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Contributions to the knowledge of some endangered *Colchicum* species of Turkey

Abstract

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Colchicum species of Turkey have importance for pharmaceutical purpose and certain species, particularly the big flowered autumnal ones are known horticulturally. The aim of this work is to present the main threats and morphological descriptions including their illustrations of three endangered *Colchicum* species namely *C. chalconicum* Azn., *C. micranthum* Boiss. and *C. turcicum* Janka.

Introduction

The genus *Colchicum* has a large number of its species which are widely scattered throughout the different regions of Anatolia. Just in Turkey there are 25 species (excl. East Aegean Islands) of *Colchicum* (Brickell 1984, Baytop 1987). This number is enough for Turkey to be regarded as a country rich of *Colchicum* species. About six of them *C. chalconicum* Azn. (Demiriz 1973, Küçüker 1987), *C. balansae* Planchon, *C. baytopiorum* C. D. Brickell, *C. bornmuelleri* Freyn., *C. burttii* Meikle and *C. micranthum* Boiss. are endemic species for Turkey (Brickell 1984).

Relatively few studies have been devoted to Turkish *Colchicum* species. Partial works were published on the morphology and anatomy of organs of some species (Kasapligil 1961, Özyurt 1978). A series of researches have been conducted to examine the morphological characteristics and the internal structures of the vegetative and generative organs of some Turkish *Colchicum* species (Küçüker 1987, 1990a, 1990b, Küçüker & Çelebioğlu 1988).

The purpose of this paper is to present the morphological descriptions, distribution and particularly the main threats of these three endangered *Colchicum* species of Turkey.

Materials and methods

The species of *Colchicum chalconicum* and *C. micranthum* were obtained from Mt Aydos, the Asiatic side of the Bosphorus; *C. turcicum* was collected from the meadows of Terkos Lake, the European side of Istanbul.

All species were collected in the field by the author; for further study the plants were cultivated in the Botanical Garden, Istanbul, partly in pots in the experimental plots,

partly free-planted in the bulb garden. Voucher specimens are deposited in the private herbarium of the author.

The characteristics of organs were shown by illustrations. The terms used for the description of some morphological features were obtained from Stearn (1983). All drawings have been made by the author.

Morphological treatment

Colchicum chalcedonicum Azn.

Corm 2.5-3.6 x 1.5-2.6 cm, long-ovoid to more or less egg-shaped; tunics mostly several layers, the outer coriaceous and dark brown, the inner thin and reddish-brown, produced into a short neck.

Leaves 3-4, hysteranthous, patent, 9-10 x 1.7-2.3 cm, oblong-lanceolate, margins undulate and glabrous, tips obtuse to acute, light or dark-green.

Flowers 1(-2), perigonium tube entire, 9-12 cm, outer segments 42-44 x 9-12 mm, inner 40-41 x 9-11 mm, medium pinkish-purple and lilac tessellated. Outer stamens 12-16 mm, inner 15-18 mm; filaments ivory-white, sometimes pinkish-purple, swollen base (nectarium) indistinct, pale to medium yellow; anthers 6-7 mm, yellow-brown, pollen yellow. Styles white, sometimes light-purple at least in the upper part.

Capsules 1.5-2.0 x 0.5-0.8 cm, oblong-ellipsoid, reddish-white; it contains 30-40 seeds, c. 1.7-2.5 diameter, \pm spherical, light-brown. — $2n = 50$ (Küçüker 1984).

Habitat

Dry stony and rocky places; rich red soils on the Mt Aydos slopes at low altitudes c. 200-480 m. Associates include the species of *Erica*, *Cistus* and *Juniperus*. Flowering from August to September. Leaves and fruits February to April (Fig. 1).

Distribution

Turkey. Endemic to Istanbul area. It was collected for the first time from Chalcedon (Kadiköy), Asiatic side of the Bosphorus, by J. V. Aznavour in 1897 (Aznavour 1897). Today, the small number of populations of *C. chalcedonicum* are restricted only in slopes of Mt Aydos, near Kadiköy (Küçüker personal field works).

Colchicum micranthum Boiss.

Corm 1.1-2.5 x 1.1-2.0 cm, oval or globular in shape; tunics several layers, thin membranous, brick-red or yellow, produced into a very short neck hardly identified.

Leaves 2-3, hysteranthous, 15-22 x 0.3-0.7 cm, linear to very narrowly linear-lanceolate, obtuse or subacute, glabrous, greyish-green or meadow-green.

Flowers 2-3, perigonium tube 8-10 cm, outer segments 24-36 x 8-10 mm, inner 22-34 x 6-9 mm, pinkish-white. Outer stamens 8-10 mm, inner 9-12 mm, filaments white; nectaries yellow, visible bulge at the base of the filaments; anthers 3-4 mm, deep-yellow, pollen yellow. Styles white.

Capsules 1.0-1.8 x 0.5-1.0 cm, narrowly ellipsoid, pale-green; it contains 40-50 seeds, c. 0.8-1.0 mm diameter, \pm spherical, brownish-yellow. — $2n = 54$ (Küçüker 1984).

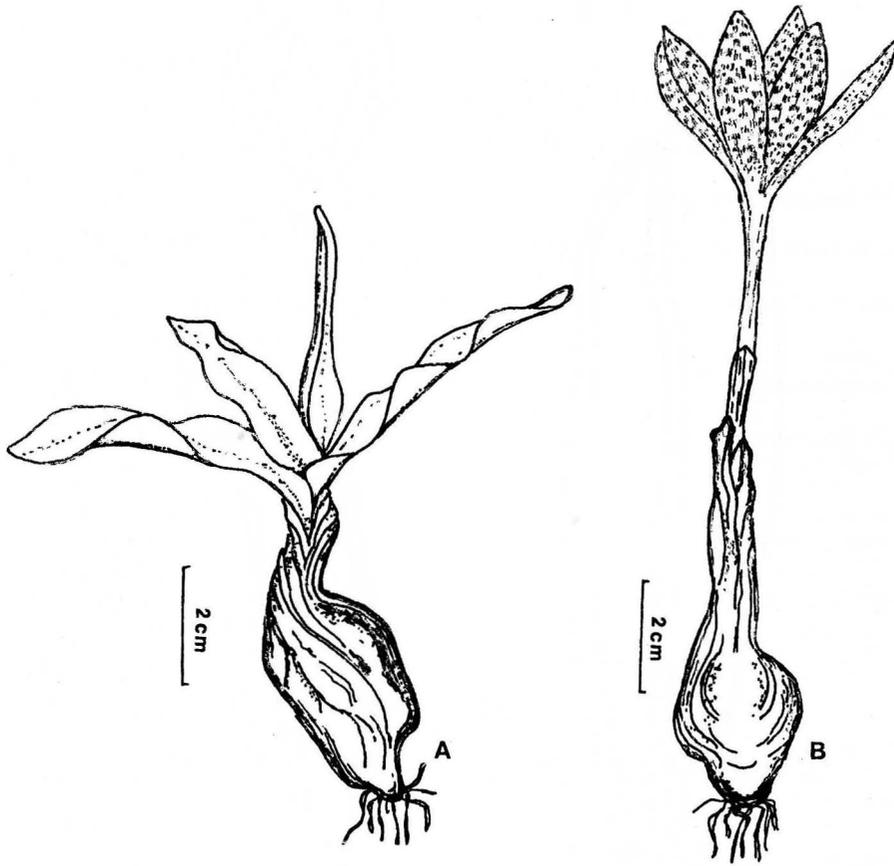


Fig. 1. *Colchicum chalcedonicum* Azn. - A. Plant in leaves, B. Plant in flowers.

Habitat

It grows at low altitudes between 480 and 500 m in rich red soils, meadows on the Mt Aydos slopes and open fields dominated by *Erica*, *Cistus* and *Pinus* species. Flowering from August to September. Leaves and fruits February to May (Fig. 2).

Distribution

Turkey. Endemic to Istanbul area. It was collected for the first time on Kocatağ to Büyükdere hillsides near the European side of the Bosphorus by V. Janka in 1872 (Boissier 1884). It was also found in the beginning of 1960s from the same localities by some Turkish collectors (Baytop 1962). By the mid-1970s, the remaining populations of *C. micranthum* have been lost to sight in these localities. Today, the small number of populations of *C. micranthum* species are sparsely distributed in the slopes of Mt Aydos (Küçüker personal field works).

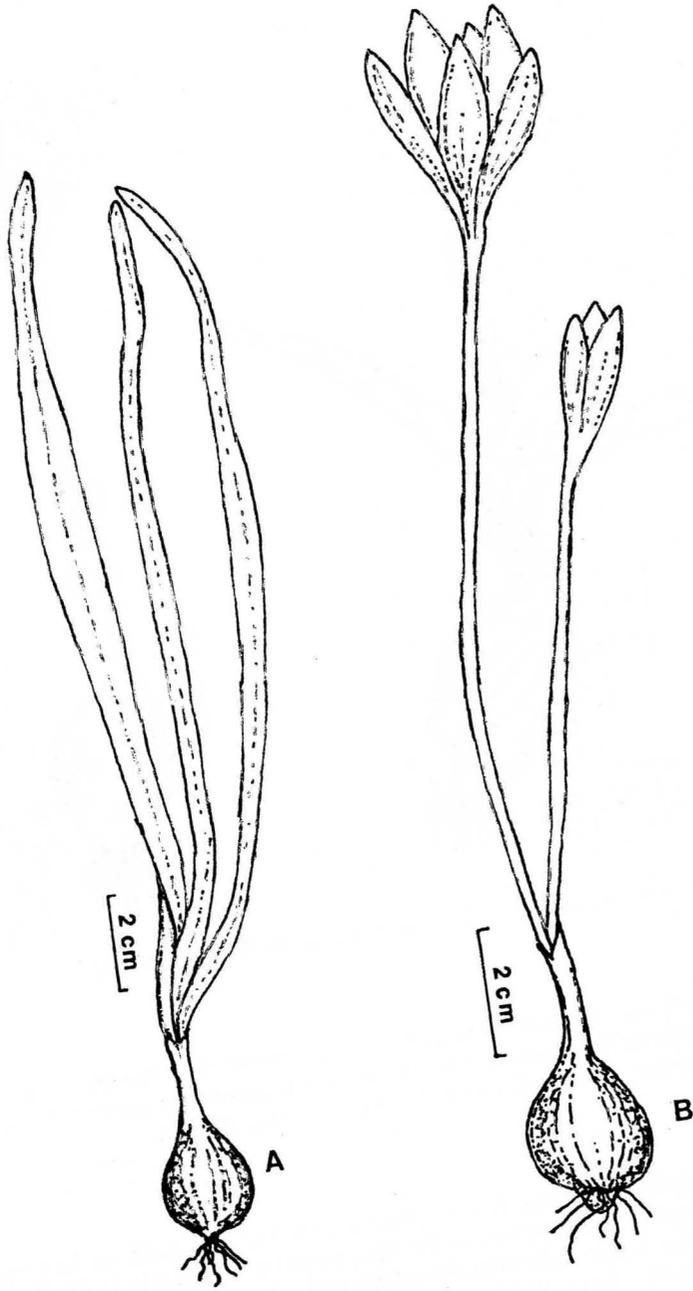


Fig. 2. *Colchicum micranthum* Boiss. - A. Plant in leaves, B. Plant in flowers.

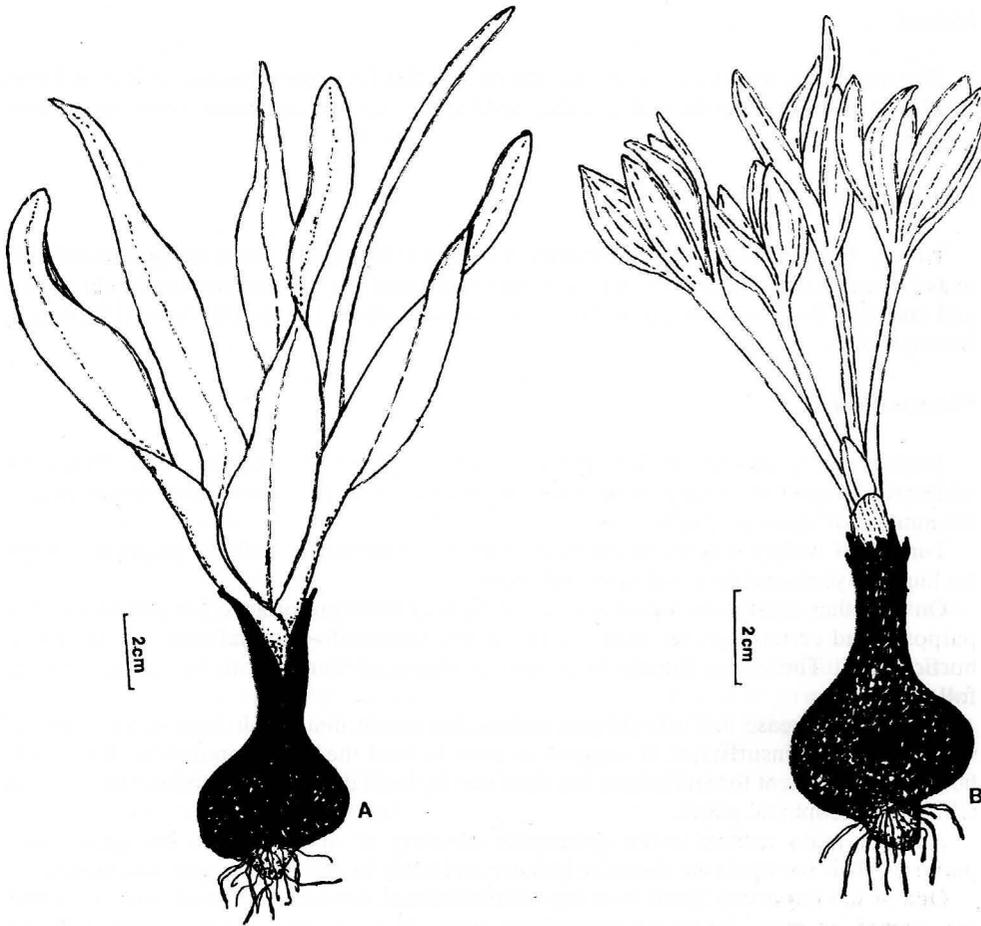


Fig. 3. *Colchicum turcicum* Janka - A. Plant in leaves, B. Plant in flowers.

***Colchicum turcicum* Janka**

Corm 3.0-4.2 x 2.5-4.5 cm, subglobose, chestnut-like shaped; tunics mostly several layers, outer ones are coriaceous, dark-brown, inner ones are hard like a leather, brown, produced into a long neck.

Leaves 5-9, hysteranthous, suberect, sometimes patent, 19-22 x 2.4-3.3 cm, narrowly lanceolate, curled in form a spiral at apex, obtuse to subacute, margins ciliate, light-green.

Flowers 3-8, perigonium tube 8-13 cm, outer segments 45-50 x 9-10 mm, inner 38-45 x 7-10 mm, light or dark pinkish-purple. Outer stamens 16-23 mm, inner 20-25 mm; filaments white, nectaries yellow; anthers 6-7 mm, yellow-orange, pollen yellow. Styles white.

Capsules 1.7-2.7 x 0.9-1.6 cm, oblong-ellipsoid, deep-green. It contains 50-70 seeds, c. 1.8-2.0 mm diameter, ± compressed-spherical, reddish-brown. — $2n = 52$ (Küçüker 1984).

Habitat

Wet meadows, open woodlands, among *Orchis* and *Leucojum* species, at low altitudes c. 50-200 m. Flowering from September to October. Leaves and fruits February to May (Fig. 3).

Distribution

Turkey. Edirne and Istanbul provinces. It is now infrequently found in open woodlands in as yet inaccessible meadows of Terkos lake near Istanbul (Küçüker personal field works) and sparsely distributed in open fields and woodlands of Edirne province (Demiriz & Baytop 1985).

Discussion

Most of the geophytes in Turkey are known for their ornamental value. Thus, the widespread export of geophytes especially bulbous plants led to a considerable decrease in the number of many geophytes.

Turkey, as widely known, has been an important exporter of bulbous plants to Europe for hundred years and their sale is steadily rising.

On the other hand, *Colchicum* species of Turkey have importance for pharmaceutical purposes and certain species particularly the big flowered autumnal ones are known as horticultural. The major threats to geophytic plants of Turkey can be summarized as follows.

The rapid increase in Turkey's populations has meant that arable land in the hands of small-holders is insufficient to support or even to feed the rural population. The small-holder's requirement for arable land has been met by local deforestation and shrub clearance with many geophytic plants.

Another main reason is the systematic clearing of maquis areas for agricultural purposes. This has upset the moisture balance and tends to produce drought conditions.

One of the important threat is to use of mechanized farming. The wide use of tractors has opened up many previously unutilized areas. Mechanized deep-ploughing has also destroyed the underground stems and organs of the geophytic plants causing their gradual disappearance from the fields.

Finally, the construction of industrial installations, new roads and many huge dams are constant sources of damage to geophytes of Turkey.

There are many cases of *Colchicum* species which can be said to be under seriously threat through conversion of their natural habitats to cultivation, housing development and other types of land uses.

The rapid development of Istanbul with its economic and business life, its industrial installations and the practice of drainage to acquire new settlements areas are the primary facts of damage to its very rich vegetation.

Therefore, most of the old localities of *Colchicum chalcedonicum* and *C. micranthum*, such as Alibeyköy, Kocataş, Büyükdere and Sariyer slopes in the European side; Çamlıca, Taşdelen in the Asiatic side of the Bosphorus (Aznavour 1897, Boissier 1884) have been completely destroyed through the conversion of these areas to urban development especially to squatter's house.

Today, very few populations of *Colchicum chalcedonicum* and *C. micranthum* are struggling for survival under the protecting of *Erica* and *Cistus* species in their localities

at the slopes of Mt Aydos (Küçüker personal field works). In addition to maquis aegis, during the last years the slopes have been surrounded with 50 to 60 km long, the barbed wires and fences by the local Forestry Department.

Another *Colchicum* species, *C. turcicum*, once widely distributed around Edirne province was common in the wet meadows of Terkos lake near Istanbul.

In recent years, the wide use of mechanized farming especially deep-ploughing in these areas has totally wiped out the *Colchicum turcicum* populations (Demiriz & Baytop 1985). This species is now infrequently found in open woodlands and in as yet inaccessible meadows of Terkos lake (Küçüker personal field works).

Thus, as it is recommended for *Colchicum micranthum* by the recent Turkish red data book (Ekim et al. 1989), the status both of *C. chalconicum* and *C. turcicum* should be stated as "vulnerable" in order to protect their remaining populations.

As it is generally known that Turkey exports bulbous plants and certain seeds for the horticultural and mainly pharmaceutical purposes. The majority of these bulbs and their seeds are taken from the nature.

The seeds of *Colchicum speciosum* which are determined as rich as *C. autumnale* seeds in respect of Colchicine content (Sütlüpinar 1983) have been exporting in the large amounts (Ekim et al. 1991). Since the majority of these seeds are taken from the wild, the seed export of this kind of pharmaceutically valuable species should be limited in order to propagate the plants.

As it is stated by Singe (1980), the export of large number of wild-collected bulbs and seeds far more serious in SouthWest Asia than Europe.

Since the export of large numbers of bulbs and tubers to Europe especially to Holland and Germany, the main groups under threat in this way are probably *Arum*, *Colchicum*, *Crocus*, *Fritillaria*, *Galanthus*, *Iris*, *Leucojum*, *Sternbergia* and *Tulipa* (Singe 1980, Demiriz 1987).

For instance, the species of *Colchicum bivonae*, *C. cilicicum* and *C. speciosum* which are powerful and healthy corms and easily grown in well-drained soils particularly *C. variegatum* which has very attractive purplish-pink tessellated flowers, the exports are being made under constant surveillance.

On the other hand, propagation of the bulbous plants depend very much upon the behaviour of the species for example, *Ornithogalum* and *Allium* species can produce many bulblets however *Colchicum* species cannot be easily propagated from the cormlets. The juvenile stage of *Colchicum* usually lasts from 4 to 8 years (Bowles 1952, Persson 1986). *Colchicum* species can be hardly grown from the seed but are rather slower than the other bulbous plant seedlings (Galil 1968).

The number of individuals is increased in this way but the area of each population grow rather slowly. The species with soboliferous corms like *Colchicum boissieri* have better chances of spreading (Persson 1986).

It cannot be said that over all Turkish *Colchicum* species are under serious threat. The great amount of the species are distributed in the Anatolian high mountains (c. alt. 3250 m) in as yet inaccessible areas, undisturbed by human activity and some of the populations have been living in well-protected National Parks.

For example, *Colchicum baytopiorum* in Termessos (Antalya), *C. burtii* in Gelibolu Peninsula (Çanakkale), *C. bornmuelleri* in Mt Ilgaz (Kastamonu), *C. variegatum* in Dilek Peninsula (Aydin), *C. bivonae*, *C. kotschyi* and *C. szovitsii* in Yedigöller (Bolu), *C. steveni*, *C. triphyllum* and *C. troodii* in Olimpos-Beydağları (Antalya), *C. umbrosum* in Uludağ (Bursa) (Brickell 1984).

Considering the above-mentioned factors influencing the growing and distributions of

some *Colchicum* species are probably similar those to be observed in other developing countries. The proposed action to protect *Colchicum* species must be realized as follows.

To prevent the extinction of the corms, their export has been placed under strict control. It should be prohibited the deliberate collecting and uprooting of these vulnerable endemic species.

Nowadays, shared opinion that is not to give about more details like their all localities and the exact addresses of the endangered endemic bulbous plants of Turkey. I would like to join to this opinion and apply my prospective *Colchicum* works. I think that it may be one of the acceptable way to preserve for the vulnerable or endangered endemic *Colchicum* species for a certain period at least.

Conclusion: systematic relationships

Colchicum chalcedonicum which is one of the endemics of Istanbul area, has been described as a new species by Aznavour (1897), was reduced to the level of variety of *C. turcicum* by Stefanoff (1926). In the last decade, taxonomic revisionary works related with the above mentioned *Colchicum* species have been continued by some authors. For instance, *C. chalcedonicum* has been indicated as a synonym of *C. turcicum* by Brickell (1980, 1984).

Thereupon, *Colchicum chalcedonicum* and *C. turcicum*, showing distinct differences in their morphological, anatomical and karyomorphological characteristics have been confirmed as two different species by Küçüker (1987).

Having succeeded as far as in publishing above mentioned study, this time, *C. chalcedonicum* has been regarded by Brickell (1984) as the synonym of *C. lingulatum*. This is another proof that Brickell had not a clear opinion about the systematical position of *C. chalcedonicum*.

Thereafter Brickell's comment, the morphological, anatomical and karyomorphological characteristics of *C. lingulatum* have been examined in order to determine whether the two species, *C. lingulatum* and *C. chalcedonicum* are the same species or not.

During our study, the systematical positions of *C. lingulatum* and *C. chalcedonicum* have been presented as two different species by Baytop (1987).

However, this paper includes insufficient morphological and karyological findings concerning the examined *Colchicum* species. Following this work, the taxonomical status of *C. chalcedonicum* and *C. lingulatum* have been proved undoubtedly as two different species by the author (1990b).

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