

Crataegus turcicus (Rosaceae), a new species from NE Turkey

Ali A. Dönmez* & Emel O. Dönmez

Department of Biology, Faculty of Science, Hacettepe University, 06532-Beytepe, Ankara, Turkey
(*e-mail: donmez@hacettepe.edu.tr)

Received 12 Aug. 2004, revised version received 18 Nov. 2004, accepted 19 Nov. 2004

Dönmez, A. A. & Dönmez, E. O. 2005: *Crataegus turcicus* (Rosaceae), a new species from NE Turkey. — *Ann. Bot. Fennici* 42: 61–65.

Crataegus turcicus Dönmez *sp. nova* (Rosaceae), is described from Artvin, in NE Turkey. The relationship of this new species to *C. pentagyna* is discussed. Diagnostic features, a description which includes pollen morphological features, and a taxonomic discussion of the new species are given. An illustration and a distribution map are also provided.

Key words: *Crataegus*, new species, Rosaceae, taxonomy

The genus *Crataegus* has 21 native species in Turkey, and an ongoing study shows that there are more taxa than hitherto known (Dönmez 2004). Furthermore, some new taxa for science and new records for the flora of Turkey have been recognized during field trips carried out by the first author since 2001. Among them, interesting *Crataegus* specimens have been collected from the alpine zone of the Kutul pasture of Artvin, at an altitude of 1800 m, in NE Turkey. The elevation is unusual for *Crataegus* species, most of which grow at lower altitudes of the region. The specimen has some peculiar features of fruit, indumentum, leaf and ecological preference.

Five different *Crataegus* species (*C. pontica*, *C. × kyrtostyla*, *C. tournefortii*, *C. rhipidophylla* var. *rhipidophylla* and *C. monogyna* var. *monogyna*) with mature fruits were also collected on the same day from lower altitudes than the speci-

men noted above, which has immature fruits until nearly the end of September. The study area was revisited to collect flowering material in the following year.

The collection site belongs to the Euro-Siberian phytogeographic region (Davis 1965) and the locality has a relatively humid climate and is dominated by mesophytic vegetation. The most dominant element of the forest is *Picea orientalis*.

Since the flora of the area is closely related to the Caucasian Flora, the Russian *Crataegus* specimens collected from the Caucasus and adjacent regions deposited at the herbaria mentioned below were examined. None of the specimens examined contained the set of characters seen in the specimen from Artvin.

Consequently, in consideration of the morphological differences and ecological preferences of the population, the plant is here described as a new species.

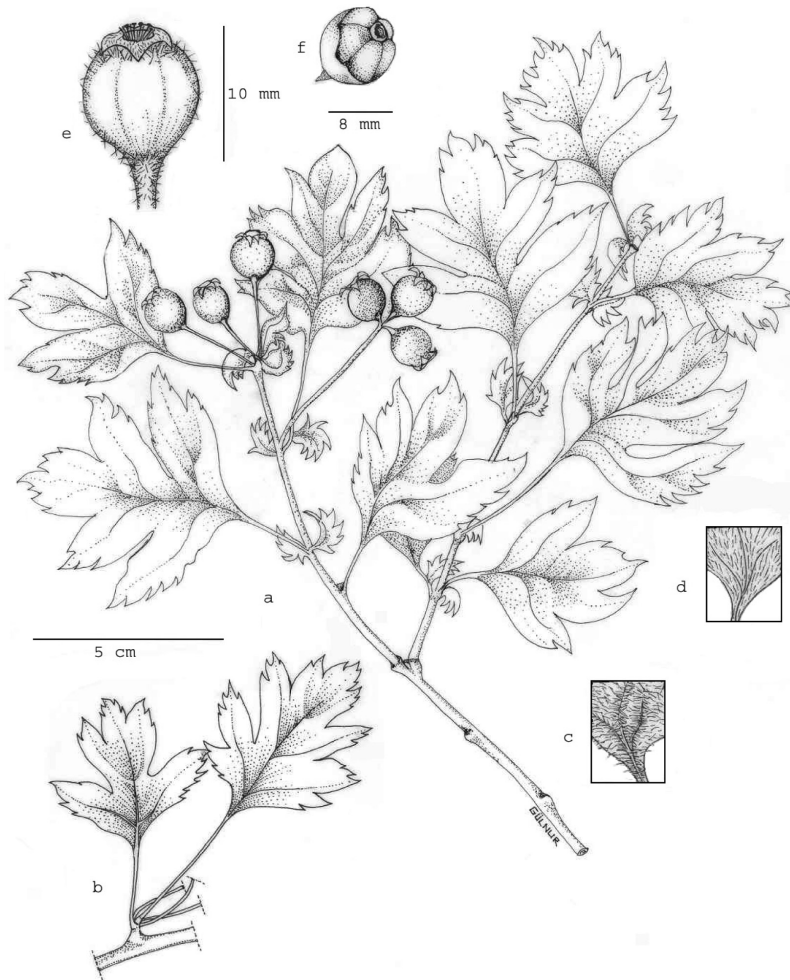


Fig. 1. *Crataegus turcicus* (from holotype). — **a**: Habit. — **b**: Short shoot. — **c**: Leaf indumentum of lower surface. — **d**: Leaf indumentum of upper surface. — **e**: Fruit. — **f**: Fruit and pyrenes (flesh partly removed).

***Crataegus turcicus* Dönmez, sp. nova**
(Fig. 1)

Ramunculi et folia sparsim villosi. Folia margine planae. Fructus ruber, late oblongus, villosus, non pruinatus.

HOLOTYPE: Turkey. A9 Artvin, Ardanuç, pasture of Yolüstü village, opening of the deciduous forest, 41°06'N, 42°11'E, 1800 m, 30.IX.2002 A.A.Dönmez 11150 (HUB; isotype L). — **PARATYPE:** Turkey. A9 Artvin, Ardanuç, pasture of Yolüstü village, opening of the deciduous forest, 41°06'N, 42°11'E, 1800–1900 m, 21.VI.2003 A.A.Dönmez 11456 (HUB).

Small tree or shrub up to 6 m. Thornless or rarely thorny, thorns 15–30(–50) mm. Twigs sparsely to moderately villous. Buds 1.5–2 mm length × 1–2.3 mm diameter. Leaves green adaxi-

ally and slightly greyish-green abaxially, sparsely villous adaxially, villous abaxially, margin irregularly serrate, widely cuneate to truncate at base, lobes acute, rarely obtuse. Subterminal leaves of flowering shoots 35–55 length × 35–60 mm wide, 2–3-lobed, serrate to slightly lacerate with 4–8 teeth in distal 1/2, basal sinuses at middle of lamina length, basal lobe 1–1.5 times as long as wide, angles of basal vein almost 45°; petiole (5–)15–20(–33) mm; stipules 5–10 × 2–5 mm, permanent up to mature fruit, D-shaped to semilunar, coarsely serrate to lacerate with 5–15 teeth, rarely entire. Subterminal leaf blades of short shoots 30–45 × 30–40 mm, 2–3-lobed, basal lobes with 4–8 irregularly serrate teeth, petiole 18–35(–45) mm; stipules 1–3 × 0.1–0.2 mm, lanceolate, or undeveloped. Leaves of elongate shoots 2–3-lobed, 40–65 mm × 45–70 mm, truncate at base,

length of basal lobes 1–2 times wide with 4–8 irregularly serrate teeth, divergent, petiole 20–30 mm; stipules 10–15 × 5–10 mm, D-shaped with irregularly 5–10 serrate teeth. Inflorescence 15–45 × 20–50 mm, dense corymbs, 10–30-flowered, lanate at flowering, villous at fruiting time; pedicels 2–4 mm, widened at apex on fruit; bracts 3–6 × 0.1–1.5 mm, deciduous, linear-lanceolate, entire or with 1–6 irregularly serrate teeth; flowers 8–10 mm in diameter; hypanthium 3–4 × 3–4 mm; sepals 2–3.5 × 1–2 mm, triangular, shortly cuspidate, entire; petals 4–6 × 4–5 mm; stamens 20; styles (4–)5. Fruit 10–12 × 8–10 mm, slightly oblong, dark red, sparsely villous all over, flesh yellowish, sepals reflexed on fruit at maturity; pyrenes 7–9 × 4–4.5 mm, (4–)5, dorsally slightly 1-striate, tightly packaged, hypostyle glabrous.

POLLEN MORPHOLOGY: Pollen grains tricolporate. Polar axis (*P*) (33–)43(–53) and equatorial axis (*E*) (38–)48(–58) μ m. Shape (*P/E*) oblate spheroidal. Polar view circular-angular. Colpus width 10–20 μ m, covered by a coarsely granular membrane. Endoapertures (pori) circular or almost square in outline, with a maximum dimension of 25 μ m. Exine thickness 1.75–2 μ m. Intine thickness ca. 1 μ m or thinner. Exine striate-perforate; striae crowded, usually in parallel groups, 0.18–0.55 μ m in width, with few anastomoses and perforations 0.18–0.36 μ m in length (Fig. 2).

ECOLOGY AND PHENOLOGY: Flowering June to July, mature fruits September to October. At the transition zone of forest and alpine meadow. 1800–1900 m.

DISTRIBUTION (Fig. 3): Euro-Siberian element. Known from only the Ardanuç (Artvin) district.

CONSERVATION STATUS: The main forest element of the location is *Picea orientalis*, and the following taxa grow at the transition zone: *Sambucus ebulus*, *Malus sylvestris* subsp. *orientalis*, *Prunus divaricata*, *Rosa canina* and some other rare shrubs. The herbaceous layer of the transition zone is covered by *Athyrium filix-femina*. The individuals of the new species grow approximately 100 m apart from each other. Nearly 10 mature individuals were observed within 1 km². The type locality of *C. turcicus* was searched in order to observe its population density. Extensive research has not been carried out yet, because field work is difficult in the harsh environmental

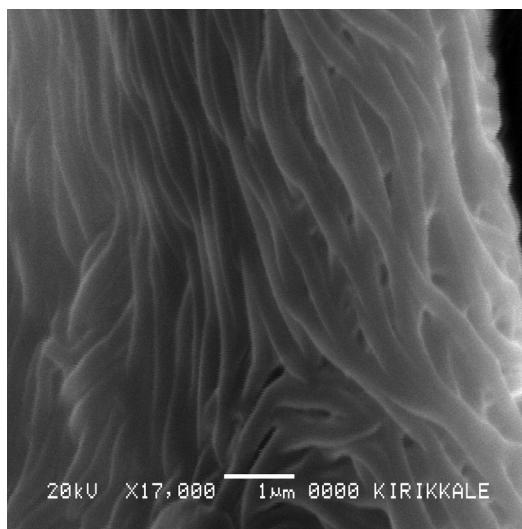


Fig. 2. The exine pattern of pollen of *Crataegus turcicus* (AAD 11456).

conditions of the location. Although there is not a considerable threat to the species, the ‘Vulnerable’ (VU) category (IUCN 2001) is proposed since it is known from only one locality and few individuals.

The amount of variation included in *C. pentagyna* differs considerably in various treatments (Pojarkova 1941, Meikle 1966, Franco 1968, Riedl 1969, Browicz 1972, Christensen 1992). In a recent treatment of the species (Christensen 1992) several taxa, which were accepted as species by previous authors, were recognized as subspecies or reduced to synonyms.

The unique fruit characters have made it difficult to decide which taxon is the closest relative of *C. turcicus*. However, through comparison with the taxa of series *Pentagynae*, *Orientalis* and *Crataegus*, it was concluded that it is more closely related to *C. pentagyna* than to series *Orientalis* or *Crataegus* by various morphological features. The most important differences between *C. turcicus* and *C. pentagyna* are given in Table 1. The indumentum of *C. turcicus* is sparsely long-villous as compared with that of *C. pentagyna*, in which it is densely tomentose-lanate. The fruit characters of *C. turcicus* differ sharply from those of the other *Crataegus* species. It has five pyrenes tightly packed and hardly separated from each other. The flesh of

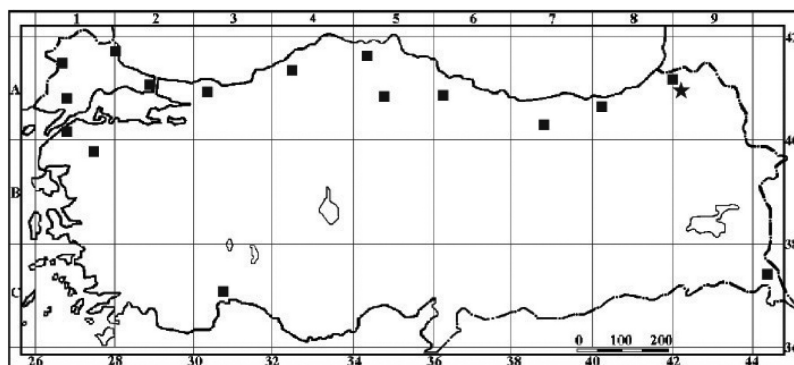


Fig. 3. Distribution of *Crataegus turcicus* (★) and *C. pentagyna* (■) in Turkey.

the fruit is rather thin in comparison with that of the other related taxa with five pyrenes. Therefore, it is not attractive for eating by humans, birds or others animals. The summer period is short at this locality and may be the reason for the development of such a fruit type. The fruit color is red at maturity, but some remain green, even at the end of September.

Byatt (1976) examined the pollen morphology of some European *C. pentagyna* specimens collected from Hungary, Romania, Bulgaria and Russia. He found that most specimens show similar exine patterns, characterised by narrow striae and very frequent and large perforations. A recent, as yet unpublished pollen morphological study on the Turkish *Crataegus* species by the present authors reveals that the exine pattern of *C. pentagyna* specimen from Karabük in northern Turkey, is quite similar to that found in the eastern European specimens. As compared with *C. turcicus*, however, the Turkish *C. pentagyna* specimens have usually narrower striae (less than $0.55 \mu\text{m}$ in width) and more frequent and larger perforations (the larger being $0.83 \mu\text{m}$ in length) (Fig. 4).

The infrageneric classification of the genus *Crataegus* by Phipps (1983) has series *Pentagynae* represented by only *C. pentagyna* in Turkey. Although *C. turcicus* does not perfectly fit into series *Pentagynae*, especially based on fruit characters, it seems reasonable to provisionally include it there.

SELECTED SPECIMENS EXAMINED of *C. pentagyna*: — **Turkey.** A1 Edirne: Enez, between Yaylasahil road and Enez, among *Quercus* scrub 30–200 m, 8.V.2001 AAD 8723, AAD 8727 (HUB). A1 Kırklareli: 9 km towards İğneada, among *Quercus* forest, 80 m, 9.V.2001 AAD 8783 (HUB). A1 Tekirdağ: 9. km from Şarköy to Gelibolu, among *Quercus-Carpinus* scrub, 290 m, 7.V.2001 AAD 8683, AAD 8686, AAD 8689, AAD 8692 (HUB). A1 Çanakkale: Çan, Ahlatlıburun village, among *Carpinus-Quercus* scrub, 187 m, 6.V.2001 AAD 8675 (HUB). A2 İstanbul: between Kilyos and Sarıyer, 35 m, 10.XI.2001 AAD 10398-S. Işık (HUB). A2 Bursa: İnegöl, Tahtaköprü village, among *Quercus* scrub, 384 m, 19.V.2002 AAD 10638 (HUB). A3 Zonguldak: Ormanlı, İsa village, among *Quercus* scrub, 135 m, 10.V.2001 AAD 8797 (HUB). A4 Bartın: Ulus, above Suçatı village, limestone, mixed deciduous forest, 460 m, 3.VI.2001 AAD 8894 (HUB). A5 Sinop: Sinop, 50 m, 25.VI.1962 Davis 38102-Coode & Yaltırık (E). A7 Gümüşhane: Zigana Pass, 1.VI.1977 C.R.Lancaster s.n. (BM). A8 Artvin: 1. km Murgul to Borçka, slopes, 345 m, 17.VII.2001 AAD 9885 (HUB). B1

Table 1. Comparison of *Crataegus turcicus* with *C. pentagyna*.

Characters	<i>C. turcicus</i>	<i>C. pentagyna</i>
Indumentum on shoots	Sparsely villous	Lanate-tomentose
Indumentum of leaves	Sparsely villous	Lanate-tomentose
Indumentum of fruit	Long villous, epruinose	± Glabrous, ± pruinose
Leaf margin	Flat	± Revoluted
Margin of basal lobes	Always dentate	Entire to dentate
Fruit colour	Red to dark red	Blackish to dark violet
Fruit shape, size (mm)	Slightly oblong, 9–11 × 8–10	Globose to slightly cylindrical, 5–9 × 5–9
Pyrenes	Tightly packaged	Immersed into flesh

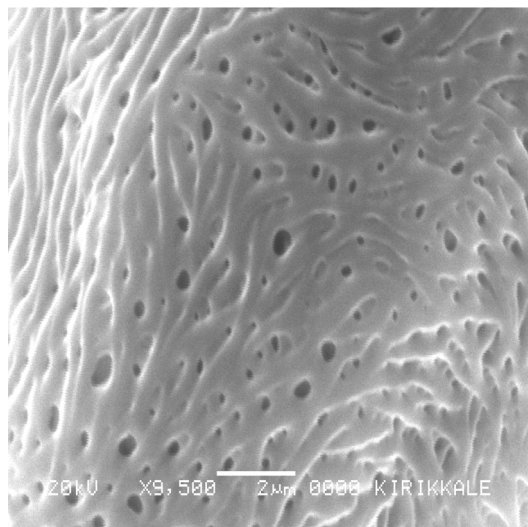


Fig. 4. The exine pattern of pollen of *Crataegus pentagyna* (AAD 10598).

Çanakkale: Biga, Gerlengeç village, c. 5 m, *Quercus-Fraxinus* deciduous forest, AAD 7530 (HUB); Yenice, Gündoğdu, 315 m, 6.V.2001 AAD 8668 (HUB). C3 Antalya: Kumluca, Bey Dağları, 890 m, 24.VIII.1966 F. Şeker-E. Turan 6007 (E). C10 Hakkari: 3. km from Şemdinli to Şapatan Pass, among *Quercus* scrub, 1660 m, 30.V.2002 AAD 10782-B. Mutlu (HUB).

Acknowledgements

The specimens of *Crataegus turcicus* were collected and photographed during the field trips made for the project "Revision of the genus *Crataegus* in Turkey" supported by TÜBİTAK-TBAG. The first author visited BM, E, C, K, L, LE, MW and W, with support from TÜBİTAK. The authors thank JE, P and PR for sending specimens to HUB as loan. The authors also thank TÜBİTAK for financial support, the

curators of the mentioned herbaria, Dr. K. I. Christensen for helpful comments on the specimen, and Gülnur Ekşi for the illustration.

References

- Browicz, K. 1972: *Crataegus* L. — In: Davis, P. H. (ed.), *Flora of Turkey and the East Aegean Islands*: 133–147. Edinburgh Univ. Press, Edinburgh.
- Byatt, J. I. 1976: Pollen morphology of some European species of *Crataegus* L. and of *Mespilus germanica* L. (Rosaceae). — *Pollen Spores* 18: 335–349.
- Christensen, K. I. 1992: Revision of *Crataegus* Sect. *Crataegus* and Nothosect. *Crataeguineae* (Rosaceae-Maloidae) in the Old World. — *Syst. Bot. Monogr.* 35: 1–199.
- Davis, P. H. (ed.) 1965: *Flora of Turkey and the East Aegean Islands 1*. — Edinburgh Univ. Press, Edinburgh.
- Dönmez, A. A. 2004: The genus *Crataegus* L. (Rosaceae) with special reference to hybridisation and biodiversity in Turkey. — *Turk. J. Bot.* 28: 29–37.
- Franco, J. D. A. 1968: *Crataegus* L. — In: Tutin, T. G., Heywood, V. H., Burges, N. A., Moore, D. M., Valentine, D. H., Walters, S. M. & Webb, D. A. (eds.), *Flora Europaea* 2: 73–77. Cambridge Univ. Press, Cambridge.
- IUCN 2001: *IUCN Red list categories, ver. 3.1*. — Prepared by the IUCN Species Survival Commission. Gland, Switzerland & Cambridge, UK.
- Meikle, R. D. 1966: *Crataegus* L. — In: Townsend, C. C. & Guest, E. (eds.), *Flora of Iraq* 2: 635–637. Min. Agric. Rep. Iraq., Baghdad.
- Phipps, J. B. 1983: *Crataegus* — a nomenclator for sectional and serial names. — *Taxon* 32: 598–604.
- Pojarkova, A. I. 1941: *Crataegus* L. — In: Komarov, V. L. & Yuzepchuk, S. V. (eds.), *Flora USSR* 9: 317–356. Botanicheskii Institut Akademii Nauk SSSR, Moscow & Leningrad. [Translated from Russian by Israel Program for Scientific Translations. Jerusalem 1971].
- Riedl, H. 1969: *Crataegus* L. — In: Rechinger, K. H. (ed.), *Flora Iranica* 66: 49–65. Akad. Druck- u. Verlagsanstalt, Graz.