

## A Morphological Investigation of *Colchicum* L. (Liliaceae) Species in the Mediterranean Region in Turkey\*

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**Abstract:** The morphological features of *Colchicum* L. species were studied based on samples collected from the Mediterranean region in Turkey between 2000 and 2004. Typifications, synonym lists, descriptions, ecology, and phytogeography are provided for all *Colchicum* species and relationships to similar species are discussed. New features were determined that were not previously given in descriptions of *Colchicum* species in the Flora of Turkey, and useful identification keys (for both flowering material and leafing-fruited material) were prepared for all *Colchicum* species in the Mediterranean region of Turkey.

**Key Words:** *Colchicum*, Liliaceae, Mediterranean region, morphology, taxonomy

### Akdeniz Bölgesi'ndeki *Colchicum* L. (Liliaceae) Türleri Üzerinde Morfolojik Bir Araştırma

**Özet:** Bu çalışmada, 2000-2004 yılları arasında Akdeniz Bölgesi'nden toplanan *Colchicum* L. türlerinin morfolojik özellikleri çalışılmıştır. Bütün *Colchicum* türlerinin tipifikasyonları, sinonim listeleri, deskripsiyonları, ekolojik ve fitocoğrafik dağılımları verilmiş ve yakın türlerle olan akrabalık ilişkileri tartışılmıştır. Türkiye Florası'ndaki *Colchicum* türlerinin deskripsiyonlarında daha önceden yer almayan yeni özellikler belirlenmiş ve Akdeniz Bölgesi'nde yayılış gösteren bütün *Colchicum* türleri için kullanışlı bir teşhis anahtarı (hem çiçekli, hem de yapraklı ve meyveli halde toplanan örnekler için) hazırlanmıştır.

**Anahtar Sözcükler:** *Colchicum*, Liliaceae, Akdeniz bölgesi, morfoloji, taksonomi

### Introduction

*Colchicum* L. is a taxonomically very difficult genus of the family Liliaceae. The ca. 100 species of the genus *Colchicum* (incl. *Merendera* Ram. and *Bulbocodium* L.) are unevenly distributed. Most species are confined to limited regions, some of which are very rich in species. The high frequencies of species and of endemics in Turkey and the Balkans indicate that these regions are major centres of diversity and speciation (Persson, 1993). *Colchicum* is represented by 36 taxa (35 species), of which 14 are endemic in Turkey (Brickell, 1984; Persson, 2000; Persson, 2001; Akan & Eker, 2005). Twenty-eight of these taxa are autumn-flowering species,

whereas the remaining 8 are early-spring flowering species. In addition, 25 of them are hysteroanthous species (leaves undeveloped at anthesis) and 11 of them synanthous species (leaves partly developed at anthesis).

Various local names are used for *Colchicum* species. These names are "Güzçiğdemi", "Göçkovan", "Öksüz çiçeği", "Kalkgit", "Acı çiğdem", "Ayı çiğdemi", "İtboğan", "Likofor", "Ligoser", and "Tarhana çiçeği" (Baytop, 1994). In addition, the names "Göç çiçeği", "Koyun dölü", and "Avu" were determined by O.D. Düşen during field studies.

Many kinds of alkaloids have been identified in *Colchicum* and *Merendera* plants. The major alkaloid of

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*Colchicum* is colchicine (Simánek et al., 1990). The use of colchicine for treatment of gout was propounded by different researchers. Moreover, colchicine has an inhibitory effect on the growth of certain tumours in plants and animals. Colchicine acts on the mitotically active cell producing metaphasic arrest, often resulting in a doubling of the chromosome number and giving rise to polyploids (Fell & Ramsden, 1967).

*Colchicum* species contain poisonous alkaloids, such as colchicine (Baytop, 1999). When these poisonous alkaloids are accidentally ingested by humans and animals, they cause very serious health problems such as serious liver damage and finally death. All parts of *Colchicum* species have been shown to contain colchicine, but seeds and corms contain more colchicine than other plant parts. Numerous studies have been carried out by different researchers on colchicine and other chemical constituents of *Colchicum* species (Sütlüpinar et al., 1988; Simánek et al., 1990; Abu Zarga et al., 1991; Ondra et al., 1995; Maier & Zenk, 1997; Nasreen et al., 1997; Kalinin & Snieckus, 1998; Rosso & Zuccaro, 1998; Rueffer & Zenk, 1998; Sütlüpinar, 2002).

The first detailed morphological properties of the genus *Colchicum* were reported by Brickell (1984). That study was followed by a number of investigations (Küçükler, 1985; Baytop, 1987; Küçükler & Çelebioğlu, 1988; Küçükler, 1990a, 1990b, 1992; Engel & Küçükler, 1994; Küçükler, 1995; Persson, 1999a, 1999b, 2001). However, so far there have been no detailed morphological studies on all *Colchicum* species distributed in the Mediterranean region.

In this research, detailed morphological features of *Colchicum* species were studied and useful identification keys (for both flowering material and leafing-fruited material) were prepared for all *Colchicum* species in the Mediterranean region of Turkey.

## Materials and Methods

Plant samples were collected from the Mediterranean region in Turkey between 2000 and 2004. *Colchicum* specimens for morphological studies were dried according to standard herbarium techniques and preserved in the Akdeniz University herbarium (AKDU). The Monograph of *Colchicum* genus (Stefanov, 1926), *Flora of Turkey* (Brickell, 1984; Persson, 2000), and the other related floras (Butcher, 1961; Mouterde, 1966;

Savulescu & Nyárády, 1966; Halacsy, 1968; Lanfranco, 1977; Nasir, 1979; Brickell, 1980; Pignatti, 1982; Meikle, 1985; Townsend et al., 1985; Feinbrun-Dothan, 1986; Zaffran, 1990; Persson, 1992) were utilised in the identification of the specimens and confirmed by comparison with the herbarium samples of the examined species in the ANK, BULU, GAZI, HUB, ISTE, ISTF, VANF, and AKDU herbaria. The specimens were evaluated according to IUCN threat categories (Ekim et al., 2000; IUCN, 2001). Authors of plant names are written according to Brummitt & Powell (1992). The abbreviations used in the text are as follows: CR = Critically endangered; EN = Endangered; LC = Least concern.

## Results

### Autumn-flowering *Colchicum* L. species in the Mediterranean region of Turkey

1. *Colchicum boissieri* Orph.
2. *Colchicum baytopiorum* C.D.Brickell
3. *Colchicum stevenii* Kunth
4. *Colchicum kotschyi* Boiss.
5. *Colchicum heldreichii* K.M.Perss.
6. *Colchicum decaisnei* Boiss.
7. *Colchicum balansae* Planch.
8. *Colchicum variegatum* L.
9. *Colchicum cilicicum* (Boiss.) Dammer
10. *Colchicum sanguicolle* K.M.Perss.
11. *Colchicum davisii* C.D.Brickell
12. *Colchicum dolichantherum* K.M.Perss.
13. *Colchicum imperatoris-friderici* Siehe ex K.M.Perss.
14. *Colchicum inundatum* K.M.Perss.
15. *Colchicum polyphyllum* Boiss. & Heldr.

### Spring-flowering *Colchicum* L. species in the Mediterranean region of Turkey

1. *Colchicum minutum* K.M.Perss.
2. *Colchicum serpentinum* Woron. ex Miscz.
3. *Colchicum szovitsii* Fisch. & C.A.Mey.
4. *Colchicum triphyllum* Kunze
5. *Colchicum burtii* Meikle

## Key to Species

### A- Key to flowering material of

1. Flowering period January to June
  2. Corms soboliferous, with horizontal underground stolons
    3. Filaments densely pilose near the base **8. burtii**
    3. Filaments glabrous
      4. Corm tunic membranous **7. triphyllum**
      4. Corm tunic papery or subcoriaceous
        5. Flowers campanulate; perianth tube purplish-pink in upper part **6. szovitsii**
        5. Flowers stellate or narrowly funnel-shaped; perianth tube wholly cream or white **5. serpentinum**
  2. Corms erect, without underground stolons
    6. Leaves synanthous, partly developed at anthesis or appearing immediately after anthesis
      7. Corm with a neck **4. stevenii**
      7. Corm without a neck **2. baytopiorum**
    6. Leaves hysteranthous, undeveloped at anthesis or subsynanthous
      8. Perianth segments strongly tessellated
        9. Perianth segments glabrous along ridges of filaments channels; anthers purple, purplish-black or purplish-brown **13. variegatum**
        9. Perianth segments pubescent along ridges of filaments channels; anthers yellow
          10. Anthers 10-16 mm; stigmatic surface decurrent for at least 2-5 mm **16. davisii**
          10. Anthers up to 10 mm; stigmatic surface punctiform or decurrent for at least 0.4-1 mm **14. cilicicum**
      8. Perianth segments not or slightly tessellated
        11. Corm soboliferous, with horizontal underground stolons
          12. Leaves hysteranthous; anthers with membranous margin **1. boissieri**
          12. Leaves synanthous or subsynanthous; anthers without membranous margin **2. baytopiorum**
        11. Corm erect, without underground stolons
          13. Neck absent, if present up to 2 cm long
            14. Leaves hysteranthous; flowers 2-25 (-30); filament channels sparsely papillose to shortly pubescent **20. polyphyllum**
            14. Leaves synanthous or subsynanthous; flowers 1-5; filament channels glabrous **2. baytopiorum**
          13. Neck at least 2 cm or more
            15. Neck 20-50 cm; cataphyll almost as long as neck **12. balansae**
            15. Neck up to 20 cm; cataphyll longer than neck
              16. Styles straight or slightly hooked at apex
                17. Filament channels glabrous or puberulous at least on margin
                  18. Flowers campanulate; filament channels with 1-3 filiform teeth at apex **15. sanguicolle**
                  18. Flowers funnel-shaped; filament channels without filiform teeth at apex **11. decaisnei**
                17. Filament channels wholly puberulous
                  19. Anthers with membranous margin **9. kotschyi**
                  19. Anthers without membranous margin **14. cilicicum**
              16. Styles distinctly hooked at apex
                20. Neck with thin fibres **17. dolichantherum**
                20. Neck without fibres
                  21. Filament channels shallow, glabrous or sometimes pubescent only at base **10. heldreichii**
                  21. Filament channels distinct and completely pubescent
                    22. Perianth segments slightly tessellated
                      23. Outer tunic of corm membranous; anthers up to 10 mm **16. davisii**
                      23. Outer tunic of corm papery or subcoriaceous; anthers at least 8 mm **19. inundatum**
                    22. Perianth segments not tessellated
                      24. Filaments white or cream in lower part, usually light- pink in upper part **18. imperatoris-friderici**
                      24. Filaments wholly white **9. kotschyi**

**B- Key to leafing and fruiting material of *Colchicum* L. species in the Mediterranean region of Turkey**

1. Leaves numerous (usually 10-25) **20. polyphyllum**
1. Leaves up to 10 or less
  2. Leaves pilose or hispid on margins and dorsal surface
    3. Outer tunics of corm with prominent longitudinal corrugations; capsule scabrid-pilose at apex **8. burtii**
    3. Outer tunics of corm without prominent longitudinal corrugations; capsule glabrous at apex
      4. Neck absent; leaves width up to 0.8 (-1) cm **5. serpentinum**
      4. Neck present; leaves width 1-5 (-7) cm **11. decaisnei**
  2. Leaves ciliate, scabrous or glabrous on margins and dorsal surface
    5. Corms soboliferous, with horizontal underground stolons
      6. Leaves 20-40 x 1.5-7 cm at maturity, narrowly or broadly lanceolate **2. baytopiorum**
      6. Leaves 7-20 x 0.2-1 (-1.5) cm at maturity, linear or linear-lanceolate
        7. Capsule length up to 1 (-1.5) cm **3. minutum**
        7. Capsule length at least 1.5 cm **1. boissieri**
    5. Corms erect, without underground stolons
      8. Leaves' margins conspicuously undulate **13. variegatum**
      8. Leaves' margins inconspicuously undulate or flat
        9. Corm without a neck
          10. Leaves length at least 20 cm at maturity; narrowly or broadly lanceolate **2. baytopiorum**
          10. Leaves length up to 20 cm at maturity; linear, linear-lanceolate or ligulate
            11. Outer tunics of corm membranous **7. triphyllum**
            11. Outer tunics of corm papery or subcoriaceous
              12. Leaves width up to 0.8 (-1) cm at maturity; capsule length up to 1.5 (-2) cm **5. serpentinum**
              12. Leaves width at least 1 cm at maturity; capsule length at least 2 cm **6. szovitsii**
9. Corm with a neck
  13. Neck thinly or strongly fibrous
    14. Neck length at least 20 cm; cataphyll almost as long as neck **12. balansae**
    14. Neck length up to 20 cm; cataphyll longer than neck **17. dolichantherum**
  13. Neck without fibres
    15. Leaves width up to 0.5 cm at maturity **4. stevenii**
    15. Leaves width at least 0.5 cm at maturity
      16. Cataphyll completely or in upper part reddish-purple
        17. Leaves pubescent dorsally at base and on sheath **11. decaisnei**
        17. Leaves glabrous or scabrous
          18. Leaves width up to 3 cm at maturity **10. heldreichii**
          18. Leaves width at least 3 cm at maturity
            19. Outer tunis of corm membranous **15. sanguicolle**
            19. Outer tunis of corm papery, subcoriaceous, or coriaceous
              20. Capsule width up to 1.5 cm **18. imperatoris-friderici**
              20. Capsule width at least 1.5 cm **14. cilicium**
  16. Cataphyll not reddish-purple
    21. Leaves at least 4 **19. inundatum**
    21. Leaves up to 4
      22. Corm narrowly ovoid to elliptic-ovoid; seeds up to 4 mm diam. **9. kotschyi**
      22. Corm elliptic to oblong-ovoid or asymmetric ovoid; seeds at least 4 mm diam. **16. davisii**

### Species Descriptions

1. *Colchicum boissieri* Orph. in Atti Congr. Bot. Firenze 1874: 29 (nomen), 30–31 (descr.) (1876). (Figure 1).

Typus: [Greece] vers l'automne sur le mont Taygete dans le Péloponèse, Orphanides 30 (holo. ATHU, iso. GI WU).

= *C. procurrens* Baker in Gard. Chron. ser. 3, 7: 192 (1890) Ic: Grey-Wilson & Mathew, Bulbs t. 10 (1981); Rix & Phillips Bulb Book 175 (n) (1981).

**Description:** Corm soboliferous, 1.5-6.5 (-7) x 0.3-1.5 cm, asymmetric ovoid or oblong-ovoid, often with tooth-like projections; tunics membranous, pale brown to reddish-brown; neck 1-4.5 (-5.5) x 0.3-0.6 (-0.8) cm, deciduous. Cataphyll 3-15 x 0.1-0.5 (-0.6) cm, white or yellowish-white. Leaves hysteranthous, 2-3, erect, suberect or arcuate, 8-20 (-22) x 0.2-1 cm, linear, obtuse to acute, margins glabrous or partly ciliate. Flowers 1-2 (-3), campanulate to narrowly funnel-shaped; perianth tube exceeding the cataphyll by 1.5-10 cm, white or cream; segments 2-5 (-5.5) x 0.5-1.6 (-1.8) cm, elliptic to oblong, each segment 10-18 (-20) veins, bright pink to purplish-pink, not tessellated, subacute to obtuse, not cucullate, filament channels distinct, with filiform teeth at apex, glabrous. Stamens 1/3 to 1/2 of perianth limb in length; filaments 8-25 mm, white or cream, with swollen yellow base, glabrous; anthers 4-8 (-10) x 1-1.5 mm, yellow, with membranous margin. Styles as long as or longer than stamens, straight or slightly curved at apex, white, stigmas punctiform. Capsule 1.5-2 x 0.8-1 cm, elliptic to oblong, glabrous,

rostrate; seeds 1.5-2.5 mm diam., almost globose or ovoid, reddish-brown. Flowering time, September-December; Leaves and fruiting time, February-May.

**Similar species:** This species is similar to *C. minutum* K.M.Perss., *C. munzurensense* K.M.Perss., and *C. leptanthum* K.M.Perss. Comparison of morphological characteristics between these species is shown in Table 1.

**Habitat:** Stony slopes, under and clearings of *Cedrus libani*, *Pinus-Juniperus* scrubs.

**Altitudinal range:** 400-1500 m.

**Turkey distribution:** West and South Anatolia.

**World distribution:** South Greece.

**Phytogeographical status:** East Mediterranean element.

**Flora of Turkey records:** A1 Balıkesir: Marmara Adası, above Çınarlıköy, 650 m, Tuzlacı (ISTE 38381, fl.). B1 Balıkesir: Kaz Dağı, Beypınar to Kosara, 700 m, A. Baytop (ISTE 18789, fl). İzmir: Boz Dağı, Büyük Çavdar Yaylası, 1400 m, T. Baytop (ISTE 45906, fl). Manisa: Manisa Dağı, Kırbağı oluk, 1250 m, T. Baytop (ISTE 36666, leaf & fr.). C1 Aydın: Samsun Dağı, 400 m, A. Baytop (ISTE 26795, fl.). C4 Konya: nr. Bozkır, Beyşehir to Karaman, 1070 m, Guichard T/175/60 (fl.).

**Specimens examined:** B1 İzmir: Bozdağı, Büyük Çavdar plateau, 1400 m, 9.x.1980, Baytop (ISTE 45906, ISTF 39071) - Bozdağı, Büyük Çavdar plateau, 1330 m, 28.iv.2001, E. Sevgi (ISTF 38492) - Ödemiş, Gülcük, under *P. nigra*, 38° 28' 620" N, 28° 02' 241" E, 1125 m, 22.ix.2001, A.A. Dönmez (HUB 10166). Balıkesir:

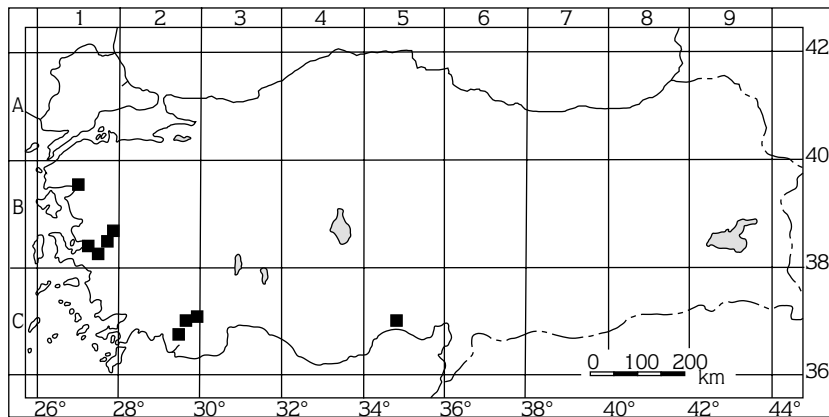


Figure 1. Distribution of *Colchicum boissieri* (■) in Turkey.

Table 1. Comparison of morphological characteristics between *C. boissieri*, *C. minutum*, *C. munzureense*, and *C. leptanthum*.

Morphological characters	<i>C. boissieri</i>	<i>C. minutum</i>	<i>C. munzureense</i>	<i>C. leptanthum</i>
Corm	asymmetric ovoid or oblong-ovoid 1.5-6.5 (-7) cm long	mostly subterete 1-5 cm long	narrowly ovoid to ellipsoid ovoid 1.2-2 cm long	subterete ---
Tunics	pale brown to reddish-brown	yellowish red-brown to yellowish brown	glossy light yellowish-brown to duller mid-brown	yellowish-brown to pale brown
Neck	1-4.5 (-5.5) x 0.3-0.6 (-0.8) cm	absent	mostly absent	mostly absent
Cataphyll	3-15 cm long	5-10 (-20) cm long	5-8.5 cm long	6-8 cm long
Leaves	hysteranthous obtuse to acute	synanthous subobtuse	synanthous subacute to obtuse	synanthous subacute
Flowers	campanulate to narrowly funnel-shaped	only narrowly funnel-shaped	only funnel-shaped	---
Perianth tube	exceeding the cataphyll by 1.5-10 cm, white or cream	exceeding the cataphyll by 1-4 (-6) cm, only white	exceeding the cataphyll by 2.5-5 (-7) cm whitish to yellowish white	exceeding the cataphyll by 4-7 cm whitish
Perianth segments	2-5 (-5.5) x 0.5-1.6 (-1.8) cm elliptic to oblong, with 10-18 (-20) veins bright pink to purplish-pink	1-3.5 x 0.1-0.5 cm linear to oblong with 5-7 (-9) veins white	1.8-3 cm x 0.25-0.75 cm narrowly oblong to narrowly oblanceolate with 7-11 veins white to palest purplish lilac	1.3-1.9 cm x 1-3 mm linear with 5-9 veins white
Filament channels	distinct, with filiform teeth at apex	shallow, without filiform teeth at apex	---	---
Stamens	1/3-1/2 as long as perianth limb	1/2-2/3 as long as perianth limb	---	---
Filaments	8-25 mm, white or cream with swollen yellow base	4-12 mm, only white with swollen orange yellow base	--- yellowish white to pale yellow with slightly swollen dull yellow to green-yellow base	--- pale yellow with thickened brownish-yellow base
Anthers	4-8 (-10) mm long with membranous margin yellow	2-4.5 (-5) mm long very thin membranous or without membranous margin bright yellow to dark grey	2.5-3 mm long --- dark purplish-grey to chocolate-brown or blackish	2.5-4 mm long --- yellow or greyish
Capsule	1.5-2 x 0.8-1 cm	0.8-1 (1.5) x 0.4-0.7 cm	1-1.5 x 0.7-1 cm	unknown
Seeds	reddish-brown	bright brown to dark brown	brown	unknown
Flowering time	September-December	January-March	February-April	early spring
Leaves and fruiting time	February-May	April-May	---	---

KazDağı, Beypınar to Koşara, 700 m, 17.x.1970, A. Baytop (ISTE 18789) - Marmara island, Çakıllı hill, rocky place, 650 m, 27.x.1977 (ISTF 39070). Manisa: Kırbağı oluk, 1250 m., 23.iv.1977, Baytop (ISTE 36666, ISTF 39072) - Manisa mountain, Sultan Plateau, 1250 m, 27.v.1980, Sütlüpınar (ISTE 44275) - Manisa mountain, Sultan Plateau, 1250 m, 4.x.1976, T. Baytop & H.J. Leep (ISTF 39076) - Manisa mountain, Sultan Plateau, 1250 m, 27.v.1980, Sütlüpınar (ISTE 44275) - Manisa mountain, Ata field, 1300 m, under the *Quercus-Juniperus*, stony place, 9.x.1973, Baytop (ISTE 26752, ISTF 39067) - Manisa Mountain, 30.i.1977, T. Baytop (ISTF 39074) - Spil mountain, Atalanı, grassland, 1250 m, 29.iii.2001, E. Sevgi (ISTF 38490) - Spil mountain, Atalanı, 1250 m, 6.x.2000, L. Şık (ISTF 37439) - Spil mountain, Atalanı, grassland, 1250 m, 27.iv.2001, E. Sevgi (ISTF 38491). C1 Aydın: Samsun mountain, 400 m, 13.x.1973, Baytop (ISTE 26795, ISTF 39068). C2 Antalya: Elmalı, Çiğlikara, Bölükatranı, opening of forest, calcareous place, 9.1991, H. Karaca, A. Güner (HUB) - Akçay to Kasaba, 29 km to Kasaba, under the *Cedrus libani* forest, 1400 m, 7.xi.1976, Baytop (ISTE 36258, ISTF 39073) - Akçay to Kasaba, 23 km from Kasaba, *Pinus* & *Quercus*, 1100 m, 21.iii.1977, T. Baytop (ISTF 39075) - Akçay to Kasaba, Kemer village, 7.xi.1976, T. Baytop (ISTF 30073) - Elmalı, Cedrus Research Forest, opening of *Cedrus libani*, 1400-1500 m, 28.ix.2001, O.D. Düşen (2444), S. Düşen, İ.G. Deniz (AKDU) - Elmalı, Cedrus Research Forest, around Şah Ardiç, clearings of *Cedrus libani*, 1500-1513 m, 9.ix.2002, 36° 35' 186" N, 29° 03' 614" E, O.D. Düşen (2569), S. Düşen, İ.G. Deniz (AKDU) - Elmalı, Cedrus Research Forest, clearings of

*Cedrus libani*, 1300-1400 m, 24.v.2003, O.D. Düşen (2444a), S. Düşen (AKDU) - Elmalı, Çiğlikara, 3-4 km to Dokuzgöl, openings of forest, 1830 m, 18.xi.2003, 36° 32' 156" N, 29° 50' 656" E, R.S. Göktürk & İ.G. Deniz (1001) (AKDU). C5 İçel: Fındıkpınar to Arslanköy, stony slopes, 1400 m, 3.xi.1983, T. Baytop (ISTF 39069).

2. *Colchicum baytopiorum* C.D.Brickell in Notes R.B.G. Edinb. 41: 49 (1983). (Figure 2).

Typus: Turkey C3 Antalya: Termessos, 550 m., 7.xi.1976, T. Baytop ISTE 36255 (holo. ISTE, fl.). Leaves and capsules described from Brickell 1380 (K).

= *C. hiemale* Siehe in sched. non Freyn (1897).

= *C. serpentinum* Woronow ex Miscz. apud Stef., Monogr. *Colchicum* 33 (1926).

**Description:** Corm erect or soboliferous, 1.5-6 (-7) x 0.8-3 (-3.5) cm, narrowly ovoid to subglobose, irregular in shape; tunics membranous or papery, reddish-brown to brown; neck absent. Cataphyll 3-15 x 0.3-1.7 cm, white, cream, or yellowish-white. Leaves synanthous or subsynanthous, 3 (-4), suberect to recurving, extending 1-10 cm from spathe at anthesis, 20-40 x 1.5-7 cm, narrowly to broadly lanceolate, obtuse to acute, margins slightly undulate or entire, glabrous. Flowers 1-5 (-8), funnel-shaped to campanulate; perianth tube exceeding the cataphyll by 1.5-13 (-15) cm, white or cream; segments 1.5-4.5 x 0.4-1.2 (-1.4) cm, elliptic to lanceolate or oblong-lanceolate, each segment 7-15 (-18) veins, bright pink to purplish-pink, not tessellated, acute to obtuse, not cucullate, filament channels shallow, glabrous. Stamens 1/2 to 2/3 of perianth limb in length;

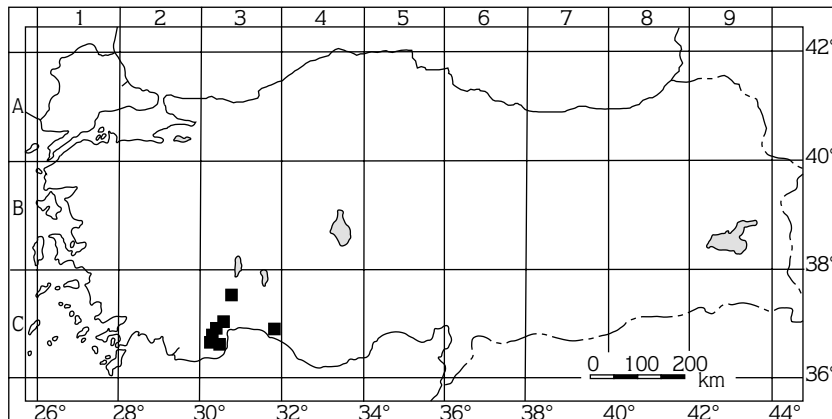


Figure 2. Distribution of *Colchicum baytopiorum* (■) in Turkey.

filaments 8-20 (-22) mm, white, with swollen orange yellow base, glabrous; anthers 3-7 x 0.8-1 mm, yellow, without membranous margin. Styles as long as or longer than stamens, straight, white, stigmas punctiform. Capsule 1.5-2.5 (-3) x 0.8-1.5 cm, elliptic to ovoid, light brown to reddish-brown or dark brown with faint to strong reticulations and dots, apiculate, glabrous; seeds 2-4 mm diam., subglobose, sometimes flattened laterally, light to dark brown. Flowering time, September-November; Leaves and fruiting time: February-May.

**Similar species:** The specimens of this species were described as a new species by C.D.Brickell from Termessos in 1983 (Brickell, 1984). *C. baytopiorum* is similar to *C. cupanii* Guss., which is distributed in Albania, Crete, France, Greece, Italy, and Sicily, and *C. boissieri*. Comparison of morphological characteristics between these species is shown in Table 2.

**Habitat:** Opening of maquis, under and clearings of *Pinus* and *Quercus* woodland.

**Altitudinal range:** 50-1000 m.

**Turkey distribution:** South-West Anatolia. Endemic (LC).

**Phytogeographical status:** East Mediterranean element.

**Flora of Turkey records:**

C3 Antalya: nr Termessos, 550 m, T. Baytop & Leep (ISTE 33890, fl.) *ibid.*, 900-1000 m, Brickell 1380 (leaf & fr.) *ibid.*, 900 m, Pasche 73-4 (photo), cult. Brickell 16.x.1976 (fl.). d. Kemer, Kesmeboğaz to Sumrakşehir, 50-600 m, Peşmen & Güner 4768 (leaf & fr.). Isparta: above Anamas, Siehe 1911: 87 (fl.).

Table 2. Comparison of morphological characteristics between *C. baytopiorum*, *C. cupanii*, and *C. boissieri*.

Morphological characters	<i>C. baytopiorum</i>	<i>C. cupanii</i>	<i>C. boissieri</i>
Corm	usually erect, sometimes soboliferous 1.5-6 (-7) x 0.8-3 (-3.5) cm narrowly ovoid to subglobose	erect 1-2 x 1-1.5 cm ovoid	soboliferous 1.5-6.5 (-7) x 0.3-1.5 cm asymmetric ovoid or oblong-ovoid
Tunics	membranous or papery reddish-brown to brown	coriaceous dark brown	membranous pale brown to reddish-brown
Neck	absent	with a short neck	1-4.5 (-5.5) x 0.3-0.6 (-0.8) cm
Leaves	synanthous or subsynanthous suberect to recurving 3 (-4) 20-40 x 1.5-7 cm narrowly to broadly lanceolate	synanthous --- 2 (-3) up to 15 x 1-1.8 cm linear to linear-lanceolate	hysteranthous suberect or arcuate 2-3 8-20 (-22) x 0.2-1 cm linear
Flowers	1-5 (-8)	1-5 (-12)	1-2 (-3)
Perianth segments	1.5-4.5 x 0.4-1.2 (-1.4) cm elliptic to lanceolate or oblong-lanceolate.	up to 2.5 x 0.3-0.5 cm narrowly elliptical	2-5 (-5.5) x 0.5-1.6 (-1.8) cm elliptic to oblong
Filaments	8-20 (-22) mm	up to 12 mm	8-25 mm
Anthers	3-7 mm without membranous margin	2-3 mm ---	4-8 (-10) with membranous margin
Capsule	1.5-2.5 (-3) cm long elliptic to ovoid	c. 1.5 cm long oblong	1.5-2 cm long elliptic to oblong
Seeds	2-4 mm diam. light to dark brown	--- ---	1.5-2.5 mm diam. reddish-brown



**Specimens examined:** C3 Antalya: Kemer, Kesmeboğaz to Gedelmuz village, 3.xi.1978, *H. Peşmen 4126* (GAZI) - Güllük mountain, around Gymnasyum, rocky place, 950-1000 m, 23.x.1996, *E. Alçitepe 1571* (AKDU) - Geyikbayırı, openings of *Quercus* scrub, 500-600 m, 3.xi.2000, *O.D. Düşen (2158)*, *S. Düşen* (AKDU) - Geyikbayırı, road side, 675 m, 3.xi.1995, *R.S. Göktürk 3593* (AKDU) - Geyikbayırı, road side, 500-750 m, 30.x.2000, *O. Ünal 1183* (AKDU) - Hisarçandır village, under forest and in clearings, 900-1000 m, 21.ix.2001, *O.D. Düşen (2429)*, *S. Düşen*, *A. Dinç* (AKDU) - Beşkonak, Selge village, 950 m, 18.x.2001, 37° 13' 638" N, 31° 07' 708" E, *O.D. Düşen (2449)*, *S. Düşen*, *K. Çetinkaya* (AKDU) - Hisarçandır village, maquis, 49 m, 11.xi.2001, 36° 51' 702" N, 30° 35' 811" E, *O.D. Düşen (2469)*, *S. Düşen* (AKDU) - Termessos, maquis, 550 m, 7.xi.76, *T. Baytop* (ISTE 36255) - Termessos, under the *Pinus* forest, 500 m, 5.v.1979, *T. Baytop & B. Mathew* (ISTF 39049) - Termessos, under the *Styrax officinalis*, 850 m, 6.x.1975, *T. Baytop et al.* (ISTF 39050) - Termessos, maquis, 850 m, 7.xi.1976, *T. Baytop* (ISTF 39051) - Termessos, 900 m, 28.x.1976, *T. Baytop & H.J. Leep* (ISTF 39052) - Termessos, Hadrien Temple, 5.vi.1983, *Sütlüpinar* (ISTE 50631) - Kemer, Kesikboğazı to Gedelme village, maquis, 200 m, 29.xi.1981, *Baytop* (ISTE 47676) - Manavgat, Beşkonak, east of Altinköy, Yalıboyu, 800 m, 22.xi.1981, *Baytop* (ISTE 47970) - Beycik village, Sarıçınar, 1500 m, 2.ii.1978, *Baytop* (ISTE 52555) - Geyikbayırı, Çağlarca, clearings of *Q. coccifera*, 680-700 m, 5.x.2002, *O.D. Düşen (2568)*, *S. Düşen* (AKDU) - Termessos, around car park, maquis, 905-915 m, 11.xi.2002, 36° 59' 289" N, 30° 28' 080" E, *O.D. Düşen (2585)*, *S. Düşen*, *Ö. Tufan* (AKDU) - Termessos, maquis, 842 m, 11.xi.2002, 36° 59'

448" N, 30° 28' 273" E, *O.D. Düşen (2584)*, *S. Düşen*, *Ö. Tufan* (AKDU) - Hisarçandır, maquis, 49 m, 9.iv.2003, 36° 51' 702" N, 30° 35' 811" E, *O.D. Düşen (2612)*, *S. Düşen* (AKDU) - Termessos, around car park, maquis, 900-915 m, 19.v.2003, 36° 59' 289" N, 30° 28' 080" E, *O.D. Düşen (2585a)*, *S. Düşen* (AKDU).

**3. *Colchicum minutum*** K.M.Perss. in Edinb. J. Bot. 56: 90, f. 1C-D, 2A (1999). (Figure 3).

Typus: Turkey C3 Antalya: 10 km from Gündoğmuş to Manavgat, *Quercus coccifera* scrub, slight depression in deep, moist terra rossa, 1000 m, 19.iv.1987, K. Persson 431 (holo. GB!).

= *C. hiemale* Siehe in sched. ad Fl. Orient. No. 87, *nom. nud.*, non Freyn (1897).

= *C. issicum* Siehe 1.c. No. 97, *nom. nud.*

= *C. psaridis* sensu Brickell in Davis (ed.), Fl. Turk. 8: 335 (1984), non Heldr. ex Hal. (1904).

**Description:** Corm soboliferous, 1-5 x 0.2-0.7 (-1) cm, with 2 (or more) usually shoot-bearing lobes, mostly subterete; tunics membranous, yellowish-brown to bright brown; neck absent. Cataphyll 5-10 (-20) x 0.2-0.7 cm, white. Leaves synanthous, 3 (-4), erect to arcuate or spreading, extending 1-8 cm from cataphyll at anthesis, 7-20 x 0.2-1 (1.5) cm, linear to linear-lanceolate, channelled with a distinct midvein and a cucullate at the apex, subobtuse to obtuse, margins entire, glabrous. Flowers 1-2 (-4), funnel-shaped; perianth tube exceeding the cataphyll by 1-4 (-6) cm, white, filiform; segments 1-3.5 x 0.1-0.5 cm, linear to oblong, channelled, each segment 5-7 (-9) obscure veins, white to bright pink or sometimes purplish-pink at the base, not tessellated,

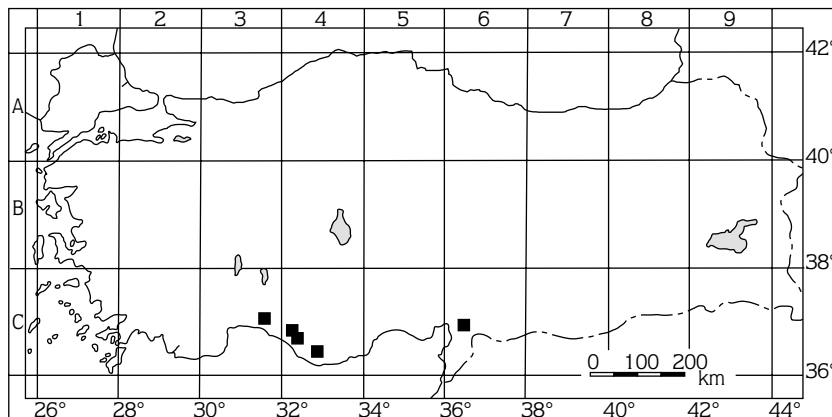


Figure 3. Distribution of *Colchicum minutum* (■) in Turkey.

subacute to narrowly obtuse, not cucullate, filament channels shallow, glabrous. Stamens 1/2 to 2/3 of perianth limb in length; filaments 4-12 mm, white, sometimes bright pink to purplish in upper part, with swollen orange yellow base, glabrous; anthers 2-4.5 (-5) x 1-2 mm, bright yellow to dark grey, very thin or without membranous margin. Styles as long as or longer than stamens, straight or slightly curved at apex, white, stigmas punctiform. Capsule at ground level, 0.8-1 (1.5) x 0.4-0.7 cm, elliptic to oblong-elliptic, rostrate, glabrous; seeds 1.5-2 (-3) mm diam., almost globose, light to dark brown. Flowering time, January-March; Leaves and fruiting time: April-May.

**Similar species:** *C. minutum* was described as a new species by K. Persson in 1999. This species is regarded as *C. psaridis* Heldr. ex Hal. in Flora of Turkey (Brickell, 1984) but except for the soboliferous habit, the 2 species are not really similar. *C. psaridis* is a Greek endemic (Peloponnesus) with usually 2 leaves (with 3 (-4) leaves in *C. minutum*) and bright purplish pink flowers (white to bright pink flowers in *C. minutum*) (Persson, 1999a).

*C. minutum* is related to *C. munzureuse* K.M.Perss., which is known from only around Tunceli. Comparison of morphological characteristics between these species is shown in Table 3.

**Habitat:** Openings in *Quercus* scrub, on limestone, stony slopes, and moist terra rossa.

**Altitudinal range:** 800-1400 m.

**Turkey distribution:** South Anatolia. Endemic (EN).

**Phytogeographical status:** East Mediterranean element.

**Flora of Turkey records:** C4 Antalya: Taurus mtns. in region of Gündoğmuş N. of Alanya, 1370 m, Allison &

Ball 77 / 7. 2 km from Gündoğmuş to Güzelbağ, 1100 m, Kammerl. & al. 90-08. İçel: Taurus, Anamur, Sırtmalı Yaylası, 1100 m, Markgraf 11121. C6 Adana/Hatay: An feuchten Orten westlich von Issus in der Cilicia pedia, Siehe 97-sub *C. issico*.

**Specimens examined:** C3 Antalya: İbradı, Ürünü village, Değirmen stream, opening of *Quercus* scrub, 800-900 m, 1.iii.2003, 37° 02' 477" N, 31° 37' 231" E, *O.D. Düşen* (2591), *S. Düşen*, *K. Çetinkaya* (AKDU) - Gündoğmuş, moist terra rossa, 800-900 m, 8.iii.2002, 36° 48' 062" N, 31° 59' 747" E, *O.D. Düşen* (2481), *S. Düşen*, *A. Dinç* (AKDU) - Gündoğmuş, moist terra rossa, 750-800 m, 5.v.2002, 36° 48' 062" N, 31° 59' 747" E, *O.D. Düşen* (2481a), *S. Düşen* (AKDU) - Between Gündoğmuş and Güzelbağ, openings of *Quercus coccifera*, 900-1000 m, 8.iii.2002, 36° 48' 253" N, 32° 00' 304" E, *O.D. Düşen* (2480), *S. Düşen*, *A. Dinç* (AKDU) - Between Gündoğmuş and Güzelbağ, moist terra rosa, 900-1000 m, 1.iii.2003, 36° 48' 214" N, 32° 00' 289" E, *O.D. Düşen* (2593), *S. Düşen*, *K. Çetinkaya* (AKDU).

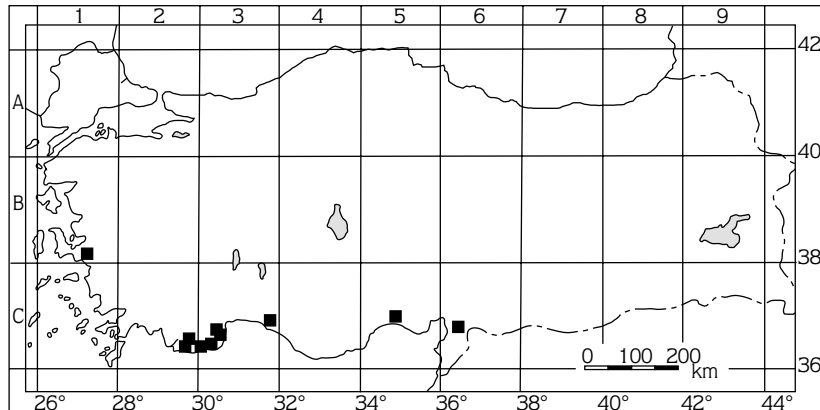
**4. *Colchicum stevenii* Kunth, Enum. Pl. 4: 144 (1843). Ic: Bot. Mag. 131: t. 8025 (1905); Boul., Fl. Lib. Syr. t. 427 (1930). (Figure 4).**

**Lectotypus :** [Syria] [specimen meum Latakiae Syriae lectum, quod amicitiae Cl. Labillardière debeo] (Steven in Nouv. Mem. Soc. Nat. Mosc. 7: 267, 1829).

**Description:** Corm 1-3 x 0.8-1.5 cm, ovoid to subglobose; outer tunics subcoriaceous or papery, dark brown to brown, inner tunics papery, reddish-brown; neck persistent, 1-12 (-15) cm. Cataphyll 1.5-15 (-20) x 0.5-1.5 (-2) cm, white or yellowish-white. Leaves synanthous, 3-7 (-12), suberect to spreading, extending 1-15 cm from cataphyll at anthesis, 6-20 x 0.1-0.5 cm, linear, obtuse to acute, entire, glabrous or ciliate on

Table 3. Comparison of morphological characteristics between *C. minutum* and *C. munzureuse*.

Morphological characters	<i>C. minutum</i>	<i>C. munzureuse</i>
Corm	soboliferous	narrowly ovoid to ellipsoid-ovoid
Leaves	more spreading, channelled with a distinct midvein	flat with narrowly furrowed along ± transparent midvein
Perianth segments	channelled 5-7 (-9) obscure veins	flat 7-11 very distinct veins
Filaments	white, sometimes bright pink to purplish in upper part	yellowish white to pale yellow
Styles	white	pale yellow or yellowish green

Figure 4. Distribution of *Colchicum stevenii* (■) in Turkey.

margins. Flowers 1-6 (-10), funnel-shaped; perianth tube exceeding the cataphyll by 1-10 (-12) cm, cream or yellowish-white sometimes pink to purplish-pink in upper part; segments 1.5-3 x 0.2-0.6 (-0.9) cm, narrowly lanceolate to oblanceolate or oblong-elliptic, each segment 7-9 veins, pink or purplish-pink, not tessellated, acute to obtuse, not cucullate, filament channels glabrous. Stamens longer or shorter than 1/2 of perianth limb in length; filaments 5-12 (-14) mm, white or cream, with swollen orange yellow base, glabrous; anthers 2-4 (-5) x 0.5-1 (-1.2) mm, yellow to greenish-grey or sometimes purplish, very thin membranous margin. Styles as long as or longer than stamens, straight, white, or cream, stigmas punctiform. Capsule 0.7-1.5 x 0.4-1 cm, oblong-ovoid, dark brown to black dotted when dry, acuminate, glabrous; seeds 1-3 mm diam., globose to ovoid, light to dark brown. Flowering time, October-December; Leaves and fruiting time: February-April.

**Similar species:** The anther colour of *C. stevenii* was given only as yellow in Flora of Turkey (Brickell, 1984). Our field observations and studies revealed that its anther colour is not only yellow but also greenish-grey or sometimes purplish. *C. stevenii* is similar to *C. pusillum* Sieber, which is distributed in Greece, Crete, Cyprus and Cyclades. Although the anther colour of *C. pusillum* was given as purplish-black, brownish-black or grey-black in Flora of Turkey (Brickell, 1984), in Flora Europaea it was stated that the same species' anther-colour is occasionally yellow and anther-colour varies considerably in different populations (Brickell, 1980). Therefore, for these reasons, anther colours are not a reliable character for distinguishing *C. stevenii* and *C. pusillum*. Comparison of morphological characteristics between these species is shown in Table 4.

Table 4. Comparison of morphological characteristics between *C. stevenii* and *C. pusillum*.

Morphological characters	<i>C. stevenii</i>	<i>C. pusillum</i>
Corm tunics	subcoriaceous or papery	only papery
Neck	up to 12 (-15) cm	up to 4 (-6) cm
Leaves	extending up to 15 cm from cataphyll at anthesis up to 20 cm long at maturity	extending up to 4 cm from cataphyll at anthesis up to 11 cm long at maturity
Perianth segments	7-9 veins pink or purplish-pink	5 veins pale rosy-lilac to white
Filaments	up to 12 (-14) mm long	up to 8 mm long
Capsule	oblong-ovoid	ovoid
Altitudinal range	up to 1500 m	up to 100 m

**Habitat:** Rocky and stony slopes and clearings of maquis.

**Altitudinal range:** 0-1500 m.

**Turkey distribution:** West and South Anatolia.

**World distribution:** Cyprus, West Syria, Greece.

**Phytogeographical status:** East Mediterranean element.

**Flora of Turkey records:** B1 İzmir: nr Kuşadası, xi. 1962, cult. Hodgkin (fl.). C2 Antalya: Kaş to Kalkan, s.l., T. Baytop (ISTE 36263, fl.). C3 Antalya: Bunda Burun, S.W. of Finike, 25 m, Watson et al. 3897 (fl.). C5 İçel: Arslanköy, 25 km from Mersin, Baron 2212 (fl.).

**Specimens examined:** C2 Antalya: Kalkan to Kaş, 2 km from Kalkan, 100 m, 21.iii.1977, Baytop (ISTE 36548) - Kale to Kaş, 11 km to Kaş, 500 m, 7.xi.1976, Baytop (ISTE 36261) - Kaş, maquis, limestone slopes, 36° 11' 919" N 29° 37' 139" E, 33 m, 30.xi.2001, S.Şık (25), A.A. Dönmez (HUB) - Kaş to Kalkan, 2 km to Kalkan, clearings in maquis, 120 m, 6.xi.2002, 36° 15' 003" N, 29° 25' 441" E, O.D. Düşen (2583), S. Düşen, O. Erol (AKDU) - Kalkan to Elmalı, 7 km from Kalkan, clearings in maquis, 600-630 m, 6.xi.2002, 36° 14' 523" N, 29° 27' 692" E, O.D. Düşen (2581), S. Düşen, O. Erol (AKDU). C3 Antalya: Kemer between Faselis and Beycik Village, 2.xi.1978, H. Peşmen 4123, B. Yıldız, O. Güneş (HUB) - Kemer between Kesmeboğaz and Sumakşehir, 50-600 m, 28.ii.1980, H. Peşmen 4768 (HUB) - Kemer to Beycik Village, Sarıçınar, 1500 m, 2.xi.1978, H. Peşmen (ANK) - Finike, Bunda Cape, rocky slopes, 50-100 m, 8.xi.2002, 36° 17' 343" K, 30° 08' 699" D, O.D. Düşen (2466), S. Düşen, K. Çetinkaya

(AKDU) - Finike, Bunda Cape, rocky slopes, 50-60 m, 13.iv.2003, O.D. Düşen (2466a), S. Düşen (AKDU). C6 Antakya: 10 km south-west of Antakya, around Büyük Karaçay, 4.xi.1976, M. Miski (ISTE 36284).

**5. *Colchicum serpentinum*** Woron. ex Misch. in Fl. Cauc. Crit. 2: 114 (1912). (Figure 5).

Typus: Culta in Horto Botanico Tiflisiensi e bulbis ex distr. Artvinensi a. 1908 allatis, ii 1910, Woronow (holo. LE).

= *C. tauri* Siehe ex Stef., Monogr. *Colchicum* 32 (1926).

= *C. hirsutum* Stef., op. cit. 34 (1926). Ic: Baytop & Mathew, Bulb. Pl. Turk.

= sub *C. falcifolium* (1984).

**Description:** Corm 1-3 (-4) x 0.8-2 cm, ovoid; outer tunics papery or subcoriaceous, reddish-brown to dark brown, inner tunics membranous or papery, yellowish-brown to bright brown; neck absent. Cataphyll 3.5-15 x 0.1-0.8 (-1) cm, white or yellowish-white. Leaves synanthous, 3-4, suberect to arcuate, extending 1.5-10 cm from cataphyll at anthesis, 8-18 (-20) x 0.1-0.8 (-1) cm at maturity, narrowly linear to linear-lanceolate, subacute to obtuse, entire, glabrous, scabrous or sparsely to densely hispid on margins and dorsal surface. Flowers 1-6 (-8), stellate or narrowly funnel-shaped; perianth tube exceeding the cataphyll by 1-6 cm, white or cream; segments 1-2.5 x 0.2-0.6 cm, elliptic to oblanceolate, each segment 8-12 veins, white, pink, or purplish-pink, not tessellated, acute to obtuse, not cucullate, filament channels glabrous. Stamens as long as 1/2 of perianth limb in length; filaments 4-12 mm, white or cream, with

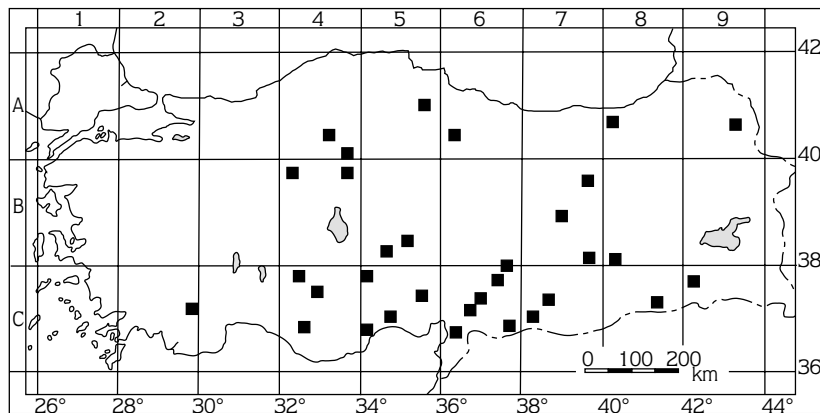


Figure 5. Distribution of *Colchicum serpentinum* (■) in Turkey.

swollen yellow or orange yellow base, glabrous; anthers 2-3.5 x 1.-1.5 mm, black, greenish-black or blackish-brown, without membranous margin. Styles as long as or longer than stamens, straight, white, stigmas punctiform. Capsule 0.8-1.5 (-2) x 0.5-1 (-1.2) cm, ovoid to elliptic or subglobose, apiculate, glabrous; seeds 1-3.5 (-4) mm diam., almost globose to ovoid, sometimes flattened laterally, reddish-brown. Flowering time, February-May; Leaves and fruiting time: April-June (-July).

**Similar species:** *C. serpentinum* was included in *C. falcifolium* Stapf in Flora of Turkey vol. 8 (Brickell, 1984), but it was excluded from the synonyms listed under *C. falcifolium* in Flora of Turkey vol. 11 (Persson, 2000).

This species is similar to *C. minutum* K.M.Perss., *C. pusillum* Sieber, and *C. stevenii* Kunth. Comparison of morphological characteristics between these species is shown in Table 5.

Table 5. Comparison of morphological characteristics between *C. serpentinum*, *C. minutum*, *C. pusillum*, and *C. stevenii*.

Morphological characters	<i>C. serpentinum</i>	<i>C. minutum</i>	<i>C. pusillum</i>	<i>C. stevenii</i>
Corm	0.8-2 cm width ovoid	0.2-0.7 (-1) cm width subterete	0.9-1.7 cm width ovoid to subglobose	0.8-1.5 cm width ovoid to subglobose
Tunics	papery or subcoriaceous reddish-brown to dark brown	membranous yellowish-brown to bright brown	only papery dull dark brown	subcoriaceous or papery dark brown to brown
Neck	absent	absent	present	present
Leaves	3-4 narrowly linear to linear-lanceolate glabrous, scabrous or sparsely to densely hispid on margins and dorsal surface	3 (rarely 4) linear to lanceolate-linear only glabrous	3-6 (-8) narrowly linear only linearz only glabrous or sometimes ciliate on margins	3-7 (-12) only linear only glabrous or ciliate on margins  only glabrous or
Flowers	1-6 (-8) stellate or narrowly funnel-shaped	1-2 (-4) funnel-shaped	1-4 (-6) funnel-shaped opening stellate	1-6 (-10) funnel-shaped
Perianth segments	elliptic to oblanceolate white, pink or purplish-pink	linear to oblong white to bright pink or sometimes purplish-pink at the base	narrowly oblanceolate to narrowly oblong-lanceolate pale rosy-lilac to white	narrowly lanceolate to oblanceolate or oblong-elliptic only pink or purplish-pink
Filaments	4-12 mm white or cream	4-12 mm white, sometimes bright pink to purplish in upper part	5-8 mm only white	5-12 (-14) mm white or cream
Anthers	1-1.5 mm width black, greenish-black or blackish-brown without membranous margin	1-2 mm width bright yellow to dark grey very thin or without membranous margin	0.5 mm width purplish-black	0.5-1 (-1.2) mm width yellow to greenish-grey or sometimes purplish very thin membranous margin
Capsule	ovoid to elliptic or subglobose	elliptic to oblong-elliptic	only ovoid	oblong-ovoid
Seeds	almost globose to ovoid, sometimes flattened laterally reddish-brown	only globose light to dark brown	---	oblong-ovoid light to dark brown
Flowering time	February-May	January-March	October-November	October-December
Altitudinal range	250-1800 m	800-1400 m	sea level-100 m	0-1500 m

**Habitat:** Moist meadows, steppe, limestone.

**Altitudinal range:** 250-1800 m.

**Turkey distribution:** Inner, South, North-East, and South-East Anatolia.

**World distribution:** South-West Georgia.

**Phytogeographical status:** Irano-Turanian element.

**Flora of Turkey records:** A5 Amasya: mt. Logman, 800-900 m, Bornm. 1889: 6. A6 Tokat: Tokat to Sivas, 1400 m, T. Baytop (ISTE 38892). A8 Trabzon: ca. 107 km S.E. of Trabzon towards Erzurum, 930 m, Grey-Wilson & Hewer 19. B6 Maraş: 15 km N. of Göksun, 1600 m, Mathew & Tomlinson 4524. B7 Erzincan: Munzur Da., 1100-1600 m, Yıldırım 2530. B8 Diyarbakır: 15 km from Silvan, Sauer 133 / 57. C4 Antalya: Ala Da. nr. Çukurbağ, 1830 m, Allison et al. 28. C5 İçel: 3 km after Arslanköy, Yedigöz, 1500 m, Brickell & Mathew 8477. C6 Hatay: 15 km N. of İskenderun, 250 m, Watson et al. 2453. C8 Mardin: 3 km from Savur to Pınardere village, 900 m, Güner 1597. C9 Siirt: Erüh to Şırnak, Rix 412.

**Specimens examined:** A4 Kırıkkale: Sulakyurt, Koru village, 900 m, 18.iii.1990, A.A. Dönmez (1654) (HUB). A9 Kars: Posof, Sarıççek village, Gönülaçan forest, Doğrular Village plateau, Posof plateau road, 1900-2200 m, 8.v.1986, N. Demirkuş (3484) (HUB 35206). B4 Kırıkkale: Around Yenilli village, 800 m, 25.ii.1990, A.A. Dönmez (1639) (GAZI, HUB 35238). B7 Erzincan: Kemaliye, Sorak valley and hills, 1100-1600 m, 4.iv.1980, Ş. Yıldırım (2530) (HUB 35204). Elazığ: 8 km to Elazığ-Pertek, around Çırçır, stony places, meadows and fields, 30.iii.1975, H. Demiriz, Ö. Saya, H. Malyer (BULU 6082) - Harput mountains, 26.iii.1983, T. Ekim (7011) (GAZI) - Harput, Çizmeçi's garden, 50 m, west slopes, 26.iii.1983, T. Ekim (7001) (GAZI). C2 Burdur: Yeşilova, Büyükyaka village, between Bağarası and Türkmen, 950-1050 m, 25.iii.1993, F.A. Karavelioğulları (1007) (GAZI). C4 Konya: Ereğli, Halkapınar, Kayasaray, Körpınar, Dar Tepe, steppe, 10.v.1982, H. Malyer (ESSE 5810, BULU 6087). Karaman: Özyurt mountain, Yollarbaşı town, 1200 m, steppe openings, 18.iii.1995, A. Dönmez (4403) (HUB 35205) - Karaman-Bozkır road, 10-15 km to Bozkır, moist meadows, 1394 m, 23.iii.2003, 37° 13' 44" N, 32° 30' 675" E, O.D. Düşen (2604), S. Düşen, K. Çetinkaya (AKDU) - Yollarbaşı town, foot of Özyurt mountain, 1180 m, 23.iii.2003, 37° 09' 972" N, 32° 59' 041" E, O.D. Düşen (2609), S. Düşen, K. Çetinkaya (AKDU) - Yollarbaşı town, foot of Özyurt mountain, steppe openings, 1000-

1200 m, 31.v.2003, O.D. Düşen (2609a), S. Düşen, K. Çetinkaya (AKDU). C5 Konya: Ereğli, Aydos mountain, Kayasaray, limestone slopes, 1600 m, 31.iii.1977, S. Erik (1760) (HUB 35203). Adana: Bürücek, Taurus mountains, 6.iii.1968, Baytop (ISTE 12462). Niğde: Around Ulukışla, roadside, 6.iii.1968, Baytop (ISTE 12457). İçel: Arslanköy, Zekerce, stony ridges, 1600 m, 9.v.1980, Baytop (ISTE 44261) - Arslanköy, Ballık mountain, 2200 m, 11.v.1976, Baytop (ISTE 34846, ISTF 38994) - Silifke, up to Sarıaydın, 1700 m, 6.v.1981, T. Baytop (ISTF 38995) - Silifke, up to Sarıaydın, 1900 m, 6.v.1981, T. Baytop (ISTF 38996) - Arslanköy, Yedigöz, 1500 m, 2.iv.1975, T. Baytop et al. (ISTF 38997). C6 Kahramanmaraş: Engizek mountain, around Kale village, 1700-1750 m, 23.iv.1988, moist places, H. Duman (3857) (GAZI) - Engizek mountain, Engizek village, 1300-1400 m, 21.iv.1987, moist places, H. Duman (2469) (GAZI) - Erince mountain, 1300-1400 m, 26.iii.1988, under the *Quercus* shrubs, H. Duman (3850) (GAZI) - Ahır mountain, ridges of the Yalnız Ardiç, 1800-1900 m, 23.iv.1992, steppe, Z. Aytaç & H. Duman (4518) (GAZI). Malatya: Doğanşehir, 10 km to Erkanak from Gölbaşı, slopes, 1100 m, 3.iv.1987, Ekrem Aktoklu (267) (HUB) - Doğanşehir, between Erkanak and Gölbaşı, around tunnel, moist meadows, 1150 m, 12.iv.1987, Ekrem Aktoklu (295) (HUB 35208).

**6. *Colchicum szovitsii* Fisch. & C.A.Mey. in Ind. Sem. Horti Petrop. 1: 24 (1835). (Figure 6).**

Typus:[USSR, Caucasia] in montibus Somchetiae, Szovits (holo. LE, iso.-leaf&fr. -H).

= *C. szovitsii* Fisch. & Mey. var. *nivale* Boiss. & Huet in Boiss., Diagn. ser. 2 (4): 122 (1859).

= *C. bifolium* Freyn & Sint. apud Freyn in Bull. Herb. Boiss. 4: 198 (1896).

= *C. hydrophilum* Siehe in Gard. Chron. ser. 3, 29: 102, f. 43 (1901).

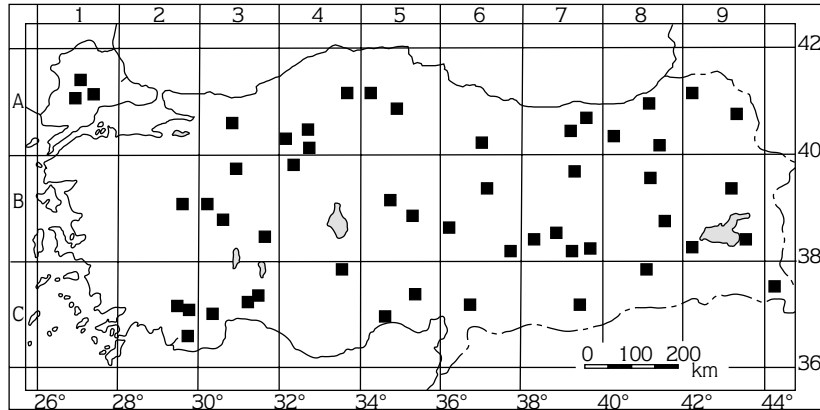
= *C. szovitsii* Fisch. & Mey. var. *bifolium* (Freyn & Sint.) Bordz. in Trudy Tiflissk. Bot. Inst. 18: 489 (1919).

= *C. armenum* B. Fedtsch. in Not. Syst. (Leningrad) 1: 4 (1920).

= *C. nivale* Boiss. & Huet ex Stef., Monogr. *Colchicum* 35 (1926) p.p.

= *C. acutifolium* Siehe in sched. Ic: Bot. Mag. 131: t. 8040 (1905).

= *C. hydrophilum*; Rix & Phillips, Bulb Book 32 (a) (1981).

Figure 6. Distribution of *Colchicum szovitsii* (■) in Turkey.

**Description:** Corm 1-3.5 (-4) x 0.8-2.5 (-3) cm, ovoid to subglobose; outer tunics papery or subcoriaceous, dark brown to blackish-brown, inner tunics membranous or subpapery, reddish-brown; neck absent. Cataphyll 3-16 (-18) x 0.3-1.5 cm, white or yellowish-white, sometimes purplish in upper part. Leaves synanthous, 2-3 (-4), suberect to spreading, extending 2-8 (-12) cm from cataphyll at anthesis, (10-) 15-25 x (1-) 1.5-3.5 cm at maturity, ligulate to linear-lanceolate, acute, cucullate, entire or slightly undulate, glabrous. Flowers 1-5 (-7), campanulate; perianth tube exceeding the cataphyll by 1-10 cm, white or yellowish-white, purplish-pink in upper part; segments 1.5-2.5 (-3.5) x 0.4-1.2 cm, elliptic to oblanceolate, each segment 7-15 veins, white, light or dark purplish-pink, not tessellated, acute to obtuse, sometimes with basal auricles, filament channels distinct, glabrous. Stamens 1/2 to 1/3 of perianth limb in length; filaments 5-13 mm, white or cream, with swollen yellow base, glabrous; anthers 1.5-4

x 0.8-1.2 mm, purplish-black or greenish-black, sometimes slightly or without membranous margin. Styles straight, white or yellowish-white, stigmas punctiform. Capsule 2-3.5 (-4) x 1-2 (2.5) cm, ovoid to elliptic or globose, light to dark brown dotted when dry, apiculate, glabrous; seeds 1.5-4 mm diam., almost globose, reddish-brown. Flowering time, February-June (-August); Leaves and fruiting time: April-July (-September).

**Similar species:** *C. szovitsii* shows different morphological features (such as corm tunics types, size and number of leaves and flowers) in different ecological conditions. Many populations have evolved in these different conditions and all these populations are included in *C. szovitsii*.

*C. szovitsii* is related to *C. triphyllum* Kunze. Comparison of morphological characteristics between these species is shown in Table 6.

Table 6. Comparison of morphological characteristics between *C. szovitsii* and *C. triphyllum*.

Morphological characters	<i>C. szovitsii</i>	<i>C. triphyllum</i>
Outer tunics	papery or subcoriaceous	membranous
Inner tunics	membranous or subpapery reddish-brown	only membranous yellowish-brown to light brown
Leaves	(10-) 15-25 x (1-) 1.5-3.5 cm at maturity ligulate to linear-lanceolate	10-15 (-18) x 0.5-1 (-1.5) cm at maturity only linear-lanceolate
Perianth tube	purplish-pink in upper part	entirely white or cream
Perianth segments	white, light or dark purplish-pink	light pink or purplish-pink

**Habitat:** Moist alpinic meadows, open slopes near melting snow, clearings of *Pinus* forest.

**Altitudinal range:** 200-3250 m.

**Turkey distribution:** North, South, East, and Inner Anatolia.

**World distribution:** Caucasus and Iran.

**Phytogeographical status:** Irano-Turanian element.

**Flora of Turkey records:** A1 Edirne: Tekirdağ to İncecik, 200 m, A. Baytop (ISTE 14883). A3 Bolu: Abant G., 1100 m, Brickell & Mathew 8508. A4 Ankara: Işık Da., pass between Gerede and Kızılcahamam, 1500 m, Watson et al. 510. A6 Sivas: 30 km W. of Suşehri, 1850 m, Kukkonen 5429. A7 Gümüşhane: Kaldırım Da., Sint. 1894: 5466. Kolath Dag (Kolath Da.), 2440-2475 m, v. 1853, Huet. A8 Gümüşhane: Kop Da. pass, 2400 m, Furse & Synge 829. A9 Kars: Sarıkamış, 2000 m, Güneş 1557. B3 Kütahya: Yenice Köyü, T. Baytop (ISTE 12486). B5 Kayseri: Erciyes Da., 2130 m, Balls 240. B6 Maraş: Göksun, 1300 m, Yıldız 2264. B7 Erzincan: Refahiye to Erzincan, 2150 m, Balls 268. B8 Erzurum: 10 km E. of Erzurum, 1890 m, Uotila 15656. B9 Ağrı: 15 km W. of Ağrı, 1700 m, Kukkonen 5445. C3 Isparta: d. Eğridir, Kapız, 2 km to Yakaköyü, 1500-1600 m, Peşmen & Güner 2004. C5 İçel: nr Giosna (Gözne), Siehe 95. C6 Maraş: Berit Da., 2500 m, Yıldız 2035. C8 Diyarbakır: nr Diyarbakır, Sauer 136 / 57. C10 Hakkari: Mor Da., 3250 m, Watson et al. 2990.

**Specimens examined:** A1 Tekirdağ: Malkara road, under the *Ulmus*, meadows, 20 km from Tekirdağ, 2.iv.1967, B. L. Burt (ISTE 10782) - Between Tekirdağ and İncecik, moist meadows, 5.ii.1969, B.L. Burt (ISTE 14883). Kırklareli: South of Pehlivan village, between railroad and Ergene, 25.xi.1994, A. J. Byfield (ISTE 66250). A3 Bolu: Yeniçağ, lakeside, near the Ankara road, 27.ii.1973, Baytop (ISTE 23937) - Abant lake, lakeside, 1350 m, 11.vii.1984, Sütlüpinar (ISTE 54489) - Around Abant lake, moist meadows, 1000-1100 m, 17.iii.2002, O.D. Düşen (2490), S. Düşen (AKDU) - Yeniçağ lake, lakeside meadows, 28.iii.1967, A. Baytop (ISTF 39108) - Abant lake, meadows, 5.vii.1975, A. Baytop, T. Baytop (ISTF 39105) - A4 Ankara: Çamlidere district, 1300 m, *Quercus* openings, serpentine, north-west slopes, 4.iv.1993, A.A. Dönmez (3137) (HUB 35247) - Kızılcahamam, Soğuksu National Park, around Çakmaklı, 1530 m, 31.iii.1990, Ö. Eyüboğlu (GAZI) -

Çubuk, Karagöl, forest openings, meadow, 1520 m, 21.iii.1974, Baytop (ISTE 34109). Kastamonu: *Quercus* shrubs, 1000 m, 21.iii.1979, O. Ketenoğlu (ANK). Bolu: Gerede, *Pinus sylvestris* forest, 1500 m, 23.iv.1976, O. Ketenoğlu (ANK). Çankırı: Atkaracalar, Dumanlı mountain, between Atkaracalar Station and Hoşisamlar, 1200-1300 m, 29.iii.1992, A. Duran (1514) (GAZI). A5 Amasya: Akdağ, Değirmendere plateau, 1400 m, 9.iv.1977, K. Alpınar (ISTE 36623). Kastamonu: Tosya, wet meadows, 1700 m, 16.iv.1976, M. Kılınç (ANK). A7 Trabzon: Zigana mountain, Kuzu Gölleri, alpine meadows, 2400 m, 28.vi.1980, Baytop (ISTE 45287, ISTF 39113) - Zigana mountain, melting snow zone, 2400 m, 9.viii.1968, T. Baytop (ISTF 39111). A8 Erzurum: Between Oltu and Tortum, 38 km to Oltu, 2400 m, snow zone, 30.v.1971, Baytop (ISTE 19942) - Paşa Pınarı, 10.v.1974, T. Baytop (ISTF 39115). Rize: Aşağı Anzel, 1750 m, 29.iv.1986, Baytop (ISTE 56880). Gümüşhane: Kop mountain, 2300 m, 18.v.1976, Baytop (ISTE 34881, ISTF 39116) - Zigana mountain, Zigana mountain pass, 2025 m, 15.iv.1982, A. Baytop, T. Baytop (ISTF 39100) - Torul, up to Gümüştüğ, 1900 m, 14.iv.1982, A. Baytop, T. Baytop (ISTF 39103). A9 Kars: Sarıkamış, Büyüktünel, *P. sylvestris* forest, openings, 2000 m, 13.v.1980, O. Güneş (1557) (HUB 35248) - Posof, Sarıçiçek village, Gönülağan forest, Doğrular Village plateau, Posof plateau road, 1900-2200 m, 8.v.1986, N. Demirkuş (3482) (HUB 35246) - Arpaçay, west of Hasançavuş village, stony area, 1900 m, 10.iv.1984, M. Koyuncu (GAZI) - Hanak, around Baştoklu village, 1850 m, v.1976, Baytop (ISTE 34831). Artvin: Steppe, moist places, 20.iv.1957, Mgf. (299) (ANK) - Between Şavşat and Ardahan, under the Çam pass, alpine meadow, 2400 m, 30.vi.1980, Baytop (ISTE 45306, ISTF 39114). B2 Kütahya: Çavdarhisar to Gediz, around Derbent plateau village, meadows, 1200 m, 22.iii.1972, Baytop (ISTE 21331) - Yenice Village 9.iii.1968, T. Baytop (ISTF 39107). B3 Afyon: Sultan mountains, up to Dereçine, 8 km from Dereçine, 1540 m, 19.iv.1975, A. Baytop (ISTE 37571) - Kütahya to Afyon, 10 km to Afyon, ii.1974, A. Baytop (ISTF 39106). Konya: Akşehir-Yalvaç road, near Cankurtaran, *P. nigra*, 1600 m, 18.iv.1976, A. Baytop (ISTE 34544). Eskişehir: Eskişehir to Sivrihisar, 45 km from Eskişehir, fieldsides, 1.iii.1979, Baytop (ISTE 41764). B5 Kayseri: Erciyes mountain, Tekir plateau, 2000 m, 16.v.1977, Baytop (ISTE 36796, ISTF 39112) - Pınarbaşı, 10 km to



Pınarbaşı, 8.iv.1983, *H. Malyer* (ESSE 5767). Yozgat: Çayıralan to Gemerek, 13-15 km from Çayıralan, meadow and under *P. nigra*, 1650 m, 8.iv.1983, *H. Malyer* (2790) (BULU, 5762). B6 Sivas: Zara to Suşehri, 10 km from Zara, 1700 m, 1.iv.1978, *Baytop* (ISTE 38985) - Suşehri to Refahiye, 15 km from Refahiye, 1580 m, 13.iv.1982, *A. Baytop*, *T. Baytop* (ISTF 39104). Kahramanmaraş: Göksun, Berit mountain, Çavdar-Arpa Çukuru plain, 1900-2100 m, 9.v.1991, moist places, *Z. Aytaç & H. Duman* (4730) (GAZI). Kayseri: Between Pınarbaşı and Gürün, Uzunyayla, 1740 m, steppe, limy soils, 4.iv.1991, *A. Güner* (8429) (HUB 35249) - Pınarbaşı to Gürün, 27 km from Pınarbaşı, 1050 m, 28.iii.1976, *T. Baytop* (ISTF 39095). B7 Diyarbakır: Ergani to Maden, Kavurgaküpü village, pass, under walnut trees, 16.iii.1975, *Baytop* (ISTE 31325) - Ergani to Maden, streamside, 17.iii.1957, *T. Baytop* (ISTF 39092). Elazığ: Karaçalı village, meadow, 1550 m, v.1980, *Baytop* (ISTE 44553) - Elazığ to Maden, 46 km Maden, near Hazar Lake, 1250 m, 26.iii.1976, *Baytop* (ISTE 34428) - South slope, meadow, 1950 m, 23.iv.1981, *H. Evren* (ANK) - Hankendi to Elazığ, 16 km to Elazığ, meadow, 1000 m, 29.iii.1976, *T. Baytop* (ISTF 39096). Mardin: Between Mardin and Sarvur, 20 km to Sarvur, 950 m, 31.iii.1976, *Baytop* (ISTE 34442). Malatya: Pütürge, South slopes, 1600 m, 15.iii.1981, *Y. Altan* (ANK). Erzincan: Refahiye-İmralı, Kızıldağ mountain pass, 2000 m, 19.iv.1982, *A. Baytop*, *T. Baytop* (ISTF 39102). B8 Muş: Around the Muş plain, meadows, *T. Ekim* (7020) (GAZI) - Hasköy, Bityazı village, Muş plain, meadow, 38° 38' 479" N, 41° 53' 839" E, 1288 m, 24.iv.2002, *A.A. Dönmez* (10527) (HUB) - Varto-Hınız, 13 km from Varto, 17.v.1976, *T. Baytop* (ISTF 39110). Erzurum: Palandöken mountain, Sultanseki hill, north slopes, meadows and melting snow zones, 2300 m, 24.iv.1970, *S. Özyurt*, *N. Balta* (ISTF 24665) - Palandöken mountain, Sultanseki hill, north slopes, wet meadows, 2150 m, 24.iv.1970, *S. Özyurt*, *N. Balta* (ISTF 24668) - Atatürk University forest, meadow, 1950 m, 29.iii.1970, *S. Özyurt*, (ISTF 24642) - Oltu-Tortum, Kutamar, 2450 m, 18.iv.1982, *A. Baytop*, *T. Baytop* (ISTF 39101). B9 Bitlis: Adilcevaz, Süphan mountain slopes, Süte Plateau, wet meadows, 2000 m, 4.vi.1993, *Y. Altan* (4798) (GAZI). Van: Hoşap to Başkale, moist meadows, 2000 m, 16.vi.1973, *T. Baytop* (ISTF 39109). C2 Burdur: Gölhisar, Kocayanan mountain, 6.v.1979, *T. Baytop*, *B. Mathew* (ISTF 39097). Antalya: Kızıldağ to

Çavdır, Rahat mountain, 2000 m, 9.ii.1983, *T. Baytop* (ISTF 39092) - Akçay to Elmalı, 19 km to Elmalı, 1050 m, 22.ii.1978, *T. Baytop* (ISTF 39094). C3 Isparta: Eğridir, Yaka village, Melikler, moist meadows, 1700 m, 24.iv.1976, *B. Mathew* (ISTE 34653) - Eğridir, Barla mountain, 1500-1900 m, 21.iv.1986, *Y. Akman* (ANK) - Eğridir, Anamas, Yaka village, Kapız stream, *P. nigra* forest, limestone, deep valley, 1280-1650 m, 15.iv.1975, *H. Peşmen*, *A. Güner* (ISTF 39098) - Yaka village, Melikler, moist meadows, 24.iv.1976, *A. Baytop et al.* (ISTF 39099) - Eğridir, 1-2 km to Yaka Village, moist meadows, 1400-1500 m, 12.iv.2003, *O.D. Düşen* (2552), *S. Düşen*, *K. Çetinkaya* (AKDU). Antalya: Saklıkent, Bakırlı mountain slopes, steppe, 1900-1950 m, 17.iv.2002, *O.D. Düşen* (2506), *S. Düşen*, *K. Çetinkaya* (AKDU) - Fesleğen plateau, moist meadows, 1848 m, 19.v.2002, *O.D. Düşen* (2517), *S. Düşen*, *K. Çetinkaya* (AKDU) - Fesleğen plateau, moist meadows, 1840-1850 m, 9.vi.2002, *O.D. Düşen* (2517a), *S. Düşen* (AKDU). C4 Konya: Around Kulu, 5.iii.1968, *Baytop* (ISTE 22455). C5 Adana: Pozantı, Şekerpınar, 1750 m, 8.iii.1979, *H. Malyer* (6639) (BULU). C6 Kahramanmaraş: Engizek mountain, north of Biçmeoluk Damları, 1500-1600 m, 21.iv.1987, moist meadows, *H. Duman* (2488) (GAZI) - Engizek mountain, Ağabeyli village, 1100-1300 m, 23.iii.1988, meadows, *H. Duman* (3837) (GAZI). C7 Urfa: Siverek, 41 km from Diyarbakır to Siverek, streamside, 1300 m, 29.i.1978, *H. Malyer* (6003) (BULU) - Siverek, Karabağçe mountain road, 12.ii.1978, *H. Malyer* (5994) (BULU). C8 Diyarbakır: Çınar, Ovabağ, Harami hill, wet area, 1400 m, 12.ii.1979, *H. Malyer* (6634) (BULU, 5794) - Dicle University area, slopes, 24.i.1979, *H. Malyer* (6632) (BULU, 5782) - Çınar, Ovabağ, Alatosun, 1150 m, 13.ii.1979, *H. Malyer* (6005) (BULU, 5791) - Diyarbakır to Silvan, 7 km from Bölge Ziraat Araştırma Enstitüsü, 29.i.1978, *H. Malyer* (6007) (BULU, 5797) - Ovabağ, Çınar, Keloş hill, 1500 m, 13.ii.1979, *H. Malyer* (6004) (BULU, 5792). C10 Hakkari: Hakkari to Yüksekova, 15 km from Yüksekova, 1800 m, moist meadows, 18.iv.1987, *A. Güner* (7133) (HUB 35245).

*7. Colchicum triphyllum* Kunze in Flora 29 (2): 755 (1846). (Figure 7).

Typus: [Spain, Andalucia] Sierra de Yunquera in humo lutoso ad nivem deliquescentem ad hoyá del tejo, et puerto de las tres cruces, 1830-2135 m., [H.M. Willkomm in Hb. Kunze] (holo. LZ, destroyed; iso. COI).

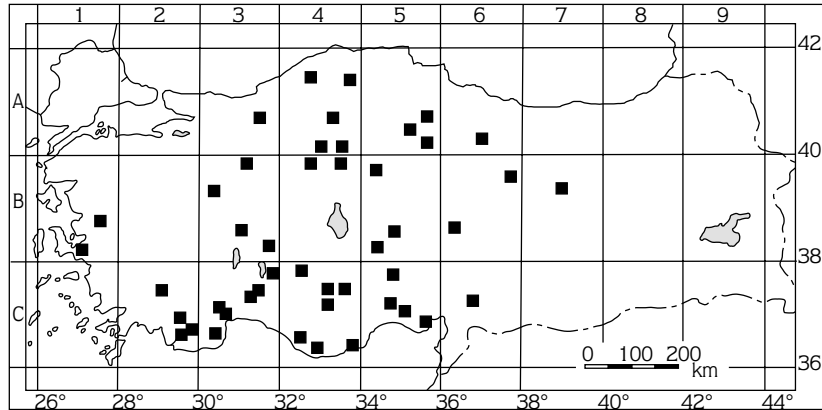


Figure 7. Distribution of *Colchicum triphyllum* (■) in Turkey.

= *C. bulbocodioides* Bieb., Fl. Taur.-Cauc. 1: 293 (1808) non Brot. (1844).

= *C. biebersteinii* Rouy in Bull. Soc. Bot. Fr. 52: 64 (1906) nom. illegit.

= *C. catacuzenium* Heldr. ex Stef., Monogr. *Colchicum* 38 (1926).

= *C. ancyrense* B.L.Burttt in Notes R. B. G. Edinb. 21: 298 (1954).

= *C. montanum* auct. Non L. (1753). Ic: Bot. Mag. 105: t. 6443 (1879).

= *C. montanum*; Bot. Mag. 164: t. 9652 (1943).

= *C. catacuzenium*; Grey-Wilson & Mathew, Bulbs t. 10 (1981).

**Description:** Corm 0.8-2.5 x 0.5-1.5 cm, ovoid to subglobose; outer tunics membranous, dark brown, inner tunics membranous, yellowish-brown to light brown; neck absent. Cataphyll 4-18 (-20) x 0.3-1 cm, white or yellowish-white, sometimes purplish-pink in upper part. Leaves synanthous, 3 (-4), suberect to arcuate, extending 2-12 cm from cataphyll at anthesis, 10-15 (-18) x 0.5-1 (-1.5) cm at maturity, linear-lanceolate, acute or subacute, slightly undulate or entire, margin scabrid or glabrous. Flowers 1-6, funnel-shaped to campanulate; perianth tube exceeding the cataphyll by 1-8 cm, white or cream; segments 1-2.5 (-3) x 0.5-1 (-1.2) cm, narrowly elliptic to oblong-elliptic or oblanceolate, each segment 10-21 veins, light pink or purplish-pink, not tessellated, acute to obtuse, sometimes with filiform lamellae or auricles at base, filament channels distinct, glabrous. Stamens shorter or longer than 1/2 of perianth limb in

length; filaments 5-10 mm, white or yellowish-white, with swollen orange yellow base, glabrous; anthers 2-4 x 1-2 mm, purplish-black or greenish-black, without membranous margin. Styles straight, white or cream, stigmas punctiform. Capsule 1.5-3 x 0.8-1.5 cm, ovoid to oblong-ovoid to elliptic, apiculate, glabrous; seeds 1.5-3 mm diam., almost globose, dark brown to reddish-brown. Flowering time, February-May; Leaves and fruiting time: April-June.

**Similar species:** *C. triphyllum* is similar to *C. szovitsii*. Comparison of morphological characteristics between these species is shown in Table 7.

**Habitat:** Rocky and stony slopes, open slopes near melting snow zone.

**Altitudinal range:** 700-2100 m.

**Turkey distribution:** South, West, East, and Inner Anatolia.

**World distribution:** North-west Africa, Central and South Spain, Greece to South Russia.

**Phytogeographical status:** Mediterranean element.

**Flora of Turkey records:** A4 Ankara: road to Çubuk dam nr Kayacak, 900 m, Kasaplıgil 345. A5 Yozgat: d. Çekerek, Koyunculu, Fakıdağ, 1400 m, İlarıslan 344. A6 Tokat: nr Artova, 1200 m, İlarıslan 343. B1 Manisa: Manisa Da., above Kızılbel, 1300 m, T. Baytop (ISTE 21343). B3 Afyon: Bayat, 1700 m, Vural 39. B4 Ankara: Dikmen Da., 1100 m, D. 26202. B6 Sivas/Tokat: 16 km from Sivas to Tokat, Sauer 151 / 57. B7 Tunceli: Munzur Da., above Ovacık, 1400 m, Yıldırımllı 1326. C2 Denizli: Honaz Da., 2100 m, Watson et al. 2559. C3 Antalya:

Table 7. Comparison of morphological characteristics between *C. triphyllum* and *C. szovitsii*.

Morphological characters	<i>C. triphyllum</i>	<i>C. szovitsii</i>
Outer tunics	membranous	papery or subcoriaceous
Inner tunics	only membranous yellowish-brown to light brown	membranous or subpapery reddish-brown
Leaves	10-15 (-18) x 0.5-1 (-1.5) cm at maturity linear-lanceolate	(10-) 15-25 x (1-) 1.5-3.5 cm at maturity ligulate to linear-lanceolate
Perianth tube	entirely white or cream	purplish-pink in upper part
Perianth segments	light pink or purplish-pink	white, light or dark purplish-pink

Tahtalı Da., 700-2000 m, Peşmen 3806. C4 İçel: Uzuncaburç, 1400 m, Güner 1576. C5 Adana: d. Saimbeyli, Bozoğlan Da., 1300 m, D. 26663.

**Specimens examined:** A3 Bolu: Meadows, 1500 m, 1.iv.1981, *Y. Akman* (ANK) - Abant lake, lakeside, meadow, ca. 1300 m, 36° 37' 423" N, 28° 06' 065" E, 208 m, 6.iii.2002, *A.A.Dönmez (10415)* (HUB). A4 Kırıkkale: Delice, Büyükavşar, 1000 m, 25.ii.1990, *A.A.Dönmez (1643)* (HUB) - Sulakyurt to Akkuyu village, 950 m, 8.iv.1989, *A.A.Dönmez (1092)* (HUB). Ankara: Kazan, Orhaniye village, Dede Çamları hill, 1400-1500 m, step, 24.vii.1993, *Orhan (1007)* (GAZI) - Çubuk, Ovacık-Saraycık villages, Bekirinpinarı, 1250-1380 m, 28.iii.1992, *E. Dündar (1131)* (GAZI) - Keçiören, Hacıkadın streamside, 960 m, 5.iii.1995, *G. Akaydın 3111* (AKDU). Zonguldak: Karabük, meadow, 800 m, 29.iii.1985, *M. Demirörs* (ANK). Kastamonu: İbişler village, 1350 m, 21.iii.1981, *M. Demirörs* (ANK) - Ağlı road, 1100 m, 9.iv.1980, *O. Ketenoğlu* (ANK) - Cide, Kızılcasu, 900 m, 8.iv.1980, *O. Ketenoğlu* (ANK). A5 Yozgat: Çekerek, *Quercus* forest, 1500 m, 25.iii.1980, *R. İlarıslan* (ANK) - Çekerek, Koyunculu to Fakı mountain, 1400 m, 25.iii.1980, *T. Baytop* (BULU 5995). Çorum: İskilip, Erenler hill, 3.iii.1983, *T. Baytop* (ISTF 39266). Amasya: Akdağ, Değirmendere plateau, 1400 m, 9.iv.1977, *T. Baytop* (ISTF 39037). A6 Tokat: Artova, *Pinus nigra-Quercus* forest, 1200 m, 4.iv.1979, *M. Vural (1238)* (ANK). B1 İzmir: Nif mountain, 1000 m, 26.iii.1981, *Baytop* (ISTE 46159, ISTF 39036). Manisa: Manisa mountain, Kızılbil, 1300 m, 23.iii.1972, *Baytop* (ISTE 21343) - Manisa mountain, Kirgebeoluk, 1250 m, 23.iv.1977, *T. Baytop* (ISTF 39038). B3 Eskişehir: Sivrihisar, Yahşıhan, 7 km to Sivrihisar, 19.iii.1983, *H.*

*Malyer (2694)* (BULU, 5712) - Eskişehir-Ankara road, roadside 35 km, 5.iii.1982, *H. Malyer & H. Başer* (BULU 6092) - Bursa-Eskişehir road, 26 km from Eskişehir, 1.iii.1982, *H. Malyer* (BULU 6101) - Seyitgazi-Yazılıkaya, 18 km, around Çayır-Çeşme, 5.iii.1982, *H. Malyer* (BULU 6089) - Eskişehir to Kütahya, Musaözü, left side of the road, 7.iii.1982, *H. Malyer* (BULU 6097) - Seyitgazi, Bardakçı village, meadow, 14.iii.1982, *H. Malyer* (BULU 6098) - Çifteler to Emirdağ, 29 km from Emirdağ, 19.iii.1977, *Baytop* (ISTE 36533, ISTF 39046) - Eskişehir to Sivrihisar, 45 km to Eskişehir, 1.iii.1979, *T. Baytop* (ISTF 39041) - Eskişehir to Hamidiye, 20 km to Eskişehir, 950 m, 26.iii.1976, *T. Baytop et al.* (ISTF 39048). Afyon: Bayat, Kaplanalanı, 1700 m, 16.iii.1975, *M. Vural 39* (GAZI) - Büyük Kalecik to Kocatepe, İtburnu plateau, around Kümbet Tepe, 2.iv.1982, 1650 m, *H. Malyer* (BULU 6100). Konya: Konya to Beyşehir 40 km, left side of road, 1500 m, 27.iii.1982, *H. Malyer* (BULU 6099) - Akşehir to Yalvaç 20 km, 1700 m, 27.iii.1982, *H. Malyer* (BULU 6091) - Akşehir-Yalvaç road, 1600 m, 18.iv.1976, *A. Baytop et al.* (ISTF 39047). B4 Ankara: İncesu, 19.iii.1943, *Baytop* (ISTE 1578) - Beytepe, Maslak valley ridges, steppe, 1000 m, 23.iii.1976, *S. Erik (1420)* (HUB 35232) - Gölbaşı, around Taşpınar village, steppe, 1100 m, 30.iii.1988, *M. Vural (4330)* (GAZI) - Steppe, 1000 m, 23.iii.1976, *S. Erik (1620)* (ANK) - Dikmen mountain, 1100 m, 20.iii.1957, *Davis-Hedge* (ANK) - Beynam forest, 1200 m, 27.iii.1976, *T. Baytop et al.* (ISTF 39044). Kırıkkale: Keskin, Böbrek mountain, north of Müsellim Village, 1000-1200 m, 24.iii.1991, *Ü. Güler (1000)* (GAZI). B5 Yozgat: South of Doğanbeyli village, 1200 m, 28.iii.1980, *T. Ekim* (ANK) - *Quercus* shrubs, 1500 m, 15.iii.1980, *B. Sayın* (ANK).

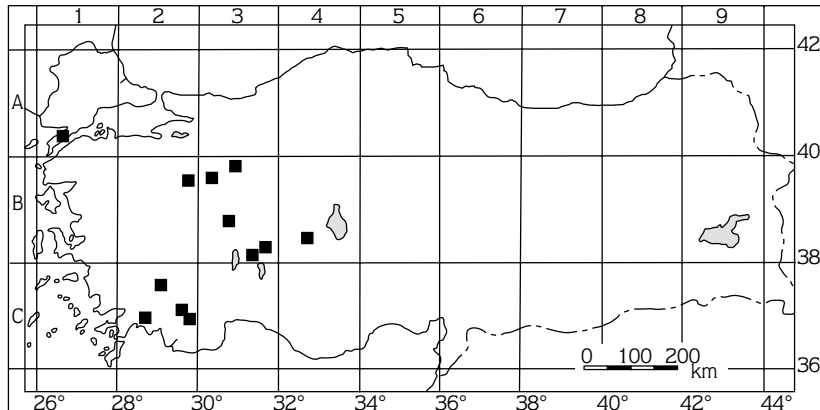
Aksaray: Kızılkaya-Çeltek village, Çatalpınar, 1100 m, 24.ii.1994, *Fusun Ertuğ* (7) (GAZI). Nevşehir: Ürgüp to Yeşilhisar, Topuzdağ mountain pass, steppe, 1660 m, 22.iii.1989, *M. Vural et al.* (4394) (GAZI) - Karacaören village, meadows, 20.ii.1978, *Baytop* (ISTE 38926). B6 Sivas: Gürün to Darende, steppe, maquis, 1400 m, 4.iv.1991, *A. Güner* (8433), *H. Karaca* (HUB 35207). Hafik, around the Lata lake, 1280 m, 8.iv.1992, *E. Hamzaoğlu* (575) (GAZI) - Sivas to Gemerek, moist meadows, 2.iv.1973, *T. Baytop* (ISTF 39040) - Zara to Suşehri, 10 km to Zara, 1700 m, 1.iv.1978, *T. Baytop* (ISTF 38993). Kayseri: Pınarbaşı, up to Ortaköy, Hınzır mountain, stony slopes, 1750 m, 23.iv.1980, *N. Çelik* (1032) (HUB 35230) - Pınarbaşı, Kaynar, Hınzır mountain slopes, riverbed, 1750 m, 22.iv.1980, *N. Çelik* (1026) (ANK) - Akkışla, up to Ganişeyh village, Hınzır mountain, 1750 m, 24.iii.1981, *N. Çelik* (1579) (ANK). C2 Burdur: Çavdır, up to Dengere village, Rahat mountain, 1900 m, 29.iii.1975, *Baytop* (ISTE 31383, ISTF 39042). Denizli: Honaz mountain, moist slopes, 2200 m, 13.iii.2002, *G. Semiz* (1427) (AKDU). Antalya: Akçay, Çiğlikara forest Department, clearings in *Cedrus-Juniperus*, 1400 m, 28.iii.1975, *T. Baytop et al.* (ISTF 39045) - Elmalı, Akçay, Çiğlikara Forest Department, Sevindik, clearings in *Cedrus-Juniperus*, 1400 m, 28.iii.1975, *Baytop* (ISTE 31378) - Elmalı, Cedar Research Forest, 1225 m, 3.iii.2001, 36° 35' 680" N, 29° 68' 122" E, *O.D. Düşen* (2188), *S. Düşen*, *İ.G. Deniz* (AKDU) - Elmalı, Çobanisa village, moist meadows, 1120 m, 16.iii.2003, 36° 51' 420" N, 30° 01' 617" E, *O.D. Düşen* (2597), *S. Düşen*, *K. Çetinkaya* (AKDU) - Elmalı, Cedar Research Forest, 1200 m, 16.iii.2003, 36° 35' 678" N, 29° 58' 139" E, *O.D. Düşen* (2599), *S. Düşen*, *K. Çetinkaya* (AKDU). C3 Antalya: Çakırlar, Hisarçandır village, Sariçınar hill to Karlık, limestone, clearings in *C. libani* - *J. excelsa* forest, 1380-1810 m, 24.iii.1979, *H. Peşmen* (4268), *A. Güner* (HUB 35233) - Saklıkent, Bakırlı mountain slopes, steppe, 1900-1950 m, 12.iv.2002, 36° 50' 472" N, 30° 19' 765" E, *O.D. Düşen* (2505), *S. Düşen*, *K. Çetinkaya* (AKDU) - Sakarpınar, moist meadows, 1850 m, 9.v.2002, 36° 50' 546" N, 30° 24' 965" E, *O.D. Düşen* (2513), *S. Düşen*, *K. Çetinkaya* (AKDU) - Sakarpınar, moist meadows, 1700-1800 m, 16.vi.2002, *O.D. Düşen* (2513a), *S. Düşen* (AKDU). Isparta: Eğridir, Anamas, Yaka village, Kapız stream to Çamova, *P. nigra* forest, limestone, deep valley, rocky area, 1280-1650 m, 15.iv.1975, *H. Peşmen-A. Güner* (2004) (HUB 35231) - Akdağ, Beldibi, 1700 m,

6.iv.1973, *Baytop* (ISTE 24183) - Şarkikaraağaç, Pınarbaşı village, v.1982, *H. Malyer* (BULU 6088). C4 İçel: Silifke, Uzuncaburç, *Pinus-Juniperus* forest openings and *Quercus* maquis, 6.iii.1973, *Baytop* (ISTE 23892) - Anamur, Güneyli plateau, Kırkkuyu, 1800-1900 m, 11.iv.1984, *H. Sümbül* (2776) (ANK) - Anamur, Halkalı plateau, 1460 m, limestone, 18.iii.1995, *A.A. Dönmez* (4396) (HUB 35227) - Anamur, Güneyli (town) plateau, Kırkkuyu, 1800-1900 m, 11.iv.1984, *H. Sümbül* (2776) (HUB 35226). Antalya: Çayırakası plateau, 1750 m, 20.v.1983, *H. Sümbül* (1876) (ANK) - Gazipaşa, Çayırakası plateau, 1750 m, 20.v.1983, *H. Sümbül* (1867) (HUB 35225). Konya: Akşehir, 6 km to Cankurtaran Village, snow zone, 1500 m, 16.iv.1981, *H. Malyer* (BULU 6093) - Ermenek, Kazancı town, Burçak Alanı, 1400-1500 m, 6.iii.1984, *H. Sümbül* (2650) (HUB 35228, ANK) - Ermenek, stony places, 1600 m, 4.iv.1979, *M. Vural* (1238) (ANK) - Hadim, Bolay village, Mandra, serpentine rock, steppe, 1500-1800 m, 13.iv.1984, *S. Erik* (3606) (HUB 35235). Karaman: Karaman-Bozkır road, 10-15 km to Bozkır, moist meadows, 1349 m, 23.iii.2003, 37° 13' 441" N, 32° 30' 675" E, *O.D. Düşen* (2602), *S. Düşen*, *K. Çetinkaya* (AKDU) - Karaman-Bozkır road, 1-2 km to Sarioğlan village, moist meadows, 1399 m, 23.iii.2003, 37° 13' 375" N, 32° 31' 602" E, *O.D. Düşen* (2605), *S. Düşen*, *K. Çetinkaya* (AKDU) - Güneysınırı, roadside, moist places, 1074 m, 23.iii.2003, 37° 22' 256" N, 32° 47' 148" E, *O.D. Düşen* (2607), *S. Düşen*, *K. Çetinkaya* (AKDU) - Yollarbaşı town, Özyurt mountain slopes, moist meadows, 1180 m, 23.iii.2003, 37° 09' 972" N, 32° 59' 041" E, *O.D. Düşen* (2608), *S. Düşen*, *K. Çetinkaya* (AKDU). C5 Konya: Ereğli, Aydos mountain, Kayasaray, Çobanpınarı, limestone slopes, 1600 m, 31.iii.1977, *S. Erik* (1764) (HUB 35236). Adana: Pozantı, Kocagöl to Eskikonacık, 5.iii.1973, *Baytop* (ISTE 23893). C6 Kahramanmaraş: Ahır mountain, Karagöl, İncebel ridges, 1400-1500 m, 22.iv.1992, snow zone, *Z. Aytaç & H. Duman* (4508) (GAZI).

**8. *Colchicum burtii*** Meikle in Bot. Mag. 181: n. s. t. 735 (1977). (Figure 8).

Typus: Turkey [A1 (E)] Çanakkale: between Eceabat and Abide, 15.iii.1975, *T. Baytop* ISTE 31322, cult. K (holo. K).

**Description:** Corm 1-4 (-5) x 0.8-2 cm, narrowly ovoid to subglobose; outer tunics strongly coriaceous, dark brown to blackish-brown, inner tunics light brown

Figure 8. Distribution of *Colchicum burtii* (■) in Turkey.

to chestnut-brown, apex laciniate with rigid fibres extending for 1-4 (-5) cm. Cataphyll 4-10 x 0.2-0.7 (-1) cm, white or yellowish-white. Leaves synanthous, (2-) 3-4, suberect to spreading, extending 1-6 cm from cataphyll at anthesis, 8-15 x 0.5-1.2 cm at maturity, narrowly linear to linear-lanceolate, obtuse, slightly undulate or entire, margin pilose. Flowers 1-3 (-5), funnel-shaped; perianth tube exceeding the cataphyll by 1-5 cm, white or yellowish-white, sometimes purplish-pink in upper part; segments 1.5-2.5 (-3) x 0.2-0.6 cm, narrowly elliptic to oblanceolate, each segment 8-15 veins, white to purplish-pink, not tessellated, acute to obtuse, without auricles at base, filament channels distinct, glabrous. Stamens 1/2 to 2/3 of perianth limb in length; filaments 6-12 mm, white or cream, with swollen yellow base, pilose at least near base; anthers 1-3 x 0.8-

1.2 mm, purplish-black or black, without membranous margin. Styles straight, white, stigmas punctiform. Capsule 0.8-1.5 x 0.3-0.8 cm, ovoid to elliptic, scabrid-pilose at apex; seeds 1-3 mm diam., almost globose, dark brown. Flowering time, January-April; Leaves and fruiting time: March-June.

**Similar species:** *C. burtii* was described as a new endemic species by Meikle in 1977. It is related to *C. triphyllum* Kunze and so differences between the 2 species are shown in Table 8.

**Habitat:** Rocky and stony slopes, moist meadows, clearings in maquis and forest.

**Altitudinal range:** 600-1650 m.

**Turkey distribution:** West and Central Anatolia. Endemic (LC).

Table 8. Comparison of morphological characteristics between *C. burtii* and *C. triphyllum*.

Morphological characters	<i>C. burtii</i>	<i>C. triphyllum</i>
Outer tunics	strongly coriaceous dark brown to blackish-brown apex laciniate with rigid fibres extending for 1-4 (-5) cm	membranous only dark brown not apex laciniate with rigid fibres
Leaves	obtuse margin pilose	acute or subacute margin scabrid or glabrous
Perianth tube	sometimes purplish-pink in upper part	completely white or cream
Perianth segments	without auricles at base	sometimes with filiform lamellae or auricles at base
Filaments	pilose at least near base	glabrous
Capsule	0.8-1.5 x 0.3-0.8 cm scabrid-pilose at apex	1.5-3 x 0.8-1.5 cm glabrous

**Phytogeographical status:** East Mediterranean element.

**Flora of Turkey records:** A1(E) Çanakkale: Gallipoli peninsula, 26.i.1926, Durham. B2 Kütahya: Kütahya to Aslanapa, 1350 m, Brickell & Mathew 8221. B3 Kütahya: Kütahya to Afyon, 1000 m, Balls 636. B4 Konya: Akşehir to Konya on road to Başkuyu, 1200 m, Mathew 9562. C2 Denizli: Denizli to Kazıkbeli, above Çukurköy, 820 m, A. Baytop (ISTE 23748). Muğla: Üzümlü, 915 m, Forbes 514. Antalya: Elmalı to Korkuteli, A. & T. Baytop (ISTE 38916).

**Specimens examined:** A1 Çanakkale: Eceabat, Abide hill, 15.iii.1975, *R.D. Meikle* (ISTE 31322, ISTF 38970). B2 Kütahya: Kütahya to Aslanapa, 1350 m, 22.iii.1975, *R.D. Meikle* (ISTE 31343, ISTF 38969) - Dumlupınar, Seklisaray village, Havva stream ridges, 1100 m, *H. Malyer* (BULU 6094). B3 Kütahya: Kütahya-Afyon road, 16 km from Kütahya, *Quercus-Juniperus* openings, 1080 m, 18.ii.1973, *Baytop* (ISTE 23744). Isparta: Şarkikaraağaç, Kızıldağ National Park, Küçük Sivri mountain northern slopes, *C. libani* forest, 1250-1300 m, 24.iii.1994, *B. Mutlu (196)* (HUB 35211, GAZI). Eskişehir: Çifteler, Yazılıkaya to Çifteler 16 km, steppe, 1200 m, 5.iii.1982, *H. Malyer* (BULU 5960). C2 Denizli: Kazıkbeli, under *P. nigra*, 930 m, 19.ii.1973, *Baytop* (ISTE 23751) - Honaz mountain, forest road, under *P. brutia* and maquis, 600 m, 20.ii.1973, *Baytop* (ISTE 23765) - Honaz mountain, Kazıkbeli, stony slopes, 7.iii.1975, *E. Tuzlacı* (ISTF 38966) - Honaz mountain, Aydınlar village, fields, 6.iii.1975, *E. Tuzlacı* (ISTF 38967) - Honaz mountain, Papazlık plateau, *Pinus* forest, 9.iv.1973, *E. Tuzlacı* (ISTF 38968). Muğla: Muğla

to Kale, 11 km from Muğla, 1100 m, *Pinus* forest, 9.xi.1976, *Baytop* (ISTE 36272) - Muğla to Kale, Yılan Beli, 16 km to Muğla, *P. brutia* openings, 1300 m, 1.v.1980, *Baytop* (ISTE 44096). Antalya: Elmalı-Korkuteli to, 31 km from Korkuteli, stony slopes, 1200 m, 22.ii.1978, *Baytop* (ISTE 38916, ISTF 38964) - Elmalı, Çobanisa village, moist meadows, 1120 m, 22.ii.2003, 36° 51' 420" N, 30° 01' 617" E, *O.D. Düşen (2588)*, *S. Düşen*, *K. Çetinkaya* (AKDU) - Elmalı, 1 km to Çobanisa village, stony-rocky slopes, 1180 m, 22.ii.2003, 36° 52' 366" N, 30° 01' 846" E, *O.D. Düşen (2589)*, *S. Düşen*, *K. Çetinkaya* (AKDU) - Elmalı, 1 km to Çobanisa village, stony-rocky slopes, 1180 m, 16.iii.2003, 36° 52' 367" N, 30° 01' 844" E, *O.D. Düşen (2601)*, *S. Düşen*, *K. Çetinkaya* (AKDU) - Elmalı, 1 km to Çobanisa village, stony-rocky slopes, 1000-1200 m, 25.v.2003, *O.D. Düşen (2601a)*, *S. Düşen* (AKDU).

**9. *Colchicum kotschyi* Boiss., Diagn. ser. 1 (13): 38 (1853).** (Figure 9).

Typus: [Iran] in solo schistoso ad radices montis Elbrus prope Passgala, viii.1847, Kotschy 655 (holo. G).

= *C. persicum* Baker in J. Linn. Soc. (Bot.) 17: 430 (1879).

= *C. candidum* Schott & Kotschy ex Boiss. var. *hirtiflorum* Boiss., Fl. Or. 5: 160 (1882).

= *C. obtusifolium* Siehe ex Hayek in Ann. Naturhist. Mus. Wien 28: 182 (1914).

**Description:** Corm (2.5-) 3-7 x 2-6 cm, narrowly ovoid to elliptic-ovoid; outer tunics membranous or subcoriaceous, dark brown, inner tunics membranous, reddish-brown to light brown; neck present, 3-14 (-15)

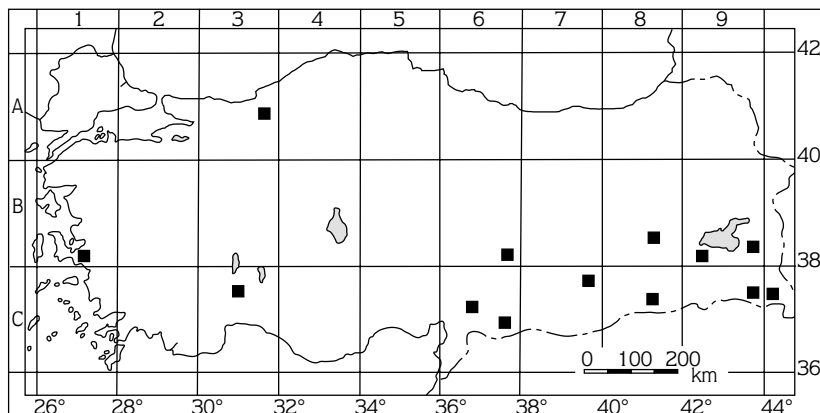


Figure 9. Distribution of *Colchicum kotschyi* (■) in Turkey.

x 0.6-2.5 (-3) cm, light brown to dark brown. Cataphyll longer than neck, 4-20 x 0.5-2.5 (-2.8) cm, white or yellowish-white. Leaves hysteranthous, 3-4 (-6), suberect to spreading, 10-20 (-25) x 2-6 (-7) cm at maturity, narrowly oblong-lanceolate to oblong-elliptic, rounded to subacute, margins slightly undulate or entire, glabrous. Flowers 2-12, funnel-shaped; perianth tube exceeding the cataphyll by 2-10 (-15) cm, white or yellowish-white, sometimes light purplish in upper part; segments (2.3-) 3-5.5 x 0.4-1.5 (-2) cm, linear to oblanceolate or oblong-elliptic, each segment 10-17 (-23) veins, white, light pink or purplish-pink, not tessellated, subacute to obtuse, without auricles at base, puberulous or pubescent along bases of ridges of filament channels. Stamens 1/2 to 1/3 of perianth limb in length; filaments 6-20 mm, white, with swollen light yellow or orange yellow base, glabrous; anthers (5-) 6-12 x 1-1.5 cm, yellow, with membranous margin. Styles curved at apex, white, stigmas decurrent for 1-3 (-4) mm. Capsule 2-4.5 (-5) x 1-3 cm, elliptic to oblong-ovoid, light to dark brown dotted when dry, rostrate, glabrous; seeds 2-4 mm diam., almost globose, reddish-brown to dark brown. Flowering time, July-December; Leaves and fruiting time: April-June.

**Similar species:** The specimens of *C. kotschyi* were first collected by Kotschy from Iran in 1847 and then these specimens were described as a new species by Boissier in 1853. As indicated in Flora of Turkey, this species was confused in herbaria and the literature with *C. balansae* Planchon and *C. decaisnei* Boiss.

*C. kotschyi* is similar to *C. speciosum* Steven and so differences between the 2 species are shown in Table 9.

**Habitat:** Moist meadows, alpinic steppe, clearings in *Pinus* forest, rocky and stony slopes.

**Altitudinal range:** 1000-3000 m.

**Turkey distribution:** North, South, West, East, and Inner Anatolia.

**World distribution:** Iraq, Iran.

**Phytogeographical status:** Irano-Turanian element.

**Flora of Turkey records:** A3 Bolu: Abant G., 1400 m, Pasche & Taub. 75-23. B1 İzmir: İzmir, Sloser-Baykan (ISTE 23957, fl.). B6 Maraş: d. Göksun, Berit Da., 2500-3000 m, Yıldız 1566 (leaf & fr.). B8 Muş: nr Muş, 2000 m, Kotschy 1859: 533 (fl.). B9 Bitlis: Saz Köyü, 1600-1700 m, Peşmen 3292 (fl.). C3 Isparta: Kapız De. 2 km S. of Yaka Köyü, 1250-1400 m, Peşmen & Güner 2315. C6 Gaziantep: Nur Da. pass, 1000 m, Watson et al. 3868 (fl.). C7 Diyarbakır: 60 km S.W. of Diyarbakır, 1050 m, Leep & Pasche 70-36, cult. Pasche, 9.ix.1972 (fl.). C8 Mardin: 10 km N. of Mardin, 1100 m, Leep & Pasche 70-37, cult. Pasche 11.ix.1971 (fl.).

**Specimens examined:** B9 Bitlis: Tatvan-Van road 10 km, rocky slopes, 1900-1940 m, 8.viii.1989, *Quercus* sp. openings, *Aytaç* (2988) (GAZI) - Gevaş to Tatvan, Pelli village (Alacabük Village), Pelli Mountain, 2400 m, 2.vii.1980, *Baytop* (ISTE 45322) - Hizan to Bitlis 5 km, Darulus village, limestone slopes, 1722 m, 1.x.2001, 38° 13' 561" N, 42° 21' 868" E, A.A. Dönmez (10262) (HUB) - Tatvan, Karz mountain, Sapur village, mixture forest and alpine steppe, 1800-2600 m, 20.viii.1972, H. Peşmen (3242) (HUB) - Tatvan-Hizan, Kavakdibi village, 1850 m, 18.ix.1978, T. Baytop et al. (ISTF 39149) - Kotum, Karz mountain, 1900 m, 23.viii.1954, Davis, *Polunin* (ANK) - Alacabük mountain, Bağ Village, Kuzey Nizar slopes, 2100 m, 13.iv.2002, F. Özgökçe (F 9966) (VANF). Van: Çatak, 17 km from Van, Ağaçlı village,

Table 9. Comparison of morphological characteristics between *C. kotschyi* and *C. speciosum*.

Morphological characters	<i>C. kotschyi</i>	<i>C. speciosum</i>
Leaves	narrowly oblong-lanceolate to oblong-elliptic	narrowly elliptic to oblong-lanceolate
Flowers	2-12 funnel-shaped	1-3 narrowly campanulate to campanulate
Perianth tube	white or yellowish-white	green or white flushed purple
Perianth segments	(2.3-) 3-5.5 x 0.4-1.5 (-2) cm linear to oblanceolate or oblong-elliptic white, light pink or purplish-pink	(4.5-) 6-7 (-8) x (1-) 1.8-2.7 cm oblong-lanceolate or elliptic pale to deep rosy-purple

Artos Mountain, 2650 m, 4.vi.1985, *Sütlüpinar* (ISTE 55349) - Hoşap to Başkale 24 km from Hoşap, Güzeldere mountain pass, 2700 m, 22.vi.1981, *Baytop* (ISTE 46731) - Bahçesaray to Arvas, field openings, 18.ix.1974, A. & T. *Baytop* (ISTF 39144) - Bahçesaray to Arvas, Arvas, 18.ix.1974, *Baytop* (ISTE 30979) - Güzelsu to Başkale, 24 km from Güzelsu, 2700 m, 22.vi.1981, A. & T. *Baytop* (ISTF 39147) - Ereğli mountain, Gölardı village, meadow, 19.vi.1981, A & T. *Baytop* (ISTF 39148) - Gürpınar, Soraviyan village, meadow, 2650 m, 3.vii.1980, T. *Baytop* (ISTF 39153). C3 Isparta: Eğridir, Yaka village, Çamova, Yaka mountain, moist meadows, 1578 m, 20.ix.2003, 37° 41' 986" N, 31° 13' 957" E, O.D. *Düşen* (2629), S. *Düşen*, K. *Çetinkaya* (AKDU) - Eğridir, Yaka village, Çamova, Yaka mountain, moist meadows, 1500-1600 m, 7.vi.2003, O.D. *Düşen* (2629a), S. *Düşen*, K. *Çetinkaya* (AKDU). C6 Kahramanmaraş: Engizek Mountain, south of the Elibüyük Hill, 2500 m, 25.viii.1986, high mountain steppe, stony areas, H. *Duman* (2340) (GAZI). C9 Hakkari: Cilo mountain Dizdere valley, moist meadows, 1.ix.1982, 1700 m, H. *Malyer* (5178) (BULU 5715). C10 Hakkari: Şemdinli to Yüksekova, 24 km from Şemdinli, 1800 m, 27.ix.1974, *Baytop* (ISTE 31137, ISTF 39145).

10. *Colchicum heldreichii* K.M.Perss. in Edinb. J. Bot. 56: 98, f. 2E-F, 4E-F (1999). (Figure 10).

Typus: Turkey C4 Konya: 3 km ENE. of Derbent, grassy depressions in hills near road, deep reddish-brown soil, 1600 m, 29.viii.1994, K. Persson 555 (holo. GB).

**Description:** Corm 1.5-4 (-4.5) x 1-3.5 cm, elliptic to ovoid; outer tunics membranous or subpapery, reddish-brown to brown, inner tunics membranous, light brown to yellowish-brown; neck present, (2-) 3-10 (-12) x 0.4-1 (-1.3) cm. Cataphyll 3.5-13 (-15) x 0.3-0.8 (-1) cm, white, sometimes purplish-red at apex. Leaves hysteranthous, 3-4, suberect to arcuate-procumbent, 5-15 x 0.8-2.5 (-3) cm at maturity, linear to oblong, obtuse to retuse, margins slightly undulate, glabrous to scabrid. Flowers 1-6 (-7), narrowly funnel-shaped; perianth tube exceeding the cataphyll by 2-6 (-8) cm, white or yellowish-white, sometimes light purplish in upper part; segments 1.5-5 x 0.3-0.8 (-1) cm, linear to linear-lanceolate or oblong, each segment 9-15 veins, white to lilac-pink, not tessellated, subacute to retuse, without auricles at base, filament channels shallow, glabrous or sometimes densely pubescent at base. Stamens 1/2 to 1/3 of perianth limb in length; filaments 5-13 mm, white or cream, with swollen golden yellow base, glabrous; anthers 4-7 (-8) x 0.8-1.3 mm, yellow, with membranous margin. Styles longer than stamens, curved at apex, white or cream, stigmas decurrent for 1-4.5 mm. Capsule ground level, 1-2 (2.5) x 0.5-1.3 (-1.5) cm, oblong to elliptic-oblong, light to dark brown dotted when dry, apiculate, glabrous; seeds 1.5-2.5 mm diam., elliptic to globose, light to dark brown. Flowering time, August-October; Leaves and fruiting time: February-April.

**Similar species:** *C. heldreichii* was described as a new species by K.M.Persson in 1999. It is related to *C. kotschyi* Boiss. and so differences between the 2 species are shown in Table 10.

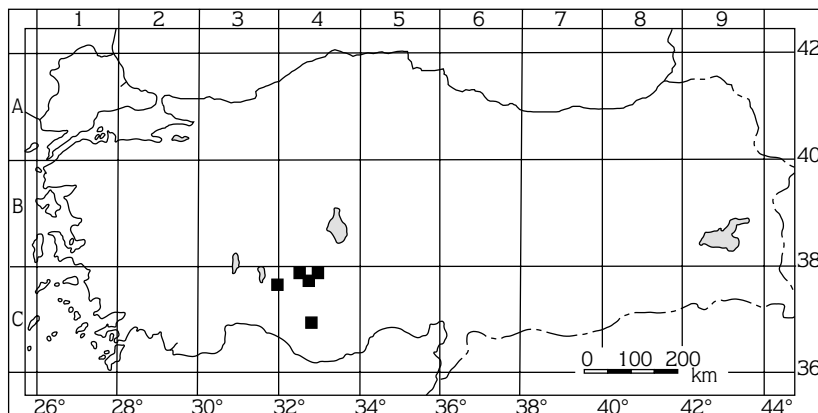


Figure 10. Distribution of *Colchicum heldreichii* (■) in Turkey.



Table 10. Comparison of morphological characteristics between *C. heldreichii* and *C. kotschyi*.

Morphological characters	<i>C. heldreichii</i>	<i>C. kotschyi</i>
Corm	1.5-4 (-4.5) x 1-3.5 cm	(2.5-) 3-7 x 2-6 cm
Outer tunics	reddish-brown to brown	dark brown
Inner tunics	sometimes yellowish-brown	reddish-brown
Cataphyll	sometimes purplish-red at apex	completely white or yellowish-white
Leaves	suberect to arcuate-procumbent 0.8-2.5 (-3) cm width linear to oblong obtuse to retuse margins glabrous to scabrid	suberect to spreading 2-6 (-7) cm width narrowly oblong-lanceolate to oblong-elliptic rounded to subacute only glabrous
Perianth segments	linear to linear-lanceolate or oblong	oblanceolate or oblong-elliptic
Filament channels	glabrous or sometimes densely pubescent at base	puberulous or pubescent along bases of ridges of filament channels
Anthers	4-7 (-8) cm long	(5-) 6-12 cm long
Capsule	1-2 (2.5) x 0.5-1.3 (-1.5) cm oblong to elliptic-oblong	2-4.5 (-5) x 1-3 cm elliptic to oblong-ovoid
Seeds	1.5-2.5 mm diam. elliptic to globose	2-4 mm diam. only globose

**Habitat:** Moist meadows, open terra rossa, rocky and stony slopes.

**Altitudinal range:** 1400-2338 m.

**Turkey distribution:** Central Anatolia. Endemic (EN).

**Phytogeographical status:** Irano-Turanian element.

**Flora of Turkey records:** C3/4 Konya: entre Beychehr et Koniah près du chemin, Heldr.1257. C4 Antalya: Geyik Dağ, 2338 m, Davis 14250.

**Specimens examined:** C4 Konya: Hadim, Hadim-Beyreli road, 20 km, high mountain steppe, 1980 m, 9.ix.1998, 36° 54' 86" N, 32° 23' 99" E, *H. Duman* (6842), *Z. Aytaç* (GAZI) - Derbent, Yeni village, Harman, 1410-1420 m, 25.viii.2002, *O.D. Düşen* (2543), *S. Düşen*, *K. Çetinkaya* (AKDU) - Derbent, 2-3 km north of Derbent, moist meadows, terra rosa, 1539-1540 m, 22.ix.2002, 38° 01' 543" N, 32° 01'844" E, *O.D. Düşen* (2556), *S. Düşen*, *K. Çetinkaya* (AKDU) - Derbent, 2-3 km north of Derbent, moist meadows, terra rosa, 1500-1600 m, 12.iv.2003, *O.D. Düşen* (2556a), *S. Düşen* (AKDU) - Derbent, 8-10 km north of the Derbent, water reservoir, slopes, 1650 m, 22.ix.2002, 38° 01' 856" N, 32° 03' 509" E, *O.D. Düşen* (2557), *S. Düşen*, *K. Çetinkaya* (AKDU).

11. *Colchicum decaisnei* Boiss., Fl. Or. 5: 157 (1882). (Figure 11).

Typus: [Lebanon] Ghazir, rochers calcaires à l'Est du village, 25.x.1861, Gaillardot 2804 (lecto. G-BOIS [Persson 1999]; iso. JE, LE, P, S).

= *C. brevistylum* Feinbrun in Eig, Zohary & Feinbrun. Anal. Fl. Palest. 355, 411, nom. nud.

= *C. laetum* auct., non Steven (1829).

= *C. troodii* sensu C.D.Brickell in Davis (ed.), Fl. Turkey 8: 342 (1984), non Kotschy (1862). Ic: Persson in Edinb. J. Bot. 56: 103-142, f. 1C, 2B (1999).

**Description:** Corm 1-4 (-5) x 0.8-3.5 (-4) cm, broadly ovoid to subglobose; tunics membranous or subcoriaceous, light brown to reddish-brown or dark brown; neck present, (2-) 3-9 (-10) x 0.5-1.5 (-2) cm. Cataphyll 3-15 x 0.3-1 (-1.5) cm, cream or yellowish-white, sometimes purplish-red at apex. Leaves hysteranthous, 3-5 (-6), suberect to arcuate-procumbent, 8-22 (-30) x 1-5 (-7) cm at maturity, linear-lanceolate to lanceolate or narrowly ovate, subobtuse to obtuse, channelled at least in lower part, pubescent dorsally at base and on sheath, margins slightly undulate, glabrous to densely ciliate. Flowers 2-10 (-15), narrowly or

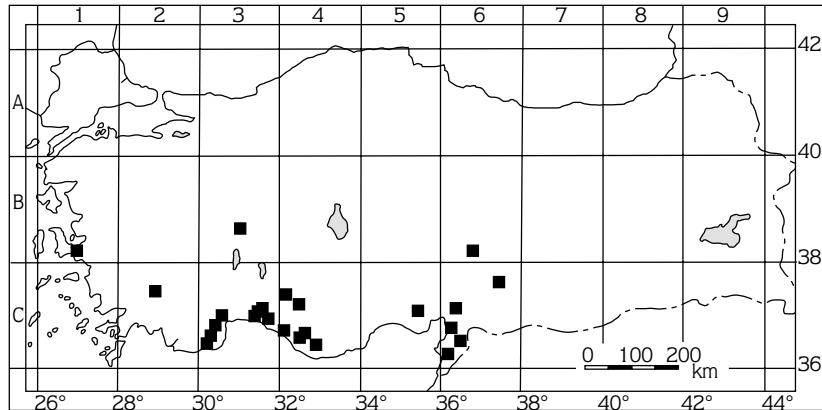


Figure 11. Distribution of *Colchicum decaisnei* (■) in Turkey.

broadly funnel-shaped; perianth tube exceeding the cataphyll by 1.5-8 cm, white or yellowish-white, sometimes light pink to purplish-pink in upper part; segments 1.5-4.5 x 0.2-1 (-1.2) cm, linear to oblanceolate, each segment 7-15 veins, white to lilac or purplish-pink, not tessellated, subobtuse to obtuse (rarely retuse), without auricles at base, filament channels shallow, puberulous at least on margins (rarely glabrous). Stamens 1/2, 1/3 or 2/3 of perianth limb in length; filaments 4-12 (-14) mm, white, with swollen yellow base, glabrous; anthers 2-8 (-10) x 0.5-1.2 mm, yellow, with membranous margin. Styles straight or slightly curved at apex, white, stigmas punctiform or decurrent for 0.5-1 mm. Capsule ground level, 1-3.5 (-4) x 0.5-1.5 cm, oblong to elliptic, light to dark brown dotted when dry, acute or acuminate, glabrous; seeds 2-3.5 (-4) mm diam., almost globose, brown. Flowering time, August-November; Leaves and fruiting time: February-May.

**Similar species:** *Colchicum decaisnei* Boiss. was confused with *C. troodii* Kotschy in Flora of Turkey vol. 8 (Brickell, 1984). When Flora of Turkey vol.11 was published in 2000, the identification was changed from *C. troodii* to *C. decaisnei*. Since Boissier's time, the name *C. decaisnei* has been used to include almost any *Colchicum* in South-West Asia with hysteranthous leaves. However, in modern times the taxonomic confusion involving *C. decaisnei*, *C. hierosolymitanum* Feinbrun, *C. polyphyllum* Boiss. & Heldr., *C. persicum* Baker, *C. feinbruniae* K.M. Perss., and *C. troodii* Kotschy has been clarified in specific papers (such as Feinbrun in 1953, Persson in 1993, 1999b) (Persson, 2000).

*C. decaisnei* is similar to *C. troodii* Steven and so differences between the 2 species are shown in Table 11.

**Habitat:** Openings of forest and maquis, rocky and stony slopes, moist meadows.

Table 11. Comparison of morphological characteristics between *C. decaisnei* and *C. troodii*.

Morphological characters	<i>C. decaisnei</i>	<i>C. troodii</i>
Corm tunics	membranous or subcoriaceous	papery
Leaves	suberect to arcuate-procumbent linear-lanceolate to lanceolate or narrowly ovate channelled at least in lower part margins slightly undulate	erecto-patent ligulate flat hardly twisted
Perianth segments	linear to oblanceolate	narrowly oblong-lanceolate
Filament channels	puberulous at least on margins	glabrous
Filaments	4-12 (-14) mm	15-20 mm
Capsule	oblong to elliptic acute or acuminate	only ellipsoid rostrate

**Altitudinal range:** 0-2000 m.

**Turkey distribution:** South and West Anatolia.

**World distribution:** West Syria, Lebanon, North Israel.

**Phytogeographical status:** East Mediterranean element.

**Flora of Turkey records:** C3 Antalya: Kemer to Yayla Kuzdere, 600 m, Kerndorff & Pasche 96-16; pass S. of Debek (ENE. of Antalya), 800 m, Runemark & Wendelbo 389; Manavgat to Akseki, 4 km N. of Fersin, forest road 2 km off the main road, 850 m, K. Persson 432. C4 Antalya: Alanya, rocky slope near the castle, 250 m, Leep L78/T44; Demirtaş to Göktepe, 12 and 15 km before Başköy, 175-250 m, K. Persson 469. C5 Hatay: Mağaracık, 20 m, Pasche & Schacht 89-07. C6 Hatay: 6.2 km N. of YaylaDağı, 700 m, Sønnderhausen 1041.

**Specimens examined:** B1 İzmir: Ödemiş, Bozdağ, Büyükçavdar plateau, 1430 m, 30.v.1980, *Baytop* (ISTE 44346, ISTF 39032). B6 Kahramanmaraş: Göksun, Berit mountain, north limestone slopes, 2500 m, 25.viii.1977, *B. Yıldız (1566)* (HUB 35242). C2 Denizli: Buldan, Süleymanlı tomb, 1129 m, 12.ix.2003, *G. Semiz (1428)* (AKDU). C3 Antalya: Kemer, Kındılçeşme, 0-10 m, 2.xi.1978, *H. Peşmen (4121)*, *B. Yıldız, O. Güneş* (HUB 35244, GAZI) - Akseki, Fersin plateau, Evlek Boğazı, rocky places, 1700 m, 13.x.1995, *A. Duran (3310)* (GAZI) - Akseki, Çukurköy, Karataş, field side, 900 m, 14.x.1995, *A. Duran (3319)* (GAZI) - Antalya to Kemer, 7 km to Kemer, *Pinus* forest, 30.x.1977, *Baytop* (ISTE 38828) - Antalya to Kemer, 7 km to Kemer, *Pinus* forest, 29.x.1977, *H.J. Leep, N. Sütlüpinar* (ISTF 39018) - Kemer, *Pinus* forest, 28.x.1976, *H.J. Leep* (ISTF 39019) - Manavgat to Akseki, Murtiçi, *Pinus* forest, 500 m, 29.x.1977, *Baytop* (ISTE 38829) - Manavgat to Akseki, *Pinus* forest, 550 m, 27.iv.1977, *T. Baytop* (ISTF 39020) - Manavgat to Akseki, Fersin, 850 m, 30.iii.1975, *T. Baytop, B. Mathew, C.D. Brickell* (ISTF 39031) - Alanya, Alanya Castle, 12.xi.1977, *Baytop* (ISTF 39021) - Alanya, roadside, stony places, 25.x.1976, *H.J. Leep* (ISTF 39027) - Kemer to Kumluca, 8 km from Kumluca, *Pinus* forest, 28.iv.1977, *H.J. Leep, N. Sütlüpinar* (ISTF 39022) - Konyaaltı to Kemer 1 km, limestone, under *P. brutia*, 17 m, 29.xi.2001, 36° 48' 642" N, 30° 35' 071" E, S. Işık (19), A.A. Dönmez (HUB) - Manavgat to Akseki, Murtiçi, *P. brutia* forest openings, 650 m, 30.ix.2000, *O.D. Düşen (2154)*, *S. Düşen, K.*

*Çetinkaya* (AKDU) - Fersin to Murtiçi, Eski Çeşme, *P. brutia* forest openings, 650 m, 29.ix.2001, 36° 51' 095" N, 31° 46' 697" E, *O.D. Düşen (2443)*, *S. Düşen, K. Çetinkaya* (AKDU) - Fersin to Murtiçi, Eski Çeşme, *P. brutia* forest openings, 650-700 m, 24.iii.2002, *O.D. Düşen (2443a)*, *S. Düşen* (AKDU) - Hurma village, Kedetler, *P. brutia* forest openings, 100-150 m, 12.xi.2000, *O.D. Düşen (2160)*, *S. Düşen* (AKDU) - Alanya, Dereköy, Türbelinaz plateau, Dokuzoluk, moist meadows, 900-910 m, 27.ix.2001, 36° 38' 974" N, 32° 02' 728" E, *O.D. Düşen (2435)*, *S. Düşen, K. Çetinkaya* (AKDU) - Akseki, Cevizli, Süleymaniye village, Akdağ, Küçük plateau, moist meadows, 1873 m, 29.ix.2001, 37° 19' 154" N, 31° 46' 554" E, *O.D. Düşen (2440)*, *S. Düşen, K. Çetinkaya* (AKDU) - Akseki, Cevizli, Süleymaniye village, Akdağ, Hadim plateau, moist meadows, 1750 m, 29.ix.2001, 37° 20' 052" N, 31° 47' 474" E, *O.D. Düşen (2441)*, *S. Düşen, K. Çetinkaya* (AKDU) - Gündoğmuş, 10 km to Gündoğmuş, *Q. coccifera* openings, 970 m, 30.ix.2001, 36° 48' 934" N, 31° 56' 513" E, *O.D. Düşen (2437)*, *S. Düşen, K. Çetinkaya* (AKDU) - Kemer-Yayla Kuzdere, *P. brutia* forest openings, 670 m, 11.x.2001, 36° 35' 987" N, 30° 26' 091" E, *O.D. Düşen (2447)*, *S. Düşen, K. Çetinkaya* (AKDU) - Kemer-Yayla Kuzdere, under *P. brutia* forest, 670-700 m, 14.iv.2002, *O.D. Düşen (2447a)*, *S. Düşen* (AKDU) - 10 km from Taşağül, Sağırini village, *P. brutia* forest openings, 58 m, 18.x.2001, 37° 00' 510" N, 31° 12' 773" E, *O.D. Düşen (2448)*, *S. Düşen, K. Çetinkaya* (AKDU) - Finike, upper region of the Marina, rocky slopes, 40 m, 8.ix.2001, 36° 17' 565" N, 30° 08' 828" E, *O.D. Düşen (2467)*, *S. Düşen, K. Çetinkaya* (AKDU) - Hurma village, Kedetler, under *P. brutia* forest, 100-200 m, 22.ix.2001, 36° 51' 091" N, 30° 35' 263" E, *O.D. Düşen (2470)*, *S. Düşen* (AKDU). C4 Antalya: Gazipaşa, Çobanlar village plateau, Armali, stony area, 1800-2000 m, 19.vii.1981, *H. Sümbül (1096)* (HUB 35240) - Alanya, Demirtaş to Beldibi, Çamlıca village, North slopes, 90 m, 25.x.2001, 36° 27' 377" N, 32° 13' 981" E, *O.D. Düşen (2450)*, *S. Düşen, K. Çetinkaya* (AKDU) - Alanya, Demirtaş to Beldibi, Tırıllar village, BoğazDeğirmeni, under *P. brutia* forest, 200 m, 25.x.2001, 36° 29' 271" N, 32° 16' 766" E, *O.D. Düşen (2451)*, *S. Düşen, K. Çetinkaya* (AKDU). Konya: Ermenek, Göktepe Town, Muzverdi village, Aşakbel Hill, 1900 m, 13.ix.1983, *H. Sümbül (2411)* (HUB 35241) - Bozkır, Çağlayan, 2-3 km north of Çağlayan, North slopes, 1380 m, 22.ix.2002, 38° 01' 853" N, 32° 03' 502" E, *O.D. Düşen (2558)*, *S.*

*Düşen, K. Çetinkaya* (AKDU) - Bozkır, Ahırlı, Bartlı plateau, moist meadows, 1345 m, 22.ix.2002, 37° 10' 936" N, 32° 05' 510" E, O.D. *Düşen* (2560), S. *Düşen, K. Çetinkaya* (AKDU) - Sorkun-Akseki road, *Abies-Pinus* forest openings, 1819-1820 m, 22.ix.2002, 37° 12' 917" K, 31° 59' 086" D, O.D. *Düşen* (2562), S. *Düşen, K. Çetinkaya* (AKDU). C5 Adana: Karsanti, limestone, 900 m, 29.x.1972, E. *Yurdakul* (ANK). C6 Adana: Osmaniye, *Q. cerris* and *P. nigra* forest, 1300 m, vii.1944, B. *Kasaplıgil* (ANK). Kahramanmaraş: Engizek mountain, Aksu district, field side, 900-1000 m, 15.vi.1986, H. *Duman* (2404) (GAZI). Hatay: Kırıkhan, Aktepe, 30.x.1976, M. *Miski* (ISTF 39026) - Hatay-Altınözü, 5 km from Narlıca, 29.x.1976, M. *Miski* (ISTF 39029) - Belen-Top Boğazi, 2 km from Belen, 550 m, 12.v.1977, T. *Baytop* (ISTF 39034). Gaziantep: Suf mountain, 15.x.1978, T. *Baytop* (ISTF 39028) - 40 km to Gaziantep, Suf mountain, 30.x.1976, M. *Miski* (ISTF 39030).

12. *Colchicum balansae* Planch. in Ann. Sci. Nat. ser. 4, 4: 145 (1855). (Figure 12).

Typus : [Turkey C5 İçel] versant meridional du Taurus, au nord de Gulek Boghas, en Cilicia; région montagneuse supérieure, ix. 1855, Balansa [126] (holo. MPU?, iso G, K).

= *C. candidum* Schott & Kotschy ex Boiss., Fl. Or. 5: 159 (1882).

**Description:** Corm 2-7 (-9) x 1.5-6 (-8) cm, ovoid to subglobose; outer tunics coriaceous, dark brown to blackish-brown, inner tunics membranous to subcoriaceous, reddish-brown to light brown; neck

present, 20-50 x 0.5-2 (-3) cm, strongly fibrose. Cataphyll as long as neck, white or yellowish-white. Leaves hysteranthous, 3-5, suberect to spreading, 15-30 (-35) x 2-8 (-10) cm at maturity, outer ones lanceolate to oblong or oblong-elliptic, inner ones lanceolate to linear-lanceolate, obtuse, margins slightly undulate, glabrous. Flowers 3-8 (-12), funnel-shaped; perianth tube exceeding the cataphyll by 1.5-6 (-9) cm, white or cream; segments 3-7 x 0.4-2.8 cm, linear to broadly elliptic, each segment 10-18 veins, white to pale lilac or purplish-pink, not tessellated, subacute to obtuse, without auricles at base, filament channels shallow, glabrous. Stamens 1/3 to 1/2 or more longer of perianth limb in length; filaments 8-25 (-30) mm, white, with swollen yellowish base, glabrous; anthers 8-15 (-18) x 0.8-1 (-1.2) mm, yellow, with membranous margin. Styles curved at apex, white sometimes pinkish-purple at apex, stigmas decurrent for 1-3 mm. Capsule ground level, 2-4.5 (-5) x 1-2 (-2.5) cm, oblong-ovoid to oblong-elliptic, brown or blackish dotted when dry, rostrate, glabrous; seeds 2-4 (-5) mm diam., almost globose, reddish-brown to brown. Flowering time, August-November; Leaves and fruiting time: March-June.

**Similar species:** *C. balansae* was indicated as an endemic species in Flora of Turkey vol. 8 (Brickell, 1984). Persson (1999b) stated that this species was collected in Poros by Melvyn Jope in 1984; for this reason, *C. balansae* is not an endemic species for Turkey.

It is similar to *C. dolichantherum* K.M.Perss. and *C. imperatoris-friderici* Siehe ex K.M.Perss.; differences are shown in Table 12.

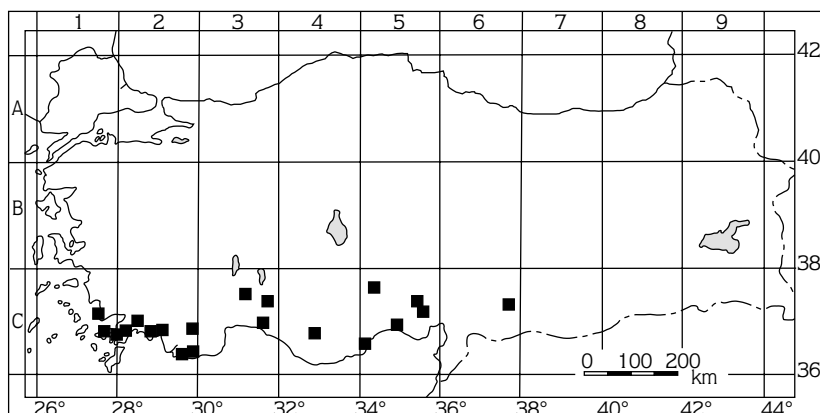


Figure 12. Distribution of *Colchicum balansae* (■) in Turkey.

Table 12. Comparison of morphological characteristics between *C. balansae*, *C. dolichantherum*, and *C. imperatoris-friderici*.

Morphological characters	<i>C. balansae</i>	<i>C. dolichantherum</i>	<i>C. imperatoris-friderici</i>
Corm	ovoid to subglobose	ovoid to ovoid-globose	narrowly ovoid to broadly ovoid
Neck	being up to 50 cm long strongly fibrose	being up to 20 cm long thinly fibrose	being up to 15 cm long not strongly fibrose
Cataphyll	as long as neck completely white or yellowish-white	longer than neck sometimes purplish-red in upper part	longer than neck cream or yellowish-white, sometimes reddish-purple in upper part
Leaves	suberect to spreading linear-lanceolate, lanceolate to oblong or oblong-elliptic with glabrous margin	only spreading oblong-lanceolate to ligulate or elliptic with scabrose or shortly ciliate margin	suberect to spreading narrowly oblong to oblong-elliptic or ovate- oblong with glabrous margin
Perianth tube	white or cream	white or cream	yellowish-white or sometimes lilac in upper part
Perianth segments	linear to broadly elliptic subacute to obtuse	linear to oblong subobtuse to obtuse	oblong to oblanceolate obtuse to retuse
Filament channels	glabrous	glabrous or shortly ciliate at least on margins	densely pubescent
Filament	8-25 (-30) mm completely white with swollen yellowish base	6-20 mm white or cream with orange yellow base	5-10 (-12) mm white or cream, usually light pink in upper part with swollen brownish-yellow base
Anthers	with membranous margin	slightly or without membranous	with membranous margin
Capsule	oblong-ovoid to oblong-elliptic	margin elliptic to oblong	only elliptic

**Habitat:** Clearings of *Pinus*, *Cedrus*, *Olea*, *Abies*, and *Eucalyptus* forest, maquis, rocky and stony slopes, moist meadows.

**Altitudinal range:** 50-2000 m.

**Turkey distribution:** South and West Anatolia.

**World distribution:** Greece.

**Phytogeographical status:** East Mediterranean element.

**Flora of Turkey records:** C1 Muğla: 16 km from Knidos to Datça, 350 m, T. Baytop & Leep (ISTE 36236, fl.). C2 Muğla: Gökova to Marmaris, nr Akçapınar, 100 m, Brickell & Mathew 8299 (leaf). Antalya: Kaş to Demre, 15 km from Demre, 550 m, T. Baytop (ISTE 36677, leaf & fr.). C3 Antalya: Manavgat to Akseki, nr Murtiçi, 880 m, T. Baytop (ISTE 36680, leaf & fr.). C5

İçel: nr Fındıkpınar, Siehe 90 (fl.). C6 Gaziantep: Gaziantep, Aysoy 440 (fl.).

**Specimens examined:** C1 Muğla: Marmaris to Datça, 14 km to Datça, 100 m, 9.xi.1984, T. Baytop (ISTE 55081) - Datça to Knidos, 14 km from Datça, 350 m, 2.x.1976, T. Baytop (ISTE 36236, ISTF 39057) - Bodrum, Akçabük valley, 18.xi.1972, N. Aktaş (ISTF 39065) - Marmaris, Bayır village, moist meadows, 142 m, 20.x.2002, 36° 41' 600" N, 28° 10' 134" E, O.D. Düşen (2573), S. Düşen, K. Çetinkaya (AKDU) - Datça, 1 km from Yaka village, under *O. europeae*, 140 m, 19.x.2002, 36° 41' 683" N, 27° 28' 323" E, O.D. Düşen (2572), S. Düşen, K. Çetinkaya (AKDU). C2 Muğla: Marmaris to Datça, 27 km from Marmaris, 100 m, 3.v.1980, T. Baytop (ISTE 44120) - Marmaris to Bozburun, 21 km to Bozburun, *Pinus* forest, 250 m,

25.iii.1975, *T. Baytop* (ISTE 31363) - Marmaris to Datça, 27 km from Marmaris, 100 m, 3.v.1980, *T. Baytop* (ISTE 44120) - Marmaris to Bozburun, field openings, 24.x.1983, *N. Sütlüpinar* (ISTE 52487) - Marmaris to Datça, 14.iv.1988, *T. Baytop* (ISTE 58464) - Sakar Geçidi, Kızılağaç, Kırtarla-Kapuz, 3.vi.1979, *T. Baytop* (ISTE 43571) - Marmaris-Datça road, 57 km from Marmaris, *Eucalyptus* plantations, 110 m, 24.iii.1981, *T. Baytop* (ISTE 46123) - Muğla to Köyceğiz, Sakar mountain pass, 650 m, 21.iv.1978, *T. Baytop* (ISTE 39012) - Muğla to Gölbaşı, Sakar mountain pass, 670 m, 23.iv.1978, *T. Baytop* (ISTE 39077, ISTF 39056) - Muğla to Marmaris, Akçapınar village, Ferah district, 33 km from Muğla, *Pinus-Quercus* openings, 10.x.1975, *T. Baytop* (ISTE 33909) - Bayırköy to Bozburun, under the *Pinus* forest, 300 m, 1.x.1976, *T. Baytop* (ISTE 36230, ISTF 39060) - Fethiye to Köyceğiz, Tepearası village, under the *Pinus* forest, 50 m, 9.x.1975, *T. Baytop et al.* (ISTF 39061) - Gökova to Marmaris, Akçapınar village, under the *Pinus* forest, 100 m, 25.iii.1975, *T. Baytop et al.* (ISTF 39062) - Muğla to Köyceğiz, Tepearası village, *Pinus* alti, 50 m, 9.x.1975, *T. Baytop* (ISTE 33907) - Dalaman, west of Kocagöl, Hodul mountain, slopes, 100 m, 5.ix.1998, *O. Ünal 1102* (AKDU). Antalya: Kaş, 27.iii.1975, *T. Baytop* (ISTE 31374, ISTF 39063) - Kaş to Demre, 15 km to Demre, 550 m, 26.iv.1977, *T. Baytop* (ISTE 36677, ISTF 39058) - Elmalı, Akdağ, 1700 m, 28.v.1982, *N. Sütlüpinar* (ISTE 48862). C3 Isparta: Eğridir, Yaka village, Kapız stream, limestone slopes, *P. nigra* forest, 1250-1400 m, 24-25.ix.1975, *H. Peşmen* (2315), *A. Güner* (HUB 35220). Konya: Beyşehir, Kurucuova,

Suludere, *P. nigra-C. libani* forest, steppe, limestone, 1500-2000 m, 8.vi.1975, *H. Peşmen* (2218), *A. Güner* (HUB 35219) - Beyşehir, Kurucuova, Suludere, under the *P. nigra* and *C. libani* forest, 1300-1400 m, 21.ix.2002, 37° 40' 032" N, 31° 21' 791" E, *O.D. Düşen* (2555), *S. Düşen*, *K. Çetinkaya* (AKDU). Antalya: Akseki, Geyran plateau, Taşlıca Yayla Evleri, stony places, 9.vi.1995, 1350-1500 m, *A. Duran* (2600) (GAZI) - Akseki, Geyran plateau, *Abies cilicica* openings, 1400 m, 11.viii.1994, *H. Duman* (5638), *Z. Aytaç*, *A. Duran* (GAZI) - Elmalı, Akdağ, Yeşilgöl road, 1600 m, 29.x.1976, *T. Baytop* (ISTE 36225, ISTF 39059) - Manavgat-Akseki, Murtıçı, 880 m, 27.iv.1977, *T. Baytop* (ISTE 36680, ISTF 39055) - Akseki, Geyran plateau, Taşlıca Yayla Evleri, rocky and stony places, 1455 m, 15.ix.2002, 36° 55' 249" N, 31° 51' 949" E, *O.D. Düşen* (2551), *S. Düşen*, *K. Çetinkaya* (AKDU) - Akseki, Geyran plateau, Taşlıca Yayla Evleri, rocky and stony places, 1450-1460 m, 3.v.2003, *O.D. Düşen* (2551a), *S. Düşen* (AKDU). C4 Konya: Ermenek, Göktepe Town, Dumlugöze, Aşakbel Hill, 1900 m, 13.ix.1983, *H. Sümbül* (2410) (HUB 35217). C5 Konya: Ereğli, Alihora to Maden, *P. nigra* forest openings, limestone slopes, 1500 m, *S. Erik* (1491) (HUB 35216). Adana: Pozantı, 2 km to Tekir Plateau, 1350 m, 2.v.1987, *N. Sütlüpinar* (ISTE 57738) - Toros Mountains, Gülek mountain pass, 2000 m, 21.ix.1975, *T. Baytop* (ISTE 33848). İçel: Aydıncık to Gülnar, 9 km to Gülnar, Bozağaç Village, 8.v.1977, *T. Baytop* (ISTE 36696, ISTF 39066).

13. *Colchicum variegatum* L., Sp. Pl. 342 (1753). (Figure 13).

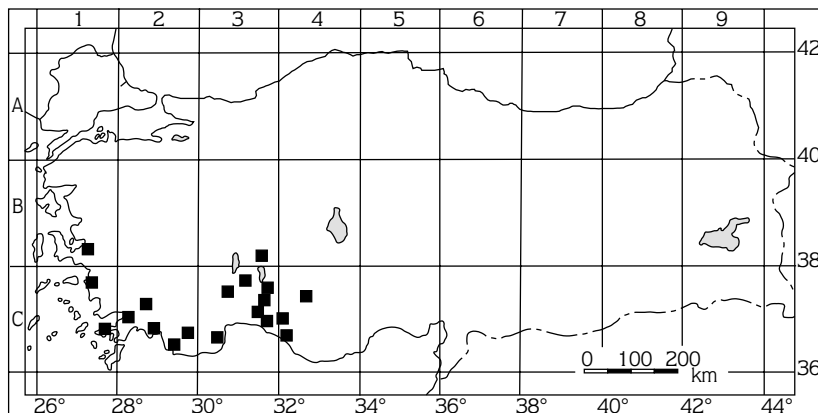


Figure 13. Distribution of *Colchicum variegatum* (■) in Turkey.

Typus : [Islands] Khios.

= *C. parkinsonii* Hooker in Bot. Mag. 100: t. 6090 (1894).

= *C. variegatum* L. var. *desii* Pamp. in Nuov. Giorn. Bot. Ital. 33: 21 (1926).

= *C. agrippinum* auct. non Hort. ex Baker in J. Linn. Soc. (Bot.) 17: 425 (1829).

**Description:** Corm 2-6 (-8) x 2-4.5 (-5) cm, ovoid to subglobose; outer tunics subcoriaceous to coriaceous, dark brown to blackish-brown, inner tunics membranous to subcoriaceous, light brown to reddish-brown; neck present, (2-) 3-15 x 0.5-1.5 (-1.8) cm. Cataphyll almost as long as neck, cream or yellowish-white. Leaves hysteranthous, 3-4, suberect to spreading, 6-13 (-15) x 0.7-2 (-2.5) cm at maturity, linear-lanceolate to ligulate, obtuse to acute, margins conspicuously undulate, glabrous. Flowers 1-2 (-3), rotate; perianth tube exceeding the cataphyll by 2-10 cm, white or yellowish-white; segments 2-5.5 (-7) x 0.5-2.5 cm, lanceolate to elliptic, each segment 10-21 veins, light or dark violet-purple, strongly tessellated, obtuse to acute, without auricles at base, filament channels glabrous. Stamens 1/2 or more longer of perianth limb in length; filaments 1.5-3.5 (-4) cm, white, cream or yellowish-white, glabrous; anthers 4-10 x 0.5-1.2 mm, purple, purplish-black or purplish-brown, without membranous margin. Styles straight or slightly curved and swollen at apex, cream, yellowish-white, light purplish-pink or violet-purple, stigmas decurrent for 0.5-2 mm. Capsule 1-4 x 0.8-1.5 (-2) cm, elliptic to oblong-ovoid, light or dark brown dotted when dry, obtuse, glabrous; seeds 1.5-4 mm diam., ovoid to subglobose, sometimes flattened laterally, light to dark brown. Flowering time, September-November; Leaves and fruiting time: February-May.

**Similar species:** *C. variegatum* is related to *C. agrippinum* Hort. ex Baker, which is a cultivated plant of unknown origin; differences are shown in Table 13.

**Habitat:** Rocky and stony slopes, among limestone boulders in rich terra rossa, clearings of *Quercus coccifera*, *Erica* and *Juniperus* scrubs, openings of *Pinus* and *Abies* forest, maquis.

**Altitudinal range:** 150-1700 m.

**Turkey distribution:** South, West, and Central Anatolia.

**World distribution:** Greece, Cyclades.

**Phytogeographical status:** East Mediterranean element.

**Flora of Turkey records:** B1 İzmir: Tahtalı Da., Bornm. 1906: 10038 (leaf). C1 Aydın: Dilek Yarımadası, A. Baytop (ISTE 26818, fl.). C2 Muğla: Muğla to Kale, 1000 m, T. Baytop et al. (ISTE 33913, fl.). Antalya: Elmalı to Kaş, 1400 m, T. Baytop & Leep (ISTE 36228, fl.). C3 Antalya: Yarpuz Da., 1200 m, D. 25780. Burdur: Burdur to Bucak, 5 km to Çeltikçi, T. Baytop et al. (ISTE 33889, fl.). Konya: 72 km from Beyşehir to Akseki, 1350 m, A. Baytop (ISTE 26887, fl.). Isparta: d. Eğridir, 2 km S. of Kapız De. towards Yaka Köyü, 1250-1400 m, Peşmen & Güner 2316 (fl.). C4 Antalya: Gündoğmuş, 1370 m, Allison et al. 77-8 (fl.).

**Specimens examined:** B1 İzmir: Bornova, Kurutepe, 3.iii.1978, T. Baytop (ISTF 38949) - Kemalpaşa, Karabel, under the *Pinus* forest, 1300 m, 10.x.1973, T. Baytop (ISTF 38963) - Karabel, Kemalpaşa, 1300 m, 10.x.1973, Baytop (ISTE 26755) - Nif mountain, 550 m, 26.iii.1981, Baytop (ISTE 46148). B3 Isparta: Şarkikaraağaç, Kızıldağ National Park, north slopes of the Zeybek Hill, water side, 1150-1300 m, 7.x.1995, B. Mutlu (1647) (HUB 35223). C1 Aydın: Selçuk to Kuşadası, 22.iv.1977, T. Baytop (ISTF 38948) - Samsun mountain, 220 m, 13.x.1973, A. Baytop (ISTF 38959, ISTE 26792) - Dilek Peninsula, maquis, 13.x.1973, A. Baytop (ISTF 38961) - Priene Ancient City, 900 m, 14.ix.2003, G. Semiz (1429) (AKDU) - Marmaris to Datça, *Pinus-Erica* openings, 10.x.1975, T. Baytop et al.

Table 13. Comparison of morphological characteristics between *C. variegatum* and *C. agrippinum*.

Morphological characters	<i>C. variegatum</i>	<i>C. agrippinum</i>
Leaves	with conspicuously undulate margins	with slightly undulate margins
Perianth segments	obtuse to acute strongly tessellated	subobtuse less pronounced tessellation

(ISTF 38951) - Marmaris to Datça, Hurmalibük, 275 m, 23.x.1983, *Sütlüpinar* (ISTE 52491). C2 Muğla: Bodrum to Milas, 25.ix.1975, *T. Baytop et al.* (ISTF 38953) - Muğla to Kale, 1000 m, 11.x.1975, *T. Baytop et al.* (ISTF 38954) - Dalaman, Göcekbeli mountain pass, under the *P. brutia* forest, 325 m, 30.xi.2001, A.A. Dönmez, S. Işık (HUB 10410) - Kale, Buynuzcuk mountain pass, *P. brutia* forest openings, serpentine, 1076 m, 21.ix.2001, A.A. Dönmez (HUB 10151). Antalya: Elmalı to Kaş, 1400 m, 30.x.1976, *T. Baytop, H.J. Leep* (ISTF 38958, ISTE 36228). C3 Isparta: Eğridir, Yaka village, Kapız stream, deep limestone valley, *P. nigra* forest, 1250-1400 m, 24-25.ix.1975, H. Peşmen, A. Güner (2316) (HUB 35224) - Davras mountain, South slopes, 1400-1450 m, 6.x.1980, *T. Baytop* (ISTF 38947) - Davras mountain, 1000 m, 6.x.1980, *Baytop* (ISTE 45870) - Eğridir, 9-10 km to Yaka village, moist meadows, 1215-1220 m, 21.ix.2002, 37° 44' 504" N, 31° 09' 266" E, *O.D. Düşen* (2552), *S. Düşen, K. Çetinkaya* (AKDU) - Eğridir, 2 km to Yaka village, moist meadows, 1220-1225 m, 21.ix.2002, 37° 43' 605" N, 31° 12' 987" E, *O.D. Düşen* (2553), *S. Düşen, K. Çetinkaya* (AKDU) - Eğridir, Yakaavşar town, stony and rocky slopes, 1200-1210 m, 20.ix.2003, 37° 45' 125" N, 31° 09' 892" E, *O.D. Düşen* (2635), *S. Düşen, K. Çetinkaya* (AKDU). Burdur: Burdur to Bucak, *Pinus* forest, 5.x.1975, *T. Baytop et al.* (ISTF 38955). Konya: Beyşehir, Kurucuova, Ülüğün hill, limestone, 1300 m, 15.x.1975, H. Peşmen, A. Güner (2346) (HUB 35222) - Akseki to Beyşehir, *Quercus-Pinus-Juniperus* openings, 1350 m, 16.x.1973, A. Baytop (ISTF 38960) - Akseki-Beyşehir road, 48 km to Beyşehir, Bakeran village, under *P. nigra*, 1500 m, 16.x.1973, *Baytop* (ISTE 26889) - Beyşehir, Kurucuova, Ülüğün hill, North slopes, 1223-1225 m, 21.ix.2002, 37° 41' 775" N, 31° 24' 940" E, *O.D. Düşen* (2554), *S. Düşen, K. Çetinkaya* (AKDU). Antalya: Kemer, Üçoluk village, 1250 m, 6.x.1977, H. Peşmen (3575), Ş. Yıldırım (HUB 35221) - Akseki, Salamut plateau, Cedar forest openings, 1600-1700 m, 13.x.1995, A. Duran (3311) (GAZI) - Around Akseki, 27.iv.1977, *T. Baytop* (ISTF 38950) - Akseki, *Abies*, 1450 m, 7.x.1975, *T. Baytop et al.* (ISTF 38956) - Zorban to Kınık, 1180 m, 9.x.1975, *Baytop* (ISTE 33906, ISTF 38952) - Upper places of Akseki, Irmasan mountain pass, *Abies* forest, 1450 m, 7.x.1975, *Baytop* (ISTE 33898) - Akseki, Fersin, Çaltı, *P. brutia* forest, 800 m, 30.ix.2001, 36° 51' 140" N, 31° 46' 285" E, *O.D. Düşen* (2442), *S. Düşen, K. Çetinkaya* (AKDU) - İbradı-Derebucak road, 14-

15 km, Yayla Evleri, northern moist slopes, 1375-1400 m, 29.ix.2002, *O.D. Düşen* (2564), *S. Düşen, K. Çetinkaya* (AKDU) - İbradı-Derebucak road, 14-15 km, Yayla Evleri, northern moist slopes, 1350-1400 m, 19.iv.2003, *O.D. Düşen* (2564a), *S. Düşen* (AKDU). C4 Antalya: Alanya, Türbelinaz Plateau, 1000 m, 16.ix.1968, B.L. Burt (ISTE 14396) - Alanya-Hadim road, 70 km, 5.x.2003, 36° 42' 613" N, 32° 26' 895" E, R.S. Göktürk (5829), *O. Ünal* (AKDU) - Gündoğmuş, 10 km to Gündoğmuş, *Q. coccifera* openings, 1000 m, 29.ix.2001, 36° 48' 919" N, 31° 55' 829" E, *O.D. Düşen* (2438), *S. Düşen, K. Çetinkaya* (AKDU) - Gündoğmuş, Gündoğmuş to Güzelbağ, 1-2 km, *Q. coccifera* openings, 900-1000 m, 11.iii.2002, 36° 48' 253" N, 32° 00' 304" E, *O.D. Düşen* (2489), *S. Düşen, K. Çetinkaya* (AKDU) - Gündoğmuş, Kahveler, Söbüçimen plateau, in the valley, 1450 m, 11.ix.1999, R.S. Göktürk, *O. Ünal* (1134), M. Gökçeoğlu, F. Topcuoğlu (AKDU). Konya: Bozkır, Çat, Hanboğazı, 1650 m, 16.vi.1983, *Baytop* (ISTE 50811) - Bozkır, Çağlayan, 4-5 km north of Çağlayan, Çat plateau road, 1395 m, 22.ix.2002, 37° 09' 134" N, 32° 11' 141" E, *O.D. Düşen* (2559), *S. Düşen, K. Çetinkaya* (AKDU) - Bozkır, Ahırlı, Bartlı plateau, moist meadows 1345 m, 22.ix.2002, 37° 10' 936" N, 32° 05' 510" E, *O.D. Düşen* (2561), *S. Düşen, K. Çetinkaya* (AKDU)

14. *Colchicum cilicicum* (Boiss.) Dammer in Gard. Chron. ser. 3, 23:34, f. 12 (1898). (Figure 14).

Syntypus: [Turkey C5 İçel] in Tauro Cilicico a pago Gülek usque ad regionem Cedrorum, 1220-1980 m, [22.ix.1853], Kotschy 84 (G,K); *ibid.*, Balansa (G); ad pylas Cilicicas (Gülek Boğazı), Heldreich (G); [C5 Hatay] in cacumine montis Cassii (Akra Da.), Boissier (G).

= *C. byzantinum* Ker-Gawler var. *cilicicum* Boiss., Fl. Or. 5: 160 (1882).

= *C. balansae* Planchon var. *macrophyllum* Siehe apud Hayek in Ann. Nat. Hofmus. Wien 28: 183 (1914) non *C. macrophyllum* B.L.Burt (1951).

= *C. decaisnei* sensu Lynch in Gard. Chron. ser. 3, 60: 204, f. 79 (1916) non Boiss. (1882).

= *C. speciosum* sensu Stef., Monogr. *Colchicum* 80 (1926) p.p. quoad plantas cilicicas non Steven (1829).

= *C. byzantinum* auct. non Ker-Gawler sub Bot. Mag. 25: t. 1028 (1807).

**Description:** Corm 2-7 x 1.5-5.5 (-6) cm, ovoid to subglobose; outer tunics papery to subcoriaceous,



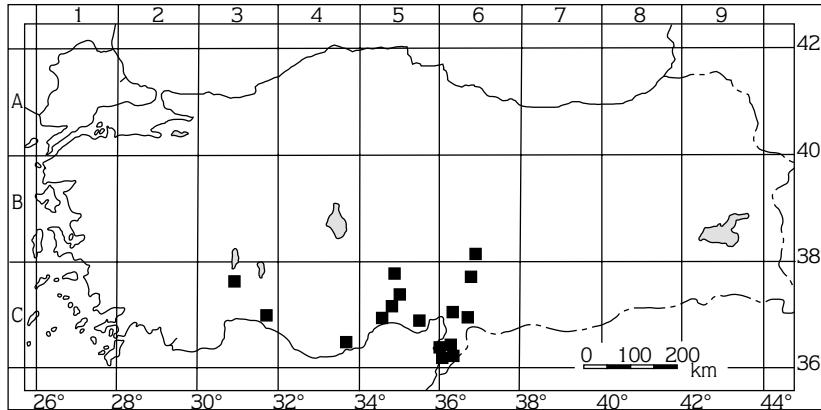


Figure 14. Distribution of *Colchicum cilicicum* (■) in Turkey.

reddish-brown to dark brown, inner tunics membranous, yellowish-brown to reddish-brown; neck present, 3-15 (-17) x 0.8-2 (-2.2) cm. Cataphyll 3.5-18 (-20) x 0.5-2 cm, white or cream, sometimes purplish-red in upper part. Leaves hysteranthous, 3-5, suberect to spreading, 15-30 (-40) x 3-10 (-12) cm at maturity, oblong-lanceolate to elliptic-lanceolate or narrowly elliptic-ovate, subobtuse to obtuse, margins slightly undulate, glabrous. Flowers 1-15 (-25), funnel-shaped to campanulate; perianth tube exceeding the cataphyll by 2-15 cm, white or cream, sometimes purplish in upper part; segments 3-7 (-7.5) x 0.7-2.5 (-2.8) cm, narrowly elliptic to oblanceolate or obovate, each segment 10-15 (-20) veins, light pinkish-purple to violet-purple, slightly or sometimes strongly tessellated, acuminate to obtuse, without auricles at base, filament channels puberulous or pubescent. Stamens longer than 1/2 of perianth limb in length; filaments 1.5-3.5 (-4) cm, white or cream, sometimes lilac in upper part, with slightly swollen light yellow to golden yellow base, glabrous; anthers 5-10 x 0.8-1.2 mm, yellow, without membranous margin. Styles longer than stamens, filiform, straight or slightly curved at apex, stigmas punctiform or decurrent for 0.4-1 mm. Capsule 2-4 x 1.5-2.5 cm, elliptic to ovoid, reddish-brown or brown dotted when dry, rostrate, glabrous; seeds 2.5-4 mm diam., almost globose, light to dark brown. Flowering time, August-November; Leaves and fruiting time: April-June.

**Similar species:** *C. cilicicum* is similar to *C. davisii* C.D.Brickell, *C. dolichantherum* K.M.Perss., and *C. imperatoris-friderici* Siehe ex K.M.Perss., and so differences between these species are shown in Table 14.

**Habitat:** Rocky and stony slopes, clearings of *Pinus*, *Quercus*, and *Olea* forest.

**Altitudinal range:** 250-2500 m.

**Turkey distribution:** South and West Anatolia.

**World distribution:** Syria, Lebanon.

**Phytogeographical status:** East Mediterranean element.

**Flora of Turkey records:** C3 Isparta: Dedegöl Da., 1600 m, cult. K, 14.viii.1975, Sorger s.n. (fl.). C4 İçel: Gülnar to Silifke, 1100 m, Brickell & Mathew 8442. C5 İçel: 11-12 km S.E. of Gülek, 1500 m, Siehe 1895: 323 (fl.). Niğde: Ulukele, Alihoca, 1200 m, Erik 2921 (leaf). Adana: nr Missis (Misis) on Pyramus (Ceyhan river), Siehe 94. Hatay: summit of Cassius (Akra Da.), Thiébaud. C6 Adana: Osmaniye to Sorgun Y., 1300 m, Kasaplıgil 91 (fl). Maraş: 10 km N. of Andirin, 1000 m, Sorger 73-13-37 (leaf & fr.).

**Specimens examined:** B6 Kahramanmaraş: Göksun, Bahçeobası village, 27.v.1988, *Baytop* (ISTE 59287). C3 Antalya: Akseki, Geyran plateau, Taşlıca Yayla Evleri, stony and rocky slopes, 1510 m, 30.ix.2001, 36° 55' 129" N, 31° 51' 880" E, *O.D. Düşen* (2439), *S. Düşen*, *K. Çetinkaya* (AKDU) - Akseki, Geyran plateau, Taşlıca Yayla Evleri, stony and rocky slopes, 1500-1550 m, 26.v.2002, *O.D. Düşen* (2439a), *S. Düşen* (AKDU). C5 Hatay: Saint Pierri mountain, rocky places, 13.iii.1975, *M. Miski* (ISTF 38981) - Amanus mountain, Daz hill, 1650 m, 1.x.1976, *M. Miski* (ISTF 38982) - Şenköy, Ziyaret mountain, 1000 m, 12.v.1976, *T. Baytop* (ISTF 38983, ISTE 34855). İçel: İçel to Fındıkpınar, 13.x.1975, *T. Baytop et al.* (ISTF 38984, ISTE 33921) -

Table 14. Comparison of morphological characteristics between *C. cilicicum*, *C. davisii*, *C. dolichantherum*, and *C. imperatoris-friderici*.

Morphological characters	<i>C. cilicicum</i>	<i>C. davisii</i>	<i>C. dolichantherum</i>	<i>C. imperatoris-friderici</i>
Corm	ovoid to subglobose	elliptic to oblong-ovoid or asymmetric ovoid	ovoid to ovoid-globose	narrowly ovoid to broadly ovoid
Outer tunics	papery to subcoriaceous reddish-brown to dark brown	membranous light brown to brown	subcoriaceous to coriaceous dark brown to blackish-brown	coriaceous to papery brown to dark brown
Cataphyll	white or cream, sometimes purplish-red in upper part	completely light yellow or whitish-yellow	cream or yellowish-white, sometimes purplish-red in upper part	cream or yellowish-white, sometimes reddish-purple in upper part
Leaves	suberect to spreading oblong-lanceolate to elliptic-lanceolate or narrowly elliptic-ovate glabrous	suberect to spreading lanceolate-oblong to oblong glabrous	only spreading oblong-lanceolate to ligulate or elliptic scabrose to shortly ciliate	suberect to spreading narrowly oblong to oblong-elliptic or ovate-oblong
Flowers	funnel-shaped to campanulate	narrowly campanulate	only funnel-shaped	only funnel-shaped
Perianth tube	white or cream, sometimes purplish in upper part	white or yellowish-white, sometimes lilac in upper part	completely white or cream	yellowish-white or cream, sometimes purplish-pink in upper part
Perianth segments	narrowly elliptic to oblanceolate or obovate light pinkish-purple to violet-purple slightly or sometimes strongly tessellated	narrowly oblong to elliptic-oblong to oblong-lanceolate white, light or dark lilac slightly or sometimes strongly tessellated	linear to oblong white, light or dark lilac not tessellated	oblong to oblanceolate white, light pink or purplish-pink not tessellated
Filament channels	puberulous or pubescent	puberulous to pubescent	glabrous or shortly ciliate at least on margins	densely pubescent
Filaments	15-35 (-40) mm white or cream, sometimes lilac in upper part slightly with swollen light yellow to golden yellow base	(10-) 12-22 mm completely whitish with swollen light yellow base	6-20 mm completely white or cream with swollen orange yellow base	5-10 (-12) mm white or cream, usually light pink in upper part with brownish-yellow base
Anthers	5-10 x 0.8-1.2 mm without membranous margin	(9-) 10-16 x 1-2 mm without membranous margin	5-15 x 1-1.5 mm slightly membranous margin or not	5-10 x 0.8-1.5 mm with membranous margin
Styles	straight or slightly curved at apex	swollen and curved at apex	thick and curved at apex	thickened and hooked to curved at apex
Stigmas	punctiform or decurrent or 0.4-1 mm	decurrent for 2-5 mm	decurrent for up to 2 mm	decurrent for 0.5-2 mm or not
Capsule	elliptic to ovoid	elliptic to oblong-elliptic	elliptic to oblong	only elliptic
Seeds	2.5-4 mm diam.	(3-) 4-5 mm diam.	2-4.5 mm diam.	2-4 mm diam.

Tarsus, Gülek mountain pass road, stony slopes, 270 m, 9.xi.1973, A. Baytop, E. Tuzlacı (ISTF 38977) - Tarsus-Gülek mountain pass, 25 km from Tarsus, stony slopes, 270 m, 9.xi.1973, H.J. Leep (ISTE 27087) - Tarsus to Pozantı, Sıraköy, *O. europaeae* openings, 250 m, 26.x.2001, 37° 02' 310" N, 34° 51' 375" E, O.D. Düşen (2458), S. Düşen, K. Çetinkaya (AKDU). Adana: Pozantı, Tarsus, Taşobası village, Sudüştü, 250 m, 2.v.1987, *Sütlüpinar* (ISTE 57739) - Pozantı, Bürücek plateau, rocky places, 1500 m, 23.viii.1989, Z. Aytaç (GAZI). Niğde: Çamardı, Demirkazık mountain, Narpuz Mountain pass, 2000-2500 m, 26.ix.1994, M. Vural (7218), M. Koyuncu, M. Ekinci (GAZI). C6 Adana: Osmaniye, Ürün plateau, 650-750 m, 20.x.1987, *Sütlüpinar* (ISTE 58326) - Mitisin plateau, 1300 m, 18.vi.1987, *Sütlüpinar* (ISTE 57992). Hatay: Şenköy, 1000 m, 7.iv.1989, Baytop (ISTE 60153).

15. *Colchicum sanguicolle* K.M.Perss. in Edinb. J. Bot. 56: 92, f. 1E, 4B (1999). (Figure 15).

Typus: Turkey C2 Antalya: Akçay, Ak Dağ near Yeşilgöl, 1650-1800 m, 29.ix.1976, T. Baytop & Leep (ISTE 36226), (holo. ISTE; iso. GB).

**Description:** Corm 2.5-4.5 (-6) x 1.5-4.5 cm, usually asymmetric, ovoid-oblong to ovoid; tunics membranous, light brown to reddish-brown; neck present, 3-8 (-10) x 0.6-1.5 (-2) cm. Cataphyll 5-15 x 0.4-1.2 (-1.5) cm, completely or in upper part reddish-purple, white or cream, sometimes purplish-red at apex. Leaves hysteranthous, 3 (-4), suberect to spreading, 18-28 (-30) x 3-4 (-5) cm at maturity, ligulate, obtuse to retuse,

margins slightly undulate, glabrous. Flowers (1-) 2-4, campanulate; perianth tube exceeding the cataphyll by 1-8 (-10) cm, white or yellowish-white, sometimes purplish-pink in upper part; segments 2.5-6 x 0.8-2.5 cm, elliptic to oblanceolate or obovate, each segment 10-30 veins, pinkish-purple to violet-purple, white or yellowish-white at base, not tessellated, subobtuse to retuse, without auricles at base, cucullate, filament channels glabrous and 1-3 filiform teeth. Stamens 1/2 to 2/3 of perianth limb in length; filaments 1-3.5 (-4) cm, white or cream, with swollen yellow base, glabrous; anthers 4-10 (-12) x 0.8-1.5 (-2) mm, yellow, without membranous margin. Styles equal or longer than stamens, straight or slightly curved at apex, white or cream, stigmas punctiform or decurrent for 0.4-0.6 mm. Capsule ground level, 1.5-3.5 x 0.8-1.5 (-1.8) cm, oblong-elliptic to oblong-ovoid, dark brown or blackish-brown dotted when dry, obtuse to apiculate, glabrous; seeds 2-4 (-5) mm diam., ovoid to globose, reddish-brown to dark brown. Flowering time, September-October; Leaves and fruiting time: May-June.

**Similar species:** Because of the long styles and the size of the leaves, *C. sanguicolle* was included in *C. cilicicum* in Flora of Turkey vol. 8 (Brickell 1984), but it was described as a new species from Ak Dağ, Yeşilgöl (Elmalı/Antalya) by K.M. Persson in 1999. These distributions of the 2 species are distinctly separate. While *C. sanguicolle* is distributed in the west of the Mediterranean region, *C. cilicicum* is distributed in the centre and east of the Mediterranean region. In addition, differences between these species are shown in Table 15.

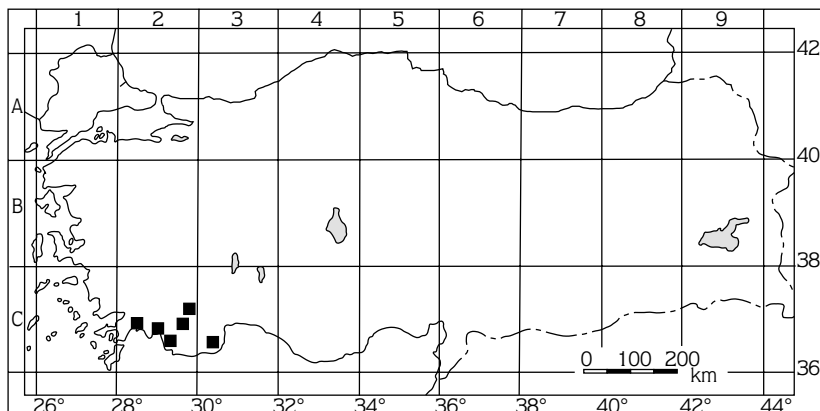


Figure 15. Distribution of *Colchicum sanguicolle* (■) in Turkey.

Table 15. Comparison of morphological characteristics between *C. sanguicolle* and *C. cilicicum*.

Morphological characters	<i>C. sanguicolle</i>	<i>C. cilicicum</i>
Corm	ovoid-oblong to ovoid	ovoid to subglobose
Outer tunics	membranous light brown to reddish-brown	papery to subcoriaceous reddish-brown to dark brown
Cataphyll	completely or in upper part reddish-purple	white or cream, sometimes purplish-red in upper part
Leaves	ligulate	oblong-lanceolate to elliptic-lanceolate or narrowly elliptic-ovate
Perianth segments	pinkish-purple to violet-purple, white or yellowish-white at base not tessellated subobtuse to retuse	light pinkish-purple to violet-purple, not white or yellowish white at base slightly or sometimes strongly tessellated acuminate to obtuse
Filament channels	glabrous and 1-3 filiform teeth	filament channels puberulous or pubescent and not 1-3 filiform teeth
Capsule	oblong-elliptic to oblong-ovoid dark brown or blackish-brown dotted when dry obtuse to apiculate	elliptic to ovoid reddish-brown or brown dotted when dry rostrate
Seeds	ovoid to globose	almost globose

**Habitat:** Moist meadows, rocky and stony slopes, edges of *Cedrus* forest.

**Altitudinal range:** 1200-1880 m.

**Turkey distribution:** South and West Anatolia. Endemic (EN).

**Phytogeographical status:** East Mediterranean element.

**Flora of Turkey records:** C2 Muğla: Baba Dağ near Fethiye, cult. K 16.x.1977, Polunin 14920; ibid. above Ovacık, 1200-1250 m, K. Persson 513. Antalya: Göğübeli (Gülübeli Geçidi) to Seki, 1750 m, Kerndorff & Pasche 93-68; Elmalı, Ak Dağ, Yeşilgöl, 1600-1800 m, Sarıyar (ISTE 44511). C3 Antalya: Tahtalı Dağ, 1350 m, Kerndorff & Pasche 96-17.

**Specimens examined:** C2 Antalya: Elmalı, Akdağ, Yeşilgöl, 1600-1800 m, 10.vi.1980, *G. Sarıyar* (ISTF 39165) - Akçay, Akdağ, Yeşilgöl, 29.ix.1976, *T. Baytop & H.J. Leep* (ISTF 39166) - Gömbe, Akdağ, Yeşilgöl, rocky-stony slopes, 1880 m, 22.ix.2001, 36° 34' 036" N, 29° 36' 797" E, *O. D. Düşen* (2432), *S. Düşen*, *K. Çetinkaya* (AKDU) - Gömbe, Akdağ, Yeşilgöl, rocky-stony slopes, 1880 m, 22.vi.2002, 36° 34' 036" N, 29° 36'

794" E, *O.D. Düşen* (2524), *S. Düşen*, *K. Çetinkaya* (AKDU) - Gömbe, Akdağ, Yeşilgöl, rocky-stony slopes, 1800 m, 2.x.2002, *O.D. Düşen* (2566), *S. Düşen*, *B. Yalım*, *D. Şirin* (AKDU). Muğla: Köyceğiz, Sultaniye village, Ülemez hill, limestone, rocky area, 900 m, 5.ix.1991, *A. Güner* (10214), *M. Vural*, *H. Duman*, *H. Şağban* (HUB 35210) - Fethiye, Ceylanköy, Eren Tepe, 1700 m, 2.x.2002, *O.D. Düşen* (2566), *S. Düşen*, *B. Yalım*, *D. Şirin* (AKDU).

16. *Colchicum davisii* C.D.Brickell in New Plantsman 5: 15, f.p. 17 (1998). (Figure 16).

Typus: Turkey C6 Adana: Dumanlı Dağ above Haruniye, 19.iv.1957, Davis 26938 (holo. E; iso. GB, Wisley).

= *C. speciosum* sensu Rech. f. in Ark. Bot. 5: 78 (1960) non Steven (1829).

**Description:** Corm 3.5-8 x 1.5-4.5 (-5) cm, elliptic to oblong-ovoid or asymmetric ovoid; tunics membranous, light brown to brown; neck present, 3-12 (-14) x 1-2.5 cm. Cataphyll stout, (5-) 8-20 x 0.4-1.2 (-1.5) cm, light yellow or whitish-yellow. Leaves hysteranthous, 3, suberect to spreading, 15-35 x 4.5-8 cm at maturity,

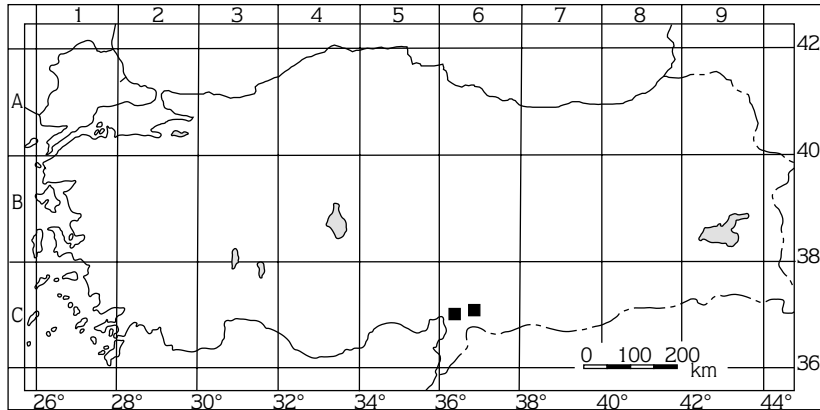


Figure 16. Distribution of *Colchicum davisii* (■) in Turkey.

lanceolate-oblong to oblong, subacute to obtuse, margins slightly undulate or flat, glabrous. Flowers 1-5 (-10), narrowly campanulate; perianth tube exceeding the cataphyll by 2-15 cm, white or yellowish-white, sometimes purplish-pink in upper part; segments 3.5-6.5 x 0.8-1.5 (-2) cm, narrowly oblong to elliptic-oblong to oblong-lanceolate, each segment 10-21 (-23) veins, pinkish-purple to violet-purple, slightly or sometimes strongly tessellated, acuminate to rounded, without auricles at base, cucullate, filament channels distinct, puberulous to pubescent. Stamens 1/2 to 1/3 of perianth limb in length; filaments (10-) 12-22 mm, whitish, with swollen light yellow base, glabrous; anthers (9-) 10-16 x 1-2 mm, yellow, without membranous margin. Styles longer than stamens, swollen and curved at apex, white, stigmas decurrent for 2-5 mm. Capsule 1.5-3 x 0.8-1.5 cm, elliptic to oblong-elliptic, rostrate, glabrous; seeds (3-) 4-5 mm diam., subglobose, reddish-brown to dark brown. Flowering time, August-September; Leaves and fruiting time: April-June.

**Similar species:** *C. davisii*, which was described as a new species from Dumanlı Mountain (Haruniye/Adana) by C.D. Brickell in 1998, is related to *C. cilicicum* (Boiss.) Dammer, and *C. speciosum* Steven. Comparison of morphological characteristics between these species is shown in Table 16.

**Habitat:** Openings of forest, moist meadows, rocky and stony slopes.

**Altitudinal range:** 1000-1950 m.

**Turkey distribution:** South and South-East Anatolia. Endemic (EN).

**Phytogeographical status:** East Mediterranean element.

**Flora of Turkey records:** C6 Adana: mountain above Osmaniye, 8.ix.1884, Pos; Mont. Amanus, Haradjian 168. Gaziantep: Kartal Dağı, 45 km before Gaziantep from Nur Dağı Geçidi, 1050 m, Kammerl. & al. 90-100.

**Specimens examined:** C6 Osmaniye: Düziçi, Haruniye, Dumanlı mountain, Oğulluk, openings of forest, 1280 m, 4.ix.2003, 37° 16' 093" N, 36° 30' 905" E, O.D. Düşen (2627), S. Düşen, K. Çetinkaya (AKDU) - Düziçi, Haruniye, Dumanlı mountain, Dumanlı, openings of forest, 1400 m, 4.ix.2003, 37° 16' 483" N, 36° 31' 357" E, O.D. Düşen (2628), S. Düşen, K. Çetinkaya (AKDU).

**17. *Colchicum dolichantherum*** K.M.Perss. in Edinb. J. Bot. 56: 126, f. 2C-D, 4D (1999). (Figure 17).

**Typus:** Turkey C6 Adana/Gaziantep: Nur Dağı Geçidi, summit (1150 m), in grass among *Quercus* scrub, 27.x.1988, K. Persson 465 (holo. GB; iso. E).

= *C. balansae* var. *macrophyllum* Siehe ex Hayek in Ann. Naturhist. Mus. Wien 28: 183 (1914), non *C. macrophyllum* B.L. Burt (1951).

**Description:** Corm 3-6.5 x 2.5-5 (-5.5) cm, ovoid to ovoid-globose; outer tunics subcoriaceous to coriaceous, dark brown to blackish-brown, inner tunics membranous, yellowish-brown to reddish-brown; neck present, 3-20 x 0.5-1.5 cm, thinly fibrose. Cataphyll 5-22 x 0.2-1.2 cm, cream or yellowish-white, sometimes purplish-red in upper part. Leaves hysteranthous, 4-5 (-6), spreading, 18-50 (-55) x 3.5-12 cm at maturity, oblong-lanceolate

Table 16. Comparison of morphological characteristics between *C. davisii*, *C. cilicicum*, and *C. speciosum*.

Morphological characters	<i>C. davisii</i>	<i>C. cilicicum</i>	<i>C. speciosum</i>
Corm	elliptic to oblong-ovoid or asymmetric ovoid	ovoid to subglobose	oblong-ovoid
Outer tunics	membranous light brown to brown	papery to subcoriaceous reddish-brown to dark brown	papery to subcoriaceous dull mid-brown
Cataphyll	completely light yellow or whitish-yellow	white or cream, sometimes purplish-red in upper part	---
Leaves	3 suberect to spreading lanceolate-oblong to oblong subacute to obtuse	3-5 suberect to spreading oblong-lanceolate to elliptic-lanceolate or narrowly elliptic-ovate subobtuse to obtuse	(3-) 4-5 only suberect narrowly elliptic to oblong-lanceolate only obtuse
Flowers	narrowly campanulate	funnel-shaped to campanulate	narrowly campanulate to campanulate
Perianth tube	white or yellowish-white, sometimes purplish-pink in upper part	white or cream, sometimes purplish in upper part	green or white flushed purple
Perianth segments	3.5-6.5 x 0.8-1.5 (-2) cm narrowly oblong to elliptic-oblong to oblong-lanceolate white, light or dark lilac slightly or sometimes strongly tessellated acuminate to rounded	3-7 (-7.5) x 0.7-2.5 (-2.8) cm narrowly elliptic to oblanceolate or obovate light pinkish-purple to violet-purple lightly or sometimes strongly tessellated acuminate to obtuse	(4.5-) 6-7 (-8) x (1-) 1.8-2.7 cm oblanceolate to oblong-lanceolate or elliptic pale to deep rosy-purple not tessellated rounded to subacute
Filaments	(10-) 12-22 mm completely whitish with swollen light yellow base	15-35 (-40) mm white or cream, sometimes lilac in upper part with slightly swollen light yellow to golden yellow base	10-18 mm
Anthers	(9-) 10-16 x 1-2 mm	5-10 x 0.8-1.2 mm	10-12 x 1-2 mm
Styles	swollen and curved at apex	straight or slightly curved at apex	curved but not or only very slightly swollen at apex
Stigmas	decurrent for 2-5 mm	punctiform or decurrent for 0.4-1 mm	decurrent for 2-4 mm
Capsule	1.5-3 x 0.8-1.5 cm elliptic to oblong-elliptic rostrate	2-4 x 1.5-2.5 cm elliptic to ovoid rostrate	4-5 x 2.5-3 cm ellipsoid acute
Seeds	(3-) 4-5 mm diam.	2.5-4 mm diam.	---

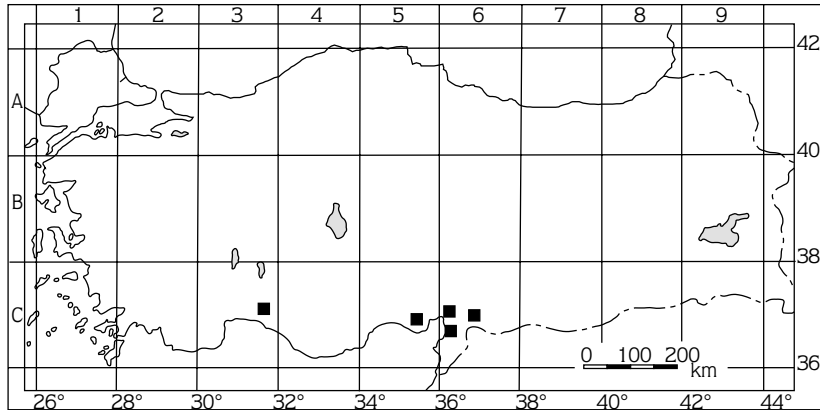


Figure 17. Distribution of *Colchicum dolichantherum* (■) in Turkey.

to ligulate or elliptic, cucullate, obtuse to retuse, margins slightly undulate, scabrose to shortly ciliate. Flowers 2-15, funnel-shaped; perianth tube exceeding the cataphyll by 1.5-6.5 cm, white or cream; segments 2-5 (-5.5) x 0.4-1.3 (-1.5) cm, linear to oblong, each segment 7-25 veins, white, light or dark lilac, not tessellated, subobtuse to obtuse, without auricles at base, filament channels glabrous or shortly ciliate at least on margins. Stamens 1/2 to 1/3 of perianth limb in length; filaments 6-20 mm, white or cream, with swollen orange yellow base, glabrous; anthers 5-15 x 1-1.5 mm, yellow, slightly membranous margin or not. Styles equal or longer than stamens, thick and curved at apex, stigmas decurrent for 0.5-2 mm or not. Capsule ground level, 2-5 x 1-2.5 cm, elliptic to oblong, rostrate, brown dotted when dry, glabrous; seeds 2-4.5 mm diam., subglobose, reddish-brown to brown. Flowering time, August-November; Leaves and fruiting time: April-June.

**Similar species:** *C. dolichantherum* was described as a new species by Karin Persson in 1999. This species is similar to *C. balansae* Planch. and *C. cilicum* (Boiss.) Dammer, and so differences between these species are shown in Table 17.

**Habitat:** Moist meadows, *Quercus* shrubs, rocky and stony slopes, clearings of maquis.

**Altitudinal range:** 30-1500 m.

**Turkey distribution:** South and South-East Anatolia.

**World distribution:** North Syria.

**Phytogeographical status:** East Mediterranean element.

**Flora of Turkey records:** C3 Antalya: 10 km from Akseki to Cevizli on old road, 1500 m, K. Persson 447 & 556. C5 Adana: auf sumpfigen Wiesen bei Missis am Pyramus (= Ceyhan river), Siehe 94. C6 Adana: Amanus, Altik, iv. 1937, Louis. Adana/Gaziantep: near Fevzipaşa in pass, 1150 m, Sønnerhausen 1070. Hatay: above Belen, W. side of pass, 700 m, J. & J. Archibald 6171.

**Specimens examined:** C6 Adana/Gaziantep: Nur mountain, Gökhöyük, Islahiye Erosion Control Area, moist slopes, 520 m, 27.x.2001, 37° 09' 508" N, 36° 43' 001" E, *O.D. Düşen (2459)*, *S. Düşen*, *K. Çetinkaya* (AKDU) - Fevzipaşa, forest openings, 607 m, 28.x.2001, 37° 06' 209" N, 36° 39' 244" E, *O.D. Düşen (2461)*, *S. Düşen*, *K. Çetinkaya* (AKDU) - Nur mountain, Gökhöyük, northern moist slopes, 520 m, 28.x.2001, 37° 08' 506" N, 36° 42' 003" E, *O.D. Düşen (2459)*, *S. Düşen*, *K. Çetinkaya* (AKDU) - Fevzipaşa, forest openings, 600-610 m, 1.vi.2002, *O.D. Düşen (2461a)*, *S. Düşen*, *K. Çetinkaya* (AKDU).

**18. *Colchicum imperatoris-friderici*** Siehe ex K.M.Perss. in Edinb. J. Bot. 56: 129, f. 2E-F (1999). (Figure 18).

**Typus:** [Turkey C4 İçel] Unweit der Calycadnus [=Göksu river] bei der Kirche der heiligen Thekla, Seleucia [= Silifke], 100 m, October, Siehe Fl. orient. 99 (holo. JE; iso. LE).

**Description:** Corm (2.5-) 3-8 x 2-6 (-8) cm, narrowly ovoid to broadly ovoid; outer tunics coriaceous to papery, brown to dark brown, inner tunics membranous, yellowish-brown to light brown; neck present, 4-15 x 0.5-2 cm. Cataphyll 2-6 cm longer than neck, cream or

Table 17. Comparison of morphological characteristics between *C. dolichantherum*, *C. balansae*, and *C. cilicicum*.

Morphological characters	<i>C. dolichantherum</i>	<i>C. balansae</i>	<i>C. cilicicum</i>
Outer tunics	subcoriaceous to coriaceous dark brown to blackish-brown	coriaceous dark brown to blackish-brown	papery to subcoriaceous reddish-brown to dark brown
Neck	being up to 20 cm long thinly fibrose	being up to 50 cm long strongly fibrose	being up to 15 (-17) cm long not fibrose
Cataphyll	longer than neck cream or yellowish-white, sometimes purplish-red in upper part	as long as neck completely white or yellowish-white	longer than neck white or cream, sometimes purplish-red in upper part
Leaves	spreading with scabrose or shortly ciliate margin	suberect to spreading with glabrous margin	suberect to spreading with glabrous margin
Flowers	funnel-shaped	funnel-shaped	funnel-shaped to campanulate
Perianth tube	white or cream	white or cream	white or cream, sometimes purplish in upper part
Perianth segments	linear to oblong white, light or dark lilac not tessellated glabrous or shortly ciliate at least on margins	linear to broadly elliptic light pinkish-purple to violet- purple not tessellated glabrous white	narrowly elliptic to oblanceolate or obovate light pinkish-purple to violet-purple slightly or sometimes strongly tessellated puberulous or pubescent
Filaments	white or cream	white	white or cream, sometimes lilac in upper part
Styles	thick and curved at apex	curved at apex	straight or slightly curved at apex
Stigmas	decurrent for up to 2 mm	decurrent for 1-3 mm	punctiform or decurrent for up to 1 mm
Capsule	elliptic to oblong	oblong-ovoid to oblong-elliptic	elliptic to ovoid

yellowish-white, sometimes reddish-purple in upper part. Leaves hysteranthous, 4-5 (-6), suberect to spreading, 10-45 x 3-9 (-11) cm at maturity, narrowly oblong to oblong-elliptic or ovate-oblong, obtuse to retuse, margins slightly undulate or flat, glabrous. Flowers 5-15 (-20), funnel-shaped; perianth tube exceeding the cataphyll by 2-8 (-10) cm, yellowish-white or cream, sometimes lilac in upper part; segments 3-5.5 (-6.5) x 0.5-1.7 cm, oblong to oblanceolate, each segment 10-20 veins, white, light pink or purplish-pink, not tessellated, obtuse to retuse, without auricles at base, filament channels distinct and densely pubescent. Stamens 1/2 to 1/3 of perianth

limb in length; filaments 5-10 (-12) mm, white or cream, usually light pink in upper part, with swollen brownish-yellow base, glabrous; anthers 5-10 x 0.8-1.5 mm, yellow, with membranous margin. Styles equal or longer than stamens, white (rarely purplish at apex), thickened and hooked to curved at apex, stigmas decurrent for 0.5-2 mm or not. Capsule 1.5-4 x (0.8-) 1-1.5 cm, elliptic, rostrate, reddish-brown or dark brown dotted when dry, glabrous; seeds 2-4 mm diam., almost subglobose, sometimes flattened laterally, reddish-brown to brown. Flowering time, September-November; Leaves and fruiting time: March-May.



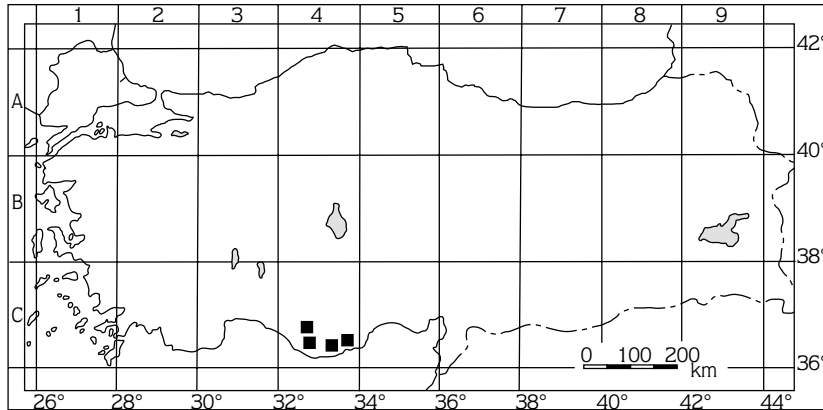


Figure 18. Distribution of *Colchicum imperatoris-friderici* (■) in Turkey.

**Similar species:** *C. imperatoris-friderici* is similar to *C. dolichantherum* K.M.Perss., *C. balansae* Planch., and *C. cilicicum* (Boiss.) Dammer, and so differences between these species are shown in Table 18.

**Habitat:** Moist meadows, openings of *Quercus* and *Abies*, rocky and stony slopes, edges of *P. brutia* and maquis.

**Altitudinal range:** 30-1760 m.

**Turkey distribution:** South Anatolia. Endemic (EN).

**Phytogeographical status:** East Mediterranean element.

**Flora of Turkey records:** C4 İçel: 40 km from Anamur to Ermenek, 1600-1650 m, Zetterlund 88-4; 20 km from Gülnar to Silifke, 1100 m, K. Persson 442; Liman Castle peninsula, 4 km SW. of Taşucu, 35 km, Watson & al. 3908.

**Specimens examined:** C4 İçel: Anamur to Ermenek, 40-45 km from Anamur, *A. cilicica* openings, rocky and stony slopes, 1600-1700 m, 12.v.2002, O.D. Düşen (2518), S. Düşen, K. Çetinkaya (AKDU) - Anamur, Abanoz plateau, Evcialanı, moist meadows, 1740 m, 4.x.2003, 36° 19' 863" N, 32° 53' 246" E, O.D. Düşen (2630), S. Düşen, K. Çetinkaya (AKDU) - Anamur-Ermenek road, Evcialanı, moist meadows, 1760 m, 4.x.2003, 36° 19' 835" N, 32° 53' 071" E, O.D. Düşen (2631), S. Düşen, K. Çetinkaya (AKDU) - Anamur to Ermenek, 40-45 km from Anamur, *A. cilicica* openings, rocky and stony slopes, 1697-1700 m, 4.x.2003, 36° 16' 435" N, 32° 55' 048" E, O.D. Düşen (2632), S. Düşen, K. Çetinkaya (AKDU).

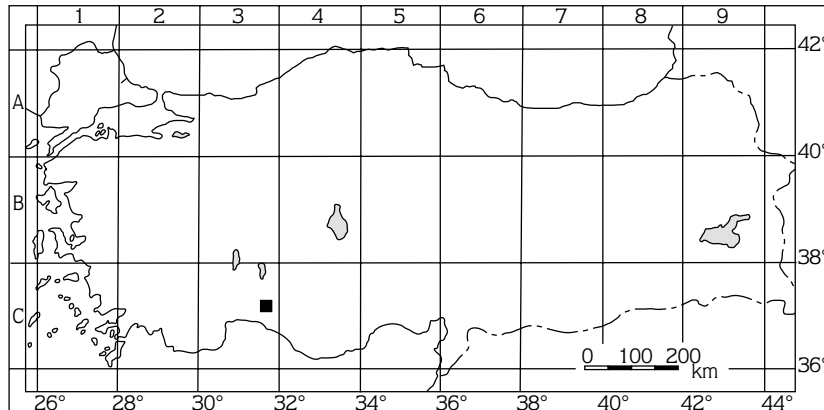
**19. *Colchicum inundatum* K.M.Perss. in Edinb. J. Bot. 56: 99, f. 2B, 4D (1999). (Figure 19).**

**Typus:** Turkey C3 Konya/Antalya: 20-30 km from Gencek to Aydıncık (İbradı), masses on large flat meadows (periodically waterlogged), 1200-1250 m, 17.iv.1991 (fr.), K. Persson 505 (holo. GB; iso. E).

**Description:** Corm 2-5 (-6) x 1.5-3.5 (-4.5) cm, ovoid to subglobose; outer tunics papery to subcoriaceous, dark brown to blackish-brown, inner tunics membranous, light brown to reddish-brown; neck present, stout, 5-15 (-18) x 0.5-1.3 (-1.5) cm. Cataphyll 4-20 x 0.3-0.8 cm, yellowish-white or cream. Leaves hysteranthous, 4-10 (-12), suberect to spreading, 10-16 x 3-5 cm at maturity, oblong-lanceolate, obtuse to truncate, channelled in lower part, margins slightly undulate or flat, glabrous, scabrous or shortly ciliate. Flowers 1-5, funnel-shaped to narrowly campanulate; perianth tube exceeding the cataphyll by 3-8 cm, white, sometimes purplish-pink in upper part; segments 2-5 x 0.5-1 (-1.2) cm, narrowly oblong to elliptic or oblanceolate, each segment 7-15 veins, white, light pink or purplish-pink, very slightly tessellated, subacute to obtuse or retuse, without auricles at base, filament channels distinct, puberulous to pubescent. Stamens 1/2 to 1/3 or 1/4 of perianth limb in length; filaments 5-12 mm, white or yellowish-white, with swollen brownish-yellow or dark yellow base, glabrous; anthers 4-8 x 0.8-1.5 (-2) cm, yellow, with membranous margin. Styles equal or longer than stamens, white, sometimes purplish-pink in upper part, curved at apex, stigmas decurrent for 1-3 mm. Capsule ground level, (1.8-) 2-4.5 x 0.8-2 cm, oblong-elliptic to oblong, rostrate, brown or black dotted

Table 18. Comparison of morphological characteristics between *C. imperatoris-friderici*, *C. dolichantherum*, *C. balansae*, and *C. cilicicum*.

Morphological characters	<i>C. imperatoris-friderici</i>	<i>C. dolichantherum</i>	<i>C. balansae</i>	<i>C. cilicicum</i>
Corm	narrowly ovoid to broadly ovoid	ovoid to ovoid-globose	ovoid to subglobose	ovoid to subglobose
Neck	being up to 15 cm long not strongly fibrose	being up to 20 cm long thinly fibrose	being up to 50 cm long strongly fibrose	being up to 15 (-17) cm long not fibrose
Cataphyll	longer than neck cream or yellowish-white, sometimes reddish-purple in upper part	longer than neck sometimes purplish-red in upper part	as long as neck completely white or yellowish-white	longer than neck white or cream, sometimes purplish-red in upper part
Leaves	suberect to spreading narrowly oblong to oblong-elliptic or ovate-oblong with glabrous margin	only spreading oblong-lanceolate to ligulate or elliptic with scabrose or short ciliate margin	suberect to spreading linear-lanceolate, lanceolate to oblong or oblong-elliptic with glabrous margin	suberect to spreading oblong-lanceolate to elliptic-lanceolate or narrowly elliptic-ovate with glabrous margin
Flowers	funnel-shaped	funnel-shaped	funnel-shaped	funnel-shaped to campanulate
Perianth tube	yellowish-white or sometimes lilac in upper part	white or cream	white or cream	white or cream, sometimes purplish in upper part
Perianth segments	oblong to oblanceolate not tessellated obtuse to retuse	linear to oblong not tessellated subobtuse to obtuse	linear to broadly elliptic not tessellated	narrowly elliptic to obovate slightly or sometimes strongly tessellated acuminate to obtuse
Filament channels	densely pubescent	glabrous or shortly ciliate at least on margins	subacute to obtuse glabrous	puberulous or pubescent
Filaments	5-10 (-12) mm white or cream, usually light pink in upper part with swollen brownish-yellow base	6-20 mm white or cream with orange yellow base	8-25 (-30) mm completely white with swollen yellowish base	15-35 (-40) mm white or cream, sometimes lilac in upper part with slightly swollen light yellow to golden yellow base
Anthers	with membranous margin	slightly or without membranous margin	with membranous margin	without membranous margin
Capsule	only elliptic reddish-brown or dark brown dotted when dry	elliptic to oblong brown dotted when dry	oblong-ovoid to oblong-elliptic brown or blackish dotted when dry	elliptic to ovoid reddish-brown or brown dotted when dry

Figure 19. Distribution of *Colchicum inundatum* (■) in Turkey.

when dry, glabrous; seeds 2-3 x 1.8-2.5 mm, almost subglobose, sometimes flattened laterally, reddish-brown to brown. Flowering time, September-October; Leaves and fruiting time: March-May.

**Similar species:** *C. inundatum* was described as a new species from between Gencek and Aydıncık (İbradı) by Karin Persson in 1999. It is in the “endangered (EN)” category in Ekim et al. (2000). However, according to the new IUCN Red List Category, this species should be classified as “critically endangered (CR)” (Criterion B1 and B2), because it is known from only the type locality and the estimated “area of occupancy” is less than 10 km<sup>2</sup> (IUCN, 2001). This species is an Irano-Turanian element according to the Flora of Turkey vol.11 (Persson, 2000), but it should be evaluated as an East Mediterranean element according to the distribution area and habitat features.

This species is related to *C. persicum* Baker, and so differences between these species are shown in Table 19.

**Habitat:** Moist meadows, around the dry lake bed (periodically waterlogged area).

**Altitudinal range:** 1200-1300 m.

**Turkey distribution:** South Anatolia. Endemic (CR).

**Phytogeographical status:** East Mediterranean element.

**Flora of Turkey records:** Known only from the type locality.

**Specimens examined:** C3 Konya/Antalya: İbradı to Gencek, 34-35 km, around the dry lake bed (periodically waterlogged area), moist meadows, 1100 m, 29.ix.2002, O.D. Düşen (2565), S. Düşen, K.Çetinkaya (AKDU) - İbradı to Gencek, 34-35 km, around the dry lake bed (periodically waterlogged), moist meadows,

Table 19. Comparison of morphological characteristics between *C. inundatum* and *C. persicum*.

Morphological characters	<i>C. inundatum</i>	<i>C. persicum</i>
Leaves	oblong-lanceolate	linear or linear-lanceolate to lanceolate, more rarely oblong
Flowers	funnel-shaped to narrowly campanulate	only widely funnel-shaped
Filament channels	puberulous to pubescent	glabrous
Filaments	completely white or yellowish-white with swollen brownish-yellow or dark yellow base	often wholly or in upper part tinged with purplish slightly swollen yellowish base
Styles	curved at apex	straight or slightly hooked

1100 m, 19.iv.2003, O.D. Düşen (2565a), S. Düşen (AKDU) - İbradı to Gencek, 34-35 km, around of the dry lake bed (periodically waterlogged area), moist meadows, 1100 m, 10.x.2003, O.D. Düşen (2633), S. Düşen, K.Çetinkaya (AKDU).

**20. *Colchicum polyphyllum*** Boiss. & Heldr. in Boiss., Diagn. ser. 2, 4: 121 (1859). (Figure 20).

Lectotypus: Turkey C5 İçel: Mersina, aux bords de la mer, 30.ix.1855, Reinert 3024 (G-BOIS) selected by K. Persson in Israel J. Bot. 41: 75-86 (1993).

= *C. stevenii* sensu Boiss., Fl. Or. 5: 165 (1882), et Stefanov, Monogr. *Colchicum*: 57 (1926), p.p. quoad pl. cilic., non Kunth (1843).

= *C. decaisnei* var. *cilicica* Siehe in sched. ad Fl. Orient No. 88, nom. nud.

= *C. cilicicum* Hayek & Siehe in Ann. Naturhist. Mus. Wien 28: 182 (1914), nom. illeg., non Dammer (1898).

**Description:** Corm 1.5-4 (-4.5) x 1-3.5 (-4) cm, narrowly ovoid to globose; tunics membranous, caducous, light brown to reddish-brown or blackish-brown; neck absent, if present 1-2 x 0.3-0.8 cm. Cataphyll 3-15 x 0.2-1 (-1.2) cm, white or yellowish-white. Leaves hysteranthous, (6-) 10-25, spreading to procumbent, 10-30 (-32) x 0.2-0.8 (-1.1) cm at maturity, linear, obtuse to retuse, flat, glabrous or scabrous on margins. Flowers 2-25 (-30), funnel-shaped; perianth tube exceeding the cataphyll by 1-12 cm, white, cream or yellowish-white; segments 1.5-5 (-6) x 0.15-1.2 cm, linear to oblong or oblanceolate, each segment 7-15 veins, light pink to purplish-pink, not tessellated,

acute to obtuse, without auricles at base, filament channels sparsely papillose to shortly pubescent. Stamens 1/2 to 1/3 of perianth limb in length; filaments 4-10 (-12) mm, white or cream, sometimes lilac in upper part, with swollen yellow base, glabrous; anthers 3-8 (-10) x 0.8-1.2 mm, yellow, with membranous margin. Styles thickened and slightly curved at apex, stigmas punctiform or decurrent for 1 mm. Capsule 1.5-3.5 x 0.6-1.2 cm, elliptic to oblong, apiculate to rostrate, yellowish-brown or dark brown dotted when dry, glabrous; seeds 1.5-3.5 (-4) mm diam., ovoid to subglobose, sometimes flattened laterally, reddish-brown to brown. Flowering time, October-November; Leaves and fruiting time: March-May.

**Similar species:** *C. polyphyllum* or material that should be assigned to this species is ignored by Brickell in Flora of Turkey. It is described by Baytop and Mathew under "*Colchicum* sp.", although judging from their specifications of habitat and distribution their description may possibly be based on a mixture of this species and *C. persicum* (Persson, 1992). It was described as a new record from İçel by Karin Persson in 1992. In addition to Turkey, this species is also distributed in North Syria. *C. polyphyllum* is similar to *C. hierosolymitanum* Feinbr., and so differences between these species are shown in Table 20.

**Habitat:** Clearings of *Quercus coccifera* scrub, moist terra rossa, edges of field.

**Altitudinal range:** 20-1500 m.

**Turkey distribution:** South and South-East Anatolia.

**World distribution:** North Syria.

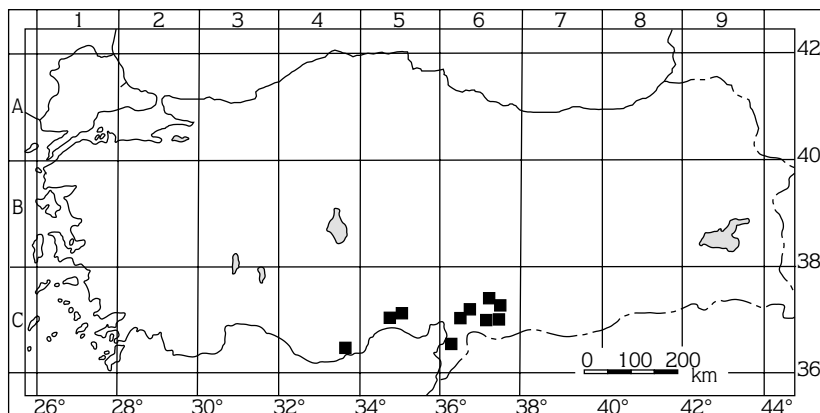


Figure 20. Distribution of *Colchicum polyphyllum* (■) in Turkey.

Table 20. Comparison of morphological characteristics between *C. polyphyllum* and *C. hierosolymitanum*.

Morphological characters	<i>C. polyphyllum</i>	<i>C. hierosolymitanum</i>
Corm	narrowly ovoid to globose	ovoid
Tunics	light brown to reddish-brown or blackish-brown	maroon-coloured
Cataphyll	being up to 15 cm long	being up to 25 cm long
Leaves	(6-) 10-25 linear obtuse to retuse	(4-) 5-9 oblong to lanceolate only obtuse
Perianth segments	linear to oblong or oblanceolate not tessellated	oblong-elliptic to oblong-obovate sometimes obscurely tessellated
Seeds	1.5-3.5 (-4) mm diam.	3.5-5 mm diam.

**Phytogeographical status:** East Mediterranean element.

**Flora of Turkey records:** C4 İçel: Silifke to Anamur, 4 km SW. of Taşucu near Liman Kalesi, 30 m, K. Persson 446. C5 İçel: Mersin to Arslanköy, near turn to Aladağ village, 850 m, K. Persson 443. Adana: M. Kassar Oghlu, ad pagum Gorumse, 1525 m, Kotschy suppl. 497. C6 Adana: Bahçe pass, 1100 m, Sönderhausen 1072, Hatay: Belen to Topboğası, 400 m, T. Baytop & Mathew (ISTE 27035). Maraş: Akseraj inter Perveri et Maraş, Nabelek 2201. Gaziantep: 42 km before Gaziantep from Nur Dağ, Akyokuş pass, 1100 m, Kammerl. & al. 90-106.

**Specimens examined:** C4 İçel: Silifke, Taşucu to Liman Castle, *Q. coccifera* shrubs, stony slopes, 21 m, 26.x.2001, 36° 16' 942" N, 33° 49' 915" E, *O.D. Düşen* (2454), *S. Düşen*, *K. Çetinkaya* (AKDU) - Taşucu to Liman Castle, *Q. coccifera* shrubs, stony slopes, 15-20 m, 7.iv.2002, *O.D. Düşen* (2454a), *S. Düşen*, *K. Çetinkaya* (AKDU). C5 İçel: Kuzucubelen village, field sides, 600 m, 3.xi.1983, T. Baytop (ISTF 39162) - Kuzucubelen, 700 m, 15.iv.1984, *T. Baytop* (ISTF 39164, ISTE 52855) - Gözne to Arslanköy, forest openings, meadows, 900 m, 9.v.1980, *Baytop* (ISTE 44263) - Mersin to Findıkpınar, 3 km to Kuzucubelen, fieldsides, 700 m, 13.x.1975, *Baytop* (ISTE 33920) - Mersin to Arslanköy, Hacgediği village, Çukurgeçtik junction, *Q. coccifera* shrubs, 831 m, 26.x.2001, 36° 55' 096" N, 34° 30' 061" E, *O.D. Düşen* (2455), *S. Düşen*, *K. Çetinkaya* (AKDU) - Mersin to Arslanköy, Yeniköy, *Q. coccifera* shrubs, 970 m,

26.x.2001, 36° 59' 564" N, 34° 29' 875" E, *O.D. Düşen* (2457), *S. Düşen*, *K. Çetinkaya* (AKDU) - Mersin to Findıkpınar, Kuzucubelen, moist slopes, 680-700 m, 27.x.2002, 36° 50' 052" N, 34° 26' 317" E, *O.D. Düşen* (2574), *S. Düşen*, *K. Çetinkaya* (AKDU). C6 Hatay: Belen to Topağazi, 2 km from Belen, 550 m, 12.v.1977, *Baytop* (ISTE 36773). Kahramanmaraş: Pazarcık to Gölbaşı, 38 km to Gölbaşı, 1000 m, 13.v.1976, *Baytop* (ISTE 34863). Gaziantep: Islahiye, Fevzipaşa, under the *P. Brutia* forest, 607 m, 28.x.2001, 37° 06' 209" N, 36° 39' 244" E, *O.D. Düşen* (2460), *S. Düşen*, *K. Çetinkaya* (AKDU). Osmaniye: Düziçi, Dumanlı mountain, northern moist slopes, 670 m, 27.x.2002, 37° 15' 977" N, 36° 29' 135" E, *O.D. Düşen* (2475), *S. Düşen*, *K. Çetinkaya* (AKDU).

## Discussion

At the end of the study, about 700 specimens belonging to the genus *Colchicum* L. had been collected from the Mediterranean region in Turkey between 2000 and 2004 and studied in terms of morphological features.

The research area is located entirely in the Mediterranean region. Therefore, about 80% of the *Colchicum* species (16 species) are Mediterranean elements, while the other 20% (4 species) are Irano-Turanian elements. Eight species are endemic to Turkey. The rate of endemism in the research area is 40% (8 species). This rate is similar to Turkey's endemism rate

for this genus. The recommended IUCN threat category for these species can be listed as follows: CR - Critically Endangered 1, EN - Endangered 5, and LC - Least Concern 2 (IUCN, 2001).

New features were determined that had previously not been given in descriptions of *Colchicum* species in the Flora of Turkey, such as cataphyll measurements, numbers of veins on perianth segments, and seed features. In addition, useful identification keys (for both flowering material and leafing-fruitlet material) were prepared for all *Colchicum* species in the Mediterranean region.

This study revealed some important findings such as the fact that *C. inundatum* should be classified as "critically endangered (CR)" (not endangered (EN))

according to the new IUCN Red List Category, that it should be evaluated as an East Mediterranean element (not an Irano-Turanian element) according to the distribution area and habitat features, and that *C. balansae* is not an endemic species for Turkey.

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