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This month IRG presents two articles describing new species.

Firstly, we are pleased to introduce a charming new Crocus, named for the indefatigable plantsman, Oron Peri, (below, with Jānis) by Jānis Rukšāns and his long-term travelling partner, the Czech, Vaclav Jošt.

The second article is by Dimitri Zubov and Jānis Rukšāns about a new species of *Erythronium* from the Southern Altai of Eastern Kazakhstan.

Vaclav Jošt.

Dimitri Zubov.

Cover image: *Erythronium fallax* flowering in type locality; May 2012 (photo – J. Rukšāns).

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--- New Species ---

New *Crocus* species (Crocoideae, Iridaceae) from Iranian Kurdistan

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Summary. New *Crocus* species growing in Zagros Mountains in W Iran is described and illustrated; the differences between the new and related species are discussed. Photographs and distribution map are provided.

Key words: geophyte, *Crocus*, Zagros Mountains, Flora Iranica.

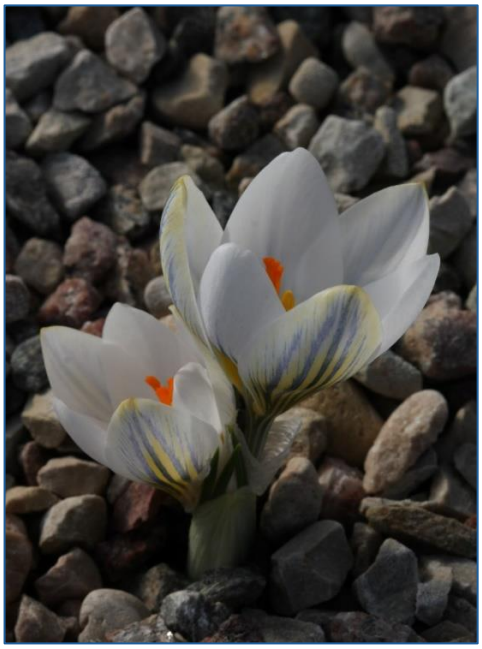
Iran is currently the focus of the world's attention and it seems that botanical researches in this country will be impossible for some time. The flora of Iran was intensively studied during the Shah's reign, which resulted in the fundamental publication of "Flora Iranica". Under the leadership of the Austrian botanist Professor Karl Heinz Rechinger (1906-1998), 176 volumes were prepared and published between 1963 and 2005, covering 1471 genera with 9977 species. 97 botanists from 20 countries participated in the preparation of this work.

The Islamic Revolution and the unrest it caused effectively halted research on Iranian flora for many years. Only at the turn of the millennium did new expeditions of European scientists in this country resume, and new discoveries also began. In 1998, the Gothenburg Botanical Garden together with the University of Tehran organized a joint expedition to the Zagros Mountains, in which the Latvian botanist Dr. Arnis Seisums from the National Botanical Garden also participated (Swedish Latvian Iranian Zagros Expedition – abbreviation SLIZE). The genus *Allium* was resumed by the German scientist Reinhard Fritsch from the Institute of Plant Genetics (IPK) in Gatersleben, and together with M. Abassi from Iran, an excellent monograph was published (2013) on the species of the subgenus *Melanocrommyum* found in Iran, etc.

The review of the genus *Crocus* in Flora Iranica was included in the 112th volume published in 1975, dedicated to the *Iridaceae* family. It was prepared by Per Wendelbo (Gothenburg Botanic Garden, Sweden) and Brian Mathew (Kew, UK), who, according to the level of research on the genus *Crocus* at that time, believed that a total of 9 species of *Crocus* occur in the region covered by Flora Iranica. Both authors considered all spring-flowering croci with white-blue flowers and a ring-shaped corm structure to belong to one species – *Crocus biflorus* Miller, indicating *C. adamii* J.Gay as a synonym, which was later separated in his monograph by B. Mathew (1982) as a subspecies of *C. biflorus* as subsp. *adamii* (J.Gay) B.Mathew (correctly must be subsp. *adamii* (J.Gay) K.Richt.). Autumn-flowering croci with a similar corm structure were designated as *C. speciosus* M.Bieb. However, under the revised species concept proposed by Harpke et al. (2013) and Kerndorff et al. (2013), *C. biflorus* and *C. adamii* are now recognized as distinct species. Neither of them grows in Iran: *C. biflorus* is found in the wild only in Italy, while *C. adamii* is found in Armenia and Georgia. It had to be concluded, therefore, that the croci found in Iran, which were included in Flora Iranica as *C. biflorus* (sensu *C. adamii*), actually represent different species.

In 2008, J. Rukšāns went on his first expedition to Iran. Already during this expedition, three new spring-flowering crocus species were discovered and later described by him as *CC. gunae*, *iranicus* and *reinhardii* and one autumn-flowering crocus species – *C. archibaldiorum* (Rukšāns) Rukšāns, which was included in Flora Iranica with the epithet *C. speciosus* M.Bieb.

Crocus gunae



Crocus iranicus

Crocus reinhardii

Crocus archibaldiorum

In 2016, German researchers from the Gatersleben Institute discovered several new spring-flowering crocus populations in Iran, and in 2017, H. Kerndorff and E. Pasche published three of them as a new species, namely - *CC. sanandajensis, zagrosensis* and *zanjanensis*.

Crocus sanandajensis

Crocus zubovii

From 2016 to 2025, the authors of this article participated in 6 more expeditions to Iran. From 2016 to 2018, they were organized by the Crocus Group enthusiasts of the Royal Horticultural Society of Great Britain, and from 2022 to 2025, by researchers from the University of Tehran, inviting the authors of this article. Janis Rukšāns from Latvia, Vaclav Jošt from the Czech Republic and two Iranian scientists (the names are not included for safety reasons) participated in the expeditions. As a result of these expeditions, several new crocus species were discovered. In 2017, *C. zubovii* Rukšāns were published, and in 2025, *C. hyrcanus* Rukšāns & Zubov, both of which were separated from the *C. speciosus* complex, were published. Several newly discovered populations of this crocus group are still incompletely studied and, it is possible, that even new species of autumn-flowering croci will be described and published in the future. In 2017, Rukšāns described *C. inghamii* Rukšāns, which grows next to *C. reihardii*, which was already described in 2015. Both are relatively similar, but can be distinguished by the pattern of the flower segments outside and the structure of the corm tunics, which in the case of *C. inghamii* is thinner than in *C. reinhardii*. The fact that they are different species is also confirmed by A. Dolatyari's studies on the cariology of Iranian croci: the diploid chromosome number in *C. reinhardii* is 16, but in *C. inghamii* – 22 (Shaghaghi & al. 2026). In 2022, Rukšāns, together with A. Dolatyari, described another 5 new species of the “biflorus” type – *CC. azerbaijanicus, chiaicus, chionophilus, marandicus* and *pseudoiranicus*, but Rukšāns also published *C. dolatyarii* in the same year. In 2024, *C. avromanicus* Advay & Rukšāns was published.

Crocus hyrcanus

The 2024 and 2025 expeditions were dedicated to the search for some species of annulate crocus, guided by the data published in Flora Iranica as *Crocus biflorus* localities, examining some insufficiently identified (researched) populations mentioned by H. Kerndorff and E. Pasche (2017), as well as searching for some croci, samples of which were collected in western Iran in the last century by Jim

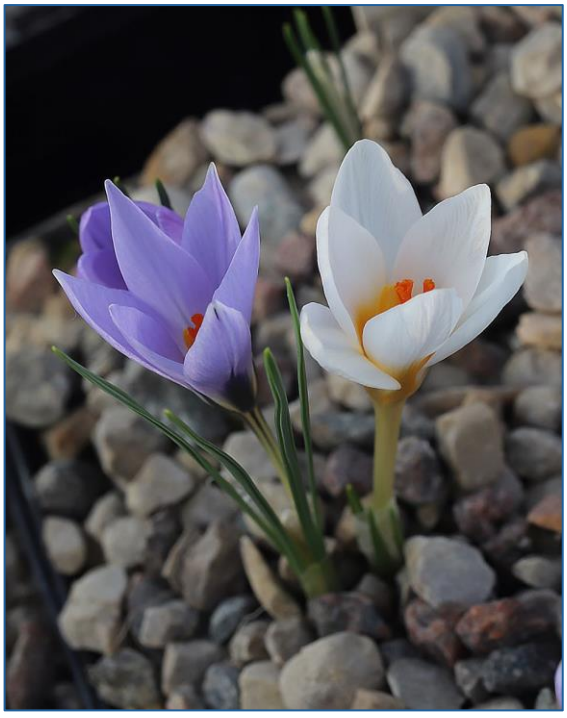
Archibald from Wales (UK) and Norman Stevens (from Cambridge Bulbs, UK). Unfortunately, the published data turned out to be very incomplete and the authors have not been able to find those populations. However, during these searches, two more new "*C. biflorus*" type crocus species were discovered and published – *C. alborzensis* Jošt, Rukšāns & Zubov (possibly the same as HKEP-1638, collected as *C.* cf. *reinhardii* – data about locality given by authors are far too approximate) and *C. evae-petrovae* Jošt, Rukšāns & Zubov [found in 2 localities (22IRS-034 and 25IRS-017) in approximately same region as sample HKEP-1629 – again data given about locality are far to approximate, to make exact judging], as well as several more populations, the detailed study of which is still ongoing.

Crocus inghamii

Crocus azerbaijanicus

Crocus chiaicus

Crocus chionophilus



Crocus marandicus

Left: *Crocus pseudoiranicus*

Right: *Crocus dolatyarii*

News about various crocus populations can often be found on social networks today, where photos of plants observed in the wild are published. That news is not always accurate enough. For example, we received photos of a yellow-flowered crocus, supposedly taken in mid-May on the border between Iran and Iraq, which aroused great interest, since species with yellow flowers were not known in this area. Therefore, our research group went to this region twice. In 2022, we failed to reach the intended region due to snow avalanches closing the road, which stopped us about 6 km before the intended site. However, a new species was discovered there – *Crocus dolatyarii*. We went there again in 2025, this time reaching the border between Iran and Iraq. During this expedition, we found that *C. dolatyari* is a much more widespread species than previously thought and was found in several places, including on the border between Iran and Turkey, and therefore it cannot be ruled out that it could also be found in Turkey. Examining the metadata of the yellow-flowered crocus photographs, it turned out that this crocus was actually photographed not in May, but in mid-March, and subsequent correspondence with the author of the photographs leads us to believe that the one photographed is actually *C. kurdistanicus* (Maroofi & Assadi) Rukšāns, which was found in western Iran, but well away from the border.

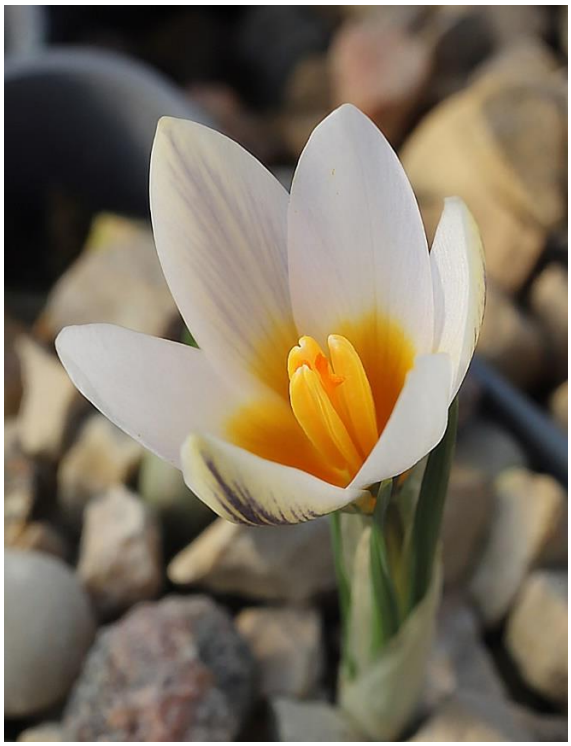
However, there are also successful finds that were made thanks to social networks. A very beautiful crocus was obtained during the 2025 expedition in the Opert mountain range. We first saw its photos on the FB pages of Iranian nature lovers. In 2023, we did not get to it due to very bad weather conditions, which forced us to stop going up the mountains several kilometers before the intended destination. The 2025 expedition was more successful, the sought-after crocus was found and its research is still ongoing, as its location is only 30 km from the previously described *C. gunae*, although the habitat seems to be different in ecological terms and on different mountain ridge. Interesting photos can also be found on the FB page “Flora Iranica”, managed by Sajad Alipour and many others. A very interesting crocus was photographed by Nader Montazeriani on the slopes of Mount Paraw, NE from Kermanshah. An interesting and most likely new species was photographed also near Deilaman in Gilan province. Regardless of several attempts it has still not been possible to rediscover the easternmost [apart from the yellow-flowered *C. almehensis* C.D.Brickell & B.Mathew, which also genetically belongs to the *C. adamii* series (not yet published) and is the easternmost species of annulate croci], “*C. biflorus*” species mentioned in Flora Iranica from Golestan Province (61 km ENE from Gonbad-e Kavus, Furse 5114), the same relates to some populations from Zagros ridge.

In 2022 and 2025, we searched for two croci that grow in our collection and were obtained from the collections of Jim Archibald and Norman Stevens in western Iran and recorded as collected south of Silvaneh and west of Lake Urmia. Both specimens are quite similar. Also very similar is the crocus found at 1470 m a.s.l. between Urmia and Silvana by H. Kerndorff and E. Pasche (sample HKEP-1631) and listed as *Crocus* cf. *roopiae* (2017). However, judging by the published images, it does not correspond to the given description of *C. roopiae* Woronow in Grossheim’s Flora Caucasica (1940), which is quite incomplete. The collections from northeastern Turkey, which are geographically closer to the locus classicus of *C. roopiae*, also do not correspond to the description of this species. Despite careful attempts using

Google Earth and attempting to identify possible locations based on geographical names and the mentioned altitudes, our group was unable to find any wild populations of these croci while visiting the region several times.

During the 2022 expedition, while traveling south from Lake Urmia along the Iraqi border between Mahabad and Marivan, near Surin, our group, slightly entering a small side road, stopped at a gentle slope, where we were attracted by some still blooming specimens of *Iris marivanica* Rukšāns. Nearby, in the grass, we also saw the leaves of a crocus that had already bloomed earlier. After studying their morphology, we came to the conclusion that the crocus found could be similar to *Crocus iranicus*, but judging by the morphological features of the leaves, the find was registered in the expedition diary with the number “22IRS-079 – most likely *Crocus species nova* cf. *iranicus*”. The collected plants in our collection first bloomed in 2024. Continuing to compare morphological features, we came to the conclusion that it is a new species, morphologically well distinguishable from similar ones. In parallel, this discovery was also studied in Iran, where the karyology of 12 species of croci of the *C. adamii* series found in Iran was examined (Shaghaghi & al. 2026). It was found that the karyotype of sample 22IRS-079 is 2n=16 (studied as sample P1015107 - Iranian scientists use a different numbering system for collected samples), while the karyotypes of *C. iranicus* and *C. pseudoiranicus* growing nearby are 2n=20 and 2n=22, respectively. Species with a karyotype of 2n=16 are found in the mountains of northern Iran closer to the Caspian Sea very far from Iran-Iraq border, namely, such a diploid chromosome number is characteristic of *C. reinhardii* and *C. alborzensis* (studied as sample P1015242). This publication confirmed that a new species had indeed been found, which is well distinguishable from other Iranian species not only morphologically, but also genetically.

Crocus avromanicus

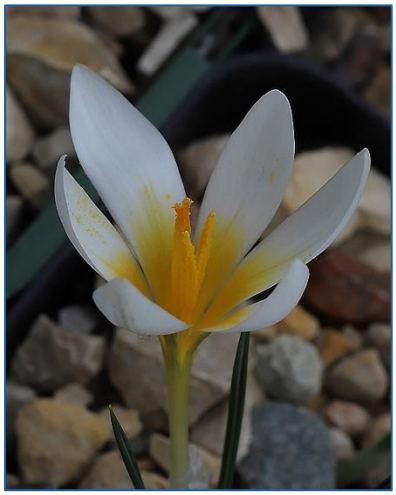


Crocus alborzensis

Crocus evae-petrovae

Crocus kurdistanicus – picture from internet.

The crocus 22IRS-079 specimen was collected after the species had already flowered in the wild. Quite often, plant specimens are not collected during expeditions at the optimal period to use wild-flowering plants for their description and herbarium. Many newly discovered species grow in remote, difficult-to-reach mountain regions, where road and climatic conditions (snow cover, winter washouts) significantly complicate access during flowering time. Repeated visits to these regions are also limited by financial considerations. Therefore, cultivated plants are used for the description of many species, which may differ slightly from those growing in natural habitats, however, the crucial morphological features characterizing crocus species, such as the characteristics of the corm tunics, the appearance of the flower, the type of throat, the cross-section of the leaves, etc., remain essentially unchanged. Perhaps only the sizes of the plant parts differ, but not the proportions of the respective sizes. Under culture conditions, changes in some features can be observed during flowering, allowing us to obtain not only flower and leaf characteristics, but also characteristics of reproductive organs – seed capsules and seeds, which for wild plants would be possible only by repeated visits to the site. This is why many species described from wild flowering plants observed and herbarized in the wild lack these details.



Crocus sp. (25IRS-073) from Opert ridge in N Iran, near Caspian Sea

Crocus sp. from nr. Mt. Paraw, NE Kermanshah - photo Nader Montazeriani

Crocus oron-perii **Rukšāns & Jošt** species nova

Type: Iran, Kurdistan prov., Zagros Mts, grassy meadow on road from Mahabad to Marivan, nr. Surin, 35º57'35.256" N 46º05'01.920" E, at elevation of 1966 m a.s.l.; cult. (specimen grown in Latvia in the garden of Jānis Rukšāns; specimen originally collected in type locality by J. Rukšāns and V. Jošt in 12th April, 2022); fl. 3rd of March, 2024, *Rukšāns & Jošt* s.n. (holotype RIG II: BOT-17859!).

Habitat and distribution – Known from type locality in Iranian Kurdistan where it was growing in grass on gentle slopes together with *Crocus haussknechtii* Boiss. & Reut. ex Boiss. and *Iris marivanica* Rukšāns at altitudes 1900-2000 m a.s.l.

Flowering time – March.

Corm – elongated round, 10 - 15 mm in diameter (in wild collected plants), in cultivation larger.

Tunics – outer tunics very hard with few distant basal splits, inner tunics something softer.

Tunics neck – up to 10 mm long, formed by adpressed very narrow threadlike splits of main tunic.

Basal rings/tunic – basal ring with very regular small densely spaced tooth, higher rings with practically only roughed upper edge or tooth are very minute, basal tunic with roughed edge.

Prophyll – absent.

Cataphylls – 4, bottom white, higher very light yellowish, uppermost slightly greenish shaded at tip.

Leaves – 5-7, emerge during flowering, greyish green, nude, 4-5 mm wide and 22-25 cm long, lamina slightly arched with narrow, slightly down and outside turned edges, white stripe very narrow – 1/6 of lamina width or even narrower, lateral channels with up to 5-6 ribs, open, keel straight or slightly narrowing in direction to base with base slightly outside turned to flat, edges nude or rarely with very short hairs.

Perianth tube – white to very light creamy, turning densely dirty greyish striped well below the base of flower segments.

Bract and bracteole – transparent, bracteole distinctly shorter and narrower, bract reach base of flower segments.

Throat – nude, sometimes with sparse minute hairs, medium large, deep orange yellow with diffused yellow rim.

Filaments – 4-5 mm long, deep yellow, with short but dense hairs.

Anthers – 9-**11-**13 mm long, yellow, tips rounded to shortly pointed, rarely with minute black tips, basal lobes short.

Connective – creamy.

Style – yellow, turning orange at split into 3 branches widening only in upper part, stigmatic surface fringed, ends between or near the top of anthers, rarely higher (observed in 2 plants from 20).

Flower segments – variable in shape, mostly elliptic, rarely obovate (seen 1 individual from 20 observed) inside white on both whorls, flowers practically scentless.

Outer segments – 27-**32-**36 mm long and 11-**14-**16 mm wide, outside very variable in colour – from densely deep purple striped over white throughout and only in basal part stripes turns dirty greyish, to generally white with only short dirty dark bluish stripes in basal part (as basal blotch) and something longer median stripe, and often with very short but prominent blue median stripe at very top of segments; rarely throughout purple stippled with darker midzone at top segments.

Inner segments – 26-**31-**34 mm long and 11-**14-**16 mm wide, similarly striped as outer segments outside but stripes are much lighter and only in basal part they becomes confluent and deep lilac, in light coloured specimens outside very similar to outer segments outside, only stripes of basal "blotch" are shorter, sometimes with similarly dark zone on segments tips as on outer segments.

Capsule and seeds – not observed.

2n = 16 (Shaghaghi & al. 2026).

Etymology – Named after our good friend from Israel, famous gardener, owner of company "Seeds of Peace" and explorer of local flora – Oron Peri. He discovered several new croci species growing wild in Israel and neighbouring countries which now are under research in Gatersleben Institute of Plant Genetics (IPK) in Germany and will be published in near future.

Recognition. At present there are only 3 species growing in Iran with leaves having 5-6 ribs in each of lateral channels – *Crocus iranicus*, *C. zagrosensis* and here described *C. oron-perii*.

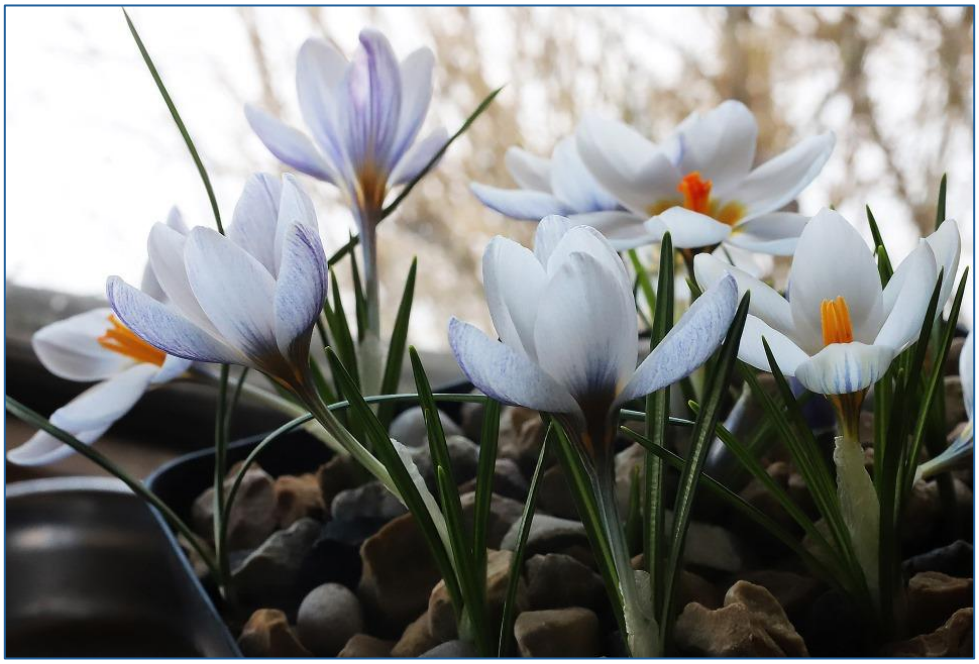
From *Crocus iranicus* new species is easy separable by corm tunics basal rings which in *C. iranicus* are with irregularly saw-toothed edges and infrequent, sporadically spaced longer needle-like teeth versus very regular small densely spaced teeth, higher rings with practically only roughed upper edge or teeth are very minute in *C. oron-perii*; flower throat colour in *C. iranicus* is very light yellow versus deep orange yellow with diffused yellow rim in *C. oron-perii*; *C. iranicus* has much wider median white stripe of leaves (1/3 versus 1/6 or even narrower in *C. oron-perii*) and shorter filaments (8-12 mm long in *C. iranicus* vs. 4-5 mm long in *C. oron-perii*).

From *C. zagrosensis* easy separable by hairy filaments which in *C. zagrosensis* are nude but in *C. oron-perii* – densely hairy. Also leaf dimensions are different – in *C. zagrosensis* they are only 2 mm wide (same in cultivated plants) versus 4-5 mm in *C. oron-perii*. Our team most likely found *C. zagrosensis* only in 2025 quite distantly from supposed *locus classicus* of this species and we still saw only two plants flowering in our collection (sample 25IRS-055), so for comparing are used only data from original description and photos of this species (HKEP-1637) in Kerndorff & al. (2017). Comparing photos of both species can be found that very different is segments outside base colour which in *C. zagrosensis* is pale yellow but in *C. oron-perii* – deep blue, even blackish.

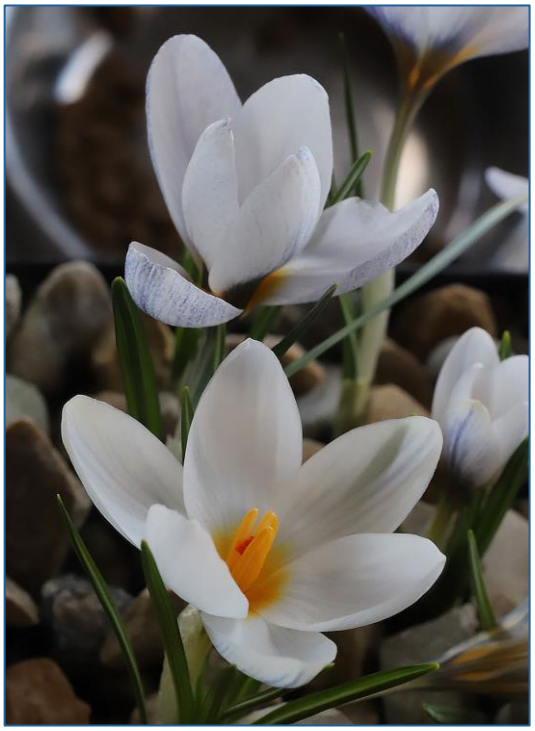
Crocus sp. from South of Silvaneh

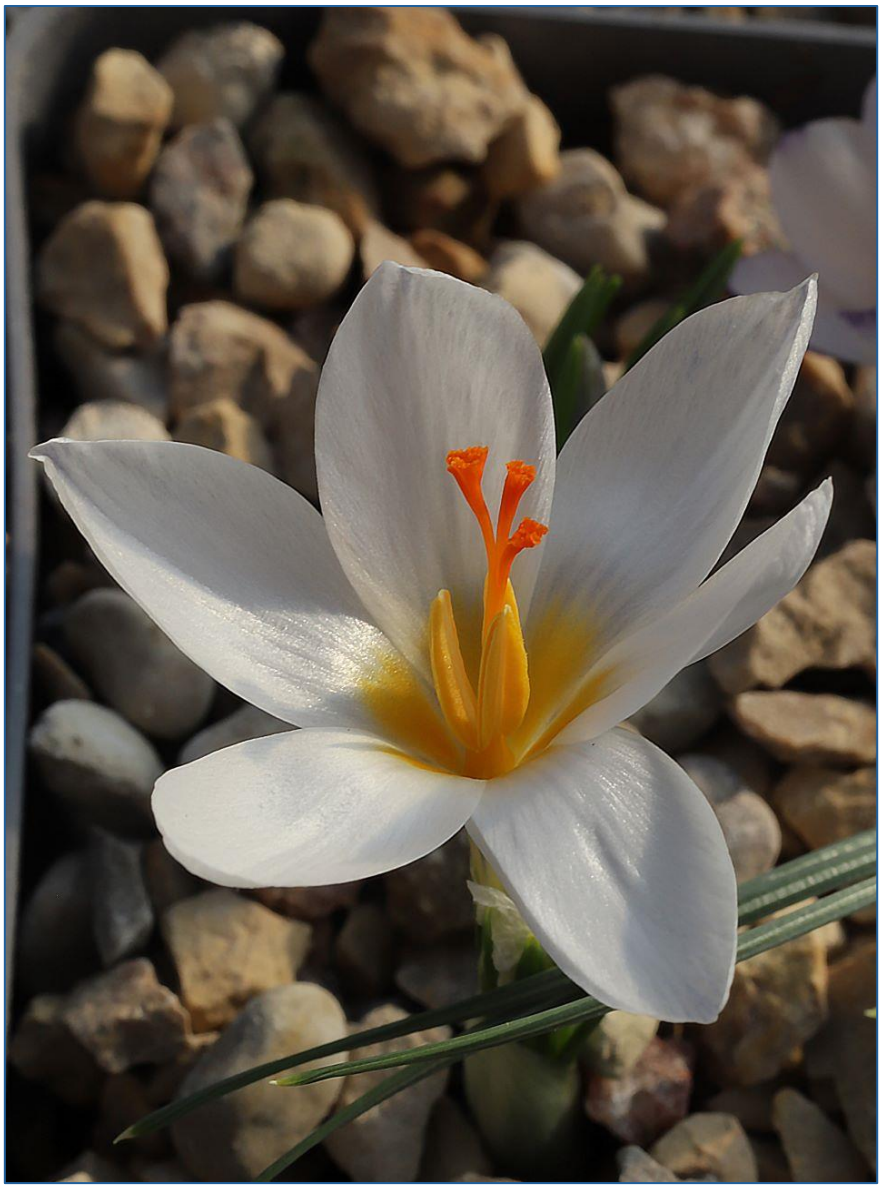
Crocus sp. from West of Lake Urmia

Iris marivanica is growing side by side with *Crocus oron-perii.*



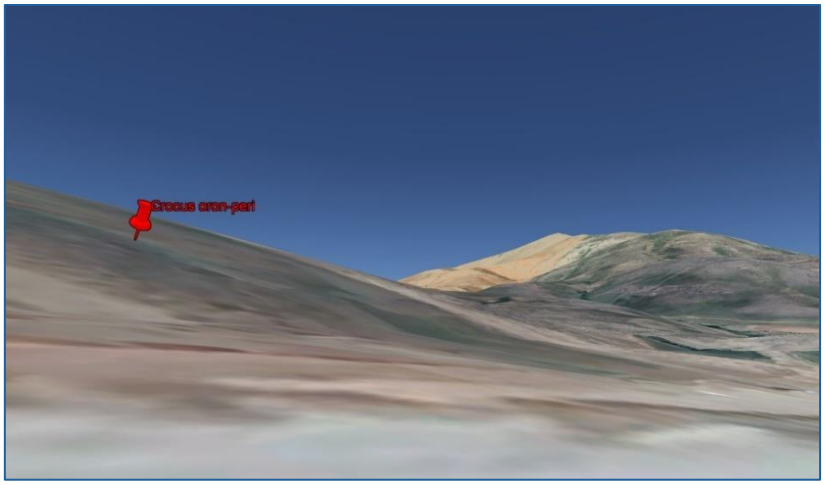
Crocus oron-perii blooming in cultivation



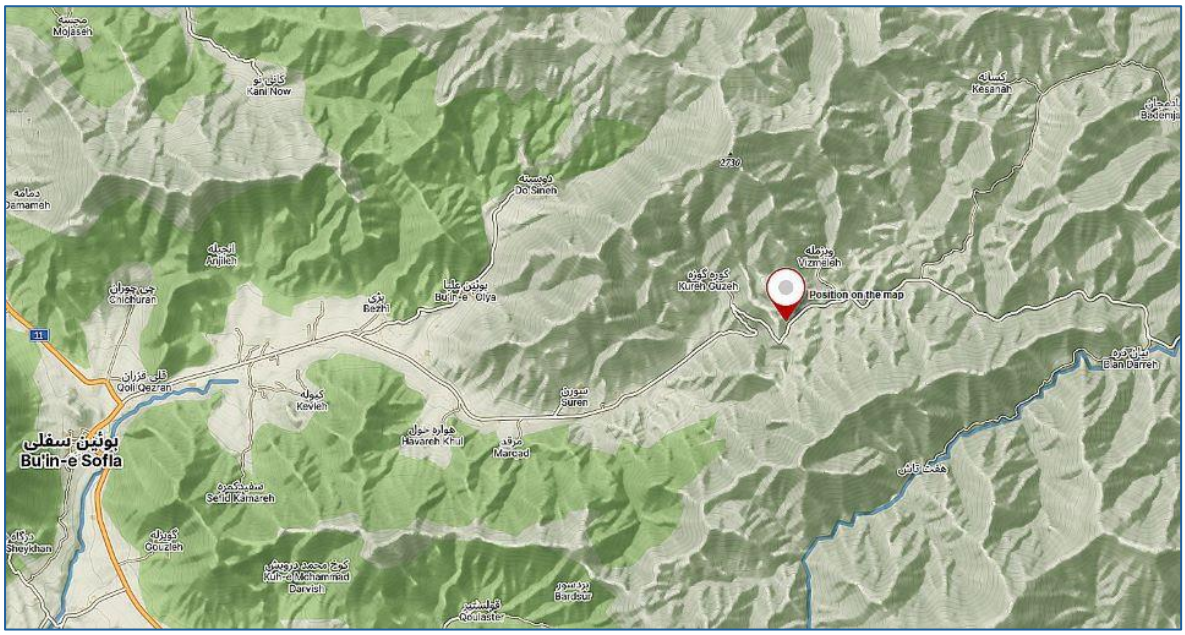


Crocus oron-perii blooming in cultivation

Habitat where *Crocus oron-perii* was observed



Habitat where *Crocus oron-perii* was observed - picture generated using Google-earth.

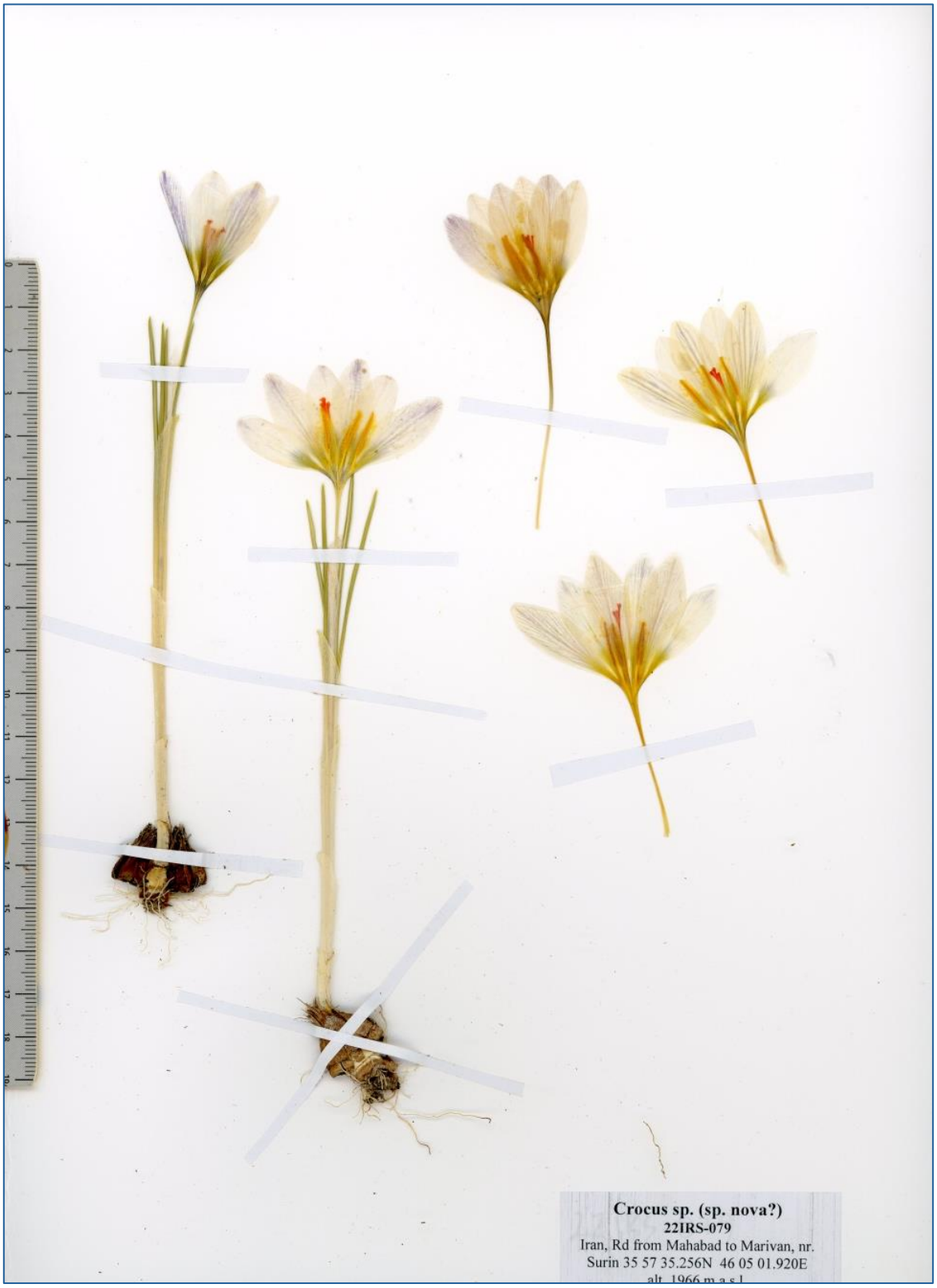


Map 1 -Type locality (locus classicus) of *Crocus oron-perii* (map generated using Mapy.cz).

Flower details of *Crocus* cf. *zagrosensis*, (sample 25IRS-055)

Flower details of

Crocus oron-perii



Holotype herbarium scan of *Crocus oron-perii*

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***Erythronium fallax* (*Liliaceae, Lilioideae*), a new species from the Southern Altai of Eastern Kazakhstan**

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Summary. A new *Erythronium* species from Eastern Kazakhstan (the Azutau ridge, S Altai) was described and illustrated; the differences between a new species and related Siberian-Sayan-Altai species are discussed. Photographs (habitat and morphology), a distribution map, preliminary conservation assessment, and the comparative analysis of the *Erythronium*'s flower visual markers are provided. The current North, Central & East Asian *Erythronium* species composition of the studied group is updated, their synapomorphies and floral adaptations for cross-pollination (buzz pollinators) and appropriate pollination syndromes are considered.
Key words: The Altai Mountains, geophyte, herkogamy, homostyly, buzz pollinators, mellitophyllous pollination syndrome, synapomorphy, Siberian dog's tooth violet, Siberian Fawn Lily, Kandyk.

The Southern Siberian, Sayan and Altai *Erythronium* species are distributed from the Kuznetsk Alatau and the Salair Ridge (Kryazh) in the north to the Mongolian Altai in the south, and from the Kolyvansky Ridge (Kryazh) of the Rudny (Western) Altai to Achinsk (Abakan Steppe, Krasnoyarsk Krai), the Western Sayan Mountains, and Western Tannu-Ola (Tyva) in the east. In other words, the range of *E. sibiricum* species complex encompasses mountain ranges such as the Altai, the Mongolian Altai, the Western Sayan Mountains, the Western Tannu-Ola Range, and the Kuznetsk Alatau and the Salair Ridge (E Kazakhstan, NW China, NW Mongolia, RF) [4, 7, 13, 14, 16-18, 20, 21, 27, 29, 31, 35, 36]. The plants of this species complex have their own shared *synapomorphies*: tunicate bulbs in the form of a tooth and with a chain of remains of the bulb basal plates of previous years ('short-rhizome-bulbous biomorph' by G. Skakunov [34]); two petiolate ovate-lanceolate leaves with a mottled pattern to varying degrees, or without a pattern – then the leaves concolorous plain green; flowers solitary, nodding, herkogamous, tepals oblong-lanceolate, united at base into

short tube and abruptly recurved above towards pedicel ('cyclamen-shaped'), stellately divaricate; nectaries consisting of a shallow nectariferous foveola guarded by four small crowded basal calli that continue into two spreading, lanceolate auricles laterally; flowers with chromatic high-contrast throat macula adaxially, incl. a basal ring of dots (corona) at the center (a signpost for pollinators) and a chromatic high-contrast shoulder's macula abaxially; anthers tetrasporangiate (four-celled), appearing bilocular at maturity due to the confluence of pollen sacs; style filiform to sub-clavate, stigma thickened, deeply trifid with bilobed lobes; seeds ovoid-crescentic to falcate (scimitar-shaped) with a reticulate testa and large, hooked, fleshy, white elaiosome.

At the same time, the North-, Central- and East-Asian *Erythronium* species complex includes, according to different authors, from 3 to 5 species [4, 6, 7, 18, 29, 31, 35, 38]:

Erythronium sibiricum (Fisch. & C.A.Mey.) Krylov, Fl. Zapadnoi Sibiri 3: 641 (1929).

Erythronium krylovii Stepanov, Vestn. Krasnoyarsk. Gosud. Agrar. Univ. 8: 62 (2011) ≡ *E. sibiricum* subsp. *altaicum* Rukšāns, Buried Treasures: 362 (2007).

Erythronium sulevii (Rukšāns) Stepanov, Vestn. Krasnoyarsk. Gosud. Agrar. Univ. 8: 62 (2011) ≡ *E. sibiricum* subsp. *sulevii* Rukšāns, Buried Treasures: 362 (2007).

Erythronium sajanense Stepanov & Stassova, Vestn. Krasnoyarsk. Gosud. Agrar. Univ. 8: 60 (2011).

Erythronium japonicum Decne., Rev. Hort. (Paris), sér. 4, 3: 284 (1854).

The nutritional and medicinal value of the Siberian dog's tooth violet, as well as other ethnobotanical and social aspects associated with historical gathering and consuming of the kandyk bulbs for food by several peoples in southern Siberia since the late 18th century, are fully disclosed in [14, 36].

The Southern Siberian-Sayan-Altai species of this complex occupy a wide variety of ecological niches, from the foothills of the Altai and the Kuznetsk Alatau Mountains – steppe-like rocky hills, birch and aspen forests, petrophytic steppes featuring descended alpine and arctic-alpine species, river floodplains, to the S Siberian, Sayan and Gorny (High) Altai forested regions of dark coniferous forests (black taiga), their edges, and floodplain meadows, to the alpine region – subalpine and alpine meadows and alpine tundra, near snowfields (200–2500 m). Literature data also showed that the different Siberian, Sayan and Altai *Erythronium* populations have a different chromosome number: 2n=2x=20, 22, 24 [2, 7, 23, 24, 28, 37, 40]. Depending on the altitude of the habitat, flowering times vary widely, from mid-April in the lowlands to late July in the alpine belt of meadows and tundra.

It should also be noted the unclear typification of *Erythronium sibiricum*. The new Siberian species was described by Porphiry Krylov in 1929 [16, 17], based on the basionym of *E. dens-canis* var. *sibiricum* Fisch. & C.A.Mey. [9, 10], a taxon established by Fischer and Meyer presumably from the Dzungarian gatherings of Alexander Gustav von Schrenk [31].

It is also known, that P. Krylov and L. Sergievskaya from Tomsk State University intensively studied *Erythronium sibiricum s.l.* populations in the wild in 1912–1929 [16, 17, 32]. Nevertheless, there is an inconsistency in Krylov's description of the foliage colouration in *E. sibiricum*. He indicates that the leaves of the Siberian *Erythronium* are plain green, with a weak grayish tint, but not mottled [17]. However, such a leaf colour pattern is more characteristic to the Rudny Altai's *E. krylovii*, and not to Siberian *Erythronium* distributed in the Kuznetsk Alatau. *Erythronium krylovii* mainly has white or pinkish and rose purple/white bicoloured flowers. Thus, in the morphological description of *E. sibiricum* according to Krylov, the plants were described very broad, including morphological characteristics of both accepted species – *E. krylovii* and *E. sibiricum.* In fact, the *Erythronium* type material from Schrenk's 1840 Dzungarian expedition, allegedly used by Fischer and Meyer (1841) [9, 10, 31] to describe the Siberian variety, simply does not exist and it is therefore absent in related herbaria collections.

Therefore, *Erythronium sibiricum* does not have a valid type specimen (holotype) hitherto. And the putative *E. sibiricum* holotype of LE01010718! contains the Notae Criticae made by A. Grebenjuk, Feb. 2024: "*Non holotypus! Dies coll. Not designat. Collector ingot. Specimen sine designat. pro β. [var.] sibiricum et not cited in descr. orig. Specimen originarum (?) obscurum*". It also turned out to be impossible to assign a lectotype, since there are no references to the original specimens collected in the reviewed literature [9, 10, 14, 20, 21]. Fischer and Meyer founded their taxon *E. dens-canis* var. *sibiricum* Fisch. & C.A.Mey. in 1841, that is near the same period of the Dzungarian expedition of A. Schrenk, when he allegedly collected *Erythronium* specimens. Moreover, in the *E. dens-canis* var. *sibiricum* description in both literature sources [9, 10], they did not even indicate the range of the Siberian variety, providing only references to the earlier Floras of Gmelin and Ledebour [14, 20, 21]. According to historical essays, Schrenk began his journey through Semirechye (the Dzungarian Alatau) in Feb. 1840 from St.-Petersburg and traveled via Moscow, Kazan, Perm, Yekaterinburg, Omsk, Barnaul, Semipalatinsk, and then on to Semirechye – Ayaguz, which he reached in June 1840. There, he studied the local flora around Lake Balkhash, the Dzungarian Alatau, and the Tarbagatai Mountains [30]. It becomes clear

that Schrenk's expedition route would have prevented them from encountering any *Erythronium*, which is indirectly confirmed by the work of the same Fischer and Meyer on the list of plants discovered by Schrenk. It describes only five species from the *Liliaceae* Juss. family – four *Allium* L. spp. and *Fritillaria pallidiflora* Schrenk, and there is absolutely no mention of *Erythronium* [11, 12]. The first designation of the Siberian variety comes from Gmelin's Flora Sibirica, 1747, where he mentioned encountering *Erythronium* plants (local term: *kandyk*) in Siberia. Gmelin notes that they have narrow and broad leaves, as well as single and double flowers of rose, purple, red, and, very rarely, white [14]. According to Gmelin and some historical essays, he visited Altai (passing through with Krasheninnikov) and the Kuznetsk Alatau, where he carried out his observations in the Tomsk Region – in the fields along the Tom and Iyus rivers [14, 22]. In the Gmelin's Flora Sibirica in Tab. VII we can see the very first documented image (the copper engraving) of a whole plant of *E. sibiricum*, definitely recognizable by its outlines (Fig. 1) [14].

Fig. 1. The earliest known illustration of the entire habit of *Erythronium sibiricum* appeared as a copper engraving in Tabula VII in the first volume of J.G. Gmelin's *Flora Sibirica*, 1747 [14]; [retrieved from https://bibdigital.rjb.csic.es. (Accessed 04 March 2026)].

We further learn about the Siberian variety from the Ledebour's Flora Altaica, who listed that *Erythronium* not only without a specific epithet – just as Erythronium. *Gmel.*, but also without specifying the collection sites: "*Hab. in planitiebus et ad latera collium summa copia (L. M. B.)*" [20]. However, we learn about Ledebour's journey to the the Rudny Altai and Kazakhstan, together with his fellow botanists Meyer and Bunge, from his travel notes in 1826 [22]. Ledebour himself spent time exclusively in the Rudny Altai on the Kolyvansky Ridge, studying the mountain flora of the vicinity of Zmeinogorsk, Oskemen and Ridder. We supposed that he could have encountered there two species of *E. krylovii* and *E. sulevii*. Thus, Ledebour notes: "*It [Erythronium] varies not only, as Gmelin already noted, in the leaves shape (narrower or wider), the colour of the flower (purple, meat-red and white), but also the leaves colouration (green, glaucous or glaucous-mottled), and the size of the tepals*" [20]. Their herbarium specimen (L.B.M.) has been preserved as LE01046178!: №500 Indic. Altaic. Erythronium Dens Canis L. (ap. Ledeb.), abundat in planitiebus et ad latera collium, [1826], leg. *L., B., M.* [*Ledebour, Bunge, Meyer*]. Unfortunately, it does not indicate the precise collection locations. However, on the sheet we may recognize very well a broad-leaved *Erythronium* with large white flowers and broadly lanceolate tepals and yellow anthers – *E. krylovii* distributed in the Rudny Altai. However, the authors make no references to this original specimen in the Flora Altaica or Flora Rossica [Grebenjuk, Feb. 2024: *Erythronium dens-canis L. β. [var.] sibiricum Fisch. et Avé-Lall. Specimen originarium. Specimina originaria non cit.; Notae criticae: Specimen ex coll. C.A. Meyerii ad Fl. Alt. (Ledeb., op.cit.: 37). Ut videtur specimina plantae commixta (collectio non homogena)*] [20, 21].

In the current circumstances and considering that the previously very broadly interpreted *Erythronium sibiricum s.l.* has been split into several new species in recent decades (*E. krylovii, E. sulevii, E. sajanense*) with clearly defined geographic ranges [4, 7, 13, 14, 16-18, 20, 21, 27, 29, 31, 32, 35, 38], there was a need to find and determine the original collections of that period, and very preferably of the *Erythronium* plants gathered from the Kuznetsk Alatau and the Salair Ridge, in order to propose a lectotype for *E. sibiricum s.s.* In this case, the chosen specimen must have a precise indication of the habitat, locality, region, date, and collectors' details. However, neither Gmelin, Ledebour, Fischer and Meyer, nor Krylov have cited the original collections or certain specimens of the Siberian taxon in their treatises [9, 10, 14, 16, 17, 20, 21]. Therefore, most likely, it is impossible to establish a lectotype for *E. sibiricum*, and a neotype is required, for example, from Krylov's gatherings made in Tomsk and Kemerovo regions and housed in the TK herbarium [16, 17].

After many years of extensive observations of cultivated *Erythronium* accessions of known origin from Kazakhstan, RF, and China in our living geophyte collections, we noted that the Siberian and Altai *Erythronium* accessions differ significantly both morphologically and by phenology depending on the region of collection. So, we noticed that plants from the passes and saddles of the S Altai Mountains in E Kazakhstan (the Azutau ridge) differ significantly from the Kemerovo Region's *Erythroniums* (e.g., Gornaya Shoria, or Mountain Shoria territory) by bicoloured floral high-contrast pattern (a distinct white throat covering up to 1/3 to 2/3 length of tepals), and in earlier flowering period, blooming at the same time as *E. krylovii* from the Rudny Altai (see Recognition).

It is known that the climate and ecological conditions of the Southern Altai (E Kazakhstan) and the Mongolian Altai are more arid, with a lower proportion of the early spring buzz pollinators within the *Erythronium* habitats [1, 3, 19]. Therefore, the kandyk grows there primarily in the most humid conditions of the subalpine and alpine zones (1400-2500 m) and it blooms as early as possible. For this reason, its bicoloured flowers at full anthesis evolutionary developed the most sophisticated enhanced visual marker (signpost) created by a strong chromatic high-contrast of the enlarged cumulative throat macula and shoulder's macula with the tepal colour and surrounding environment (*mellitophyllous pollination syndrome*). The enhanced floral cumulative maculas serve as nectar guides for the most effective attraction of the specialized pollinators in more arid climate conditions of the Sothern Altai Mountains due to the "runway" effect for the early spring queen bumblebees *Bombus* spp. and certain specialized solitary bees' species [8, 26]. For comparison, we can look at a much smaller floral throat macula of the less contrasting flower of the kandyk races from more northerly located and humid regions of the Kuznetsk Alatau and the Salair Ridge (Fig. 19).

Unlike the mainly white-flowered Rudny Altai populations of *Erythronium krylovii* on the Ulbinsky and the Ivanovsky ridges, its Kolyvansky Ridge populations inhabiting the NW Altai foothills and growing in birch (*Betula pendula* Roth)–aspen (*Populus tremula* L.) groves (local term: *kolki*) on stony steppe hillocks (local term: *sopka*) (300-600 m), also have rose purple/white bicoloured flower morphs with enhanced floral cumulative throat macula, which is similar by a pattern to the allopatric S Altai *E. fallax*, but both white-flowered and rose purple/white bicoloured *E. krylovii* populations all have a distinct non-mottled plain green leaf pattern. It is obvious that the more steppe-like nature of the NW Altai foothills also contributes to a decrease in the number of the early spring buzz pollinators for the *Erythroniums* in that region, which is why *E.*

krylovii also evolved a bicoloured flower morph with a chromatic high-contrast cumulative throat macula (Fig. 19).

Since the E Kazakhstan *Erythronium* plants originated from the Azutau ridge differ significantly in morphology, ecology, and by earliest flowering time, from other known Siberian species, we decided to describe a distinct new kandyk species from the Southern Altai.

Materials and methods

Field studies for *Erythronium fallax* were undertaken in E Kazakhstan in May 2012. Herbarium specimens of other related *Erythronium* species were examined in virtual herbaria at AA, ALTB, H, IRKU, KUN, KUZ, LE, MW, NS, NSK, PE, RIG II (abbreviations after Thiers 2026 [39]). Measurements, colours, and other details are based on living material and herbarium specimens, and data derived from field notes and cultivated plants. Morphological examinations were made using a zoom stereomicroscope SMZ800N (Nikon Instruments Inc., Japan). Morphological terminology follows Beentje 2010 [5]. A distribution map (Map 1) was plotted using recorded coordinates from the field notes, virtual herbaria data, “Plantarium” online atlas and plant guide of CIS region, iNaturalist community mapping, the Global Biodiversity Information Facility (GBIF), and from the literature, verified by Google Earth Pro 7.3 (©2017 Google), and produced using SimpleMappr on-line tool for creating maps [33]. The floral throats’ illustrations were prepared using Recraft AI on-line tool. A preliminary conservation status of *E. fallax* was informally assessed following the IUCN’s Red List Categories and Criteria (IUCN 2024 [15]). Extent of occurrence (EOO) and area of occupancy (AOO) were calculated using ground point data and ShinyGeoCAT for geospatial analysis for Red List assessment [25] based on the recommended grid size of 2×2 km.

Taxonomic Treatment

Erythronium fallax *Zubov & Rukšāns* ***sp. nov*****.** Type: Kazakhstan, East Kazakhstan Region, Kurshim (Kurchumsky) District, southern dry macroslope of the Azutau ridge (Southern Altai), Marble Pass (Mramorny Pass), within steppified shrubby forb-graminoid meadow, 1400 m, fl., 10 May 2012, *Zubov & Rukšāns* s.n. (holotype RIG II:BOT-17860!).

Paratypes designated here:

KAZAKHSTAN: *E. sibiricum* (Fisch. & C.A.Mey.) Krylov, East Kazakhstan Region, Kurshim (Kurchumsky) District, northern foot of the Narymsky ridge, Maymyr riv.; *Bidullayeva,* fl. 05 May 1985 (paratype AA10760000!);

KAZAKHSTAN: *E. sibiricum* (Fisch. & C.A.Mey.) Krylov, East Kazakhstan Region, Katonkaragay District, Katon-Karagay State National Nature Park, Yazevoye Lake, 1664 m, *Bolbotov*, fl. 02 June 2021 (paratype ALTB1100038233!);

KAZAKHSTAN: *E. sibiricum* (Fisch. & C.A.Mey.) Krylov, East Kazakhstan Region, Kurshim (Kurchumsky) District, Azutau ridge, Mramornaya Mt., stream side, on rich, loose soil, 1140 m, *Dyachenko*, fl. 09 May 2021 (paratype ALTB1100006451!);

CHINA: *E. sibiricum* (Fisch. & C.A.Mey.) Krylov, Altay Prefecture, Xinjiang Uygur Autonomous Region (Xinjiang), in the vic. of Hongfuqiao bridge, Xiaodonggou Forest park, in the roadside grassland, 1795 m, *Liu, Zhang, Xiong* 16CS12265, fl. 02 June 2016 (paratype KUN1453268!);

CHINA: *E. sibiricum* (Fisch. & C.A.Mey.) Krylov, Altay Prefecture, Xinjiang Uygur Autonomous Region (Xinjiang), Habahe, along the hiking root from Tuwaxincun to Baihabahe Cun, on the grass slope, 1863 m, *Liu, Zhang, Xiong* 16CS12400, fr. 08 June 2016 (paratype KUN1453233!);

CHINA: *E. sibiricum* (Fisch. & C.A.Mey.) Krylov, Altay Prefecture, Xinjiang Uygur Autonomous Region (Xinjiang), Xiaodonggou Forest park, meadow, 1807 m, *Shang, Qu, Guo, Zhao, Zhu, Zhu, Wei* I"-4659, fl. 05 June 2023 (paratype PE02397054!).

Bulb c. 4 × 2 cm, white, whitish to creamy white, ovate-oblong (“tooth-shaped”): apical part with a pointed tip bearing an upper and lower denticles of the only storage tunicate scale, basally – with a chain of remains of the basal plates of previous years – 3 – 6 internodal segments of varying ages, prominent in a reproductive bulb (short-rhizome-bulbous biomorph), covered with thin, papery brown disintegrated remnants of last year's scales; adventitious roots white, thin, unbranched.

Stem 10 – 14 cm long, simple, nodding at the apex, green to reddish-brown, cylindrical.

Leaves 2, 8 – 11 × 1.6 – 2.8 cm, borne near middle of stem, opposite, petiolate, unequal, reticulate veined; leaf blade upon emergence involute and slightly twisted, appearing cymbiform, channeled, lanceolate to sub-oblong, glabrous, contrast-mottled adaxially (green/reddish-brown), dull, with a faint waxy bloom (± glaucous) adaxially, dull ± glaucous-green abaxially; at fruiting leaf blade becoming concolorous, glaucous-green with a marbled pattern adaxially (green/subtle whitish spots); leaf base cuneate,

apex acuminate, hooded, leaf margin entire, sub-undulate to undulate; *petiole* 2 – 3 cm long, reddish-brown.

Flower solitary, actinomorphic, nodding, long pedunculate; *tepals* 6, in two whorls, 5.2 × 1 cm, contrast bicoloured: ± half-length (1/3 to 2/3) white proximally, ± half-length lilac to rose purple distally, oblong-lanceolate to ± strap-shaped, furrowed, united at base into short tube and abruptly recurved above towards pedicel (strongly reflexed – *cf.* "cyclamen-shaped" in anthesi plena), stellately divaricate, apex obtuse, hooded; *floral cumulative throat macula* at the tepal bases (adaxially) enhanced, massive, creamy, yellowish, fuscous-yellowish to whitish, with an indistinct, blurred, ± dotted corona ring, bordered by a wide white stripe all together reaching ± 1/3 – 2/3 of the tepal length; external (abaxial) base of the tepals (*floral cumulative shoulders' macula*) fully lilac to violet at the shoulders, merging into a yellow stripe of various shades of yellow, fuscous-yellow, greenish-yellow and bordered by a broad, signpost-enhancing perimacular white stripe, or *shoulders' macula* bold, lilac, merging into a broad, signpost-enhancing perimacular white stripe reaching ± 1/3 of the tepal length; *nectaries* located at the internal base of the inner tepals, consisting of a shallow nectariferous foveola guarded by four small crowded basal calli that continue into two spreading, lanceolate auricles laterally.

Androecium. Stamens 6, in two trimerous whorls, diplostemonous; *filaments c.* 10 mm long, subequal, white, incrassate distally in half to upper third, ± fusiform to elongated-rhomboid, elongated and flattened at the base and middle part, abruptly subulate at the apex, bearing a distinct subulate appendage at the point of anther attachment; *anthers* 9 – 10 mm long, golden yellow, linear-oblong, anatomically tetrasporangiate (four-celled), though appearing bilocular at maturity due to the confluence of pollen sacs, basifixed on abruptly subulate filaments and dehiscing by two longitudinal slits (latrorse to extrorse); *pollen* bright yellow; grains ellipsoidal, monosulcate, exine exhibits a distinct reticulate sculpturing; *pollination syndrome* bimodal: mellitophyllous (queen bumblebees *Bombus* spp. and certain specialized solitary bees) and facultative autogamy.

Gynoecium (ovary and receptacle) syncarpous, tricarpellate; *ovary* ± triquetrous, *c.* 8 mm long and *c.* 10 mm in diam., superior, briefly stipitate, trilocular, green to dark green, obovate to sub-globose; placentation axile; *style* typically 1.5 to 2 times longer than the ovary and exceeds the stamens (a herkogamous flower), pure white, filiform, straight to slightly curve downward, caducous, *c.* 15 mm long; *stigma* well developed, sub-clavate, 2 – 4 mm long and *c.* 3 mm in diam., funnel-shaped, thickened, deeply

trifid with bilobed linear to linear-lanceolate, slightly recurved lobes, pure white, papillose.

Capsule 2.0 – 3.0 cm long, erect, weakly triquetrous in cross-section, with rounded ribs, tubercular at maturity, loculicidal, elliptical to ± pyriform (obovate to sub-globose tapering to the base): typically broader at the top and briefly stipitate, being basally attenuated into a short, robust neck; initially smooth and fleshy, often with a waxy, matte appearance, becoming chartaceous to leathery when ripening, and turns from pale green to a straw-yellow or light brown; often with a persistent, dried style at the apex..

Seeds 4 – 6 × 1.1 – 2.2 mm, ± angular, distinctly ovoid-crescentic to falcate (scimitar-shaped) – one side more curved than the other, giving a slightly asymmetrical, "comma-like" appearance, lustrous, cinnamon-brown to reddish-brown (in fully mature), and pale cream or yellowish (in immature), with a reticulate testa and large, hooked, fleshy, white elaiosome 3 – 4 mm long (myrmecochory). 2n=2x=20 [37].

Figs 2–9.

Fig. 2. *Erythronium fallax* floral organs (Central Asia: acc. no. 12KZ-098, ex type locality); March 2026 (photo – J. Rukšāns).

Below: Figs. 3, 4A. *Erythronium fallax* flowering in type locality; May 2012 (photos – J.Rukšāns).

Fig. 4B. *Erythronium fallax* capsules (Central Asia: acc. no. 12KZ-098, ex type locality) in J. Rukšāns nursery; May 2026 (photo – J. Rukšāns).

Fig. 5. *Erythronium fallax* habitat of the steppified shrubby forb-graminoid meadow on the Marble Pass (Mramorny Pass), 1400 m, Azutau ridge, Southern Altai, Central Asia, E Kazakhstan; May 2012 (photo – J. Rukšāns).

Fig. 6 *Erythronium fallax* (Central Asia: acc. no. 12KZ-098, ex type locality) cultivated in J. Rukšāns' nursery; Apr. 2017, March 2026 (photo – J. Rukšāns).

Fig. 7 *Erythronium fallax* (Central Asia: acc. no. 12KZ-098, ex type locality) cultivated in J. Rukšāns' nursery; Apr. 2017, March 2026 (photo – J. Rukšāns).

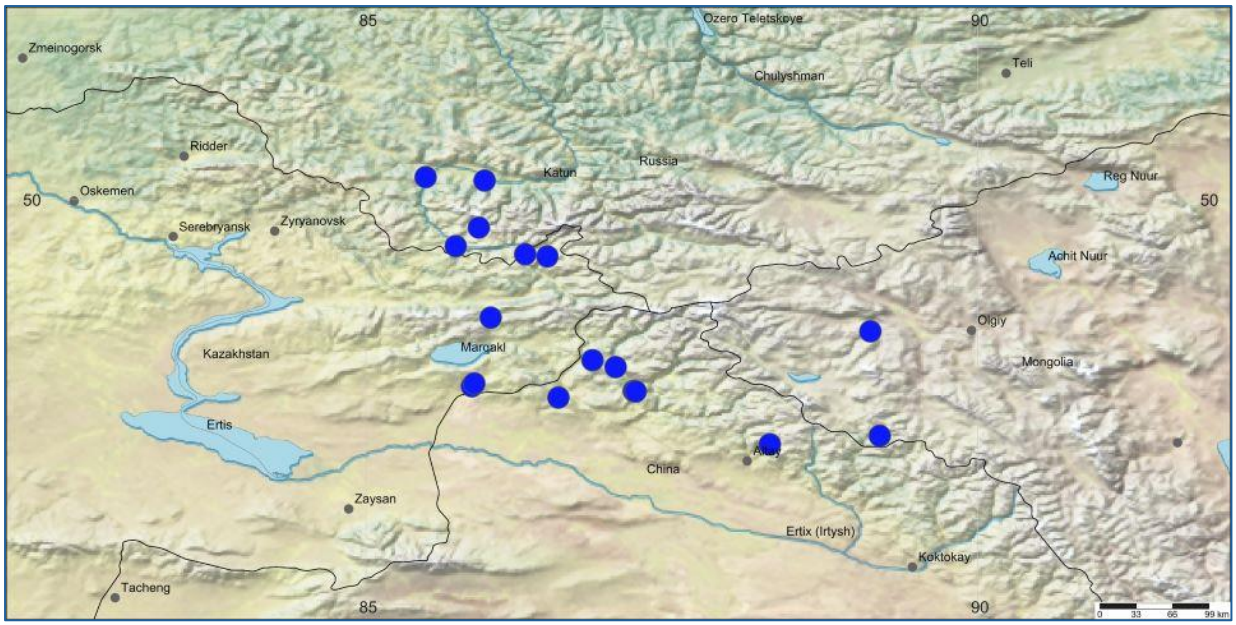
Fig. 8. *Erythronium fallax* (East Asia: acc. ex Mongol Altai, Xinjiang Uygur Autonomous Region/Xinjiang, NW China) cultivated in J. Rukšāns' nursery; Apr. 2010 (photo – J. Rukšāns).

Fig. 9. *Erythronium fallax,* an abaxial view of a high-contrast floral cumulative shoulders' macula (East Asia: acc. ex Mongol Altai, Xinjiang Uygur Autonomous Region/Xinjiang, NW China) cultivated in J. Rukšāns' nursery; Apr. 2010 (photo – J. Rukšāns).

RECOGNITION. Morphologically similar to *E. krylovii*, but differs by having leaves with mottled pattern; tepals contrast bicoloured: ± half rose purple distally, half white proximally in *E. fallax* (*vs* leaves plain green, concolorous; tepals mainly white to pinkish, but may also be bicoloured in *E. krylovii*).

Morphologically similar to *E. sibiricum s.s.*, but differs by having tepals contrast bicoloured and floral throat macula enlarged: ± half rose purple distally, half white proximally in *E. fallax* (*vs* tepals entirely rose lilac to purple up to the small throat macula in *E. sibiricum s.s.*).

DISTRIBUTION. Central Asia. The Southern Altai: the Azutau, the Kurchumsky, the Narymsky, the Sarymsakty, the Listvyaga (Kazakhstan), and the Katunsky (RF) ridges; **East Asia**. The Mongol Altai Range: the Tsengel-Ula ridge (Bayan Ulgii Aimag, Mongolia) and the ridges within N Xinjiang Province (China). **Map 1.**



Map 1. Distribution of *Erythronium fallax* sp.nov. in the Southern & Mongol Altai (E Kazakhstan, NW China, NW Mongolia, RF) [retrieved from/www.simplemappr.net. (Accessed 17 Feb. 2026)].

HABITAT. Described from southern dry macroslope of the Azutau ridge (the Southern Altai) – Marble Pass (Mramorny Pass), at 1400 m elevation, growing on black soil, within steppified shrubby forb-graminoid meadows, accompanying by shrubs: *Rosa spinosissima* L., *Lonicera tatarica* L., *Daphne altaica* Pall., and herbaceous species: *Elytrigia gmelinii* (Trin.) Nevski, *Calamagrostis epigeios* (L.) Roth., *Bromopsis inermis* (Leyss.) Holub., *Agropyron cristatum* (L.) Gaertn., *A. tarbagataicum* N. Plotn., *Phleum phleoides* (L.) H.Karst., *Carex* L. sp., *Galium verum* L., *Peucedanum ruthenicum* M.Bieb., *Medicago falcata* L., *Alcea nudiflora* (Lindl.) Boiss., *Centaurea ruthenica*

Lam., *Phlomis tuberosa* L., *Corydalis nobilis* (L.) Pers., *Lilium martagon* L., *Iris haematophylla* Fisch. ex Link, *Gymnospermium altaicum* (Pall.) Spach, *Fritillaria verticillata* Willd., *Allium tulipifolium* Ledeb., *Tulipa altaica* Pall. ex Spreng., *T. heteropetala* Ledeb., *Gagea* Salisb. sp., etc. [1, 3, 19];

in The Southern Altai (E Kazakhstan, RF): it grows from the mid-montane belt's steppified shrubby forb-graminoid meadows of mountain passes and saddles (900 – 1400 m), along forest edges and forest meadows of the black taiga – Siberian larch (*Larix sibirica* Ledeb.), Siberian larch – pine (*Pinus sibirica* Du Tour), and Siberian spruce (*Picea obovata* Ledeb.) – fir (*Abies sibirica* Ledeb.) forests, and mixed with birch (*Betula pubescens* Ehrh., *B. rotundifolia* Spach) and aspen (*Populus tremula*), to the upper forest line, along thalwegs and subalpine wetlands (1200 – 2100 m); rarely, in some places, it descends to river floodplains, along the edges/slops of narrow strips of floodplain forests (*Populus laurifolia* Ledeb., *P. nigra* L., *Betula pendula, B. pubescens, Salix viminalis* L., *S. triandra* L., *Hippophae rhamnoides* L.) at an elevation of 1000 – 1100 m (e.g., the floodplains of the Upper Katun section – "Katun Horseshoe", southern slopes of Belukha Mt.) [1, 3, 19];

in The Mongol Altai Range (NW Mongolia, NW China): it was found mainly in mid- and high-montane regions – in forest meadows, floodplains, in tall-grass subalpine and alpine grasslands, along the edges of moist coniferous (*Picea obovata*, *Abies sibirica*) and larch forests (*Larix sibirica*), grassy montane slopes, and along the edges of snowfields (1400 – 2500 m). Ephemeroid. Mesophyte.

CONSERVATION STATUS. *Erythronium fallax* is endemic to the Southern & the Mongol Altai Mountains (Kazakhstan, Mongolia, China, RF). Its area of occupancy (AOO) is provisionally estimated to be 56 km^2, and the new species is currently represented by 17 geolocated data points. The habitats could decline rapidly due to local anthropogenic pressure, such as overgrazing and the threat of small- to large-scale collection of flowering plants and bulbs by illegal collectors as it is a highly valuable decorative, food and medicinal plant, e.g., in China, what could cause a slow, long-term continuing decline. Due to the limited AOO, severely fragmented populations and the range of threats, this species is assessed as Endangered (EN) under IUCN Red List Categories and Criteria (IUCN 2024 [15]). EN B2ab(i,ii,iii): B2 – Geographic range in the form of AOO estimated to be less than 500 km^2 for *E. fallax* and: – a. Severely fragmented; and b. Continuing decline observed (See Map 1).

PHENOLOGY. Flowering: (end April–)May – end-June; fruiting: May – end July.

ETYMOLOGY. The species epithet *“fallax”* means *"deceptive, misleading"* due to the significant morphological similarity of the new species to *E. sibiricum* and almost 100 years of merging of both species into the only one widely distributed *E. sibiricum s.l.*

Fig. 10. *Erythronium krylovii* (Central Asia: acc. ex Western Altai, Zmeinogorsk vic., Kolyvansky Kryazh, Altai Krai, RF) cultivated in D. Zubov garden; Apr. 2025 (photo – D. Zubov).

Fig. 11, 12. *Erythronium krylovii* (Central Asia: acc. ex Rudny Altai, Ulba, E Kazakhstan) cultivated in J. Rukšāns' nursery; Apr. 2006 (photos – J. Rukšāns).

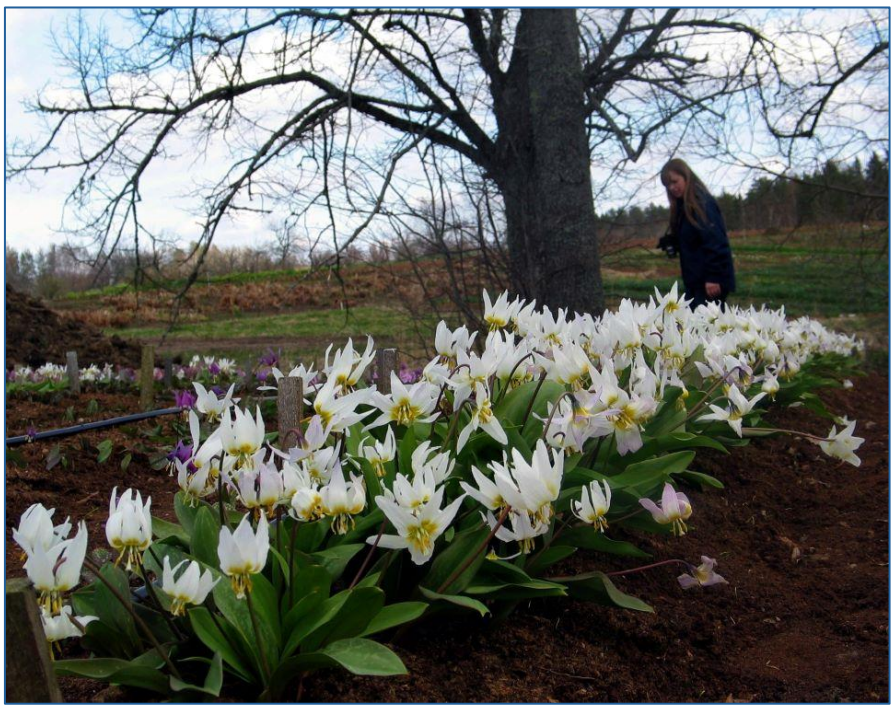


Fig. 13, 14. *Erythronium sulevii* (Central Asia: acc. ex Western Altai, Soloneshensky District, Altai Krai, RF) cultivated in D. Zubov garden; Apr. 2024 (photos – D. Zubov).

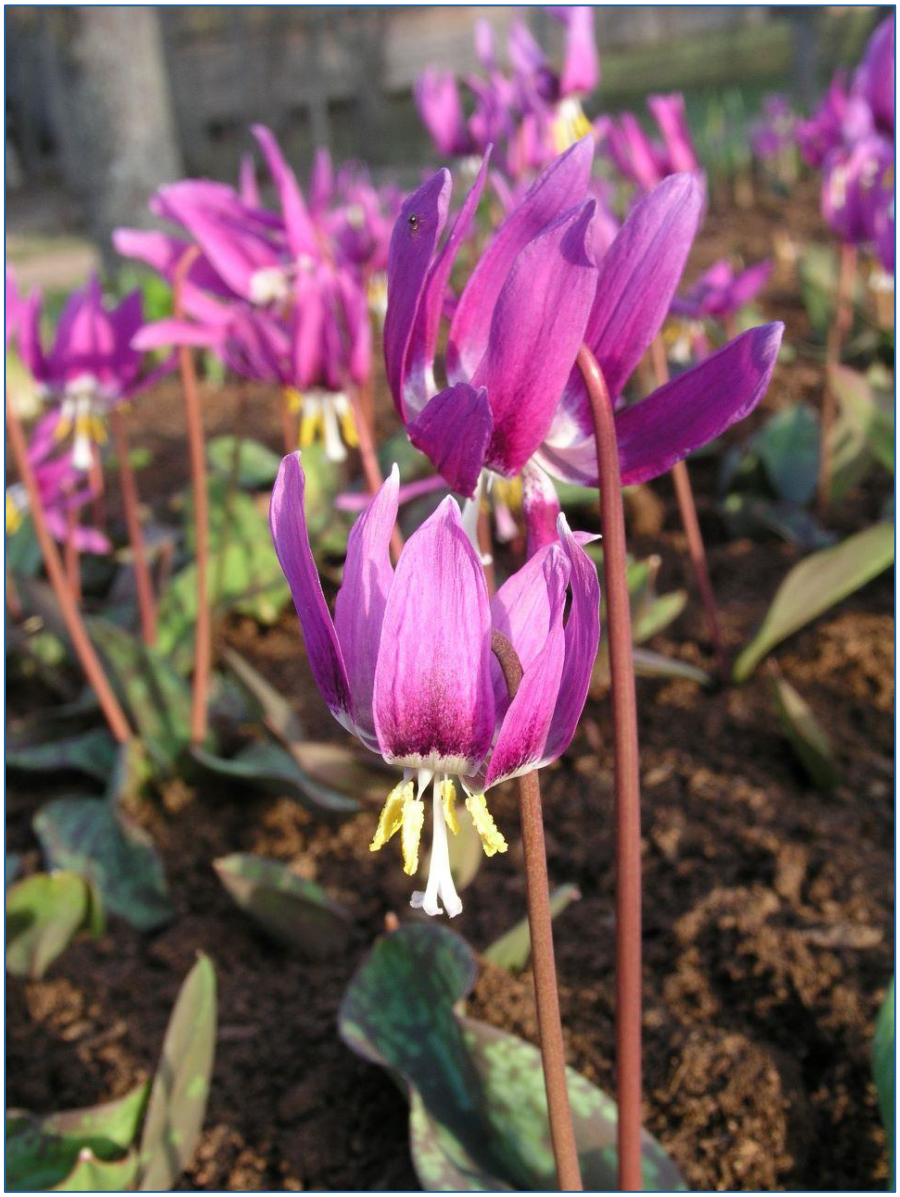


Fig. 15. *Erythronium sibiricum s.s.* (North Asia: acc. ex Kuznetsk Alatau, Kemerovo Region, RF) cultivated in J. Rukšāns' nursery; Apr. 2006 (photo – J. Rukšāns).

Fig. 16**.** *Erythronium sajanense* (North Asia: acc. ex Western Sayan, Tanzybey vic., Krasnoyarsk Krai, RF) cultivated in D. Zubov garden; March 2023 (photo – D. Zubov).

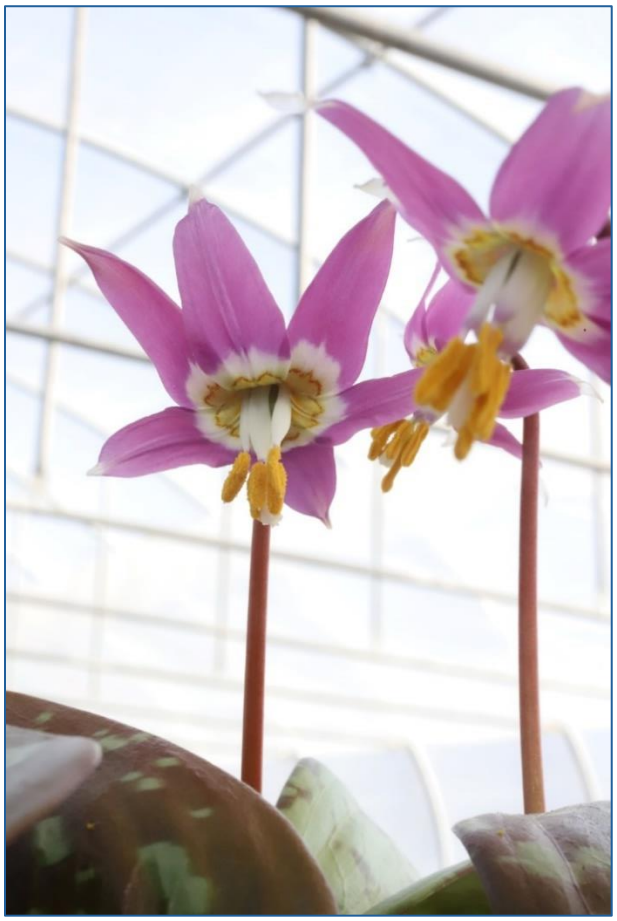


Fig. 17. *Erythronium sajanense* (North Asia: acc. ex Western Sayan, Tanzybey vic., Krasnoyarsk Krai, RF) cultivated in J. Rukšāns' nursery; March 2026 (photo – J. Rukšāns).

Fig.18. *Erythronium japonicum* (East Asia: acc. ex Japanese archipelago, Honshu Island, Touhoku Region, Japan) cultivated in D. Zubov garden; Apr. 2022 (photo – D. Zubov).

Identification key for the Asian *Erythronium* species (North, Central & East Asia)

1. Anthers yellow; flowers white, pinkish, rose-lilac, or purple……..……**2.**

1. Anthers purple-violet; flowers rose-lilac. ……..……**5.**

2. Leaves with a contrast-mottled pattern; stigma well developed, deeply trifid or stigma compact, weakly trifid ……..…….....**3.**

2. Leaves without a contrast-mottled pattern, plain green, concolorous; flowers white, often turning pink(-ish) when fading, or rose purple/white bicoloured; flower throat macula usually bold, contrasting, intense yellow to fuscous-yellow, yellowish, dotted ring inconspicuous or contrasting red, unevenly-dentate, sometimes bordered by a narrow yellow or white stripe all together reaching ± ¼ – 1/5 of the tepal length; stigma well developed, deeply trifid with bilobed lobes …… ***E. krylovii*** (Rudny (Western) Altai)

3. Stigma well developed, sub-clavate, deeply trifid with bilobed lobes; stamen filaments subequal, incrassate distally in half to upper third, ±fusiform/elongated-rhomboid, elongated and flattened at the base and middle part, abruptly subulate at the apex, bearing a distinct subulate appendage at the point of anther attachment……..……..…….……...**4.**

3. Stigma compact, weakly trifid; stamen filaments unequal, flattened, not fusiform/elongated-rhomboid in half to upper third, ± strap-shaped, abruptly subulate at the apex, bearing a distinct subulate appendage at the point of anther attachment …… ***E. sajanense*** (Western Sayan, Western Tannu-Ola)

4. Flowers rose-lilac, purple; throat macula small, cream, yellowish, fuscous-yellowish to white, with a distinct ± broadly dotted, unevenly-dentate ring, usually bordered by a narrow white stripe all together reaching ± 1/5 – 1/4 of the tepal length …….**E. *sibiricum*** (Kuznetsk Alatau & Salair Ridge, Western & Gorny Altai, western part of Western Sayan)

4. Flowers contrasting bicoloured, tepals adaxially ± half rose purple distally, half white proximally; throat macula enhanced, massive, cream, yellowish, fuscous-yellowish to whitish, with indistinct, blurred, ± dotted ring, bordered by a wide white stripe all together reaching ± 1/3 – 2/3 of the tepal length…..…….***E. fallax* sp. n.** (Southern & Mongol Altai)

5. Stamen filaments subequal, 2 – 3 mm wide, incrassate distally in half to upper third, ±fusiform/elongated-rhomboid, elongated and flattened at the base and middle

part, abruptly subulate at the apex, bearing a distinct subulate appendage at the point of anther attachment; flower throat macula small, cream, yellowish, fuscous-yellowish to yellow, with an indistinct to bold dotted ring, usually bordered by a narrow white stripe all together reaching ± 1/5 – 1/4 of the tepal length ……..……...……...***E. sulevii*** (NW Altai)

5. Stamen filaments unequal, *c.* 1 mm wide, filiform, abruptly subulate at the apex, flower throat macula not contrasting, often lighter than tepal colouration, but with a well-contrasting, bold, each tepal's ± tridentate ring…….

E. japonicum (Japanese archipelago, Kuril Islands (Kunashir), Korean Peninsula, NE China (S Jilin, Liaoning))

According to the Bartha's molecular data [4], we can divide the Asian erythroniums into two distinct phylogenetic clades. Consequently, the actual species composition of the complex of related Southern Siberian-Sayan-Mongolian-Japanese *Erythroniums* looks as follows:

Sibiricum clade

E. sibiricum (Fisch. & C.A.Mey.) Krylov (rose purple flowers, yellow anthers, high-contrast floral macula, mottled leaves) – the Kuznetsk Alatau and the Salair Ridge, the Western and Gorny Altai, western part of the Western Sayan (RF); 2n=20, 24; 300 – 1700(– 2200) m; flowering time: (mid-April –)May – mid-July;

E. krylovii Stepanov (white to pinkish, rose purple/white bicoloured flowers, yellow anthers, enhanced high-contrast floral macula, plain green leaves) – the Rudny (Western) Altai: the Ivanovsky, the Ulbinsky (Kazakhstan), and the Kolyvansky (RF) ridges; 300 – 800(– 1600) m; flowering time: mid-April – mid-May;

E. sulevii (Rukšāns) Stepanov (rose purple flowers, purple anthers, ± enhanced high-contrast floral macula, mottled leaves) – the NW Altai: the Terektinsky, the Korgonsky, the Iolgo, the Baschelaksky, the Anuisky, the Seminsky, and the Cherginsky ridges (RF); 300 – 1200 m; flowering time: mid-April – end May;

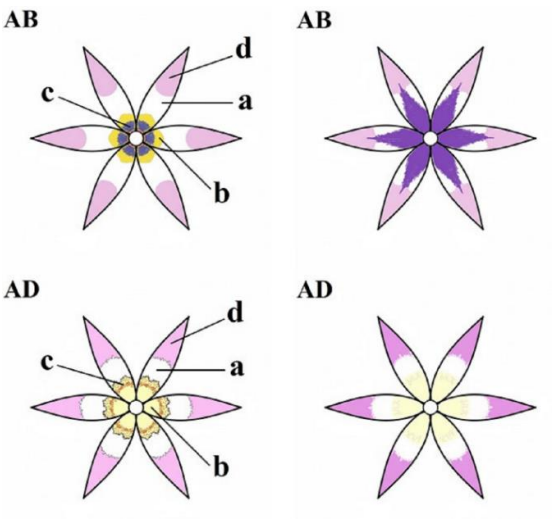
E. fallax Zubov & Rukšāns (rose purple/white bicoloured flowers, yellow anthers, enhanced high-contrast floral macula, mottled leaves) – the Southern Altai: the Azutau, the Kurchumsky, the Narymsky, the Sarymsakty, the Listvyaga (Kazakhstan), and the Katunsky (RF) ridges; the Mongol Altai Range: the Tsengel-Ula ridge (Mongolia) and the ridges within N Xinjiang, China; 2n=20; (1100 –)1400 – 2500 m; flowering time: (end April–)May – end-June;

Japonicum clade

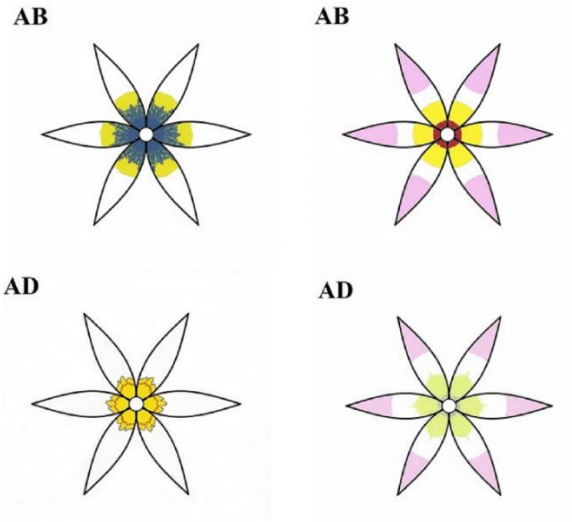
E. japonicum Decne. (rose purple to dark lilac flowers, purple anthers, indistinct floral macula, mottled leaves) – Japanese archipelago, Kuril Islands (Kunashir), Korean

Peninsula, NE China (S Jilin, Liaoning); 2n=24; 100 – 1600 m; flowering time: mid-March – May(– early June);

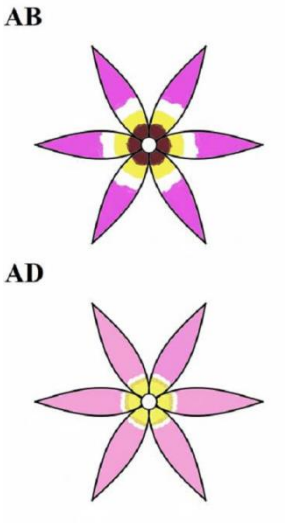
E. sajanense Stepanov & Stassova (rose purple flowers, yellow anthers, high-contrast floral macula, mottled leaves) – the Western Sayan, the Western Tannu-Ola, 2n=22, rarely 24, 400 – 1500(– 2000) m; flowering time: end April – May(– early June).



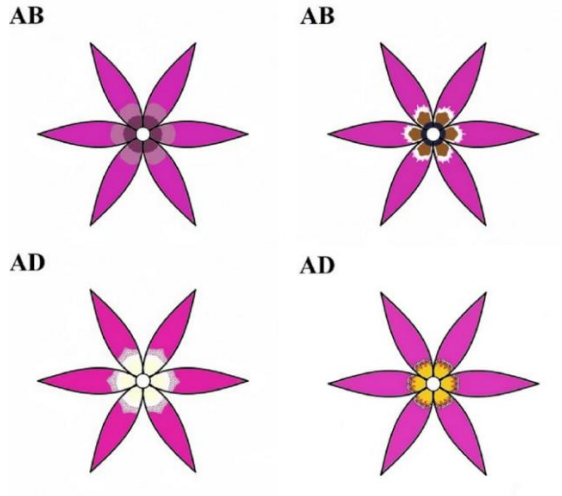
Erythronium fallax



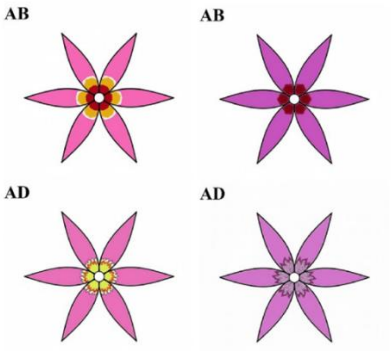
Erythronium krylovii



Erythronium sulevii



Erythronium sibiricum s.s.



Left: *Erythronium sajanense* Right: *Erythronium japonicum*

Fig. 19. Comparative analysis of the schematic representation of flower visual marker (signpost) as nectar guides – *the throat macula* and *the shoulders' macula*, on the adaxial and abaxial sides respectively in different Asian *Erythronium* species, as a reflection of the mellitophyllous pollination syndrome (buzz pollinators); the floral cumulative *throat* macula structure: a – *a signpost-enhancing perimacular white stripe* (absent in some species), b – *a throat* itself (almost white to various shades of yellow, fuscous-yellow, greenish-yellow, rarely lilac to rose purple and fully dotted, e.g. in *E. japonicum*), c – *punctate corona* (a basal ring of varying width and prominence of brown-reddish to purple violet dots), d - dark-coloured tip of the tepal to high-contrast the entire macula; the floral cumulative *shoulders'* macula structure: a – *signpost-enhancing perimacular white stripe* (not present in all species or populations), b – a yellow stripe of various shades of yellow, fuscous-yellow, greenish-yellow (may be not present within the same population); c – dark basal blotch at the transition of the stem to the perianth, d - dark-coloured tip of the tepal to high-contrast the entire macula; AD – adaxial view (*the throat macula*), AB – abaxial view (*the shoulders' macula*) [prepared using Recraft AI; retrieved from https://www.recraft.ai. (Accessed 15 Feb. – 03 March 2026)].

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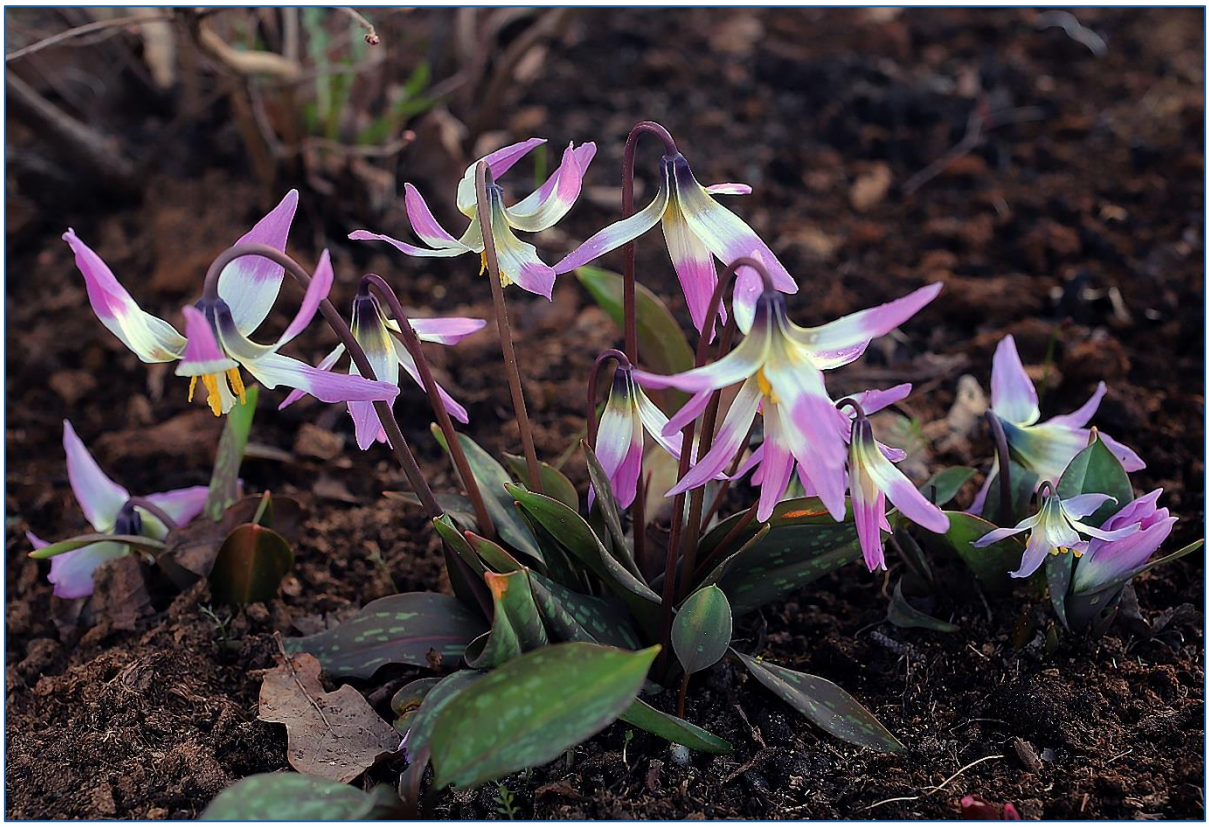

Erythronium fallax in the garden.