Crocus brachyfilus (Iridaceae), a new species from southern Turkey

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Abstract

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Crocus brachyfilus I. Schneider, a new autumn-flowering species of *Crocus* L. belonging to *C.* ser. *Speciosi* from S Turkey, is described and compared with *C. elegans* Rukšāns.

Additional key words: taxonomy, *Crocus elegans*, *Crocus* ser. *Speciosi*

Introduction

In 1982 Brian Mathew published his comprehensive revision of the genus *Crocus* L. Taxonomically he divided the genus into two subgenera: *C.* subg. *Crocus* and *C.* subg. *Crociris* B. Mathew. *Crocus* subg. *Crocus* he divided into two sections: *C.* sect. *Crocus* and *C.* sect. *Nudiscapus* B. Mathew containing 15 series altogether. *Crocus* subg. *Crociris* consists of only one species, *C. banaticus* Gay. The criteria for this taxonomy were mainly morphological parameters.

At that time 80 species of *Crocus* were known. Mathew presumed a rather close relationship of the crocuses inside each series, which led him establish a "subspecies concept" for many taxa in many series (e.g. in *C.* ser. *Crocus*, *C.* ser. *Kotschyani* B. Mathew, *C.* ser. *Reticulati* B. Mathew, etc.).

After the application of molecular methods the view on the taxonomy of the genus *Crocus* changed (Petersen & al. 2008; Mathew & al. 2009; Harpke & al. 2013). Most recent phylogenetic investigations clearly support a distinction of taxa at species level (Harpke & al. 2013) as many subspecies can be found in different genetic clusters, which mean the subspecies concept of Mathew (1982) cannot be maintained.

Ten years later, Helmut Kerndorff and Erich Pasche started extensive systematic field investigations (Kerndorff 1993; Kerndorff & Pasche 1994, 1997, 2003, 2004a–b, 2006, 2011, 2012; Kerndorff & al. 2013 a–c; Pasche 1993) especially in Turkey. The analysis of approximately 76 investigated populations using a wide spectrum of morphological, cytological, ecological, geographical, statistical and later on molecular parameters and methods resulted in the discovery of many new species.

As a result of these efforts and the change of subspecies into species level the number of species has increased to more than 150 (Harpke & al. 2013). The majority belong to *Crocus* sect. *Nudiscapus*. Especially the results of the molecular methods will extensively change the whole systematic view of the genus *Crocus*. At present, also other series and species are under revision. Recently Rukšāns (2012, 2013) published a revision of *C. speciosus* M. Bieb., the type species of

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Fig. 1. *Crocus brachyfilus* in habitat. – Turkey, Pisidian Taurus (type locality), 10 Nov 2013, photograph by I. Schneider.

C. ser. *Speciosi* B. Mathew. He split *C. speciosus* from formerly three into nine "subspecies", which cannot be accepted. Instead they should be raised to species level. In fact, it seems that Rukšāns already did this himself (Rukšāns 2014). Following the description of *C. striatulus* by Kerndorff & al. (2013a), *C. brachyfilus* I. Schneider is a further new addition to *C.* ser. *Speciosi* from S Turkey.

Description of the new taxon

Crocus brachyfilus I. Schneider, **sp. nov.** – Fig. 1, 2.
Holotypus: Turkey, Konya Province, south of Seydişehir, 1700–1800 m, 10 Nov 2013, [*I. Schneider*] *IS 1326* (GAT 23357 [corm & leaves]; isotypus: GAT 23578 [flowers]).

Description — Herbs perennial, geophytic, with a corm. *Corm* subglobose, 10–12 mm high, 10–20 mm in diam.; *basal plate* with many tiny teeth; *basal rings* present, smooth edged to slightly dentate. *Tunics* dark brown, membranous; *neck* present, short but distinct, 5–10 mm long, consisting of hard triangular caps with acute apices. *Cataphylls* 3 or 4, silvery white, becoming brownish with age. *Leaves* hysteranthous, 2 (rarely 1 or 3), green with central longitudinal white stripe, linear, 3–5 mm wide, broadest at middle, glabrous, without ribs in grooves on lower surface; white stripe c. ⅓ of leaf width. *Prophyll* absent. *Bract* and *bracteole* present, silvery white, inconspicuous, thin, 25–30 mm long, c. 3 mm wide. *Flowers* [30 flowers examined] autumnal, solitary, fragrant. *Perianth tube* white, 25–50 mm long measured from soil level (mostly c. 45 mm); *throat* white, glabrous; *perianth segments* inside and outside light to deep blue, evenly striped on both surfaces with 5 ± intense dark blue feathered veins, sometimes silvery on outside of outer 3 segments; *outer perianth segments* broadly egg-shaped, subacute at apex, 28–40 mm long (mostly c. 35 mm), 11–18 mm wide (mostly c. 15 mm); *inner perianth segments* 27–36 mm long (mostly c. 34 mm), 11–17 mm wide (frequently c. 14 mm). *Filaments* white, 2–5 mm long (rarely to 8 mm), glabrous; *anthers* mainly deep yellow, sometimes creamy white (see below), narrow, indistinctly arrow-shaped, flattened at top, 15–23 mm long (mostly c. 18 mm); *connective* colourless; *pollen* yellow. *Styles* divided into many reddish orange slender branches, sometimes yellow-orange (but then anthers creamy white), equalling or exceeding tips of anthers. *Capsule* and *seeds* not seen. *Chromosome number* unknown.

Fig. 2. *Crocus brachyfilus* – A: style branches exceeding anther tips; B: style branches equalling anther tips; C: style branches yellowish orange, anthers creamy white; D: opened flower; E: corm with basal rings and short, acute-tipped neck; F: corm basal plate, basal rings and tunics. – Scale (D, E): graduated in cm and mm. – Photographs by I. Schneider.

Phenology — Flowering in October and November.

Distribution and ecology — Turkey, Konya Province, Pisidian Taurus. Until now *Crocus brachyfilus* is known only from one locality S of Seydişehir. It occurs in clearings in *Abies cilicica* (Antoine & Kotschy) Carrière woods together with *Cedrus libani* A. Rich. and *Pinus nigra* var. *pallasiana* (Lamb.) Asch. & Graebn. in turf on limestone formations at altitudes of 1700–1800 m.

Etymology — *Crocus brachyfilus* is named after its rather short filaments (*brachys* means short, and *filum* means filament).

Table 1. Morphological and phenotypic differences between *Crocus brachyfilus* and other members of *Crocus* ser. *Speciosi* from Turkey.

***Crocus* taxon**	**Corm basal rings**	**Corm tunic**	**Corm tunic neck**	**Cata-phylls number**	**Cataphylls colour**	**Leaves number**	**Leaves width [mm]**	**Perianth throat colour**	**Perianth segment length [mm]**	**Filament colour**	**Filament length [mm]**	**Anther colour**	**Anther length [mm]**	**Style branch-es**	**Style branches relative to anthers**	**Chromo-some number (2*n*)**
C. striatulus	present	membranous	very short	3	white, brown with age	1 or 2 (or 3)	3–5	white	32–38	white	6–10	yellow	11–15	many	exceeding anthers	10
C. pulchellus	present	coriaceous or membranous	intimate	3 or 4	white, apex brownish or purplish	(3 or)4 (or 5)	4–5	dark yellow	18–40 (–50)	yellow, pubescent	3–6	white	7–13	many	below anther tips	12
C. speciosus	present	coriaceous	long	3 or 4	reddish spotted or green veined	(3 or)4 (or 5)	3–5	white	30–60	white or pale yellow	4–11	yellow	10–24	many	much exceeding anthers	14, 18
C. ilgazensis	absent	membranous	absent	3 or 4	like *C. speciosus*	(3 or)4 (or 5)	3–5	white	25–35	pale yellow	9–13	yellow	9–13	few	below anther tips	6, 8
C. xantho-laimos	present	coriaceous	long	3 or 4	like *C. speciosus*	(3 or)4 (or 5)	1–2.5	yellow	30–38	deep yellow	4–11	yellow	9–14	many	below anther tips	10
C. ibrahimii	present	coriaceous	short or absent	3 or 4	like *C. speciosus*	(3 or)4 (or 5)	1.5–4 (–5)	yellow	30–60	white or pale yellow, pubescent	4–11	white	10–24	many	exceeding anthers	?
C. sakariensis	absent	membranous	absent	3 or 4	like *C. speciosus*	(3 or)4 (or 5)	3–6	yellow	30–60	white or pale yellow	4–11	yellow	10–24	many	exceeding anthers	?
C. bolensis	present	coriaceous	long	3 or 4	like *C. speciosus*	(3 or)4 (or 5)	4(–5)	white	30–60	white or pale yellow	4–11	yellow	10–24	many	below anther tips	8
C. elegans	absent	membranous	long but weak	3 or 4	dark brown	(3 or)4 (or 5)	4(–?)	white	30–60	white or pale yellow	7–10	white	10–24	many	exceeding anthers	?18
C. brachyfilus	present	membranous	short	3 or 4	silvery white, becoming brownish with age	(1 or)2 (or 3)	3–5	white	27–40	white	2–5 (–8)	mainly deep yellow	(15–)18 (–23)	many	equalling or exceeding anther tips	?

Discussion

Crocus brachyfilus is a high-mountain plant that inhabits preferably open areas in coniferous, especially *Abies* woods (Fig. 1). Its type locality lies relatively isolated from other *Crocus* species of *C.* ser. *Speciosi* in SC Anatolia. Superficially it appears to be closely related to *C. speciosus* (formerly *C. speciosus* subsp. *speciosus*) and *C. elegans* Rukšāns. Rukšāns (2013) even questioned the occurrence of *C. speciosus* in Turkey and restricted it to the Caucasus region and presumably to the Crimea. Because of the relative geographical proximity of *C. brachyfilus* and *C. elegans* (both occur in Konya province), it makes sense to compare the two taxa with each other. Considering the measurements in Table 1, considerable differences between them are revealed. The corm of *C. brachyfilus* has basal rings, smooth edged to slightly dentate (Fig. 2E, F). The basal plate is provided with many tiny teeth. The corm tunics are dark brown, with a short but distinct neck consisting of hard triangular caps with acute apices (Fig. 2E). On the contrary, Rukšāns (2013) described the corm of *C. elegans* with no rings but a long weak neck. Concerning the leaf number, Rukšāns (2013) saw no difference between *C. elegans* and *C. speciosus*, which infers that *C. elegans* must have 3–5 leaves, whereas *C. brachyfilus* has normally 2, exceptionally 1 or 3. The filaments of *C. brachyfilus* are 2–5 mm long, rarely to 8 mm, which is the shortest yet known in this "aggregate" (Fig. 2A, B, D), whereas those from *C. elegans* have a length of 7–10 mm. The anther colour of *C. brachyfilus* is mainly deep yellow and not white as in *C. elegans*. Last, but not least, the style branches of *C. brachyfilus* equal (Fig. 2B) or exceed (Fig. 2A) the anther tips. In *C. elegans* the style branches always exceed the anther tips. Unfortunately the indicated chromosome number $2n = 18$ for *C. elegans* remains uncertain because it was not determined from original material but was taken from a publication of Brighton & al. (1983), who investigated a collection "south of Beyşehir". To which taxon this chromosome number belongs remains uncertain. However, the morphological differences clearly set *C. brachyfilus* aside from *C. elegans* and also from the other members of the series (Table 1) described by Rukšāns (2012, 2013).

The present taxonomic state of *Crocus* ser. *Speciosi* remains open as a whole, because recent molecular investigations of Harpke & al. (2013) show that the series is now part of a large clade formed by many species of the former *C.* ser. *Reticulati* and *C.* ser. *Biflori* B. Mathew. To clarify the situation further research is necessary.

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