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This month the IRG presents further notes on new and re-classified *Crocus* species from Dr Jānis Rukšāns.

We also include some photos to give a flavour from the recent Spring Show and Sale of plants held in Prague by our friends in the [Klub skalničkářů Praha](#). Three shows per year are staged in the gardens of the Faust House and St John on the Rock Church on Charles Square (Karlově náměstí) in the beautiful city of Prague. The next exhibition is in May. The [SRGC Forum](#) has reports from all the SRGC shows and

many AGS shows in the UK for those who love to see plants grown to perfection in pots.

Cover picture: *Crocus kofudagensis* JJJ-024 pictured in the *locus classicus*, photo Jānis Rukšāns.

## ---Crocus Special---

### Some New *Crocus* Taxa (*Iridaceae*) from Western Turkey and East Aegean Islands

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**Abstract:** Six new species in the genus *Crocus* from W Turkey and adjacent territories are described; status of two subspecies of *C. cancellatus* is changed.

**Key words:** *Crocus antalyensioides*, *Crocus antalyensis*, *Crocus lycius*, *Crocus pamphylicus*, *Crocus dilekyarensis*, *Crocus kofudagensis*, *Crocus rhodensis*, *Crocus sozenii*, *Crocus zetterlundii*, Turkey, Rhodes (Greece).

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My retirement from nursery chores has given me time to sort out all my observations accumulated during more than 50 years of growing bulbous plants. This has resulted in the description of a number of new taxa, found and collected during more than 60 mountain trips since 1977. Among them are representatives of *Erythronium*, *Iris*, *Prospero*, *Puschkinia*, *Tulipa*, but the majority are from the genus *Crocus*. This is a genus where only in recent years have many researchers carried out thorough

investigations. Several new taxa have been described in the preceding years but there are still many left to be named, as more extensive data gathering is needed to decide upon their status.



Jānis Rukšāns  
photographing  
*Crocus biflorus* in  
Basilicata,  
Italy. Photo Filippo Di  
Matteo

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The approach to the species concept has dramatically changed since Mathew published his fundamental monograph in 1982. The introduction of modern genetic research methods has enabled the elaboration of a new system that is now successfully used in several institutes, and the leading role in these developments is played by the Leibniz Institute of Plant Genetics and Crop Plant Research (IPK), in Gatersleben, Germany. They mostly focus on crocuses from section *Nudiscapus* Mathew and particularly on species from the former series *Biflori* Mathew.



Italian *Crocus biflorus* from Basilicata (left) and from Puglia (right)

Species from series *Biflori* are among my favourites, though during my research trips new species in other groups were found, too. They, as well as some of the crocuses formerly allied with series *Biflori*, are described here. Since in most cases there were no opportunities to perform DNA analysis, here the main attention is directed towards the morphological differences which are of importance in the field where there are no laboratories at one's disposal. The variability within crocus species is quite great and consequently separation using morphology is not easy, therefore the features which really distinguish the species must be chosen very carefully. There are several groups of closely related species where separation is possible only by a complex of features many of which overlap, and in borderline situations the identification is quite problematic. The species described here are easily separable from their relatives by some very specific characteristics indicated in the descriptions.



*Crocus antalyensis* subsp. *striatus*; subsp. *typica* 14TUS-009, Altinyaka; subsp. *typica*, Saklikent

***Crocus antalyensis*** B.Mathew is very popular with gardeners and has been offered for years by several nurseries. This species was studied by the Turkish botanists Erol et al. (2010, 2011), who

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divided *C. antalyensis* into three different taxa at subspecies level. When I saw the flowering of my first gatherings of *C. antalyensis* from the wild I was surprised because they looked very different from the plants which I had grown earlier, obtained from commercial nurseries in Holland and elsewhere. Later, after visiting the populations of the *Crocus sp.* regarded as *C. antalyensis* in Bursa province (NW Turkey) my conviction that there were different taxa embraced under this name gained further confirmation. Putting all the localities of my gatherings on the map and checking the mapping of *C. antalyensis* in Flora of Turkey, it became evident that there were two well-separated areas – the southern area from where the type specimen of *C. antalyensis* comes (between Antalya and Altinkaya) and another region situated further north - in Bursa and Bilecik provinces. The huge distance between these two general areas allowed the assumption that they could be of different kinds and led me to undertake a more detailed comparison of the morphological features of them both, which resulted in the description of a new species - ***C. antalyensioides*** (like *antalyensis*).

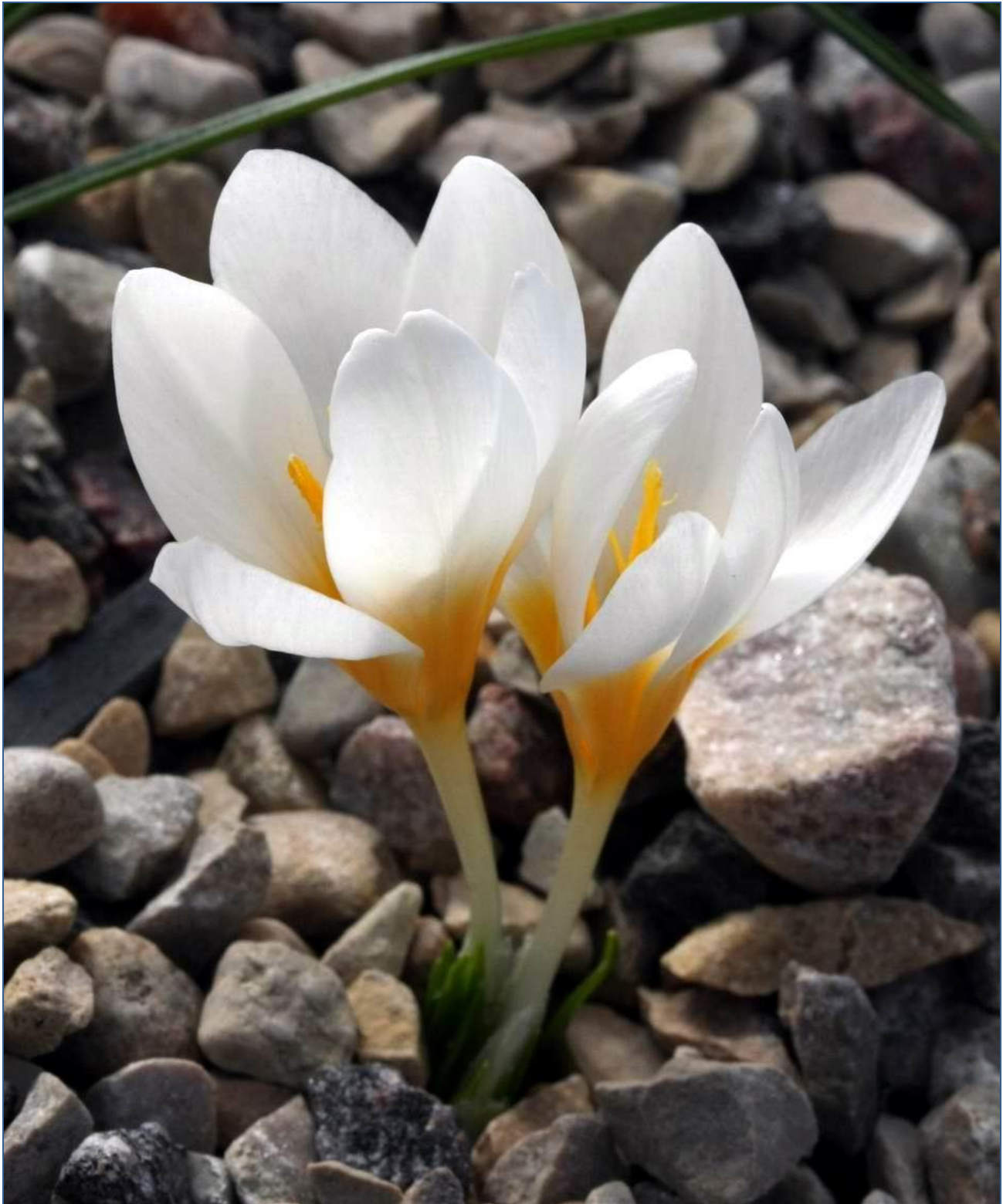


*Crocus antalyensioides* TULA-024 -04 - showing inners

*Crocus antalyensioides* has much more rounded flower segments and larger flowers with different proportions between the segment length and width, and generally they are bigger than in its southern allies. Plants gathered by me (TULA-024) in Bursa province are on the whole indistinguishable from the commercial stocks. The only difference is the degree of the leaf development at anthesis - in the commercial stocks the leaves have barely emerged whereas in the plants observed in the wild they

## ---International Rock Gardener---

have reached the tips of the flowers or even exceeded them: such differences in the development between wild and cultivated plants of the same species are not unusual and have been observed within a number of species. Plants offered in the trade as "*Crocus antalyensis* Alba" belong, by all features, to the northern variant. White-flowered individuals appear from time to time among the seedlings raised from the blue-coloured specimens of the commercial stocks. I tried to trace the origin of the commercial stock and the trail stopped at the Dutch crocus grower and breeder Willem van Eeden, who ran the famous nursery of rare small bulbs. Unfortunately, I was not able to obtain more information on the origin of the stocks from Mr van Eeden.

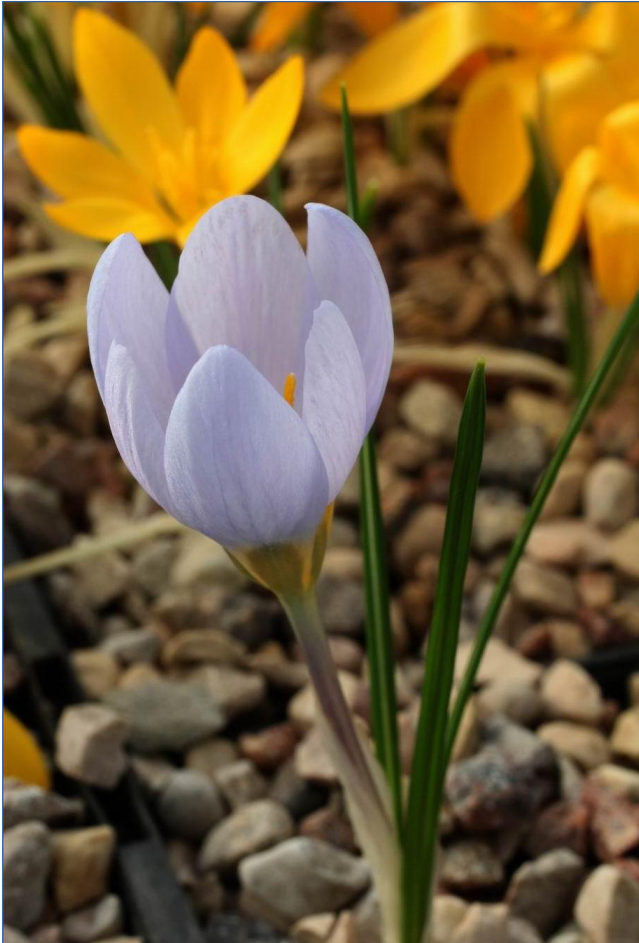


*Crocus antalyensioides* Alba

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## ***Crocus antalyensioides* Rukšāns species nova**

Type: Ex culturae in horto Jānis Rukšāns. (Plants from NW Turkey, Bursa province, near the road from İnegöl to Domaniç). Cultivated plants collected on 26-02-2011 (TULA-024). Holotype: GAT, Isotype GB.



*Crocus antalyensioides* TULA-024 -04

**Habitat and distribution** - Described from plants originally collected from a small spot between cultivated fields on a steep grassy slope below a large oak tree at an altitude of 380m. Most likely other acquisitions from Bursa and the neighbouring Bilecik province belong to the same species: the same is true regarding the plants distributed in commerce by several nurseries. Plants in Bilecik province were found at altitudes up to 800m (Davis, 1984 as *C. antalyensis* T. Baytop et al., 8201).

**Flowering time** - February-March.

**Corm** - 10-15mm in diameter.

**Tunics** – papery, splitting in the lower part into numerous parallel fibres.

**Tunic neck** - long, brown, persistent.

**Cataphylls** – 3, white, papery.

**Prophyll** - absent.

**Leaves** – 3-5, up to 3mm wide, green, without ribs in lateral channels and a white stripe 1/4 of the leaf diameter, nude or minutely papillose at edge. In the wild, leaves reach or even overtop the tips of the floral segments, in cultivation they only emerge at anthesis. [In *C. antalyensis* the leaves are narrower

(up to 2mm wide), darker green and slightly scabrid on the margins of the keel and lamina.]

**Perianth tube** – greyish white with purple or grey stripes in the upper part, confluent at the very top.

**Bract and bracteole** – thinly papery, white with brownish shaded tips, the bracteole distinctly smaller, but well visible.

**Throat** – nude, yellow to orange, with a lighter, diffused edge.

**Filaments** – 5-6mm long, yellow to orange.

**Anthers** – 10-12mm long, yellow, distinctly arrow-shaped.

**Connective** – creamy, always slightly lighter than the anthers.

**Style** – white to creamy, rarely yellow, divided into as many as 8-15 branches with short subdivisions, usually overtopping anthers or not so often ending at the tips of the anthers.

**Flower segments** – ovate to sublanceolate, rarely narrower, with an obtuse, very rarely subacute apex; inside uniformly violet blue, rarely completely white. Length to width ratio: around 1.9-2.1 (in *C. antalyensis* - more than 3).

**Outer segments** – 32-45mm long and 17-20mm wide, ratio (1.7-)1.9-2.1(-2.6); outside uniformly blue or with darker bluish-violet shading along the midrib, at the base a greenish-grey tongue-like basal blotch.

**Inner segments** – equal or slightly shorter and wider than the outer segments, ratio (1.6-) 1.9-2.0(-2.5); same uniformly blue as the outside, with a diffuse greenish-yellow blotch at the base.

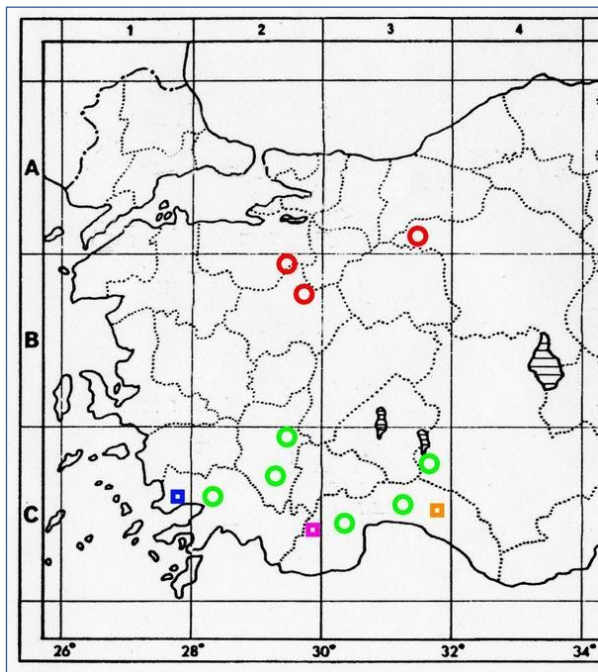
**Capsule and seeds** – not observed.

**2n** = ?

**Etymology** - the name means “similar to *antalyensis*”

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I find *Crocus antalyensioides* is somewhat easier in cultivation than its associates (*C. antalyensis* and its subspecies); it is a better grower and regularly flowers with me. It seems that it is somewhat tender. Without regular re-sowing, I would probably have lost it within a few years, but at present it grows quite well in my greenhouse. Plants in the open garden lasted no longer than 3-4 years.



No intermediates were observed between open pollinated seedlings of both species although they were grown side by side. Sometimes individuals appear with yellow flowers among open pollinated seedlings of the commercial stocks (*Crocus antalyensioides*) and the trade has also offered a “*C. antalyensis* yellow form”. It still is unclear whether these are unusual colour forms, some other species (*C. mouradii* Whittall) or hybrids with *C. mouradii* or *C. flavus* Weston. For some time one could buy a dark yellow-blooming cv. ‘Turkish Cocktail’ reported as a hybrid between *C. antalyensis* and *C. flavus*. Among my open-pollinated seedlings of the commercial variant (*C. antalyensioides*) bicoloured individuals appeared in which the yellow colour was flushed over with a nice light blue.

Map #1: **Green circles** - *Crocus antalyensis*; **red circles** - *C. antalyensioides*; **blue square** - *C. antalyensis* subsp. *striatus*; **lilac square** - *C. antalyensis* subsp. *gemicii*; **orange square** - *C. antalyensis* subsp. *nova*.

[Maps # 1-4 use Turkish (west) grid system by Davis (1984)]



*Crocus antalyensioides* TULA-024 locality

The Turkish botanist Erol (2010, 2011) described two subspecies of *Crocus antalyensis* - subsp. *striatus* and subsp. *gemicii* – which can generally be told apart by the flower colour patterns and the shape of the flower. Many of the leading botanists working with the genus *Crocus* (Kerndorff et al., 2013B, Schneider, 2014, D. Harpke, personal communication) no longer support subspecies status. However, the publications of Erol et al. and personal correspondence with him, as well as my observations in cultivation (subsp. *antalyensis* and subsp. *striatus*), have not fully convinced me that it would be worth raising their status to species level. Both subspecies occur in a very restricted area and are known only by a very limited number of specimens. So I still prefer to regard them as subspecies, but this could change when more data becomes available.

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First of all it is necessary to clarify a very important question - what is a species and what is a subspecies? If we take a historical look we see that the species concept in the genus *Crocus* has notably changed during the last few decades and much knowledge has come from genetic researches on DNA level. We still do not have a definite answer to the question: where does the border lie between the species rank and the infraspecific rank? This is not strongly defined by [the Code](#) (ICN) and taxonomists have so far failed to establish satisfactory standards for the determination of specific and subspecific differences. Meikle (1957) cited Walters who suggested that “where 90% of reasonably complete specimens could be assigned to one taxon or another without the use of microscope, then the taxa should be given specific rank”. At the same conference Tutin suggested that a plausible definition of a subspecies might be: “taxa differing from one another in minor morphological characters, occupying distinct areas (though sometimes with a zone of overlap) or else isolated ecologically, but potentially capable of interbreeding without substantial reduction in fertility” (Meikle, 1957). As to the crocus, I think that the best approach was proposed by Kerndorff et al (2013B): “...different species of the same genus and **at the same locality** (emphasis added by me - J.R.) should only occasionally produce hybrids or only sterile hybrids”. This definition has been applied for many plant groups for years, but not at all times.

During my Turkish trips I gathered *Crocus antalyensis* at several localities in Antalya province and I got some more plants from other travellers. The easternmost population was found near Gündoğmuş and when it bloomed in my collection, the flowers displayed a very distinct colour pattern, not observed in other populations of subsp. *antalyensis* distributed N and W of Gündoğmuş. Following the standpoint of Erol et al. (2010, 2011), it could be regarded as a new subspecies of *C. antalyensis* while awaiting a more thorough research on DNA level.

Here I give a description of this crocus while still not naming it. (Distribution area shown via an **orange square** on Map #1 on previous page – 7.) The details generally characterize features of all subspecies of *Crocus antalyensis* other than the pattern of the flower segments' colour.



*Crocus antalyensis* subsp. nova JATU-077



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## *Crocus antalyensis* subspecies nova (?) from Gündoğmuş area

**Habitat and distribution** – scattered on limestone formations in clearings amongst low spiny shrubs, but mostly inside them, thus being protected from grazing; in Turkey, in eastern part of Antalya province, near Gündoğmuş, at altitudes of 980-1100m.

**Flowering time** - February - March.

**Corm** – 10-15mm in diameter, ovoid, positioned 10-15cm deep in the soil.

**Tunics** – papery, splitting at the lower part in numerous parallel fibres.

**Tunic neck** - long, dark brown persistent neck of old cataphylls, at the apex even reaching the soil surface.

**Cataphylls** – 2-3, silvery, turning brownish towards the apex with age.

**Prophyll** - absent.

**Leaves** – 4-6, dark green, 1-2mm wide, the white stripe 1/4 to 1/3 the leaf width, slightly scabrid on the margins of the keel and lamina, usually reaching the lower part of the flowers at blooming time, rarely is overtopping them.

**Perianth tube** – white, suffused greyish, bluish or purplish at the apex.

**Bract and bracteole** – silvery white, very unequal, bracteole narrowly ligulate, enclosed within the bract.

**Throat** – yellow to orange.

**Filaments** – 3-5mm long, yellow to orange.

**Anthers** - up to 4 times longer than the filaments, wider at the base, and then tapering to a narrow, obtuse tip, rarely with +/- parallel edges, and ending with a distinct notch at the tip.

**Connective** – paler than the anthers, yellow

**Style** – divided into 6-12 yellow to orange branches, very rarely whitish, usually ending below the tips of the anthers.



*Crocus antalyensis* subsp. nova  
JATU-077

**Flower segments** – lanceolate to sub lanceolate, with a subacute, rarely almost acute or obtuse apex. Length to width ratio around 3.3-3.8.  
**Outer segments** – up to 30mm long and 8-11mm wide, ratio - (2.75-)3.3(-3.7); outside pale blue to violet, sometimes buff, distinctly striped, but the stripes usually diffused, rarely sharply defined. Inners usually with two distinct white stripes from the throat up to the tips of the segments, sometimes with smaller lateral stripes, rarely the stripes are less prominent.

**Inner segments** – up to 28mm long and 7-9mm wide, ratio - (3.3-)3.8(-4.0), reverse distinctly darker than in the outer segments, with a dark blotch at the base, inside in the same

colour as the outer segments, but the white stripes less prominent or absent.

**Capsule and seeds** – not observed.

**2n** = ?



*Crocus antalyensis* subsp. *nova* RUDA-006

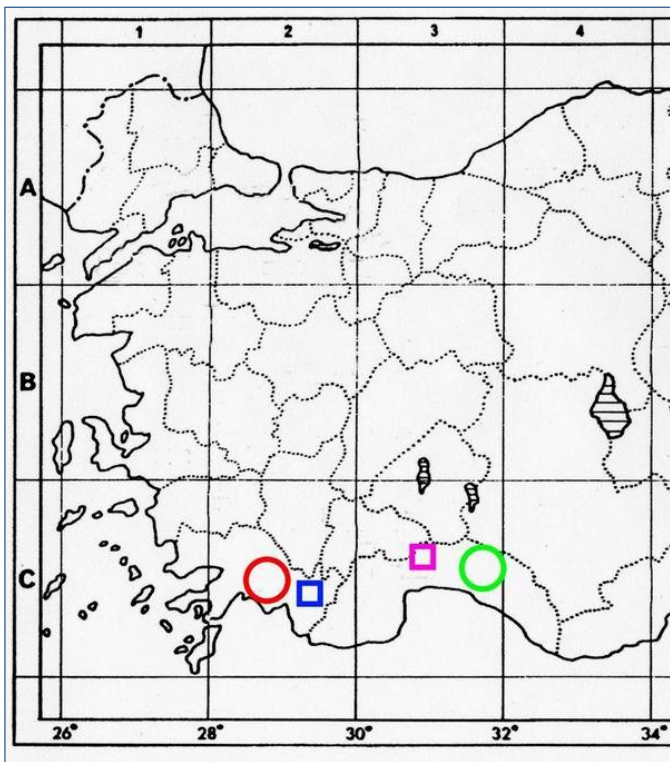
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Erol et al. (2011) have given a key to separate their new subspecies from the typical subspecies. Here is a slightly modified key with the possible new subspecies included.

1. Flowers inside lilac-blue, with bluish suffusion on the outside of the base of the outer segments ..... subsp. *antalyensis*
1. Flowers pale lilac-blue, distinctly striped or flecked on the outside of the outer segments
  2. Flower shape infundibular, outside of inner segments striated .... subsp. *striatus*
  2. Flowers waist-shaped, outside of outer perianth segments striped ...subsp. *gemicii*
1. Flowers distinctly white-striped on the inside of perianth segments..... subsp. *nova* (?)

In cultivation it is not an easy plant and I cannot report any great success. Almost every winter it suffers, regardless of being grown in pots. Probably I plant it too shallow as in the wild corms are positioned very deep in the soil.

There are several groups of closely related species which are now under extensive examination by several researchers. One of these groups comprises species of series *Crocus* B.Mathew, which includes *Crocus pallasii* Goldb. *s.l.* (*sensu lato*) with 4 subspecies (*sensu* Mathew) now regarded as separate species. One of the closest relatives to *C. pallasii* is *C. macedonicus* Rukšāns described from the Vertisko ridge in Greek Macedonia, but later found in a much wider area (as far as W Larissa – it was encountered there by Dr. G. Papapolymerou, personal information; and maybe here we can also add "*C. pallasii*" from Central Macedonia (FYRM) - Šopova, 1972). Other close relatives are *C. asumaniae* B. Mathew & T. Baytop and *C. mathewii* Kerndorff & Pasche. Brian Mathew once expressed the opinion that since they were so close then they probably belonged to the same species (personal discussion), because to the west individuals can quite often be seen which look intermediate between *C. pallasii* and *C. mathewii*. Such plants are quite common in populations of the crocus species at present regarded as *C. pallasii* on E Aegean islands (observed by me on Chios and Samos). On the phylogenetic tree the closest neighbours of *C. pallasii* are *C. mathewii* and *C. asumaniae* (Petersen et al., 2008).



Map # 2 **Red circle** - *Crocus mathewii*; **green circle** - *C. asumaniae*; **blue square** - *C. kofudagensis*; **lilac square** - *C. kofudagensis* aff. (Ariasos).

[Maps # 1-4 use Turkish (west) grid system by Davis (1984)]

*Crocus asumaniae* was described from near Akseki where I succeeded in finding it very close to the *locus classicus* (near Cevizli, JATU-070), thus securing a good sample for further comparison. It is believed that *C. asumaniae* is found only around Akseki (Mathew, 1982), and all the samples (5) grown in the Gothenburg BG (Botanical Garden) were collected in an area within 4-20km from Akseki. The features that help to separate *C. asumaniae* from *C. pallasii* are the position of the branching point of the style and the length of the stigmatic branches. According to Mathew, in *C. asumaniae* the style divides above the base of the anthers, and the branches are at least half the length of the flower segments, while in *C. pallasii* the style divides more or less below the middle point of the anthers and the branches are shorter than half of the floral segments' length. My observations on a large number of individuals (more than 100) at the *locus classicus* of *C. pallasii* (Ukraina: Kaya-Bash heights, Crimea, temporarily occupied by Russia) showed that the length of stigmatic branches could vary greatly. Much more constant is the point where the

## ---International Rock Gardener---

style divides - in most cases it is at the bottom of the anthers or below them, rarely higher, but not exceeding half the anthers' length. The stigmatic branches of the Crimean plants in the wild and in cultivation almost always end below the tips of the anthers and only rarely slightly exceed them. As Crimea is the *locus classicus* of *C. pallasii*, this trait must be regarded as typical for this species. In Turkish plants, stigmatic branches usually overtop the anthers considerably. Another feature that separates the former typical subspecies of *C. pallasii* and *C. asumaniae* is the length of the corm tunic's neck, which in *C. asumaniae* usually is 3-4cm long, whereas in *C. pallasii* it is only up to 2cm long.

***Crocus mathewii*** (below) is distributed quite far to the west of Akseki. Its main characteristic feature is the dark purple throat inside the flower, however there have been populations with pure white individuals scattered among more typical ones ([P.&P. Watt, Scottish Rock Garden Club Crocus forum](#)).



During an autumn trip in 2009, our team researched the variability of *C. mathewii* near its *locus classicus* and in the surroundings. We saw that individuals with pure white and lighter or darker tones of violet colour in the flower segments were found in approximately equal proportions and all of them had a very distinct deep purple staining in the throat. We did not observe any with a pure white throat.

At some 20km distance we found another crocus with purest white flowers growing side by side with *C. lycius* (B. Mathew) Rukšāns. At first we thought it was *C. asumaniae*, assuming a much wider area of its distribution (the locality was more than 200km distant from the *locus classicus* of *C. asumaniae*).

Further observations showed that it was very distinct from both *C. pallasii* and *C. asumaniae*: the neck of the corm tunics was very short, not longer than 10-15mm, rarely reaching 20mm; the style in most cases was white, rarely yellow, divided into three red branches near the tips of the anthers or even higher, rarely slightly lower. The length of the

style branches was very variable - within 10-20mm range, generally less than half the flower segments' length, which can be 35-45mm. These features allowed me to regard this crocus as a new, as yet undescribed species, which I decided to name after the nearest and highest mountain peak - Kofu Dağ. In cultivation it always blooms after *C. asumaniae*. In N Antalya, near the ruins of the ancient Ariassos quite similar plants were observed (JATU-059, JJJ-035), but with a lighter lilac colouration amongst darker-coloured individuals, which more resembled *C. pallasii* s.l.

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Left: *Crocus kofudagensis* Rukšāns species nova JJJ-024

Below: *Crocus kofudagensis* corm



### ***Crocus kofudagensis* Rukšāns species nova.**

Type: Ex culturae in horto Jānis Rukšāns. (Plants from SW Turkey, W Antalya province, after the turn to Kaş from the road to Kalkan-Elmalı). Cultivated plants collected on 01-11-2009 (JJJ-024). Holotype: GAT, Isotype GB.

**Habitat and distribution** - at present known only from the type locality, where it was growing on a stony strip between the road and the pine forest, at altitudes of 900-1000m. *C. lycius*, from the *C. cancellatus* group, was growing on the other side of the road. Individuals observed near Ariassos grew on very stony slopes amongst dwarf spiny shrubs together with *C. pallasii* s.l. Identical plants are grown in Gothenburg BG, originally collected between Kassaba and Elmalı (JP 88-58).

**Flowering time** - November.

**Corm** - 10-15 mm in diameter, slightly elongated, globose.

**Tunics** – finely fibrous and reticulated.

**Tunic neck** - short, distinctly shorter than in *C. asumaniae* with which it is compared.

**Cataphylls** – 3, transparent, papery, white, turning yellowish with age.

**Prophyll** - absent.



*Crocus kofudagensis* at locus classicus

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**Leaves** – 8-10(-11), grey green, 1-2mm wide, without ribs in lateral channels, white stripe around 1/3 of leaves' width; at blooming time without leaves, or they have just emerged, but well advanced right after the blooming, and the overwinter as well-developed leaves.

**Perianth tube** – white.

**Bract and bracteole** – subequal, white, membranous, with long, narrow, rather flaccid tips.

**Throat** – white, slightly greyish shaded.

**Filaments** – 8-10 mm long, white to creamy.

**Anthers** - equal to or slightly longer than the filaments (10-12mm), yellow.

**Connective** – creamy to yellow.

**Style** – white, rarely yellowish, right below the splitting point turns yellowish, splitting at the tip of the anthers or more often even higher into three bright red branches, club-shaped at the tips.

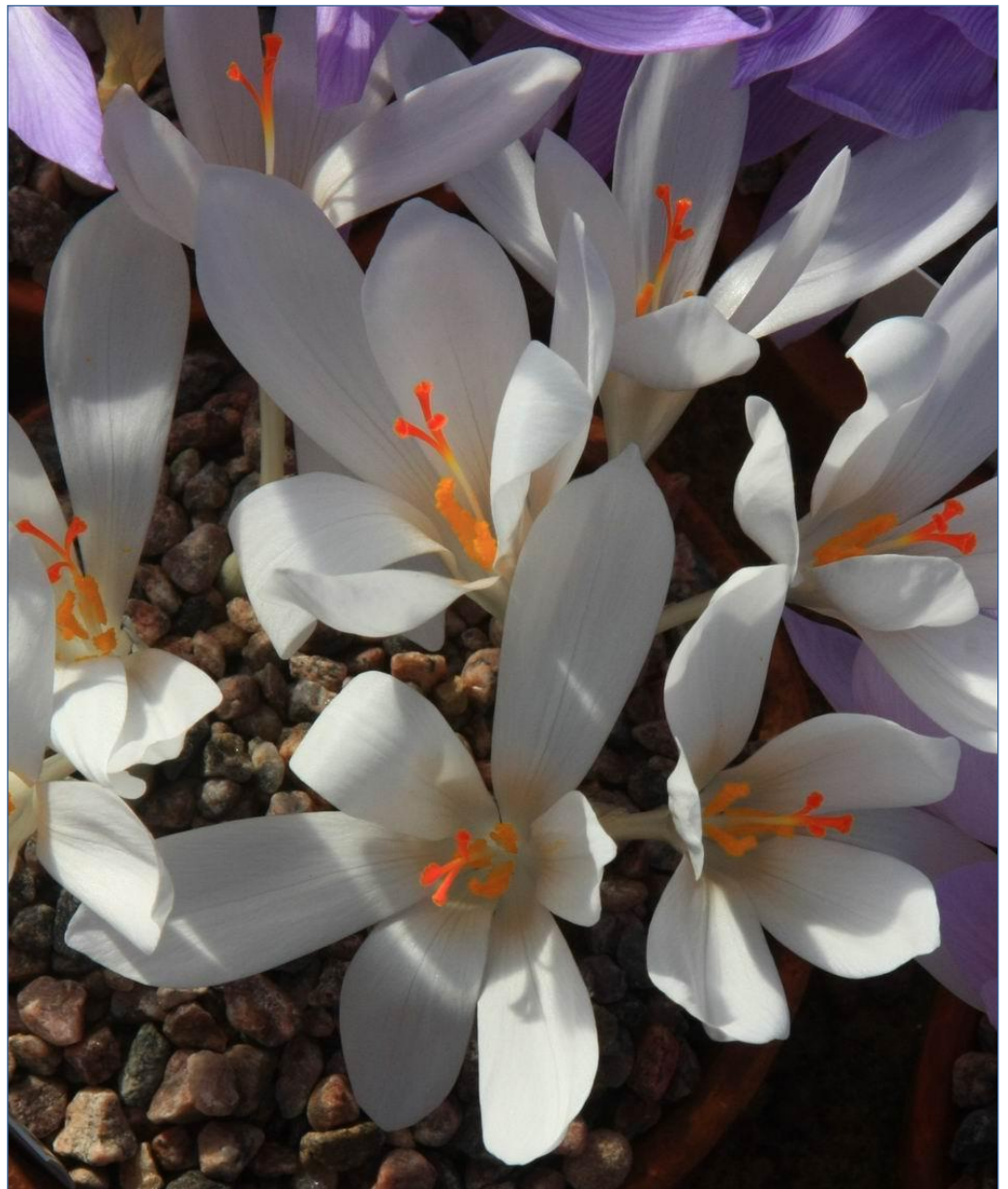
**Flower segments** – 35-45mm long and 12-18mm wide, obovate to lanceolate, with rounded to subacute tips, inner segments slightly wider and in most cases distinctly (up to 3-4mm) shorter than the outer, though can be subequal, too. In most observed specimens pure white throughout, rarely very light lilac, some specimens become lilac shaded when dried in herbarium, at the outside base turns slightly greyish.

**Capsule and seeds** - not observed.

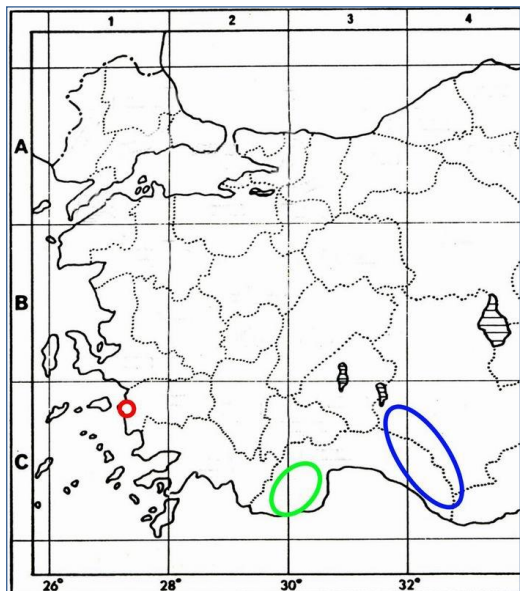
**2n** = ?

*Crocus kofudagensis* is easy in cultivation but I find that in Latvia it can be grown only in a greenhouse as it forms leaves in autumn. In summer I keep the pots under cover providing a dry and hot summer rest. It sets good seed.

*Crocus kofudagensis*  
JP 88-58 in Gothenburg  
BG (Botanical Garden)



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Map # 3 **Green circle** - *C. lycius*; **blue circle** - *C. pamphylicus*; **red circle** - *C. dilekyarensis*.

[Maps # 1-4 use Turkish (west) grid system by Davis (1984)]

*Crocus lycius*



Another group that needs revision belongs to section *Nudiscapus* Mathew series *Reticulati* B.Mathew. Recently major alterations were made in the group of species formerly classified under the collective name *Crocus reticulatus* Steven ex Weber & Mohr; as a result, it was split into five species, two of them new (Harpke et al., 2014). Together with some other species, they frame the new concept of series *Reticulati sensu stricto* leaving all the others outside. There are several characters listed which separate them from other species with reticulated tunics. Among the ones left outside of the new concept of series *Reticulati* is *C. cancellatus* s.l. which occupies an extensive area from Iran and Jordan in the east all the way to the westernmost parts of Greece.



*Crocus lycius* LST-418

When Mathew (1982) reviewed *Crocus cancellatus*, he lowered the status of two species of Herbert to subspecies level and described two new taxa at subspecies level himself, so in line with his approach, he affiliated five subspecies to *C. cancellatus*. Such an approach is not accepted and is rejected by recent genetic researches by several authors.

In their revision of series *Reticulati*, D. Harpke et al.

(2014) regarded two *Crocus cancellatus* subspecies - subsp. *lycius* B.Mathew and subsp. *pamphylicus* B.Mathew as species. But their new status has never been formally published. Mathew wrote to me: "With regard to changing the status of my *C. cancellatus* subspecies, I think you need to make the transfer correctly as I have not done it. So, they would become *C. lycius* (B.Mathew) Rukšāns and *C. pamphylicus* (B.Mathew) Rukšāns. It is necessary also to have the full reference to the basionym, so the combination is not valid if the basionym is excluded" (private letter, dated 20-12-2014)

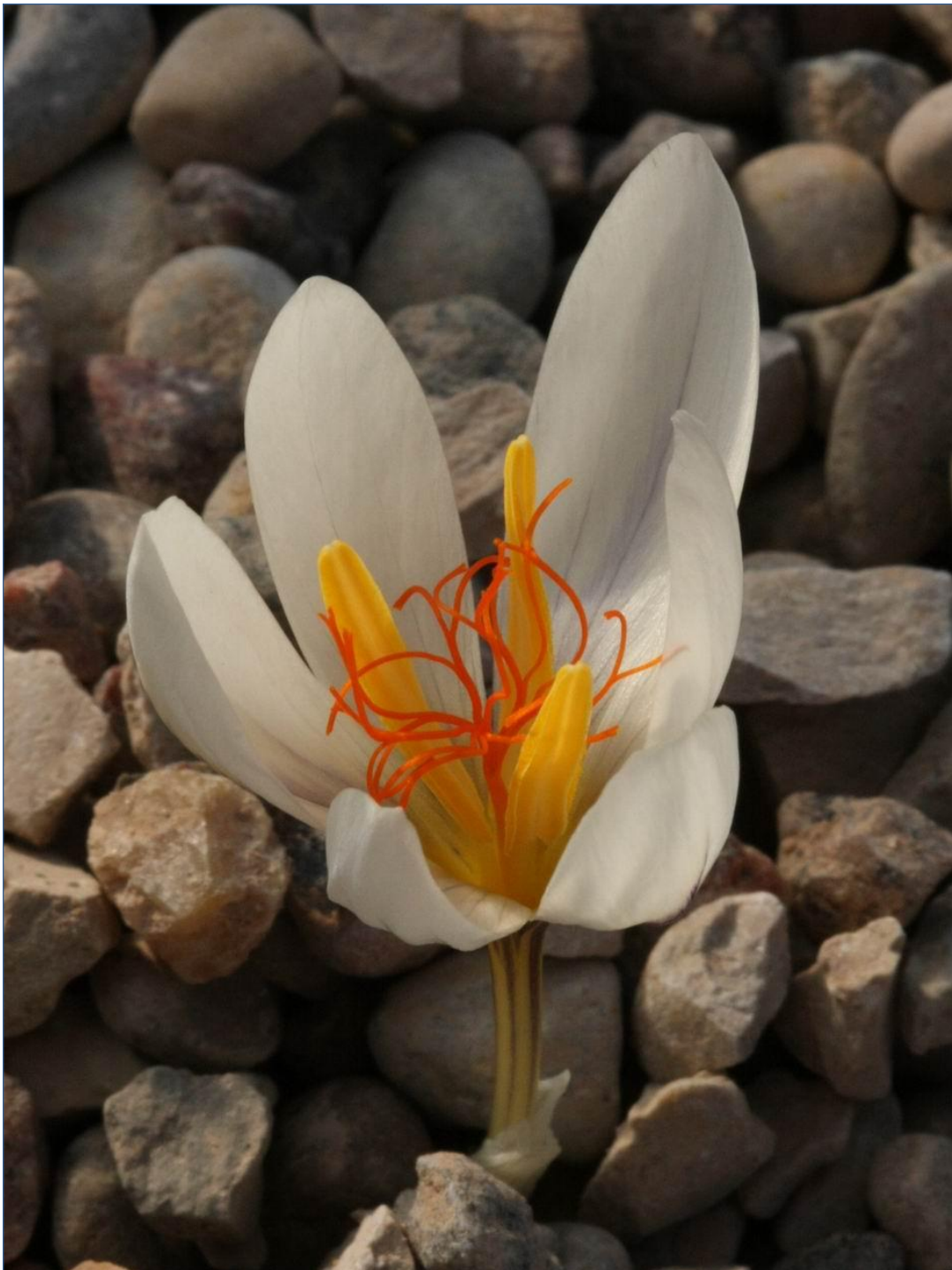
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I am doing this here, along with the description of a new species from the large and taxonomically very complicated *Crocus cancellatus* s.l. group.

### ***Crocus lycius* (B.Mathew) Rukšāns comb. & stat. nov.**

Basionym: *C. cancellatus* Herb. subsp. *lycius* B.Mathew in *The Crocus*: 69 (1982).

*Crocus lycius* occurs in a very well defined area starting from W Antalya up to the eastern Muğla province. I have never seen it growing together with other crocus species from the *C. cancellatus* s.l. group. It is very easy separable from other species. Flowers of *C. lycius* are almost invariably white (occasionally flushed pale lilac): only at the base of the segments outside are a few short purplish stripes, very rarely reaching half the segments' length. The most distinctive feature is the many-branched bright orange to red style, usually positioned among the anthers, and only rarely slightly overtopping them.



*Crocus lycius* JATU-054  
– showing the style  
branches below the top  
of the anthers.

In cultivation *Crocus lycius* is not very difficult, though here in Latvia it is suitable only for growing in pots, which I keep in the greenhouse throughout the year, providing hot and dry summer rest. It sets seed very well without additional pollination and I have never observed any hybrids with other species although it grows with me side by side with other species from the *C. cancellatus* group.

*Crocus lycius* blooms without leaves. After flowering comes to an end, they start to develop but remain quite short until spring.



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*Crocus pamphylicus* inners



*Crocus pamphylicus* Kazim-Kazbekir

***Crocus pamphylicus* (B.Mathew) Rukšāns comb. & stat. nov.** Basionym: *C. cancellatus* Herb. subsp. *pamphylicus* B.Mathew in *The Crocus*: 69 (1982).

*Crocus pamphylicus* is distributed on the opposite side of Antalya - NE and E Antalya to İçel (Mersin) province. According to Flora of Turkey, it has been found N of Akseki and on Naldöken dağı above Anamur. Our team found it at an even more easterly location - above İçel, on Göktepe dağı. The main feature separating *C. pamphylicus* from other species of the "*C. cancellatus* aggregate" are the white anthers; it is observed that seedlings from cultivated plants retain this trait; therefore it can be assumed that it does not hybridize with other species within the aggregate. Sometimes individuals with white anthers erroneously keyed out as *C. pamphylicus*, have been observed in populations of *C. damascenus* Herbert, spread from Israel to N Iraq & W Iran ([Archibald, Seedlist Master SRGC](#)). Anthers can turn white in case of some development failures; such anthers are usually without pollen and were observed in several species.

*Crocus pamphylicus* is not very common in cultivation. It is rarely offered by nurseries and the price is comparatively high for a plant which is not very difficult in cultivation. I grow it only in the greenhouse where it sets seed well, though it is quite shy to increase by splitting. Pots are kept in the greenhouse during summer.

Two former subspecies of *Crocus cancellatus* - the typical subspecies and *C. damascenus*, are found in the Middle East. *C. cancellatus* - occurs in S Turkey (prov. İçel, Hatay and Adana), Syria, Lebanon and N. Israel, and *C. damascenus* in N Iraq, Lebanon, Israel, Jordan, W Iran, N and W Syria and in C, E and SE Turkey. It is quite possible that in such a large area several undescribed species are hidden under this name. Some of the samples collected in this area look quite distinct but more research must still be done before any definite conclusion can be reached.

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*Crocus mazziaricus* in habitat, Greece, autumn 2014

The fifth species from this group - ***Crocus mazziaricus*** Herbert (*C. cancellatus* subsp. *mazziaricus* sensu B. Mathew) sensu lato occupies the W part of the area and has the widest range of distribution. It was described from Lefkada (Lefkas) Island in W Greece and is distributed in Peloponnesus, Mainland Greece, Macedonia (FYRM), Ionian Islands, S and W Turkey (provinces of Denizli, Muğla, Aydın). In the autumn of 2014, our team studied *C. mazziaricus* at the *locus classicus* just at the peak of flowering. After comparing individuals from various localities, it became clear that even in Greece probably at least two, or even more species were hidden under this name (typical plants and one population near Thíva and another from near Larissa that look sufficiently distinct to be regarded as different species) and the same can be said about several samples gathered in Turkey. Markedly differing from the type in its morphological features is the sample gathered on Dilek Yar (facing Samos Island) and this is the one I first regard as a different species. Other acquisitions still need to be studied more completely.



Left: *Crocus mazziaricus* corms

The new species is clearly separable from *C. mazziaricus* and is named after the mountain ridge Dilek Yar (Dilek cliff) where it was found. *Crocus mazziaricus* from the type locality and in Peloponnesus generally is white or only slightly lilac-tinted, and even the darker-coloured specimens from the surroundings of Thíva (Thebes) and Larissa have never been so bright bluish-violet as the plants described here as *C. dilekyarensis*. In *C. mazziaricus* the stigma is yellow to light orange, corm tunics are coarsely reticulated with a 2-4cm long neck formed by coarse fibres, whereas in *C. dilekyarensis* the stigma is bright orange-red to red and the corm tunic fibres are

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much thinner, with the neck only 1.5-2.0cm long. Dilek Yar borders on the sea and flat lowlands, thus it is ecologically well isolated from other crocuses and this is what has sparked the speciation. The "*Crocus mazziaricus*" from the adjacent Samos Island (Greece) has different flowers and the corm tunics are much coarser, closer to the typical *C. mazziaricus* from Lefkada in W Greece.



*Crocus dilekyarensis* R2CV-018

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### ***Crocus dilekyarensis* Rukšāns species nova.**

Type: Ex culturae in horto Jānis Rukšāns. (Plants from W Turkey, Aydın prov., Dilek Yar, W of the ruins of Priene, alt. ~ 190m). Collected on 14-03-2008 (R2CV-018). Holotype: GAT.

**Habitat and distribution** - amongst low shrubs on very stony soil.

**Flowering time** - November (in cultivation).

**Corm** - up to 20mm in diameter.

**Tunics** – finely reticulated.

**Tunic neck** - up to 20mm long, formed by narrow, slightly curved tunic fibres.

**Cataphylls** – 3, white, the outer with a light greenish tip.

**Prophyll** – absent.

**Leaves** – 4-6, glabrous, dark greyish-green, 2.5-3mm wide with 3(-4) distinct ribs in lateral channels, the white stripe (1/3-) 1/2 of the leaf width.

**Bract and bracteole** – bracteole visible, shorter than the bract.

**Perianth tube** – white, turning purple towards the top.

**Throat** – whitish to pale yellow.

**Filaments** – 8-10mm long, whitish to light yellow.

**Anthers** - 17-19mm long, dark yellow.

**Connective** – lighter yellow.

**Style** – deep orange-red, divided around the tips of the anthers (rarely lower) into 3 branches, in the upper part subdivided into 3-5 shorter branches each.

**Flower segments** – obtuse to almost pointed, inside bright bluish-violet turning lighter towards the throat, and with slightly darker veining.

**Outer segments** – 40-46mm long and 12-15mm wide, outside with three dark stripes half the segments length.

**Inner segments** – slightly smaller, 38-42mm long and 10-12mm wide, outside with narrow, short stripes at the base.

**Capsule and seeds** - not observed.

**2n** = ?

*Crocus dilekyarensis* is easy in cultivation but can be grown only in pots kept in the greenhouse during the summer. Mountain slopes where it was originally found are exposed to the sun and in summers become parched. It increases quite well vegetatively though I have not had any seeds yet. Usually it blooms here only in November when natural pollinators are absent or rare. So far, I have not tried hand pollination. Originally only five corms were collected during the summer, with the leaves already dry and all these individuals are quite uniform. It is very likely that the variability in nature is richer than that observed here.



*Crocus dilekyarensis* R2CV-018

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Species from the former series *Biflori* B.Mathew are at present the most studied of crocuses, mainly by the efforts of the German researchers Kerndorff and Pasche who, during the last decade, have described more than 40 new taxa from this aggregate; several more species have been described by other researchers. Some 30 years ago one of the world's leading authorities in bulbs, the late Michael Hoog, former co-owner of the Van Tubergen Company which introduced scores of new bulbs into cultivation, told me during one of our conversations: "In Turkey there still is an immense number of new species which wait to be discovered. On each mountain ridge and valley you can find a new crocus species." His words proved prophetic. Kerndorff and Pasche (2004, 2006, Kerndorff et al. 2013A, B) alone have observed 76 crocus populations all over Turkey. Although these are well separated genetically, sometimes morphological differences are not very conspicuous so the identification is not always simple, especially taking into account the great infraspecific variation in some species. When asked about the identity of some of my acquisitions, Pasche would usually reply that DNA checking was necessary for a final decision (private communication).

Of course, it is not possible for two persons to observe all the populations and all the possible new crocus species. To achieve this, several generations would be needed, especially in such a mountainous region as Turkey, with its many isolated places which are difficult to access. In order to avoid any conflict of interest I cannot, in most cases, use the services of the geneticists from the IPK who are collaborating with both explorers on a new system of crocuses, with the greatest attention being given to species with ring-like basal tunics (the former series *Biflori*). Taking this into account, I am very careful in selecting which crocus species from my acquisitions to describe as new taxa, especially from the "biflorus" aggregate. Here I present three new species from this group which are easy separable from the related species by their morphological features without special laboratory equipment. Of course, samples of the new taxa are forwarded to the IPK (Gatersleben) to be included in the database thus ensuring the preparation of a more complete phylogenetic tree sometime in the future.



*Crocus zetterlundii* JATU-008 – previously thought to be *C. pulchricolor*

In 1975 Baytop and Mathew described a new crocus species from the surroundings of Lake Abant - *Crocus abantensis*. Although this locality is a popular place for botanical trips, the new species was overlooked for a long time because in flower it strongly resembled *C. pulchricolor* Herbert "which is much more plentiful in the same area" (Mathew, 1982). *C. pulchricolor* (described from Uludağ),

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according to Mathew (1982), is distributed as far as N of Ankara where it grows on “thickly pine-wooded hills between Bolu and Kızılcahamam.” Although I visited and carefully searched the heights over Lake Abant several times, I never observed *C. abantensis* and *C. pulchricolor* growing together. The closest locality where I saw crocus species from the *C. biflorus* aggregate eastward of Lake Abant was at a 30km distance S of Bolu (**JATU-008**) where it bloomed in a flooded meadow together with a *Colchicum sp.* at the forest edge by melting snow. Further observations in cultivation showed that it was identical with two unidentified samples (LST-103 and 109) collected in leaf on the 4<sup>th</sup> of June 2005, during a joint expedition of Latvian and Swedish botanists (Gothenburg BG) to Turkey (abbreviated to “LST”).

Right: *Crocus thirkeanus* corm showing growth of stolons.

When they flowered in cultivation they drew attention because they looked quite different from *Crocus pulchricolor*, which they had been temporarily labelled as, according to the distribution area most recently indicated by Mathew. But until recently it was not easy to determine the features that separate both species as the samples of *C. pulchricolor* grown by me were of unknown origin, so could be misnamed.



Below: *Crocus* SABS-1135, Uludağ



Only after gathering the true *C. pulchricolor* from Uludağ [SABS-1133, 1135 and R2CV-003, the last at the *locus classicus*, in a wet meadow, before the entrance into the national park, where it grew and bloomed together with the stoloniferous ***C. thirkeanus* K. Koch** [syn. *C. herbertii* (B.Mathew) B.Mathew] and *C. chrysanthus* (Herbert) Herbert] was it possible to make a complete comparison of them. Both crocuses have differing colour patterns and the new species is much more uniform in colour. During blooming they are easily separable by the position of the stigmatic branches which in all the samples of *C. pulchricolor* of known origin well overtop the anthers and only rarely end close to the anther tips, while in all the gatherings of the new species they end below the tips of the anthers. Another feature separating the two can be observed at harvesting time (although it is also significant at flowering time) – the cataphylls of *C. pulchricolor* from Uludağ are invariably whitish, whereas in the new crocus they are distinctly yellow coloured. I decided to name the new crocus species after Henrik Zetterlund who organized the trip to Turkey during which we found this beautiful crocus for the first time.

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*Crocus zetterlundii* corm tunics

### ***Crocus zetterlundii* Rukšāns species nova.**

Type: Ex culturae in horto Jānis Rukšāns. (Plants from NW Turkey, Bolu province, near Bakyrly yaylasi, altitude 1360m). Collected on 04-06-2005 (LST-109). Holotype: GB.

**Habitat and distribution** - known from 3 localities, though distributed much wider (personal communication with [Ibrahim Sözen](#), Turkish crocus enthusiast) at altitudes from 1340m to 1600m where it bloomed (acquisition JATU-008, 11<sup>th</sup> of March, 2007) in a very wet open meadow near melting snow at the coniferous forest edge entering lighter spots under trees. The environs of specimen LST-109 were still waterlogged even after flowering, on the 4<sup>th</sup> of June.

**Flowering time** - March - May.

**Corm** - slightly flattened, globose, 13-17mm in diameter.

**Tunics** – thinly membranous, though strong, inner tunics finer.

**Tunic neck** - 4-6mm long, formed by widely spaced triangular splits in the outer tunic, inner tunics' neck without splits.

**Basal rings** – edge almost smooth, formed by very small, less than 0.5mm long, densely spaced teeth of the same length (in *C. pulchricolor* teeth are larger, unequal in length, and widely interspaced by prominently longer sharp teeth).

**Cataphylls** – 3-4, distinctly yellowish.

**Prophyll** - absent.

**Leaves** – 4-5, dark green, 2mm wide, nude or slightly papillose at edge, without ribs in lateral channels (occasionally observed one indistinct rib in one of channels), white stripe around 1/4 of leaves width, just emerging or rarely reaching the base of the flower at anthesis.

**Bract and bracteole** – subequal, papery, yellowish.

**Perianth tube** – mostly dark bluish or purplish coloured throughout, only in the light-coloured individuals does it become lighter towards the base, or densely dotted bluish or purplish.

**Throat** – lighter or darker yellow to orange, sometimes greyish shaded at the edge (**LST-109**), then the filaments with blackish shade at the top; quite often somewhat darker (greyish) deep in the throat where the flower tube begins.

**Filaments** – 4-5mm long, lemon to dark yellow, rarely shaded greyish at the top.

**Anthers** - 3.5-4 times longer than the filaments, orange-yellow.

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**Connective** – indistinct, sometimes paler than the anthers, or creamy.

**Style** – bright orange-red to red, at the top divided into three branches distinctly wider or fringed at the tips, mostly ending below the tips of the anthers, rarely reaching them and only occasionally slightly higher.

**Flower segments** – subequal, inner segments slightly narrower, with more or less obtuse tips, inside lighter or darker bluish-violet, towards the throat gradually becomes almost white.

**Outer segments** – (28-)35(-45)mm long and (10-)12.5(-17)mm wide, inside darker than on the inner segments, outside mostly flushed lighter or darker violet, not so often entirely purple with a very dark, sometimes even blackish, short basal blotch, not exceeding 1/3 the segments length. At the edge the basal blotch shortly rayed, but the rays never ascend as is observed in *C. pulchricolor*. Lighter forms and albinos are without a basal blotch. If the basal blotch resembles a light greenish or yellowish tongue, it is margined by a dark purple rim.

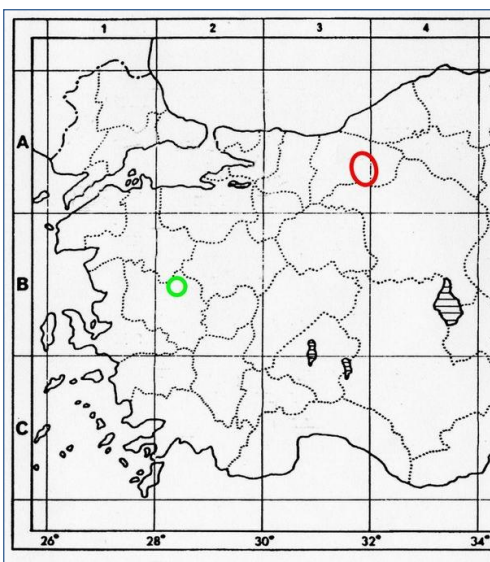
**Inner segments** – (26-)32(-40)mm long and (8-)11(-14)mm wide, generally slightly lighter and smudged in colour, with a smaller basal blotch.

**Capsule and seeds** - not observed.

**2n** = ?



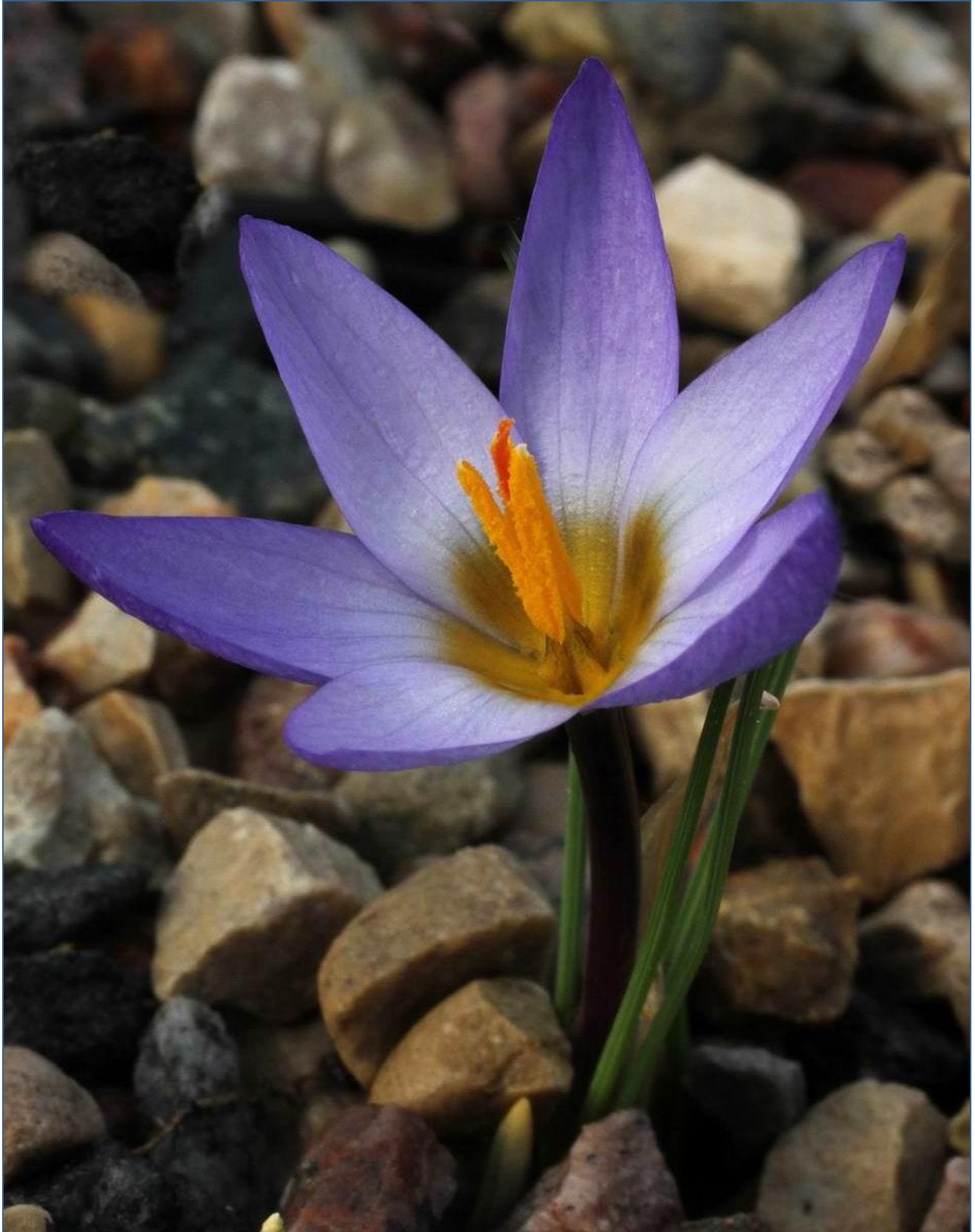
Above: *Crocus zetterlundii* LST-103 inner and side view. Below, right: *C. zetterlundii* corm



*Crocus zetterlundii* is very easy in cultivation and readily sets seed. Although I have not tried it in the open, judging by the conditions in its homeland, it may be a good grower, just like its distant neighbour *C. abantensis*, which even prefers and grows better in the garden than in greenhouse pots. It increases well by splitting but if you want to multiply *C. zetterlundii* from seeds, isolation and controlled hand-pollination is essential as it can hybridise with some other species from the *C. biflorus* aggregate.

Map # 4 Green circle - *C. sozenii*; red circle - *C. zetterlundii*.



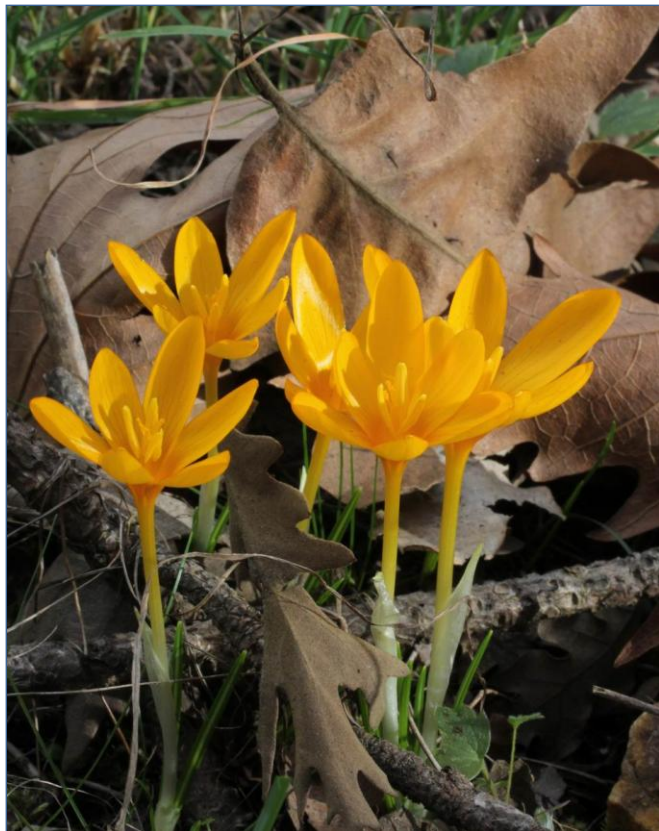


*Crocus zetterlundii* LST-109

In spring 2013 I travelled across NW Turkey together with the crocus enthusiast Ibrahim Sözen. Our goal was to take pictures of a few new crocus species quite recently described from this region by Kerndorff & Pasche (2011, 2012). Although we did see crocuses, many in flower, the weather on the whole was very unfavourable. Our searches were often halted by sudden rains, and at one time a

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snowfall covered everything in a white blanket that even caused the closure of several mountain passes. The highlight of our endeavours was the finding of ***Crocus thirkeanus*** (former *C. herbertii*) on the slopes of Bozdağ more than 200km from its *locus classicus* on Uludağ, and especially momentous was the discovery of a pure white mutation, never before recorded in this species.



*Crocus thirkeanus* and *C. thirkeanus* Alba

Among our other goals was the very special *Crocus lydius* Kerndorff & Pasche, described from Göldağ where it was reported from three localities as growing only on granite based soils (Kerndorff et al, 2011). There were not that many places with granite outcrops on this mountain ridge, but nonetheless our exertions proved futile. We found everything but *C. lydius*. Our attempts were hindered by the changeable weather, heavy rains and washed-out roads. We saw a lot of *C. chrysanthus* s.l., ***C. mouradii*** Whitall (***C. flavus* subsp. *dissectus*** T.Baytop & B.Mathew) in full bloom, *C. pallasii* s.l., and others.



Left: *Crocus mouradii*

In the late afternoon on the 15<sup>th</sup> of March we crossed the snow-covered Simav Dağlari (around 50-55km from Göldağ), where along the roadsides a *Crocus* sp. with yellow flowers was putting on a good show. We stopped there to check its identity and to take some pictures. It turned out to be *C. mouradii*. While I was on my knees photographing a flower, İbrahim suddenly called out – “Hey, Jānis, you’re sitting on *biflorus* crocuses.” And indeed, there were some at the very end of blooming and with weather-beaten flowers that I had not noticed. Although it was dark, we made a quick observation of the plants in the vicinity and found that superficially this crocus resembled the much-desired *C. lydius* - it had the exact number of leaves - mostly 2, around 20% - 3 leaves, on average 2.2 (n=30) (in

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*C. lydius* - 2.3), but it was too dark for more research *in situ*. So we collected a few corms to check later in the hotel. Leaf cross-section pictures taken in the hotel showed another affinity with *C. lydius*: the number of ribs in the lateral channels was 4-5. In *C. lydius* it is 3-4.5-6. [Crocus multicosatus](#) Kerndorff & Pasche (2013A) from the same region has the same number of ribs in lateral channels, but it is much leafier having 2-6, on average 3.2 leaves per plant and has black anthers. Such a high number of ribs are quite unusual, and at present I know of only few species that share this trait - others are [C. schneideri](#) Kerndorff & Pasche from SE Turkey and the recently described [C. iranicus Rukšāns](#) from Iranian Kurdistan. [C. incognitus](#) Kerndorff & Pasche from the neighbouring İzmir province with a similar number of leaves (1-2.3-3) has only 2-3 ribs in the lateral channels. Initially, the number of leaves and the leaf cross-section of the crocus found on the pass led us to think of the target, *C. lydius*. The last feature checked was the morphology of the basal rings. [C. lydius](#) is characterised by very long-pointed teeth, but the edges of the basal rings in the crocus found by us were almost smooth or with slightly distanced sharp teeth not longer than 1mm, which can hardly be defined as long. So the crocus collected turned out to be a new, yet to be described species, clearly separated from others by the number and morphology of the leaves, and by the edges of the basal rings - important features in separating crocus species in the large and intricate "*C. biflorus*" aggregate.

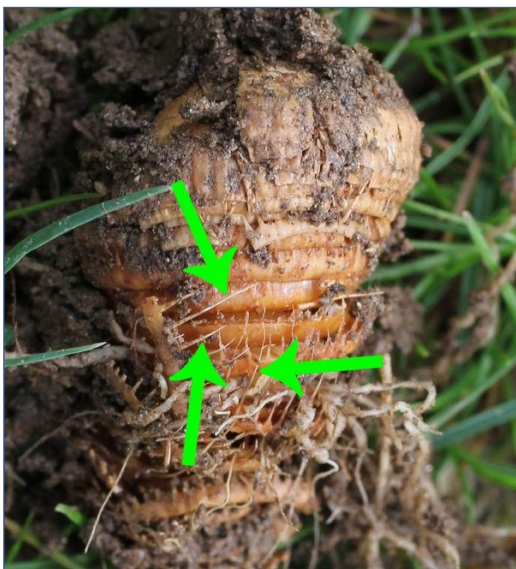


Left: *Crocus sozenii* corm tunics

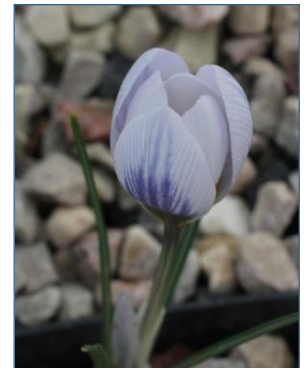
To honour my friend İbrahim Sözen who spotted this crocus I decided to name it *Crocus sozenii*.

*Crocus sozenii* can be easily distinguished from [C. simavensis](#) (described by Kerndorff and Pasche from that neighbourhood, NE of Simav), by the colour and morphology of the anthers as well as by the leaf and

corm tunic morphology and its habitat. *C. simavensis* is another species with very long teeth on its basal rings and it is reported as growing together with *C. chrysanthus* s.l. in open oak forests and shrubs. We didn't find ***Crocus simavensis*** at the supposed *locus classicus* (according to the original description) due to the snowfall that covered the mountains the night before our arrival but we found a very similar crocus later at much lower altitude, quite far from its supposed area. Its identification still needs additional checking but seems that it will turn to be *C. simavensis* (right).



Left: Long-toothed basal rings on corm, most likely of *C. simavensis*.



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***Crocus sozenii*** Rukšāns **species nova**. Type: Ex culturae in horto Jānis Rukšāns. (Plants from NW Turkey, Manisa province, Simav Dağları, altitude 1370m, at the edge of a *Pinus* forest). Collected 15-03-2013 (13TUS-028). Holotype: GAT.

**Habitat and distribution** - known only from the type locality on the pass in the Simav Dağları where it grows in lighter spots at the edge of a coniferous forest, side by side with *Crocus mouradii*. Within a short distance *C. chrysanthus* s.l. were also observed.

**Flowering time** - March.

**Corm** - subglobose, 15-17mm in diameter.

**Tunics** – very hard, coriaceous, outer shortly split at base.

**Tunic neck** - short, not longer than 5-6mm, formed by widely based sharp triangular tunic splits.

**Basal rings** – wide, hard, almost smooth or with up to 1mm long, slightly distanced sharp teeth.

**Cataphylls** – 3, yellowish.

**Prophyll** - absent.

**Leaves** – 2-2.2-3 (n=30), grey green, up to 4 mm wide with 4-5(-6) ribs in lateral channels, erect, distinctly V-shaped, sparsely ciliated on edges and keel margins, white stripe around 1/4 - 1/5 of leaf width, only emerging at start of blooming. In cultivation I observed one individual with 4 leaves.

**Bract and bracteole** – thinly membranous, silvery to light straw coloured, bract much wider, bracteole subequal - narrower, ending at same point or longer.

**Perianth tube** – white, only below flower becomes striped or entirely greyish purple.

**Throat** – nude, bright orange.

**Filaments** – 4-6mm long, yellow to orange.

**Anthers** - yellow, around 3 times longer than the filaments, with 1-2mm long basal lobes and parallel edges abruptly rounded, sometimes notched at top.

**Connective** – paler yellow to whitish, rarely slightly greyish shaded at very top.

**Style** – orange, ending well below the tips of the anthers.

**Flower segments** – broadly elliptic to subovate, subacute at tips, inside uniformly light violet-blue. Flowers have pleasant, honey-like scent.

**Outer segments** – (24-)28(-35)mm long and (10-)11(-13)mm wide, outside pale lilac with very dark blackish purple stripes usually up to middle of segments length, sometimes confluent and with median stripe even reaching segments tip; rarely as deep purple basal blotch over greenish grey base.

**Inner segments** – slightly (~1mm) shorter and wider (1mm) than outer segments, outside of darker colour, only basal blotch something lighter purple, not going up higher than 1/3 of segments length.

**Capsule and seeds** - not observed.

**2n** = ?



*Crocus sozenii*

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*Crocus sozenii* Holotype sheet

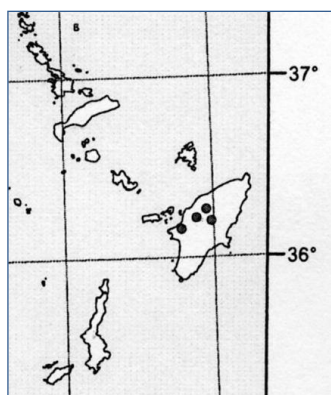
My experience in growing *Crocus sozenii* is very limited. It bloomed in cultivation for the first time in spring 2015, so no observations about the capsule and seed morphology is included. Nevertheless, all the morphological features observed both in the wild and later in the flowers of the cultivated plants confirmed my opinion of it as a new species, easily separable from other crocus species with ring-like basal tunics. I grow it in pots that are kept in the greenhouse throughout the year but considering the weather conditions and neighbouring plants in its homeland, it is possible that it would also grow in the open garden.

## ---International Rock Gardener---

When I worked on the crocus collection in the Gothenburg Botanical Garden my attention was drawn by two superficially quite similar but geographically very distant and isolated gatherings – both labelled as *Crocus biflorus* subsp. *biflorus* Miller – one from Italy, another from the island of Rhodes in Greece, off the SW coast of Turkey, which therefore is included within the area reviewed in *Flora of Turkey and the East Aegean Islands* (1984). Although superficially both looked fairly similar, there were some features separating them but for the final decision more representative samples were needed. According to Colasante (2014) and Mathew (1982), *Crocus biflorus* is distributed throughout Italy starting in the north and all the way down south to the northern part of Sicily (Mathew, 1982), and is represented there by several cytotypes with  $2n = (7), 8, 10, (15), 20$  (Colasante, 2014). It is very likely that in such a large area more than one species are disguised under this epithet which is now investigated by Kerndorff and Pasche (Pasche, personal information). To avoid duplication I excluded the Italian populations from my research programme leaving only three ecologically different populations of *C. biflorus* s.l. in the south of Italy – **Puglia and Basilicata regions** – in order to get authentic material of the Italian crocuses (deposited in the Herbarium of IPK, Gatersleben) regarded at present as *C. biflorus* to be later compared with the plants from Rhodes.



*Crocus biflorus* from (left) Puglia and (right) Basilicata in Italy



Map # 5  
*Crocus rhodensis* on Rhodes, Greece  
(by Strid, unpublished)

Right: *Crocus bifloriformis*, photo  
Ibrahim Sözen.

In the materials used to prepare maps for the *Flora of Greece*, kindly given to me by Prof. Strid (unpublished), there are several gatherings of *Crocus biflorus* s.l. from Rhodes, for the most part identified as *C. biflorus* subsp. *biflorus*, and one gathering [Coll: Goulimis no. s.n. 1955-03-06 on Oros Profitis Ilias (ATH)] identified as *C. biflorus* subsp. *nubigena* (Herbert) B.Mathew. Mathew (1982) regarded plants from Rhodes as belonging to the type subspecies of *C. biflorus*, originally described from Italy, and he included plants from NW Turkey under this name, too. The latter were later separated by

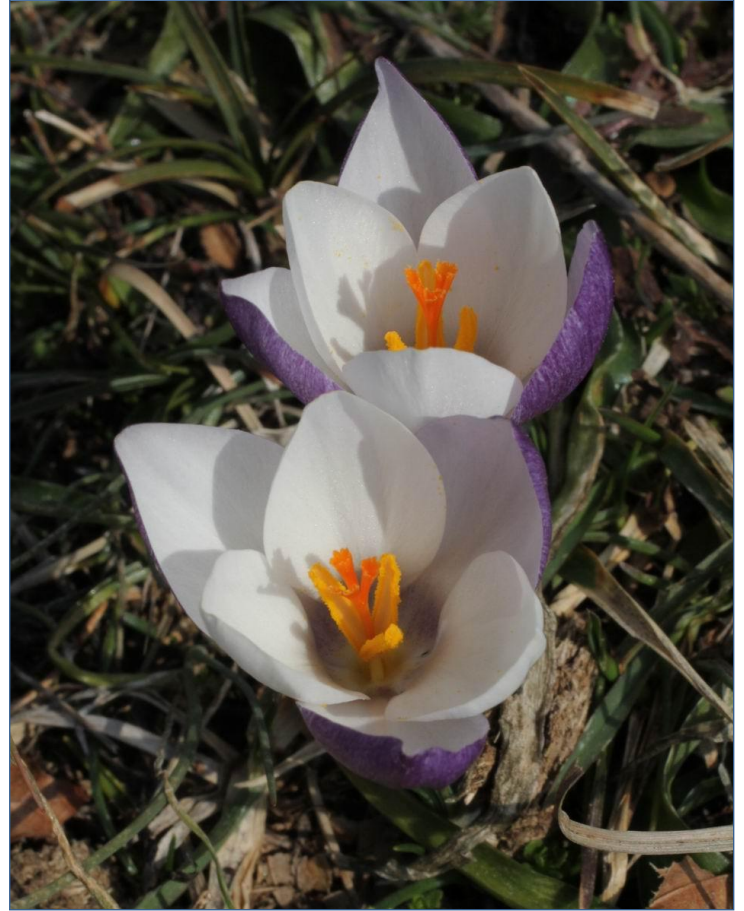


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Kerndorff et al. (2012) as *Crocus bifloriformis*. Unfortunately some data published in the original description of *C. bifloriformis* are incorrect – in the indicated region no elevated places are higher than 719m, although both authors state the altitudes of 900 -1100m as typical for *C. bifloriformis*. Our team found this species in the same region at an altitude of 160m.



*Crocus alexandri* MO-9528



*Crocus alexandri* from Mt. Falakro

In February 2015, with the kind help of two amateur botanists from Italy – Filippo Di Matteo and Angelo Porcelli – I visited two regions in Italy where *Crocus biflorus* s.l. is very common and locally very abundant. Our main goal was a mysterious crocus pictured on the [website of John Lonsdale](#) as *C. alexandri* Ničić ex Velen. MO-9528, and reported as collected near Bari, in Puglia, Italy.

Further research showed that the plant MO-9528 was collected by M. Oogaard in 1995, between Altamura and Bari at an altitude of 420m. Its seeds were later offered under the name of *C. biflorus* subsp. *biflorus* by Archibald (Archibald's Master List, [SRGC Archibald Archive](#)). There are not many unspoiled natural localities at this altitude and all are located around Altamura. The pictures on Lonsdale's website certainly did not show subsp. *biflorus*. Additionally, *C. alexandri* has not been recorded from Italy. So it appeared to be a probable new species which had earlier been overlooked in this well-explored area. At the same time the photo with MO-9528 plants was visually indistinguishable from a photo of *C. alexandri* from Mt. Falakro in Greek Macedonia.

My Italian correspondents several times explored the potential localities where this mysterious MO-9528 might grow and found nothing. In February 2015 we revisited almost all the likely areas near Altamura where *Crocus biflorus* s.l. could occur. We found 4 populations of *C. biflorus* just at the peak of blooming near Altamura and this allowed us to make herbarium vouchers and morphological observations.

All the localities where we observed *Crocus biflorus* near Altamura were situated in *Quercus* sp. scrubland or in lighter spots in mixed forests, always in partial shade. Generally all the observed

## ---International Rock Gardener---

individuals exhibited a white ground colour (only in some was it light blue) and mostly with 3 dark stripes over the backs. Very few pure albinos were also noticed, as well as a few specimens with a yellow shade on the backs of the flower segments. In the herbarium white individuals mostly change colour to a bluish shade when dried. Anthers in all the flowers observed were pure yellow. These results allowed us to assume that somewhere on the way to Lonsdale in the USA a mislabelling had occurred, as it was quite unlikely that such an outstanding expert as Archibald could misidentify such a readily identifiable species.

The population of *Crocus biflorus*, which we found in Basilicata region near the ghost town of Craco, grew under very different ecological conditions – on a steep, completely open meadow in rather dense grass between cultivated fields and a road. It was in full bloom and we could make good observations about the morphological features. Even though the area was comparatively small the number of plants in it was very large. As in the vicinity of Altamura, most of the observed individuals were white in colour, although the percentage of blue-coloured individuals was slightly higher, but still low. In the herbarium white individuals from Craco turned bluish. Flowers were generally larger. Anthers were yellow, but in two observed plants they were slightly greyish-shaded in the upper part.

We observed another population in the Basilicata region in Bosco di Rotondella (Rotondella's Wood). There *Crocus biflorus* densely covered meadows bordering the forest edge and lighter spots in between large oak trees. All the plants there showed an almost invariably lighter or darker blue ground colour and three more or less prominent deep purple stripes over the backs of the outer segments. Although the length and width of the striping varied from almost none to nearly confluent purple there were always white lines between the deep purple zones.



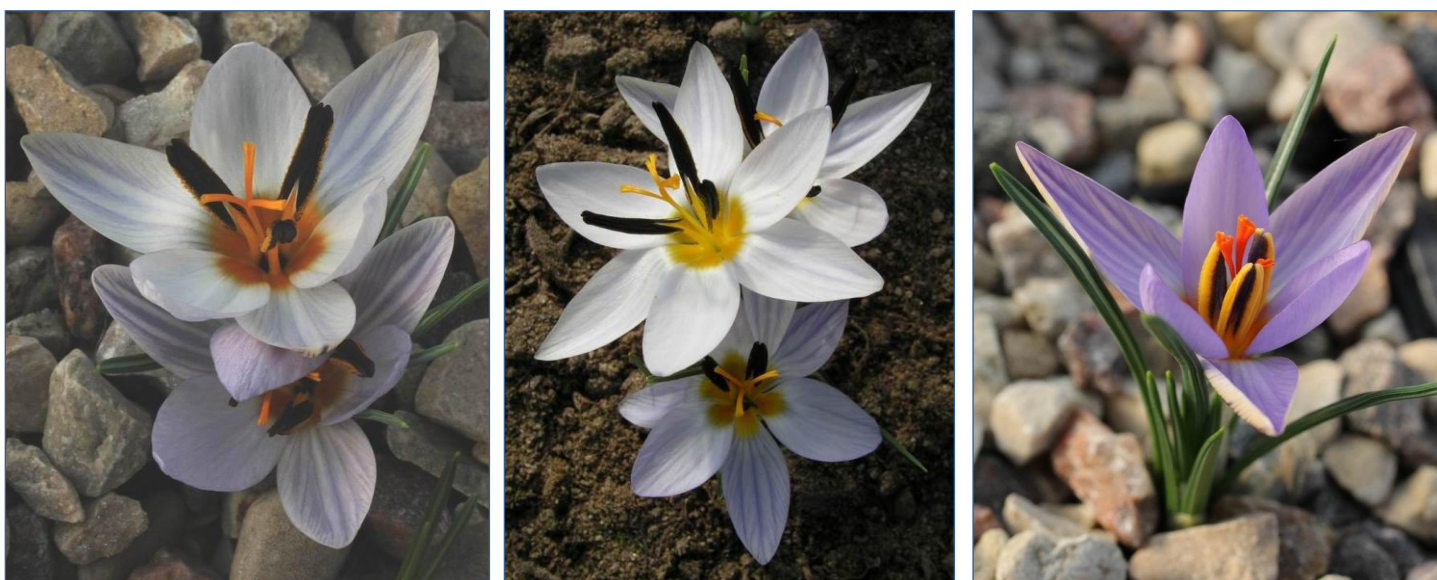
Darker form of *Crocus biflorus* in habitat

Among many thousands of typically coloured individuals we found only two plants with pure light yellow outsides of the outer segments without striping and one pure albino. In spite of an especial scrutiny, I observed only one specimen with greyish shaded anthers, so this feature can be regarded only as an exceptional mutation not characteristic to *Crocus biflorus*.



## ---International Rock Gardener---

The main feature that commanded my attention when I compared the samples from Italy and Rhodes in the Gothenburg Botanic Garden was the colour of the anthers. As noted above, the Italian *Crocus biflorus* invariably has yellow anthers. In contrast to the Italian *C. biflorus*, the plants from Rhodes in most cases had partly greyish shaded anthers, and this explains why such an experienced botanist as Constantine Goulimis misidentified them as *C. biflorus* subsp. *nubigena* (Strid, unpublished). I carefully studied the plants growing on Mount Profitis Ilias on Rhodes. While descending I checked the anther colour in 100 individuals. 87 had grey colour presented in various degrees – mostly in the upper third or half, rarely only at the tips or all over. 13 individuals had yellow anthers. The grey colour was visible only on the pollen sacs (thecae) while the connective in all cases was whitish or dirty whitish. This is one of the features separating the Rhodes plants from *C. nubigena* s.l. where anthers are distinctly black throughout (plants from Lesbos Island and Turkey) or at least the connective is black (plants from Samos Island). I have not seen *C. nubigena* with light connectives. Any doubt about the identity disappears when basal rings are compared – in the Rhodes plants the basal rings have very short, somewhat saw-like teeth, while in the *C. nubigena* complex they are distinctly longer and narrow, more needle-like. By its basal rings the Rhodes crocus resembles *C. biflorus* from Italy.



*Crocus nubigena sensu lato* - from Lesbos (left), Göktepe (centre), Samos (right)

An important feature in separating crocus species from the former series *Biflori* B.Mathew is the length and position of the stigmatic branches relative to the tips of the anthers. In observed populations of *Crocus biflorus* from Italy the stigmatic branches usually end well over the anther tips, but in the Rhodes crocus they end well below the tips, only rarely nearing them. In this aspect they are closer to *C. nubigena*. In both *C. biflorus* and the Rhodes crocus the leaves well surpass the flowers at blooming time. In *C. biflorus* they are approximately two times the flower length, in the Rhodes crocus they are even 3-4 times longer, although I observed individuals with shorter leaves, too, similar to *C. biflorus*. Flowers in the Rhodes form are in average much smaller, yet the measurements overlap, although I have never seen such small flowers among *C. biflorus* and vice versa. Also the corms of the Rhodes crocuses are generally smaller. I have not seen flowers of “biflorus” crocus from Karpathos Island (located only 100km E from Rhodes), but by their basal ring features they clearly belong to the “nubigena” group from Samos, Ikaria Islands (both more than 200km N from Rhodes and 240km from Karpathos) and Lesbos Island (400km N from Karpathos).

All this allows me to regard the crocus with annulate corm tunics from the island of Rhodes as a newly identified species. I decided to name it *C. rhodensis* after the locality where it is distributed. The measures given in the description were based on 30 individuals.



***Crocus rhodensis* Rukšāns species nova.**

Typus: Greece, Rhodos Island, Profitis Ilias, 14-02-2015. 15GRS-029. Holotype GB, Isotype: GAT.

**Habitat and distribution** - Known from the island of Rhodes, where it grows on Profitis Ilias and Ataviros mountains and adjacent territories at an altitude of 700-800m (650-1100m, by Strid), on rocky limestone areas in brown soil on lighter spots between *Pinus halepensis* and *Cupressus sempervirens*, as well as in deforested areas (Mt. Ataviros).

**Flowering time** - February - March.

**Corm** - up to 10mm in diameter.

**Tunics** – hard, leathery.

**Tunic neck** - 4-5mm long, split in narrow triangular segments.

**Basal rings** – distinct, hard with practically smooth edge, with occasional very few short, narrow teeth.

**Cataphylls** – 3, slightly yellowish toned.

**Prophyll** - absent.

**Leaves** – 3-4, dark green, less than 1mm wide, without ribs in lateral channels, the white stripe occupies 1/5 to 1/4 of leaf width, significantly overtopping the flowers at anthesis.

**Perianth tube** – white, in upper part with dirty bluish to deep lilac stripes.

**Bract and bracteole** – subequal, bracteole slightly shorter and narrower.

**Throat** – nude, yellow to deep yellow.

**Filaments** – 4-5mm long, hairy to papillose, yellow.

**Anthers** - 9-10(-12)mm long, yellow in upper part grey to blackish, rarely yellow throughout.

## ---International Rock Gardener---

**Connective** – white to dirty white, distinctly lighter than anthers.

**Style** – with three branches gradually expanding to slightly fringed tip, dark yellow to orange, usually ends below tips of anthers, rarely reaching them or slightly overtopping anthers.

**Flower segments** - subequal, subacute to acute, inside invariably white.

**Outer segments** - (13-)19(-29)mm long and (4-)5-6(-8) wide, outside white or slightly buff toned with usually 3 dark purple to even blackish stripes reaching almost tip of segments, rarely stripes more or less confluent or only at the base of segments.

**Inner segments** - as long as outer segments but usually slightly wider - (5-)6-7(-9)mm; white with short, pointed bluish or purplish narrow tongue at base, always lighter than stripes on outer segments.

**Capsule and seeds** – not observed.

**2n** = 8 (Davis, 1984 as *C. biflorus* Crook 2353).

**Etymology** - named after the island of Rhodes where it is distributed.



*Crocus rhodensis*

Marcus Harvey (Australia) who sent me a lot of seeds of various crocus from Greece collected during his regular trips there passed an opinion that “I have my own theory about this plant. I wonder if the Italian soldiers brought the crocus there and planted it around their encampment to remind themselves of home. It is more an Italian plant than a Greek one and the troops must have gathered flowering plants because all around the barracks *Colchicum macrophyllum* still grows. I am sure these are not random plantings and being an un-abashed romantic I secretly hope this turns out to be the true story.”

Kerndorff et al. (2014) wrote that *Crocus biflorus* (Italy) while different to those in Greece/Aegean Islands, is closer to some from West Anatolia.

I have cultivated plants originally collected by Strid and grown in Gothenburg Botanical garden, from where I got some corms. They turned out to be good growers, increasing well. In cultivation flowers are slightly larger than in the wild, but still smaller than in all sample acquisitions of *C. biflorus* from Italy. So far I have only grown them in the greenhouse.

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Variations of *Crocus rhodensis*

## Aknowledgments

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The Prague Rock Garden Club (KSP [Klub skalničkářů Praha](#)) is developing [a new website](#).

This vibrant group of alpine and rock garden plant enthusiasts are justly famous for the quality of their gardens but they are equally adept at exhibiting plants in pots as well as in the planted gardens at the exhibitions they stage three times a year in Prague. These exhibits take place in Charles Square (Karlově náměstí) in a secluded garden between the Faust house and the church of St. John "on the Rock" (Faustovým domem a kostelem sv. Jana Na Skalce).



**VELKOU KVĚTNOVOU VÝSTAVU**  
od 6. do 23. května 2015  
denně od 9 do 18 hodin

Výstavní areál Praha, Karlovo náměstí, Moráň

Prodej skalnicěk a poradenská služba. Komentovaná prohlídka. Ukázka tvorby a osázení koryt.

TEL.: 734 404 686

Above left: The KSP show garden, photo Ian Christie  
Left: A banner announces the show

The next exhibition will take place in May, starting on 6<sup>th</sup> and running until 23<sup>rd</sup>. The event is open from 0900 to 1800 each day and all visitors are most welcome.

A temptingly extensive sale of plants associated with these events can create as much envy in onlookers as the show itself.

Right: The array of plants for sale at the KSP May show in 2013, photo Ian Christie

The following photos are from the early show which took place from 22<sup>nd</sup> March- 3<sup>rd</sup> April 2015; they were sent by Rudi and Elke Weiss and were taken by Petr Antonin who kindly allowed his pictures of the show to be shared with us.



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Above: *Ranunculus calandrinoides*  
Left: *Trillium nivale*

N.B. Many show and event reports can be enjoyed in [the SRGC Forum](http://www.srgc.net).