerastium argaeum*) was accepted as a synonym of *D. cerastoides* (syn.: *C.*

cerastoides) in previous studies, in this study it was concluded that it should be a variety of *D. cerastoides*. It is distinguished by its glandular hairs.

D. kotschyi (as *C. kotschyi*) has been described as an indeterminate species in the Flora of Turkey (Cullen, 1967) since it was reported from Van with only one record examined. Although one more record from Hatay was mentioned, this example was not seen by the author in the Flora of Turkey (Cullen, 1967), and no sample from Hatay was seen in this study.

Based on the samples examined, the distribution of this species was expanded, and it was concluded that there was no problem in the taxonomic status of the species.

Acknowledgments: I would like to thank the ANG foundation for their financial contribution to herbarium trips.

Conflict of interest: The authors declare that they have no conflict of interests.

Informed consent: The authors declare that this manuscript did not involve human or animal participants and informed consent was not collected.

References

- Arabi, Z., Ghahremaninejad, F., Rabeler, R.K., Sokolova, I., Heubl, G., & Zarre, S. (2018). On the taxonomic status of the genus *Dichodon* (Caryophyllaceae: tribe Alsineae): morphological and molecular evidence reassessed. *Phytotaxa* 360 (3): 220-236.
- Cullen, J. (1967). *Cerastium*. In: Davis, P.H. (ed.) *Flora of Turkey and the East Aegean Islands*, vol. 2 (pp. 73-85). Edinburgh University Press.
- Hernandez-Ledesma, P., Berendsohn, W. G., Borsch, T., Von Mering, S., Akhani, H., Arias, S., ... & Uotila, P. (2015). A taxonomic backbone for the global synthesis of species diversity in the angiosperm order Caryophyllales. *Willdenowia*, 45(3), 281-383. <https://doi.org/10.3372/wi.45.45301>.
- Holub, J. (1974). New names in Phanerogamae 3. *Folia Geobot. Phytotax*, 9, 261-275. <https://doi.org/10.1007/BF02853148>.
- Ikonnikov, S. S. (1973). Notae de Caryophyllaceis, 1. [Notes on Caryophyllaceae, 1. On the genus *Dichodon* (Bartl.) Reichb.]. *Novosti Sistematiki Vysshikh Rastenii*, 10, 136-142.
- Ikonnikov, S. S. (1976). Notae de Caryophyllaceis, 3. [Notes on Caryophyllaceae, 3. On the genus *Dichodon* (Bartl.) Reichb.]. *Novosti Sistematiki Vysshikh Rastenii*, 13, 113-120.
- Reichenbach, H. G. L. (1841a). *Der Deutsche Botaniker. Erster Band. Das Herbarienbuch* (pp. 1-236). Arnoldische Buchhandlung, Dresden and Leipzig.
- Reichenbach, H. G. L. (1841b). *Icones Florae Germanicae et Helveticae*, vol. 5. (pp. 1-38). Sumptibus Friderici Hofmeister Lipsiae [Leipzig].
- The Plant List (2013). *Dichodon*. The Plant List. A working list of all plant species. Available from: www.theplantlist.org. Last Accessed on 12 February 2022.

Cite as: Keskin, M. (2022). The Genus *Dichodon* (Caryophyllaceae) in Turkey. *Front Life Sci RT*, 3(1), 16-20.