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A new species of *Viola* L. (Violaceae) from South Anatolia

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A new species of *Viola* L., ***Viola yildirimlii*** M. Dinç & Y. Bağcı **sp. nov.** from South Anatolia is described and illustrated. It is found on the rocky slopes of Aladağ National Park, in the county of Adana, south Turkey, at an elevation of 1800 m. It belongs to *Viola*, subsect. *Viola*, and is similar to the Turkish endemics *Viola isaurica* Contandr. & Quézel and *V. kizildaghensis* M. Dinç & Ş. Yıldırımlı. Diagnostic morphologic characters for a detailed discrimination from two similar taxa and other Turkish *Eflagellatae* species are discussed. © 2003 The Linnean Society of London, *Botanical Journal of the Linnean Society*, 2003, **141**, 477–482.

ADDITIONAL KEYWORDS: systematics – taxonomy – Turkey – *Viola*.

INTRODUCTION

Viola L., the type genus of *Violaceae*, has about 400 species (Heywood, 1993). Becker (1925) divided *Viola* into 14 sections. Of these two sections, *Viola* and *Melanium*, occur in Turkey (Coode & Cullen, 1965; Davis, Mill & Tan, 1988; Yıldırımlı, 2000). The original delimitation of section *Viola* proposed by Becker (1925) includes 18 subsections. Two subsections of these, *Viola* L. and *Rostratae* Kuppfer, occur in Turkey. Subsect. *Viola* ser. *Eflagellatae* consists of four species in Turkey (Coode & Cullen, 1965; Davis *et al*., 1988; Yıldırımlı, 2000; Dinç & Yıldırımlı, 2002).

In 2001, we collected fruiting material of a violet in the mountainous region of Aladağ National Park in Adana Province in southern Anatolia in Turkey. This violet species was of interest on account of its very restricted, steep and rocky distribution area. Furthermore, the plant exhibited characteristics of *Viola* sect. *Viola* subsect. *Viola* series *Eflagellatae* and its close relatives in the series are all relictual with narrow endemic or disjunct distributions (Melchior, 1939; Contandriopoulos & Quézel, 1976; Yıldırımlı, 1994; Marcussen, 1998; Dinç & Yıldırımlı, 2002). Therefore, we collected flowering material of the same plant from the same locality in 2002. The result of comparative studies in close species of subsect. *Viola*, led us to our decision that the plants from Aladağ National Park represent a new species, *V. yildirimlii*.

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SPECIES DESCRIPTION

VIOLA YILDIRIMLII M. DINÇ & Y. BAĞCI **SP. NOV.**
(FIGS 1–3)

Planta herbacea, perennis, acaulis, estolonifera, ad 8 cm alta. Rhizoma crassiusculum lignescens, plus minusve verticale et ramosissimum. Folia juvenilia ovata et basi subcordata, adulta triangulari-ovata et basi truncata, lamina 6–30 mm longa, 10–20 mm lata, crassiuscula, crenato-serrata, pubescentia in petiolum 15–60 mm longum, alatum angustata. Stipulae lanceolatae vel late lanceolatae, aliquando anguste ovatae, 4–12 mm longae, 1–2.5 mm latae, membranaceae, breviter glandulo-fimbriatae. Pedunculi 25–35 mm longi, paullo supra medium bibracteolati. Bracteolae 4–5 mm longae, infra medium glandulo-fimbriatae. Flores *in vivo* inodorati, 8–10 mm longi. Sepala anguste oblonga, 3–4 mm longa, 1–1.1 mm lata, pubescentia; appendix 0.8–1 mm longa. Petala glabra, violacea, usque ad medium fere albida. Calcar violaceum, sursum curvatum. Stylus 1.5–1.6 mm longus, basi geniculatus, apice in rostellum elongatum et porrectus; cavus stigmaticus ad marginem fuscus. Cap-

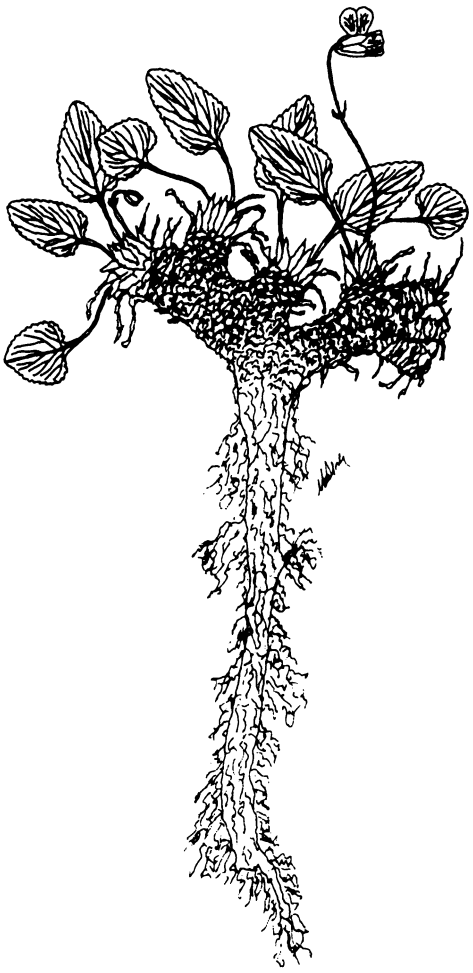

Figure 1. Habit of ***Viola yildirimlii*** M. Dinç & Y. Bağcı **sp. nov.** (depicted from holotype, natural size)

sula globosa, 8–10 mm diametro, dense pubescens. Pedunculi fructiferi prostrati. Semina 3 mm longa, 1.5 mm lata, elaiosomatibus conspicuis.

Type: Turkey. C5 Adana: Aladağ National Park, Aladağ, above Ulupýnar village, rocky slopes, 1800 m, 22.iv. 2002, *Dinç* 1162 & *Bağcı* (Holotypes: KNYA); Ibid., 30.iv. 2001, *Dinç* 985 & Bağcı (paratypus, KNYA; Hb. Yıldırımlı).

Acaulous perennial herb up to 8 cm high, lacking stolons. Rootstock 5 mm thick, woody and more or less branched, vertical, clothed with withered petioles. Leaves erect or suberect, ovate and very shallowly cordate at base when young; prostrate, narrowly triangular-ovate and truncate at base when mature; blade 6–30 mm long, 10–20 mm wide, pubescent, thick, crenate-serrate. Petioles 15–60 mm, narrowly winged, pubescent. Stipules lanceolate to widely lanceolate, sometimes narrowly ovate, 4–12 mm long, 1–2.5 mm wide, membraneous, shortly glandular-fimbriate. Stalks (of chasmogamous flowers) 25–35 mm long, pubescent; bracteoles 4–5 mm long, borne just above the middle of the stalk, glandular-fimbriate below the middle; stalks of the cleistogamous flowers much shorter. Flowers not fragrant, 8–10 mm long, violet with a white throat. Sepals narrowly oblong, 3–4 mm long, 1–1.1 mm wide, pubescent; sepal appendages 0.8–1 mm long. Petals hairless, lower petal 8–10 mm, lateral and upper petals 8–9 mm; spur pale violet, 2–3 mm, curved upwards. Style 1.5–1.6 mm, geniculate at base, apex curved downwards, shortly beaked; stigmatic cavity brown at circumference. Capsules borne on stalks which are procumbent at maturity, globose, compressed at apex, 8–10 mm in diameter, densely pubescent. Seeds 3×1.5 mm with distinctive elaisomes.

DISCUSSION

Subsect. *Viola* is composed of the perennial acaulescent species with lateral leafy shoots (stolons), which may be reduced or absent (Okamoto, Okada & Ueda, 1993). The species of subsection *Viola* produce chasmogamous flowers opening in early spring and cleistogamous flowers opening during favourable periods throughout the rest of the growing season (Redbo-Torstensson & Berg, 1995). Characteristic of subsection *Viola* are globose, nonballistic capsules born on decumbent stalks at maturity (Okamoto *et al*., 1993). The seeds have conspicuous elaiosomes and are dispersed by ants (Beattie & Lyon, 1975). The new species exhibits these features clearly. Species without stolons of the subsection *Viola* are, traditionally, considered as series *Eflagellatae* (Okamoto *et al*., 1993; Marcussen & Borgen, 2000). *V. yildirimlii* is, naturally, included in series *Eflagellatae*, since it is without stolons.

Series *Eflagellatae* consists of 11 species. Seven relative species of *V. yildirimlii* in the series, *V. chelmea* Boiss. & Heldr., *V. libanotica* Boiss., *V. pyrenaica* Ramond, *V. isaurica* Contandr. & Quézel, *V. bocquetiana* Yıldırımlı, *V. sandrasea* Melchior and *V. kizildaghensis* M. Dinç & Ş. Yıldırımlı, are all relictual with narrow endemic or disjunct distributions and native to the high montane and alpine regions of Central Europe, North Africa, and the Middle East (Melchior, 1939; Contandriopoulos & Quézel, 1976; Yıldırımlı, 1994; Marcussen, 1998; Dinç & Yıldırımlı, 2002). Four of the 11 species, *V. sandrasea, V. bocquetiana*, *V. kizildaghensis* and *V. isaurica* are from Turkey (Melchior, 1939; Contandriopoulos & Quézel, 1976; Yıldırımlı, 1994; Dinç & Yıldırımlı, 2002), and they are known from their type collections, except *V. isaurica,* which grows on calcareous rocks in the mountainous region of Ermenek and its

Figure 2. *Viola yildirimli* in the wild – in flower.

Figure 3. *Viola yildirimli* in the wild – fruiting.

Table 1. Comparison of the characteristics of ***V. yildirimlii* sp. nov.**, *V. kizildaghensis* and *V. isaurica*

	Viola yildirimlii	*Viola kizildaghensis*	*Viola isaurica*
Lamina shape	Ovate to narrowly triangular-ovate, often truncate, sometimes shallowly cordate at base	Lanceolate, narrowly or sometimes widely cuneate at base	Ovate, cordate to truncate at base
Stipule shape and fimbrication	Lanceolate to narrowly ovate, shortly glandular-fimbriate	Linear-lanceolate to lanceolate shortly glandular-fimbriate	Linear to linear-lanceolate, long glandular fimbriate
Corolla colour and pubescence	Violet, glabrous	Pinkish-purple, glabrous	Violet, glabrous
Style shape	Shortly beaked at apex, geniculate at base, stigmatic cavity is brown at circumference	Shortly beaked at apex, sigmoid at base, stigmatic cavity is transparent at circumference	Long beaked at apex, nearly straight at base, stigmatic cavity is transparent at circumference
Distribution	C5 Adana, Aladağ National Park, endemic	B3 Isparta, Kızıldağ National Park, endemic	C4 Karaman, Ermenek and its environs, endemic

environment (Dinç, 2002). The new species is clearly similar to the series *Eflagellatae* species in Turkey.

The most important characters distinguishing the species in subsection *Viola* are stipule shape and fimbrication, corolla colour, lamina shape, shape of styles and stigmas, and quality of pubescence (Becker, 1925; Okamoto *et al*., 1993; Marcussen & Nordal, 1998). Considering these distinguishing characters, our specimens differ clearly from its relatives. Although *V. yildirimlii* is reminiscent of *V. isaurica* on the point of external morphology, it seems to be the closest relative to *V. kizildaghensis* (Table 1).

In subsection *Viola,* styles are more or less hooked and beaked (Okamoto *et al*., 1993). *V. yildirimlii* and *V. kizildaghensis* have shorter stigmatic beaks than does *V. isaurica*. Styles of *V. yildirimlii* are geniculate and those of *V. kizildaghensis* are sigmoid at base. Those of *V. isaurica*, on the contrary, are nearly straight at base. Although stigmatic beaks of *V. isaurica* are gradually thinned to the apex, *V. yildirimlii* and *V. kizildaghensis* are gradually thickened. Stigmatic cavity is brown at circumference only in *V. yildirimlii* (Fig. 4). This feature is the most distinguishing character of the new species which differ both from two of its close allies and the other species in series *Eflagellatae*.

Lateral petals are beardless in *V. yildirimlii* as in *V. isaurica* and *V. kizildaghensis*. Among these, *V. isaurica* and *V. yildirimlii* have violet corolla, whereas *V. kizildaghensis* has pinkish-violet corolla. Leaves of *V. isaurica* and *V. yildirimlii* are ovate and shallowly cordate to truncate at base. However, the mature leaves of *V. yildirimlii* are narrowly triangular-ovate. The same characters of *V. kizildaghensis* are lanceolate and cuneate at base (Fig. 4).

Stipules are glandular-fimbriate in all three species, but stipule shape and fimbria length are different. Stipules are lanceolatae and shortly fimbriate in *V. kizildaghensis* and *V. yildirimlii*. Moreover, fimbria length is not more than half the width of the stipule in these species. *V. isaurica* has linear to linear-lanceolate stipule and its fimbria are longer than half the width of the stipule, sometimes about as long as stipule width.

There are two further endemic species, *V. sandrasea* and *V. bocquetiana* belonging to subsect. *Viola* series *Eflagellatae* in Turkey. The new species differs from *V. bocquetiana* in its shallowly cordate to truncate leaves (not only cordate), violet petals (not white), pubescent capsules and vegetative parts (not scabrous), bracteoles borne just above the middle of the peduncle (not borne just below the flowers) and brown circumference of stigmatic cavities. *V. yildirimlii* differs from *V. sandrasea* in its shortly glandular-fimbriate and hairy stipules (not long fimbriate, eglandular and glabrous), leaves with very shallowly cordate to truncate bases (not with to cuneate bases), pubescent ovary and vegetative parts (not glabrous), narrowly oblong sepals (not lanceolate-elliptic) and style geniculate at base (not sigmoid-curved) and brown circumference of stigmatic cavities. Furthermore, the distribution altitude of the new species is 1800 m (not 3000 m) and its flowering time is in April (not in July). Contandriopoulos & Quézel (1976) described *V. sandrasea* Melchior ssp. *cilicica* Contandr. & Quézel as a new taxon in South Anatolia and this taxon has not been recorded to date. Since its type collection lacked flowers, its description was incomplete. Therefore, the systematic position of *V. sandrasea* ssp. *cilicica* is uncertain (Davis *et al*., 1988). Davis *et al*. (1988) suggested that *V. sandrasea* ssp. *cilicica* was the same as *V. alba* Besser ssp. *dehnhardtii* (Ten) Becker rather than to be a new, very disjunt subspecies of *V. sandrasea*.

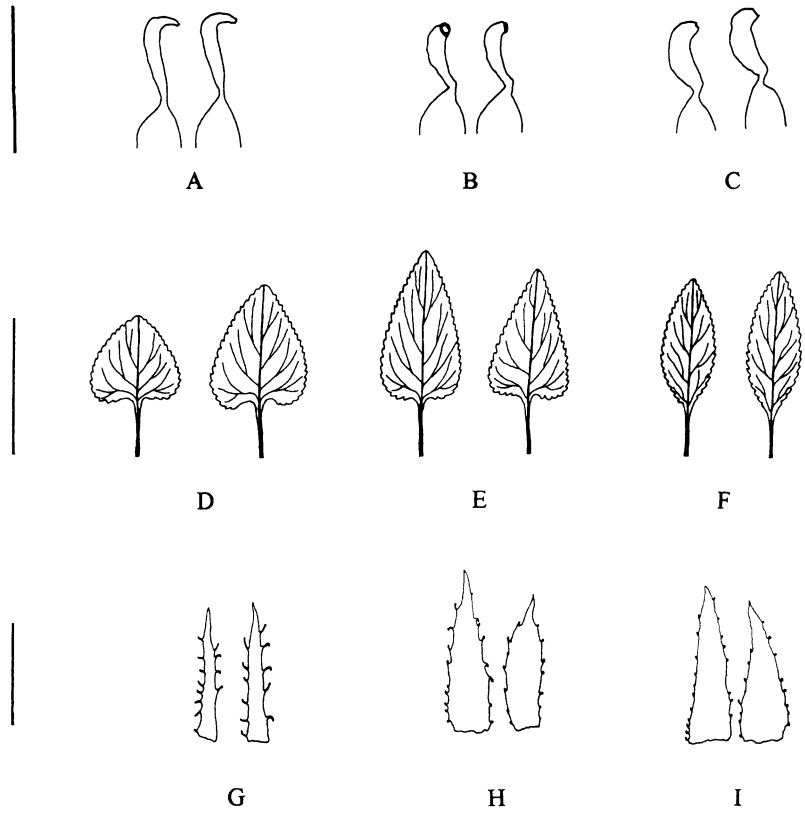

Figure 4. Styles, leaves and stipules of *V. isaurica*, *V. yildirimli* and *V. kizildaghensis*. (A,D,G) *Viola isaurica* (*Dinç* 620); (B,E,H) *Viola yildirimlii* (*Dinç* 1162 & Bağcı); (C, F, I) *Viola kizildaghensis* (*Dinç* 964 & *Yıldırımlı*) (A, B, C) scale-bar = 3 mm; (D,E,F) scale-bar = 15 mm; (G,H,I) scale-bar = 5 mm.

ECOLOGY, DISTRIBUTION AND STATE

Endemic, Mediterranean element. We collected the new species from only one locality in Aladağ National Park in Adana province in South Anatolia. *V. yildirimlii* grows on rocky slopes near melting snow, together with *Corydalis rutifolia* (Sibth. & Sm.) DC. ssp. *erdelii* (Zucc.) Cullen & Davis, *Primula vulgaris* L. ssp. *vulgaris*, *Anemone blanda* Schott & Kotschy, *Ornithogalum lanceolatum* Labill., *Muscari azureum* Fenzl (endemic), *Gladiolus atroviolaceus* Boiss. at an altitude of 1800 m. The range of the new species is restricted to only one locality. The population include approximately 30–40 individuals. Its area is approximately 100 m^2. Therefore, we suggest that *Viola yildirimlii* should be placed under the IUCN category *Critically Endangered (CR)* (IUCN, 2001).

OTHER EXAMINED MATERIAL

V. isaurica C4 Karaman, between Ermenek and Balkusan village, Balkusan valley, calcerous rocks, 1550–1600 m, 16.iv. 2000, *M. Dinç* 620 (Yıldırımlı Herb., KNYA). Ermenek, Kazancı, calcerous rocks, rock crevices, 1400 m, 15.iv. 2000, *M. Dinç* 616 (KNYA). C4 Konya: border of Taşkent-Alanya, foot of Sütsüz mountain, rock crevices, 1450 m, 25.v. 1999, *M. Dinç* 603 & *Ş. Yıldırımlı* (Yıldırımlı Herb.) – *V. kizildaghensis* B3 Isparta: Şarkikaraağaç, Kızıldağ National Park, Kızıldağ, stony slopes, 1350–1600 m, 04.iv. 2001, *Dinç* 964 & Ş. *Yıldırımlı* (Yıldırımlı Herb., KNYA, HUB), 12.v. 1999, *Dinç* 592 (KNYA).

PHENOLOGY

In the wild, flowering occurs in second half of April near melting snow. We have observed that the flowering begins in the middle of April and we collect the fruiting specimens at the end of April. This suggests that flowering time is very short. The new species grows on rocky slopes at an altitude 1800 m.

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