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This issue of IRG contains descriptions of three new plant species. Janis Rukšāns discusses Crocus of series Kotschyani and describes a new species, *Crocus hatayensis* from Turkey, Janis Rukšāns and Henrik Zetterlund define a new Eranthis species from Iran, and John Watson dedicates a new Viola species to a very special person. We hope you find this an exciting way to conclude our ninth year of publication.

Cover photo: *Viola* F.& W.11580. Cerro Atravesada, Picunches Dept., Argentina, byJohn M. Watson.

---Species description---

***Eranthis iranica* (Ranunculaceae) Rukšāns & Zetterlund - new species of winter aconite from Iran**

Janis Rukšāns, Dr. biol. h.c. (Latvia) janis.bulb@hawk.lv
Henrik Zetterlund, Gothenburg Botanical garden (Sweden)

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Summary: Species of *Eranthis* (*Shibateranthis*) from Iran and Central Asia are discussed; a new species *Eranthis iranica* is described.

Key words: Iran, Central Asia, *Eranthis iranica, Eranthis longistipitata*.

Winter aconites (*Eranthis* Salisb.) are very popular garden plants. The most widely grown is *Eranthis hyemalis* (L.) Salisb. - native in European woods from SE France up to Bulgaria and naturalized in Britain. It is one of the first yellow flowering bulbous plants blooming in early spring in shady places together with snowdrops and snowflakes. Many cultivars have been raised, especially in the last years, when some kind of “eranthophilia” similar to other flower “philias” began.

In Turkey *Eranthis hyemalis* is replaced by *E. cilicica* Schott & Kotschy - superficially very similar but having more dissected leaves and bracts, often tinged bronze. *E. cilicica* is less easy to grow in the open garden and requires a more sunny position and some drying in summer, although under trees where *E. hyemalis* are usually grown, the soil in summer is dried out completely by roots of trees overgrowing them. *E. cilicica* is distributed in Cilician Taurus mountains in S. Turkey and its area enters N of Iraq and W of Iran (Iranian and Iraq Kurdistan), possibly N of Syrian Kurdistan, too, but this is not easily verifiable now. Both species looks very similar, and in Flora Iranica (H. Riedl, 1992) they are not separated, regarding *E. cilicica* as synonym of *E. hyemalis*.

Herbarium of *Eranthis cilicica* from Kurdistan, W Iran.

When grown together, both species occasionally hybridise and the most popular hybrid is named *Eranthis* 'Guinea Gold' - having distinctly bronze-toned leaves and bracts, showing hybrid vigour, being larger and more robust than both parents. It is reported as sterile, but occasionally some seeds are formed in fruitlets.

Left above: *Eranthis hyemalis* first year seedlings.
Right above: *Eranthis longistipitata* first year seedlings – the second seedleaf is missing.

All species of *Eranthis* are divided into two subgenera. European (*E. hyemalis*) and W Asian (*E. cilicica*) belong to subgenus *Eranthis* and have yellow flowers, but those growing to East starting from Kopet Dag ridge in Iran belong to subgen. *Shibateranthis* (Nakai) Luferov with *E. longistipitata* Regel sensu lato having yellow flowers and growing in the west part of *Shibateranthis* area and around 7-8 species with white flowers growing from Siberia to Japan, Korea and China. (In Flora of USSR both Siberian species are characterised as having yellow flowers, this is not true - author observed only herbarium specimens where white colour of petals turns yellow during drying). Japanese botanists and most Russian botanists regard them all as a different genus - *Shibateranthis* Nakai.

The main difference between both subgenera lies in the number of seed leaves. In true *Eranthis* there are two, but in subgenus *Shibateranthis* only one (although it belongs to dicotyledons), and the second seed leaf is aborted. In subgenus *Shibateranthis* around 8-9 species are described, superficially very similar. W. Boens (2014) concludes that, when you look at the descriptions in the different floras, it's very clear that there are only some minor differences, of which the most important is often the place where they occur in the wild. The most logical conclusion one can make from these observations, is that all these species had one and the same parent. For example - because of geographical separation of different populations of species with white flowers, Japanese *E. pinnatifida* started to differ from the plants on the mainland etc. Since the morphological and genetic differences are not that important yet, one can assume that the separation between these different populations happened quite recently. This last statement can also be used for both species from subgenus *Eranthis* and to *E. longistipitata* sensu lato from subgen. *Shibateranthis*.

Eranthis longistipitata sensu lato grows in the Western part of subgen. *Shibateranthis* area. According to Flora of USSR its area inside former Soviet Union includes Amu-Darya, Sir-Darya, Pamiro-Alai and Tian-Shan and NE Iran is mentioned as the general distribution area. The type specimen comes from Bugun-tau range (Kazakhstan?). The authors have observed it in Uzbekistan, Kyrgyzstan and Kazakhstan. All plants seen by us had yellow, sometimes even slightly greenish (cold) yellow flowers, occasionally turning reddish at end of blooming or pinkish when dry. There are some pictures on the website “plantarium.ru” with slightly orange or brownish tinted flowers, but such were never observed in nature by these authors. The radical leaves are palmately 3-5 parted, the single flower is on the top of a leafless stem, and is shortly pedicelled in centre of an involucre divided into linear segments. The pedicel significantly elongates during flowering and especially in seed - hence the species epithet - *longistipitata*.

Eranthis longistipitata from Uzbekistan.

The area where *Eranthis longistipitata* sensu lato is distributed in the wild is divided into two isolated regions. The eastern area where typical *E. longistipitata* sensu stricto is growing includes Central Asian states of Uzbekistan, Kazakhstan and Kyrgyzstan. The western area is isolated from the eastern part by huge Karakum Desert (in direction to West and by high mountains of Tian-Shan in direction to South. Western area lies on Kopet-Dag Mountains (including Kopet-Dag in Turkmenistan) and according to Flora Iranica also in N and NW Afghanistan (not one sample from the last area was seen by the authors).
The authors have not seen any gatherings from Tajikistan, so we cannot judge about their taxonomy. Flora of Tajikistan characterizes them as orange-yellow.

Eranthis longistipitata from Kazakhstan.

Eranthis longistipitata from Kyrgystan.

The first introduction of Iranian *Eranthis longistipitata* sensu lato in cultivation was made by Gothenburg BG on April 24th in 2003. The collection was made in the province of Razavi Khorasan in north-eastern Iran, on the road between Bajgiran and Quchan at an elevation of 1900 m. We stopped for pictures of the glorious *Iris fosteriana* that flowered by the thousands on the steppe-slopes. The collection *Eranthis longistipitata* T4Z 1150 was growing in the shade of a low ridge with *Iris acutiloba* ssp. *lineolata* (T4Z 1155), *Corydalis chionophila* (T4Z 1151) and *Thalictrum sultanabadense (*T4Z 1156*).* The *Eranthis* was past flowering and going into dormancy.

Eranthis longistipitata tubers – Kyrgystan (gridlines 5 mm)

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Eranthis iranica - T4Z 1150 Photo Henrik Zetterlund.

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Corydalis chionophila – in cultivation at Gothenburg B.G.

Iris acutiloba subsp. *lineolata*

Iris fosteriana - Photo Bob Charman.

Eranthis iranica T4Z 1150 at Gothenburg Botanic Garden.

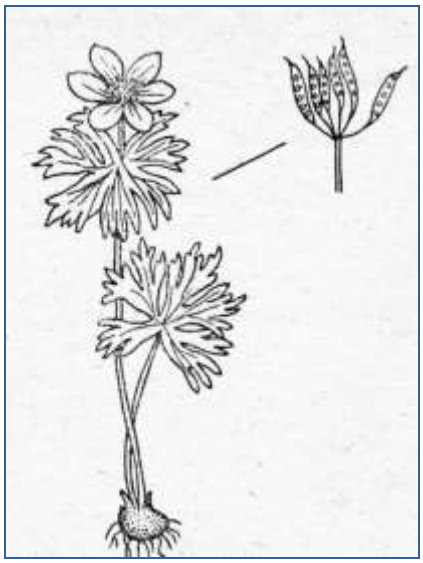
This sample immediately attracted our attention from its first blooming in cultivation by its distinctly orange shaded flowers and much more divided radical and involucral leaves, allowing us to suppose another species different from typical *E. longistipitata*. So one of the targets of Janis Rukšāns during his trip to NE of Iran in 2008 was just finding and observing as many as possible populations of *Eranthis* along the planned route of his travel. Really the trip was too late to find the searched plant easily but, luckily, in deep gullies on very shaded banks of small streams on Kuh-e Hazar Masjed ridge at altitudes of 1900 and 2250 m two populations (WHIR-038 and WHIR-047) were found just at very end of blooming with flowers almost dried already and another population with practically dry leaves more to the west and at a somewhat lower altitude. On the first two localities it was possible to collect small samples for later comparison with the plants from Gothenburg BG collection. In the third locality it was too late in the season to find the very small black tubers at this development stage when leaves are no longer so firmly attached to the tuber. Both gathered samples in cultivation turned out practically identical with Gothenburg's plants. The sample of supposedly new species were sent for DNA analyses which confirmed genetical difference (still unpublished) between E and W regions where *E. longistipitata* sensu lato is growing. The difference was also confirmed by attempts to get hybrids between both general populations. Regardless of careful pollination of Iranian plants with pollens from Uzbekistan and Kyrgyzstan samples, no seed was obtained, but pollination between both Iranian populations gave good seeds which germinated well the following spring. So we decided to publish the Iranian plant as a new species and decided to name it *Eranthis iranica* after the country from where the plants for this research came.

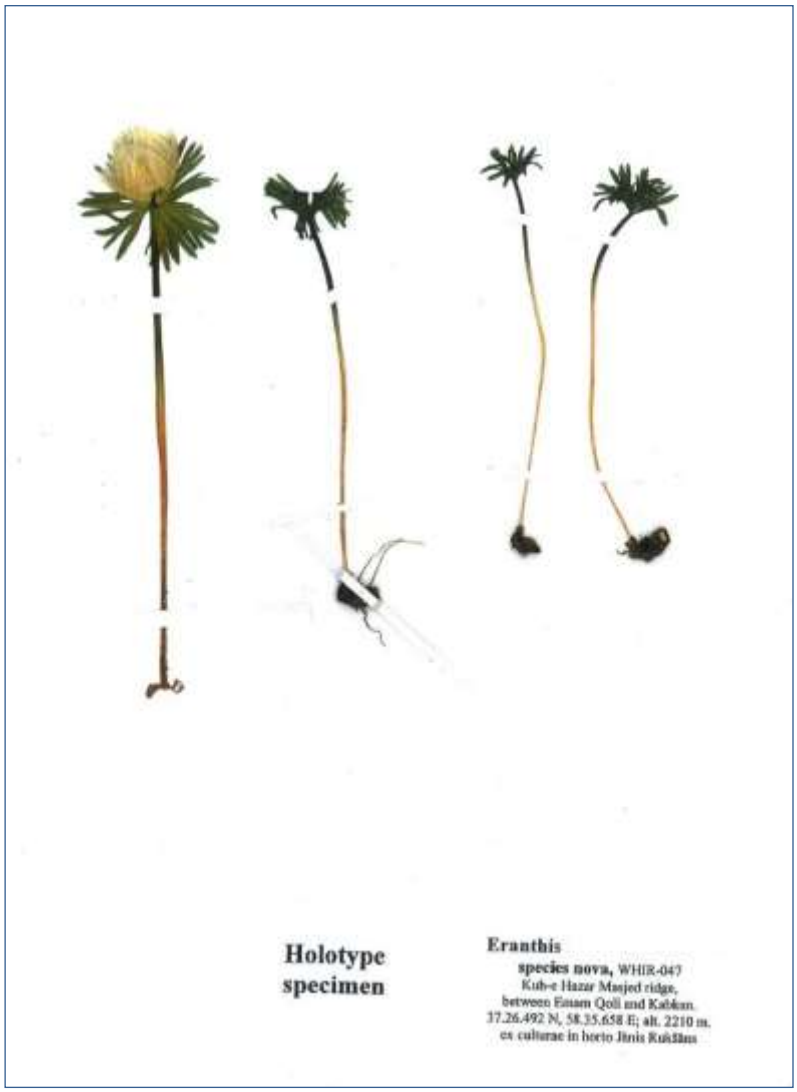
Eranthis iranica – WHIR-038

Eranthis iranica - WHIR-047

Most likely the plants listed in the Key-book of Turkmenistan Plants (Nikitin V., Geldihanov A., 1988) as *Shibateranthis longistipitata* and as *Eranthis longistipitata* in Flora of Turmenistan (Nevskij S., 1948) belong to the same species due to their distribution area “rarely in SW and Central Kopet-Dag” and the black-white drawings of it published in cited key-book and Flora looks very similar to plants observed by us from Iranian Kopet-Dag. Very similarly are those designated *E. longistipitata* in Flora of Tajikistan (Vol. 4) and the flower colour there is characterised as orange-yellow. This allows us to suppose wider distribution of new species than is regarded by us at present.

Right: *Eranthis iranica* in Flora Turkmenorum as *Eranthis longistipitata*.
Below: *Eranthis iranica* in Keybook of Turkmenistan Flora as *Shibateranthis longistipitata.*





Eranthis iranica -
Holotype
(WHIR-047)
Herbarium sheet

Eranthis iranica Rukšāns & Zetterlund species nova

Type: Iran, Kuh-e Hazar Masjed ridge between Emam Qoli and Kabkan, almost on pass. Large wide valley with some rocky outcrops on sides at altitude 2210 m; 37°26.492 N and 58°35.658 E. Leg. J. Rukšāns, ex culturae in horto Jānis Rukšāns, 02-03-2016. Holotype: GB (Gothenburg).

Habitat and distribution: stony slopes and argillaceous soils on mountains up to the alpine zone in eastern part of Kopet-Dag mountain ridge in Iran and most likely in adjacent areas of Turkmenistan Kopet-Dag and N Afghanistan: Mazar-i-Sharif and NW Afghanistan: Bala Murghab and N Herat (Afghan localities cited after H. Riedl, 1992). Taxonomical status of plants from Tajikistan still needs checking.

Flowering time: March to April (May).

Description: Perennial with subglobose tuber with many very small daughter tubers faintly attached to the main tuber from which arise one or two radical leaves. Daughter tubers are often pushed in some distance from mother plant by very thin stolones. Leaves palmately 3-5 parted, deeply secondary dissected, each lobe again dissected into 2-4 secondary lobes, occasionally with shallower lobed tips, at start of vegetation brownish green, very narrowly edged brown, later pales to dark green; leafless stem 5 to 14 cm long, dark brown with single shortly pedicelled flower at top. Involucre divided similarly to basal leaves and is of same colour. Sepals are petaloid, orange, on outside brownish with darker stripes. Pedicel significantly elongates during flowering and especially in fruit. Fruitlets 12-14 mm long, born on long stalks, linear with longish curved beak.

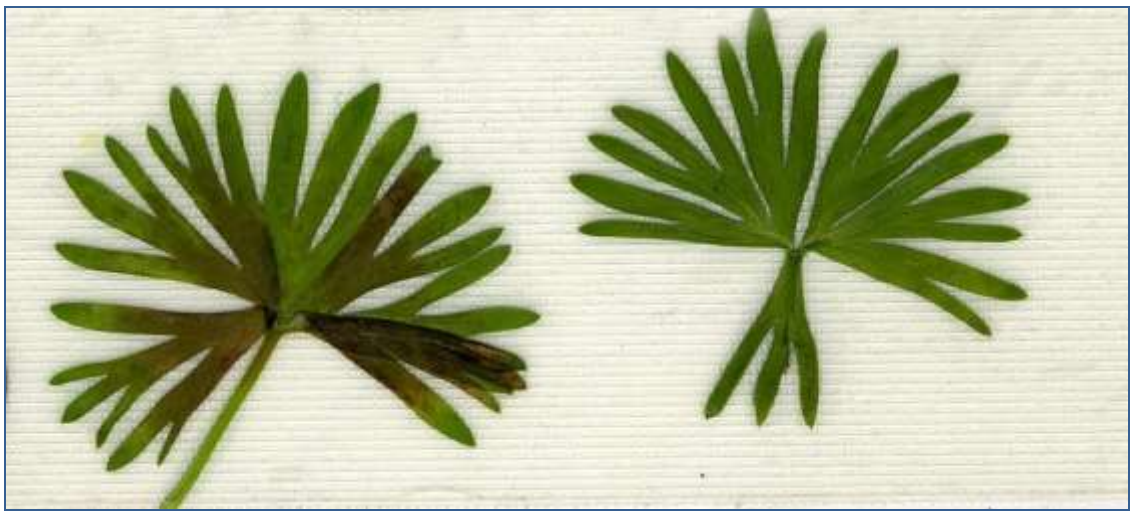
Separable from the very similar *Eranthis longistipitata* by flower colour and much deeper and more finely dissected leaves. Stalks of fruitlets in *E. iranica* are more up-turned at maturity (p.13,17), whilst in *E. longistipitata* they are more horizontal (p.18). Geographical separation and failure of inter-crossing gives another confirmation of independent species status of the newly described species.

Eranthis iranica T4Z 1150 tubers. Photo Johan Nilson (Gothenburg BG)

Eranthis iranica WHIR-047 tubers

Eranthis iranica WHIR-038 – leaves

Eranthis iranica WHIR-038 – leaves



Eranthis longistipitata leaves - left from Tashkent, right from Bishkek

Eranthis longistipitata (Kazakhstan) leaves

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Eranthis iranica seedpods

Fresh seeds of *Eranthis iranica* T4Z 1150
Photo Johan Nilson (Gothenburg BG)

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Eranthis longistipitata from Karatau Mnt., Kazahstan - seedpods - Photo Aleksandr Ebel

Cultivation notes.

Central Asian species of *Eranthis* are not very easy in cultivation. They need really dry and hot summer conditions, so we can recommend both species only for pot growing under cover where dry summer rest can be provided, although during growing season they require reasonably damp conditions. They can be multiplied vegetatively, breaking old tubers and by sowing small daughter tubers which are very easily detached from the mother tuber. We recommend immediate repotting in new substrate as keeping out of soil can cause over-dehydration and loss of germination capacity. If we must keep them for some time, we usually cover harvested tubers with dry sand.

Seeds must be sown just after harvesting; they will then germinate very well. Seeds stored dry (kept dry) at room temperature will have significantly reduced germination capacity. We use our standard potting mixes, (Janis Rukšāns uses a mix prepared from 3 parts of coarse sand and 1 part of peat moss + adequate amount of dolomite chalk and slow release complete fertilizer) covering seeds with a thin layer of grit or coarse sand and placing pots outside in shady spot. Do not allow the medium to dry out completely but protect from excessive water during raining periods. Seeds will germinate very well the next spring. Seedlings start blooming in their third season.

The various localities where *Eranthis iranica* was observed by the authors.

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---International Rock Gardener---

---Species description---

Crocuses of series *Kotschyani* Mathew (Iridaceae) with a new species *Crocus hatayensis Rukšāns* from Hatay Province, Turkey.

Jānis Rukšāns, Dr. biol. h.c. email: janis.bulb@hawk.lv

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Summary: variability and distribution of crocus species from series *Kotschyani* in Caucasus, Turkey, the Middle East and Iran are observed. A new crocus species for the flora of Iran is recognized and a new species from Hatay Province in southern Turkey described.

Key words: the Caucasus, Turkey, Iran, *Crocus autranii, Crocus cappadocicus, Crocus gilanicus, Crocus hakkariensis, Crocus hatayensis, Crocus karduchorum, Crocus kotschyanus, Crocus lazicus, Crocus ochroleucus, Crocus scharojanii, Crocus suworowianus, Crocus vallicola.*

There are more than 240 species of crocuses distributed in the wild from Portugal and Northern Africa eastwards to Central Asia and Western China. In my monograph “The World of Crocuses” (2017) 235 species are described, but since its publication numerous new ones have been described by me and other botanists. Many of them are known only to the botanists who described them and have never been introduced into cultivation, regardless of their high ornamental value. Many are endangered and known in the wild in very limited areas. Climate changes, agricultural expansion, the flooding of large valleys by the building of dams for irrigation and electricity production purposes all put their existence in great danger. Only their introduction into cultivation can give these beauties some chance to persist for many generations.

Many crocus species have been introduced into cultivation and grown in amateur collections and botanical gardens; a few have become important crop plants and are grown by large commercial nurseries in large amounts. One of them is the autumn-blooming *Crocus kotschyanus* C. Koch, already described in 1853, but for a long time better known under its synonymous name *C. zonatus* Gay ex Klatt, which really seems more fitting and perfectly characterizes its flowers. The latter name was used by one of the first great monographers of the genus G. Maw (1886). The next monographer of the genus, B. Mathew (1982), used *C. kotschyanus* as the type species for the new series *Kotschyani* Mathew, including in it seven species and dividing *C. kotschyanus* into 4 subspecies, regarded nowadays as separate species, thus until recently it was estimated to comprise 10 + 1 species (*C. scharojanii* sensu Mathew in fact represents two species – *C. scharojanii* Rupr. and *C. lazicus* Boiss.). They are all closely related genetically and this has been supported by chromosome studies (Brighton C., 1980) and later by phylogenetical researches (Petersen et al., 2008; Harpke et al., 2013).

Morphologically all these species are somewhat similar in some features and can be arranged into several groups where hybridization between the species occasionally occurs, when growing together naturally or planted alongside in cultivation.

In the “northern” group might be included the yellow-flowered *Crocus scharojanii* from the Caucasus and *C. lazicus*, which replaces the former in N Turkey, and the white-flowered *C. vallicola* Herbert, which occasionally hybridizes in the wild with both yellow species and is distributed in the Caucasus and N Turkey. They have 2n=8. A hybrid between *C. scharojanii* and *C. vallicola* is in cultivation and according to H. Zetterlund (Gothenburg Botanical Garden, private communication) is fertile and sets seed. This hybrid is named *C. scharojanii* var. *flavus* Lipsky and the original sample

grown in Gothenburg was collected on Mt. Tagverula, Rachinskiy Khrebet, Georgia, at an altitude of 2700 m. Both species hybridize in Abkhazia and, judging by the pictures, the hybrids might be fertile as there one can see a full range of shades starting from slightly yellowish creamy to quite deep yellow where only the purple stripes at the inner base of the flower segments (so characteristic of some forms of *C. vallicola*, especially in the W Caucasus, but not rare in Turkey either) allow one to suppose a hybrid origin, because that type of colouring is not known in the true *C. scharojanii*. Quite often at the base of the segments in the throat of the flowers of *C. vallicola* there are two pale to bright yellow blotches, similar to the species from other “groups” of series *Kotschyani*.

Crocus scharojanii at Abishira-Akhuba ridge, N Caucasus, altitude 2300-2600 m.

Crocus scharojanii in Abkhazia, altitude 2300 m.

Crocus lazicus, NE Turkey. Photo Johan Nilson.

Crocus lazicus, cultivated in author's collection.

Crocus scharojanii flavus, Gothenburg BG.

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Hybrids between *Crocus vallicola* and *C. scharojanii*, Abkhazia.

Crocus vallicola in Abkhazia, altitude 2300 m.

C.vallicola from Karachajevo-Czerkesk, N Caucasus.

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Crocus vallicola from Zigana pass, NE Turkey.

Crocus autranii in Abkhazia, altitude 2300 m.

Crocus autranii - cultivated in author's collection.

Two species with differing chromosome numbers belong to the same group. *Crocus autranii* Albov from the W Caucasus is bright lilac; its chromosome number 2n=32 according to Brighton (1980) has resulted from an autoploid doubling of the original 2n=16, which in turn is an allotetraploid with *C. vallicola* as one of its parents. The other species is the quite distant, eastwardly growing *C. gilanicus* B. Mathew with 2n=24. The karyotypes of *C. gilanicus* and *C. autranii* are similar, with the exception of the differences in chromosome numbers. *C. gilanicus* flowers are much smaller than in other species (by size these could be compared only with *C. ochroleucus* Boiss. & Gaill. from the very south of the area where species of series *Kotschyani* are distributed) and the colour varies from white to light lilac, often white with a lilac shading at the tips of the segments. In both species the throat is pure white.

Their areas in the wild are separated by around 1000 km, but in cultivation they easily hybridise. F_1 hybrids are very similar to *C. autranii*, just slightly lighter and smaller, and visually distinguishable from the true *C. autranii* only if placed side by side. These hybrids are fertile and in F_2 generation split into plants that are very similar to the pure *autranii*, almost typical *gilanicus* and a full spectrum of intermediates. Most interesting is the fact that in many F_2 hybrids bright yellow spots appear in the flower throat, a characteristic of *C. vallicola*, in such a way confirming Brighton's statement about the involvement of the *C. vallicola* genome in the evolution of these species.

F_1 hybrid between *Crocus autranii* and *C. gilanicus*.

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Crocus gilanicus (16IRS-056) from Javaher Deh, far E of Mazandaran Prov., Iran.


Above left: *Crocus gilanicus* (16IRS-075) from mountain pass over Los, Mazandaran Province, Iran.
Above right: F_2 hybrids between *Crocus gilanicus* and *C. autranii,* similar in shape to *C. gilanicus*.

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These F_2 hybrids between *Crocus gilanicus* and *C. autranii* more closely resemble *C. autranii*.

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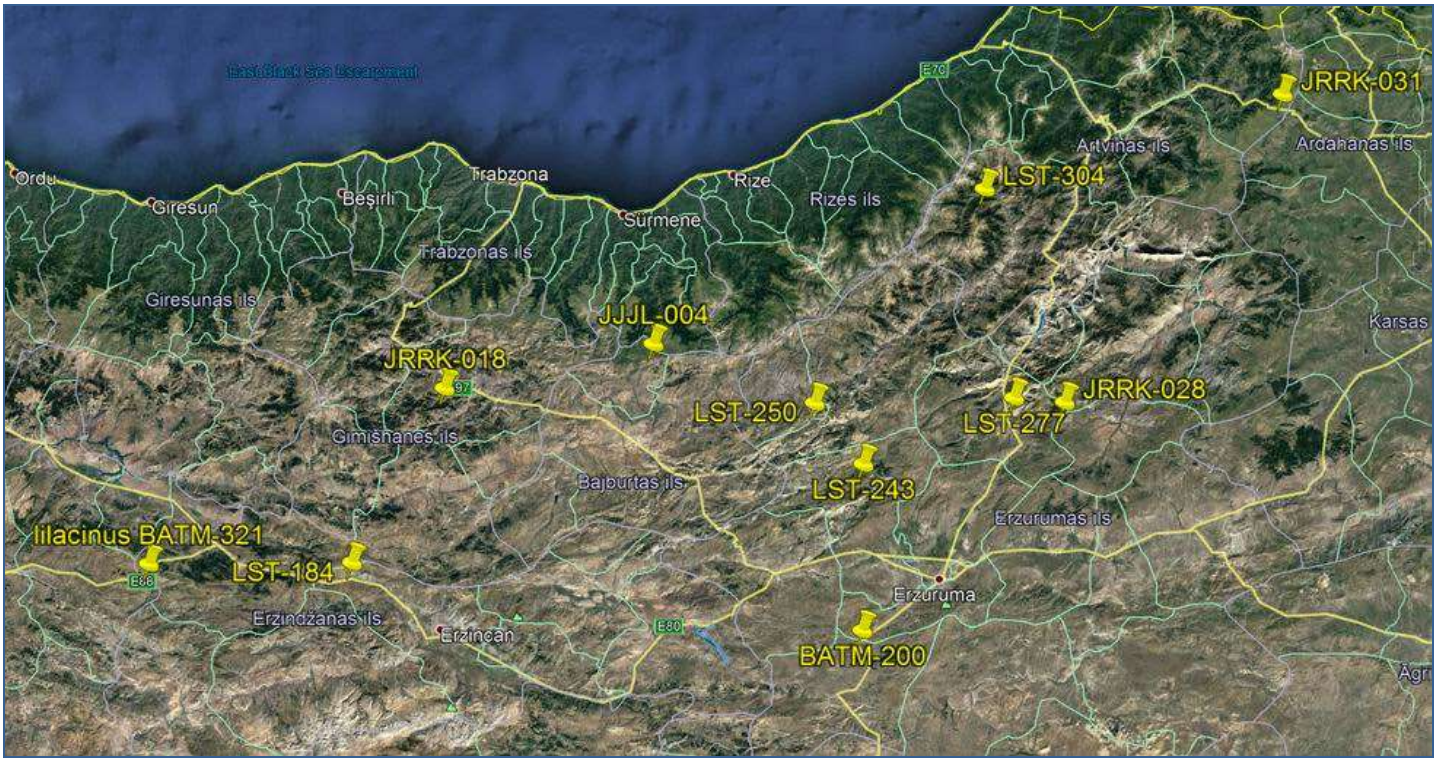
The rest of the species can be divided into two groups according to the position of the corm in the soil – the species in which corms are positioned horizontally (axis vertical), and the species in which corms are positioned on their side (axis horizontal). The latter contains 4 species, which are distributed to the south of the northern group, and can be named, in accordance with the geographical distribution, as the “central” group. Three of them have 2n=10 and one - *Crocus suworowianus* - has 2n=20.



Map of the localities where *Crocus suworowianus* was observed by the author.

Crocus suworowianus corms - showing how they were positioned sideways in the soil.

Crocus suworowianus K. Koch is somewhat similar to *C. vallicola*, but differs from it by the position of the corm in the soil and its ecological preferences. *C. vallicola* is a plant of moist alpine turf favouring north-facing slopes, while *C. suworowianus* prefers dryer conditions and south-facing slopes. Flowers are generally white with paler or darker yellow blotches in the throat, occasionally the blotches are absent. Sometimes the inside of the flower segments is veined violet in the lower half. During several trips the author observed this species in more than 10 localities and everywhere all types of colouring were seen occurring side by side, but, in the direction to the west, increasingly more often forms were observed that were more intensely lilac striped. Some even approached the colour of the lighter forms of *C. cappadocicus* (B.Mathew) Rukšāns. On the attached map are marked only the localities from where I observed. *C. suworowianus.*

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Crocus suworovianus (JRRK-018) from Kosedeği Geçidi Turkey.

Crocus suworovianus (JRRK-028) from Kireçli Geçidi, Turkey.

Crocus suworovianus (LST-304) from Kaçkar Mountains, Altiparmak, vicinity of Niznara village, Turkey

The form that is known in cultivation as *C. suworowianus* var. *lilacinus* from near the Kızıldağ Geçidi around 25 km W of Refahiye is somewhat confusing. It is located just between the Erzincan and Suşehri populations of *C. cappadocicus* and looks intermediate between *C. suworowianus* and *C. cappadocicus*. Both species can hybridize in cultivation. Seedlings of *C. suworowianus* var. *lilacinus* split into lilac and white-coloured forms. I am not sure that both species meet in the wild, and I still have doubts as to which name should be applied to this plant.

Crocus collected as *Crocus suworovianus lilacinus* (BATM-321) from Kizildağ Geçidi, Turkey.

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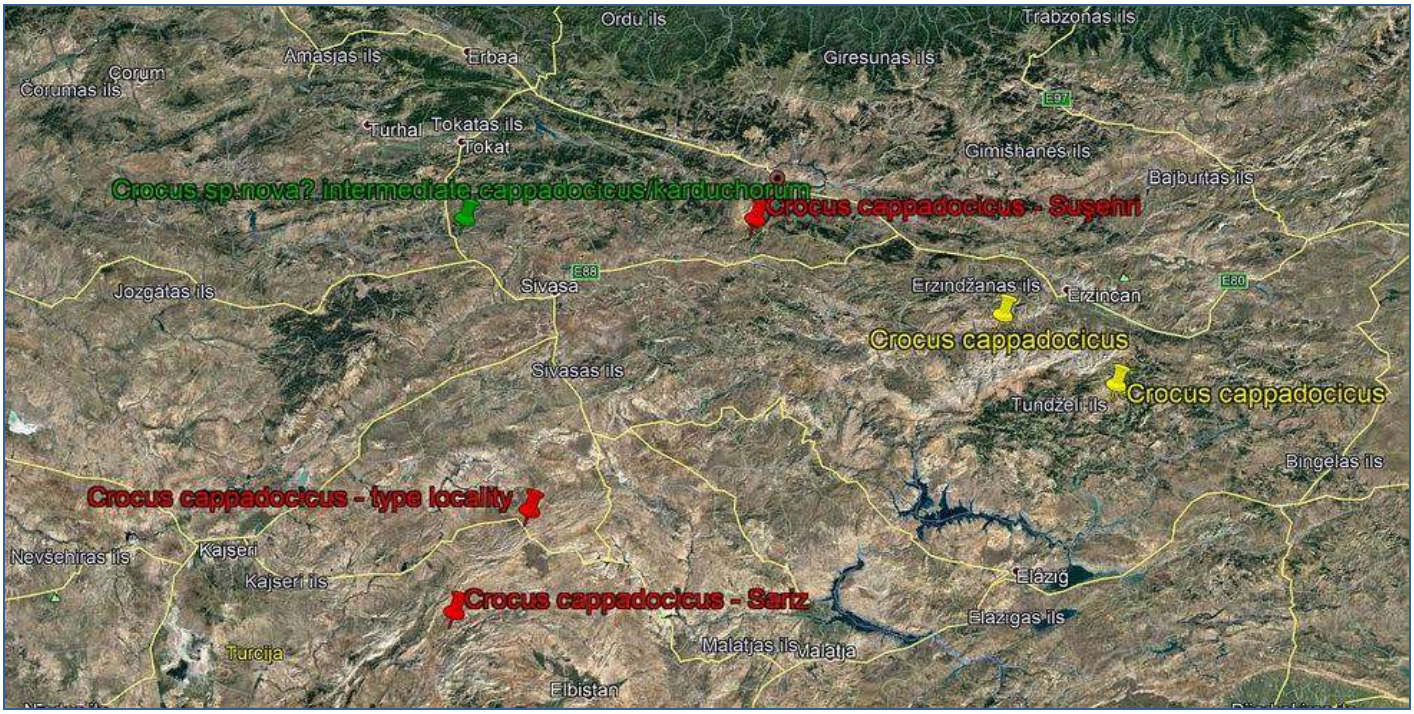

Localities from where *Crocus cappadocicus* was observed (yellow and red marks) and locality where picture of unknown taxon was made by Kees Jan van Zwienen (green mark).

Crocus cappadocicus corms - positioned in soil on their side.

Whitish form of *Crocus cappadocicus* (JRRK-090) from Ziyaret Geçidi, Turkey.

Left above: Dark form of *Crocus cappadocicus* (JRRK-090) from Ziyaret Geçidi, Turkey.
Right above: *Crocus cappadocicus* (LST-364) from near Ziyaret Geçidi, Turkey.

Possible new species pictured between Yildizeli and Tokat, Turkey - Photo Kees Jan van Zwienen.

Crocus cappadocicus (2n=10) according to the Flora of Turkey (1984) has the widest distribution area in this group, comparable only with that of *C. suworowianus.* Yet in cultivation there is only the population that originated in the *locus classicus* on the Ziyaret Geçidi located in the south of its area. This population is very variable in flower colour – from very light whitish lilac to deep purple – and grows excellently in cultivation, setting seed well. I have not seen plants from Sarız, which is located only 50 km SW of Ziyaret, but its proximity to the type locality allows me to suppose that both might be identical. According Brian Mathew it was collected on 9 June 1965 on a pass (not identified at the time) above Sariz, ESE of Kayseri at c. 1800 m altitude, on a N-facing slope in a damp gully; it was mixed together with one of the annulate crocus, *Colchicum szovitsii*, etc. The

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populations that are located near Tunceli and to the north (150-250 km) are quite distant, but so far I have not met anyone who is growing them and I did not find any populations there during my trips. The situation gets more confusing with the finding, by travellers Kees Jan van Zwienen and Marijn van den Brink further to the west from the northernmost population of *C. cappadocicus,* a crocus that looks intermediate between *C. cappadocicus* and *C. karduchorum*. Both travellers noted that “these plants seem to be different from the population at Ziyaret Geçidi, possibly a new subspecies...” On the website of Kees Jan is placed only one picture of weather-damaged flowers (reproduced here). The locality is situated 120 km N of the Ziyaret Geçidi and 500 km to the west from the *C. karduchorum* localities. Unfortunately, the political situation in Turkey nowadays is not favourable for a more thorough research to untangle this puzzle.

Crocus karduchorum at *locus classicus*. Photo Kees Jan van Zwienen.

Crocus karduchorum Kotschy ex Maw (2n=10) was regarded by B. Mathew as a subspecies of *C. kotschyanus*. The true species was introduced into cultivation only quite recently, although its name was well known to gardeners long before: for decades many nurseries offered *C. kotschyanus* var. *leucopharynx* Burtt, instead of the true *C. karduchorum* which has a similar pure white throat. The true *C. karduchorum* was rediscovered in the wild only in 1974 by Prof. T. Baytop. The species is easy to identify by the multiple strikingly white style branches which extend well above the anthers and sometimes even the tips of the flower segments. The white throat is diffused and gradually blends into the lilac of the segments. The gathering SASA-102 collected by Archibald, Stevens & Seisums, in the region where *C. karduchorum* is distributed, is somewhat ambiguous. The flowers of this sample have yellow blotches at the segment bases, similar to those in *C. kotschyanus*, and although the style usually overtops the anthers it is sometimes less branched and is even be tinged slightly yellowish. They look like hybrids with *C. kotschyanus* or *C. cappadocicus* or as a transitional form, although all these species are well separated geographically. In cultivation *C. karduchorum* easily hybridizes with *C. cappadocicus*, so in growing both species from seed, isolation is essential to avoid the appearance of hybrids.

Variability of *Crocus karduchorum* sample SASA-102, reported as collected at *locus classicus*.

Distribution map of *Crocus karduchorum* (brown marks) and *C. hakkariensis* - yellow marks in Turkey, the red mark shows the new locality in Iran.

The fourth species in the central distribution area is *Crocus hakkariensis* (B. Mathew) Rukšāns which has the same diploid chromosome number 2n=10 as *C. karduchorum* and *C*. *cappadocicus*. It was described by B. Mathew as a subspecies of *C. kotschyanus* and for a very long time it was practically unknown in cultivation. Its area lies in Hakkâri Province in eastern Turkey, which is inhabited by the Kurds and where the resistance against cultural suppression by the Turkish government is especially strong, so travelling there is not easy and I got my first samples of this species only quite recently. Its identity is easy to check with a moderately strong hand-lens – the flower throat in *C. hakkariensis* is distinctly hairy and nude in its relatives. *C. kotschyanus* sensu lato has a hairy throat too, but its corms are positioned upright.

Until recently the area of *Crocus hakkariensis* was enclosed within Hakkâri Province in Turkey. In spring 2017 our small group visited the mountains between Agh-Bolagh and Disaj at the NW

corner of Lake Urmia in Iran. On the pass at an altitude of 2160 m we observed beautiful forms of *Iris bakeriana* Foster (among them there was one albino), some Juno iris, *Corydalis haussknechtii* Lidén and *Corydalis verticillaris* DC subsp. *boissieri* (Prain) Wendelbo and other bulbous plants in full bloom. But no crocuses. In 2018 we returned to the site, hoping to collect some seeds. We got several very good seedpods of irises, but not a sign of *Corydalis* was detected at that season. Instead everywhere sprouted the leaves of a crocus with almost ripe seedpods. After checking the corms it became clear that a new species in the Flora of Iran had been found. When the three collected corms bloomed, it was confirmed that it was *C. hakkariensis*.

Iris bakeriana, Iran.

Albino of *Iris bakeriana*, Iran.

Right: *Corydalis haussknechtii*, Iran.

Below: *Corydalis verticillaris* subsp. *boissieri*, Iran.

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Iris pseudocaucasica sensu lato, Iran.

Crocus hakkariensis - in seed and its corms, pictured in Iran. (Gridlines 5mm)

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Crocus hakkariensis (18IRS-061) variability in Iran.

Localities from where *Crocus kotschyanus* sensu stricto was observed by author - yellow marks 2n=8, red mark 2n=20.

Within the distribution range of crocuses earlier regarded as typical *Crocus kotschyanus* (southern group) according to Brighton (1980), plants occur that have two cytotypes – 2n=8 and 2n=10 – and each of them has a discrete distribution. All of them, including *C. ochroleucus* (2n=10) from SW Syria, Lebanon and N of Israel, have horizontally positioned corms. *C. kotschyanus* sensu stricto is described from the Cilician Taurus Mountains and from there come 2 samples investigated by Brighton, both having 2n=8, and these are the ones that must be regarded as typical and true *C. kotschyanus.* Samples JJJ-003, 007, etc. observed by our team were nearly identical with Brighton's

sample from Mersin. Samples from Armut Dağ and the Gezbeli pass, both situated along the Cilician Taurus Mountains, are morphologically inseparable. The position of the sample from Doğanşehir is still unclear. I got it from Jim Archibald as *C. cappadocicus*, although visually it resembles *C. kotschyanus*. According to Brighton, it has 2n=20 and his hypothesis is that it arose as an autotetraploid from *C. kotschyanus* cytotype with 2n=10. *C. suworowianus* has 2n=20 too, but it is different morphologically. By morphology plants from Doğanşehir look closer to *C. kotschyanus* cytotype 2n=8, having long anthers and stigmas that in general well overtop the anthers and only rarely equal their tips. Its population is very distant from both *C. suworowianus* (300-350 km) and *C. kotschyanus* cytotype 2n=10 (250 km).

Crocus kotschyanus (JJJ-003) from near Mersin, Turkey.

Left:
Crocus kotschyanus
(JJJ-007) above the village of Tepekoy, Turkey.

Below:
Crocus kotschyanus (JJJ-007) - cultivated plant.

Crocus kotschyanus (JJJ-007) - cultivated plants.

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In the direction to the south from the Cilician Taurus are distributed at least two, may be even three, crocus species – *Crocus species nova* earlier regarded as *C. kotschyanus* cytotype 2n=10 and in the very south *C. ochroleucus* with the same chromosome number 2n=10. B. Mathew separates them both in accordance with the time the leaves develop – in *C. ochroleucus* they appear at or immediately after anthesis (leaves synanthous), while in *C. kotschyanus* sensu lato they are completely absent and appear at least 2 months later (leaves hysteranthous). *C. ochroleucus* being somewhat similar to *C. kotschyanus* is a distinctly smaller plant and its corms produce many very small offsets (cormlets). Similar cormlets are produced by some forms of *C. kotschyanus* s.l., but they are significantly larger, as are the main corm and all the vegetative and reproductive parts of a mature plant.

In 2003 during my second trip to Turkey (together with E. Dambrauskas from Lithuania) we entered Hatay Province where, after Antakya, halfway to the Syrian border, we drove along a dirty side road where on a bare slope with shrubs and sparse vegetation I collected a few crocus corms (sample RUDA-117). When they bloomed for the first time in cultivation, I was perplexed as to their identification. Superficially they resembled *Crocus kotschyanus* but had a different flower shape, and some other morphological features looked different, although somewhat overlapping with those used by B. Mathew to characterise the variability in *C. kotschyanus*. The main feature separating it from the typical *C. kotschyanus* was the formation of well-developed leaves during flowering.

In 2007 and again in 2009 Erich Pasche sent me a good number (up to 100 cormlets and mature corms) of several HKEP gatherings of *Crocus kotschyanus* from Hatay Province. Some additional corms were later bought from the nursery of Antoine Hoog in France who was growing those samples, too. The sample HKEP-9205, already in autumn, formed leaves together with flowers and on November 21st, 2009 they were 7 cm long. About this sample E. Pasche wrote to me: “We found it on the ascent of Cebel-i Akra, prov. Hatay, at altitude of 1150 m, on the 17.03.1992. The reason for showing leaves so early is maybe caused by the fact that it is from a rather southern position, not far from the Syrian border, where it is warmer than in the rest of the country. With me it has leaves up to 8 cm, too, already.” I noted that in this sample the stigma is hidden among the anthers and is less branched than in *C. kotschyanus* from the Cilician Taurus. In 2009 I got another sample (JP-8837) from the Gothenburg BG collected by J. Person in Hatay Province, 23 km before Yayladağı by the road from Antakya. By main morphological features it was practically undistinguishable from both RUDA-117 and HKEP-9205. In 2016 Dirk Schnabel (Germany) sent me a plant reported as collected by Vlastimil Pilous in the Ziyaret Mts., Hatay Province. It was virtually identical with my sample RUDA-117 having lovely light violet to whitish, darker striped flowers with confluent yellow-orange blotches in the throat giving the impression of an orange throat. All these samples already form leaves during flowering in autumn.

Another sample of *Crocus kotschyanus* received from E. Pasche was HKEP-9317. It was reported as originally collected in Hatay Province near Alanyayla, S of Antakya, at an altitude of 1200 m; it forms side-growing stolons with small cormlets at their tips. Its flowers are light violet with darker stripes and a creamy yellow throat encircled by a narrow dark yellow V-shaped edge. Unfortunately the given data about its locality does not enable it to be marked on the map. The nearest places with such altitudes “S of Antakya” are only in the surroundings of the locality from where sample HKEP-9205 came and in Syria. According to B. Mathew (1980), stoloniferous forms occur in Syria and Lebanon, but their examination now is impossible due to the political situation in the region. In his article “Notes on Crocus (Iridaceae) in Syria and Jordan”, H. Kerndorff (1994-1995) wrote about Syrian forms of *C. kotschyanus* from Djébel Ansariyeh above Haffée (altitude 1300-1400 m) as having pure white styles, rarely dissected into more than three branches which made “them somewhat different from races in the Central Taurus Mountains of Turkey”, but nothing was said about their possible stoloniferous habit and the time when the leaves emerge. Sample HKEP-9201 was collected NE of Belen, Hatay Province, at altitude of 1100 m. Its flowers are light violet with slightly darker veins and distinct two bright yellow spots at the base of each flower segment. Both

(HKEP-9201 and HKEP-9317) form leaves only long after blooming, with me only in spring even when the autumn had been very long and warm as was observed during the last years. In nature their growing conditions are very similar to those of RUDA-117, HKEP-9205 and JP-8837. This puts under doubt E. Pasche's hypothesis that warmer climate causes an earlier development of foliage and allows one to suppose that samples HKEP-9201 and 9317 might belong to different taxa, regardless of the same chromosome number (2n=10) and some similar morphological features. In general both look closer to a typical *C. kotschyanus* from the Cilician Taurus (the stigma is more branched and mostly overtops the anthers, the anthers are around twice as long as the filaments, the leaves appear only in spring).

Crocus kotschyanus from Armut Dag.

Crocus kotschyanus from Gezbeli Geçidi., Turkey.

Crocus kotschyanus from Doğansehir (2n=20).

Left above: *Crocus kotschyanus* aff. from Hatay Province, Turkey (HKEP-9201)
Right above: Stoloniferous form of *Crocus kotschyanus* aff. (HKEP-9317)

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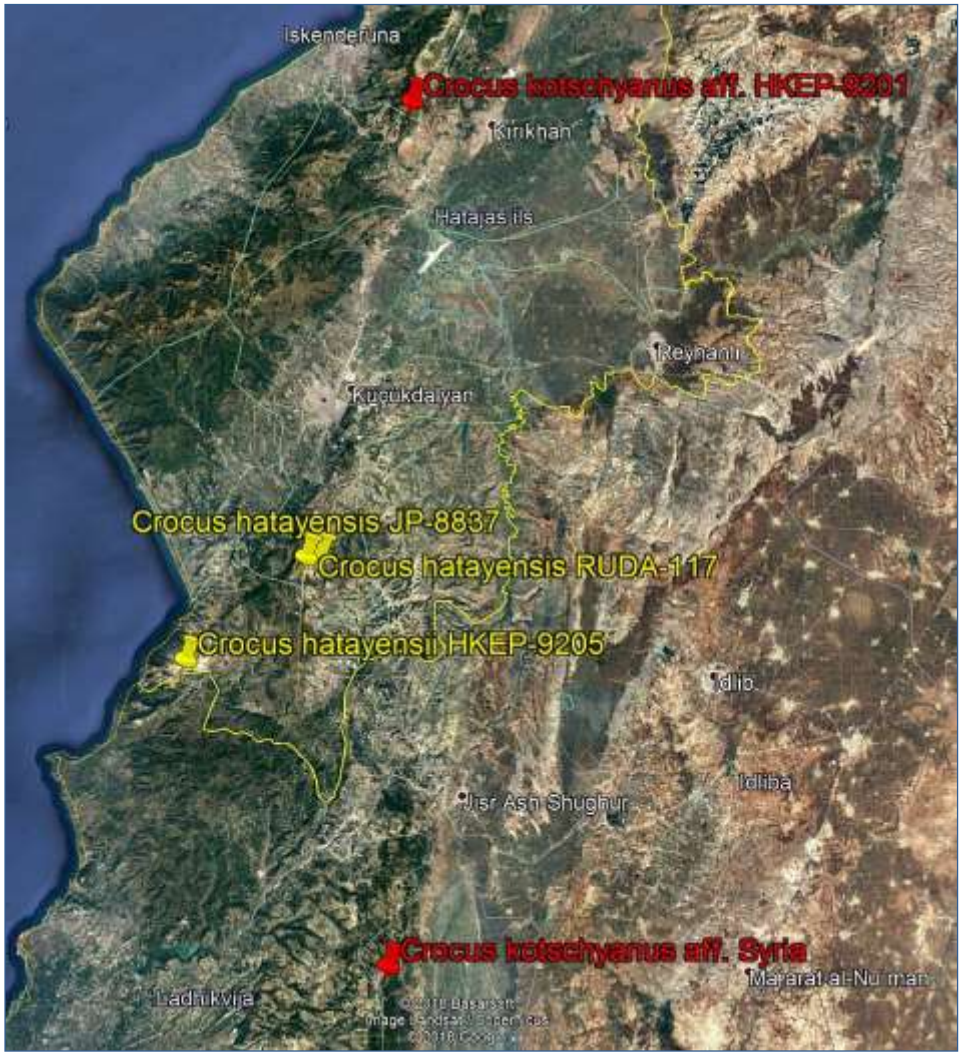

Map of *Crocus kotschyanus* sensu lato localities in Hatay Province and Syria (red marks), and localities of *Crocus hatayensis* (yellow marks).

Crocus hatayensis (RUDA-117)

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Crocus hatayensis (RUDA-117)

Crocus hatayensis (JP-8837)

Crocus hatayensis (JP-8837)

Crocus hatayensis (HKEP-9205)

Holotype herbarium sheet of *Crocus hatayensis* (RUDA-117)

Crocus hatayensis corms. (Gridlines 5mm)

Crocus hatayensis* Rukšāns *species nova

Type: Ex culturae in horto Jānis Rukšāns. Plants originally collected in dry leaves, on the 29th of May, 2003 in SE Turkey, Hatay Province, Ziyaret Mts., along rd. from Antakya to Yayladağı Yolu, 36° 2.230' N and 36° 7.195' E, at alt. 960 m, RUDA-117. Holotype: GB (Gothenburg), Isotype: GAT (Gatersleben) from plants cultivated by Janis Ruksans, collected on 15-10-2017.[1] Ic.: World Crocuses, p. 293 (as *C. kotschyanus* HKEP-9317[2]).

Habitat and distribution – known only from the type locality and its vicinities (samples HKEP-9205 and JP-8837) in Hatay Province, S Turkey, but may be distributed wider, where it grows in grass on slopes with dwarf spiny shrubs and sparse vegetation.

Flowering time – in cultivation October - November, in the wild unknown, but most likely November.

Corm – flattened, slightly irregularly round, in cultivation up to 23 mm in diameter and 10 mm high.

Tunics – papery, brown.

Tunic neck – up to 7 mm long, split into broadly-based triangular segments.

Basal plate – up to 10 mm in diameter, starry.

[1] In the description are given measurements of type gathering RUDA-117. Samples HKEP-9205 and JP-8837 are characterised in following table and comments.
[2] Editing mistake, correctly must be RUDA-117.

Prophyll – present.

Cataphylls – 4-5, white, the inner two light green at the top.

Leaves – (4)5-7(8), dark green, development starts in the autumn when they reach the base of the flowers at anthesis, later in autumn reaching up to 15 cm in length and 3 mm in width (dimensions depends from weather), and become up to 4 mm wide at maturity in spring, parallelly edged, gradually tapering in the upper third, sometimes quite abruptly at top, glabrous to very sparsely papillose on the surface, edges flat or very slightly bent downward, without ribs in the lateral channels, the white stripe 1/3 to 1/2 of the leaf width, the keel very wide (at least 2/3 of leaf width), very minutely papillose on the edges.

Perianth tube – slightly greenish to yellowish white.

Bract and bracteole – hidden into the cataphylls, transparent, bract tubular, bracteole only slightly shorter, but narrow and lingulate, hidden inside the bract.

Flowers – autumnal, usually 2 to 5(8) from each shoot (in cultivation), fragrant.

Throat – hairy (deep inside), light yellow with a very large (wide) heart-shaped orange-yellow blotch, mostly so large that it gives the impression of a completely orange throat. In samples HKEP-9205 and JP-8837 the throat colour is more similar to a typical *C. kotschyanus* – with two bright orange-yellow blotches at the upper edge of the creamy to light yellow zone.

Filaments – 8-**9.9**-12 mm long (n=20), light yellow, sparsely papillose.

Anthers – 10-**11.4**-13 mm long (n=20), creamy or white, basal lobes short, triangular; pollen yellow.

Connective – white.

Style – creamy, very variable, often divided already in the throat into 3 up to 20 mm long branches gradually becoming bright yellow at the very top, with expanded or even fringed tips; less often divided around the base of the anthers, rarely almost at their tips into 3 up to 10 mm long branches, at the top occasionally shortly subdivided into 2 secondary branches; stigmatic branches 8 to 20 mm long (8-**12.4**-20 mm), mostly ending below or level with the tips of the anthers (63%), less often (37%) overtopping them (position can vary from season to season).

Flower segments –lanceolate to oblanceolate with acuminate tips on the outer segments and acute tips on the inner segments, rarely with more rounded tips (JP-8837).

Outer segments – in the type sample 37-**42.5-**53 mm long and 9-**12-**15 mm wide (n=20) the outside white becoming slightly lilac at the top with distinct 5-7 darker lilac stripes from base to top, at the very base a translucent inside orange blotch; the inside of the same colour, only the basal blotch distinctly darker orange. Samples HKEP-9205 and JP-8837 are more variable in colour from very slightly lilac tinted to a whitish ground colour to light rosy lilac, but always with distinct darker stripes along the length of the segments.

Inner segments – 30-**39**-47 mm long and 9-**12**-15 mm wide (n=20), of the same colour and shape as the outer segments, only slightly shorter.

Capsule and **seeds** – not characterized.
2n = 10 (? – most likely the same as in other samples from the region as checked by Brighton, 1980).

Etymology - named after Hatay Province in Turkey, where this crocus was found and is distributed.

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Crocus hatayensis basal plate

Left: *Crocus hatayensis* - leaf cross-section.

Right: *Crocus hatayensis* - cataphylls

Localities of observed samples of *Crocus ochroleucus.*

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The main feature separating the new species from other species in series *Kotschyani* is the development of leaves during or right after anthesis. In this character it approximates the more southerly distributed *Crocus ochroleucus*, but is well separable from the latter by the size of all parts. B. Mathew regarded both cytotypes of *C. kotschyanus* sensu lato as conspecific, so the given dimensions of the flower parts were of high amplitude. For this reason when comparing the typical *C. kotschyanus* from the Cilician Taurus with the newly described species I used the data given by G. Maw (1886) and my own observations on samples from Cilician Taurus. The anthers in *C. kotschyanus* sensu stricto (2n=8) are around twice as long as the filaments or even longer, whereas in *C. hatayensis* they are of approximately same length or only slightly longer. In *C. kotschyanus* the style is divided into short branches over or a little below the tips of the anthers and usually overtop them in length, whilst in *C. hatayensis* it mostly divides well below the tips or even in the throat into long branches, mostly ending at or below the tips of the anthers and less often overtopping them. Attached table allows comparison of morphological differences between samples regarded by author as belonging to *C. hatayensis.*

Comparative morphology of various samples of *Crocus hatayensis*

Origin of sample	Outer segments (mm) length/width ratio	Inner segments (mm) length/width ratio	Filaments (mm)	Anthers (mm) length ratio to filaments	Length of the style branches (mm)	Position of the style regarding the stamen (%) * v	=	^
RUDA-117 type locality n=20	35-**42.5**-53 9-**12**-15 ratio = 3.5	30-**39**-47 9-**12**-15 ratio = 3.25	8-**9.9**-12	10-**11.4**-13 ratio =1.15	8-**12.4**-20	38	25	37
HKEP-9205 n=10	32-**38.6**-51 11-**15.2**-22 ratio = 2.5	30-**35.6**-50 11-**15**-22 ratio =2.4	8-**10.2**-14	10-**11.5**-16 ratio = 1.13	5-**8.7**-14	50	33	17
JP-8837 n=10	34-**21,6**-46 12-**15**-17 ratio = 2.6	31-**33.3**-40 12-**14.3**-16 ratio = 2.3	8-**9.7**-11	10-**11.8**-13 ratio = 1.22	10-**13.2**-17	0	33	67
Average n=40	32-**41.4**-53 9-**13.3**-22 ratio = 3.11	30-**37.3**-50 9-**12.3**-22 ratio = 3.0	8-**10.2**-14	10-**13.8**-16 ratio = 1.16	5-**12.1**-20	32.3	35.4	32.3

* v - stigma positioned below the tips of the stamens; = stigma equals the tips of the stamens;
^ - stigma longer than the stamens (overtops them) – numbers rounded.

The table clearly shows that the plants from the type locality (RUDA-117) have distinctly narrower flower segments than samples HKEP-9205 and JP-8837, but the main key features, such as the time of the leaf development, the anther-filament length ratio, the length of the style branches, are very close in all the samples regarded by the author as belonging to *Crocus hatayensis*. More inconstant is the position of the style regarding the tips of the anthers, but in my opinion this is a very variable feature, which can change from season to season and is affected by the age of the flower. In season 2018 *Crocus hatayensis* was more floriferous than usual (probably because of the very hot summer when flower initiation occurred), forming up to 8 flowers from a shoot and shortly before end of blooming (10th of November, 2018 some flower buds still showed noses) flowers invariably had stigmas branching in the throat or slightly below the base of the anthers with long branches that always ended below or at the tips of the anthers. In this aspect all 3 samples were identical. The data included in the table was made during the peak of blooming, when the type herbarium was prepared. *C. hatayensis* in 2018 had the longest blooming period between all samples of *C. kotschyanus* sensu

lato and was one of the last bloomers of series *Kotschyani* in the author's collection. Only *Crocus ochroleucus* also bloomed so late.

Crocus ochroleucus from Broumana, Lebanon.

Crocus ochroleucus 'Dalton White' from Israel.

Crocus ochroleucus from Massada, Israel.

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Out of the wild blue yonder. Or discovering an unknown *Viola* in Argentinian Patagonia while dogged by the perils of exploration

John M. Watson, Casilla 161, Los Andes, Valparaiso Region, Chile.
john.anita.watson@gmail.com

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Preface: Dying to find new plants

The Grim Reaper has a long history of association with the main occupation in my life, plant hunting; and that for employing his sickle in distant lands, not a trowel or plant press. He scythed down Reginald Farrer [Fig.A], whose florid writings inspired me as an adolescent boy to waste most of my life collecting and studying the alpine flora. Everybody knows that Farrer and George Forrest [Fig.B] met their ends as a result of natural causes while in the field. The dramatic demise of David Douglas, gored to death in Hawaii by a wild bull when he fell into a pit trap, has been frequently chronicled. Jean Marie Delavay succumbed to bubonic plague in China; and whereas George Forrest just escaped with his life during the Tibetan lama uprising, a botanically inclined French missionary, André Soulié, was murdered by them. Numerous accounts covering the so-called Golden Age record these events and fatalities in detail, as well as others of the era. Frank Kingdon-Ward [Fig.C] described in one of his books how he was camped in a valley during a major earthquake which sent huge rocks crashing by, such that he expected to be crushed by one at any moment - but by good fortune wasn't. It always reminds me irresistibly of that hilarious scene in the 1925 silent film 'Seven Chances', where Buster Keaton flees down a slope from a host of 700 would-be brides in their wedding gowns, with huge dislodged boulders bouncing all around him [Fig.D] - except those were studio-made and rubber, of course!

Left to right above: Fig.A: Reginald Farrer (1880-1920) met his end in mountains on the Burma (Myanmar) - China border. The exact cause is unknown - diptheria, pneumonia or alcohol poisoning have been suggested.Fig.B: George Forrest (1873-1932). Collapsed and died of a heart attack in Yunnan. Fig.C: Frank Kingdon-Ward (1885-1958). Caught in1950 by a boulder avalanche at the epicentre of an earthquake, 9.6 on the Richter Scale, in Assam while camping, he was lucky to get away with his life.

Left above: Fig.D: A sepia still from the 1925 film 'Seven Chances', with Buster Keaton attempting to outrun boulders. Right above: Fig.E: Chris Stocken (1923-1966) was fatally wounded by a falling rock during a services expedition to Greenland.

Fig.F: Sydney Albury (seated, left) (1919-1970) and Martyn Cheese in Belen, Turkey, 1966. Died of pulmonary oedemia (altitude sickness) in remote Nepal. (Apr 1966. JMW)

This readily available information leads to an impression most people would assume to be correct: that plant discovery and collecting in those historic days was far more hazardous than it is nowadays. Savage tribes have been all but tamed, modern medicines combat 'exotic' diseases, we can fly by aircraft in comfort to our destination, and move about in vehicles on far better road systems. Don't believe it! The statistics speak for themselves. In the 'Bad Old Days' it seems there was one such fatality every 13 years or so. In the last 60 odd years that has reduced alarmingly to one every seven. Among the better known to the world of horticulture we've lost Chris Stocken [Fig.E], killed by a falling rock; Sydney Albury [Fig.F], fatal altitude sickness; more recently Jamie Taggart [Fig.G], cut off in his prime as a result of a presumed accident; and Michael Wickenden [Fig.H] from natural causes. The shocking murders of Rod and Rachel Saunders [Fig.I] by Islamic terrorists in South Africa early this year stand out as a savage reminder. Alwyn Gentry [Fig.J], the outstanding botanical authority of the tropical South American flora, was killed in an air crash while surveying. Another famous academic botanical collector, Nicolai Vavilov [Fig.K], starved to death in Stalin's gulags. Drug cartels killed two more who stumbed accidentally into their illicit operations; one, a hapless Bolivian, by stabbing. Although already 70 years old at the time, the Yellowstone botanist Erwin Evert, discoverer of various new species, came off worse after "a fatal encounter with a grizzly bear" in 2010 when walking through the area where he studied the flora. A sixth academic fell to his death from a cliff by stretching too far for a tantalizing rare plant, the sort of risk which tempts many of us.

Far left: Fig.G: SRGC member, Jamie Taggart (1972-2013). His body was found in the wilds of Vietnam, apparently due to an accident while he was exploring alone.

Left: Fig.H: Michael Wickenden (1955-2016). Michael developed Cally Gardens, now happily in the hands of Kevin Hughes.

Left: Fig.I: Rod Saunders (1943-2018) and wife Rachel Saunders (1954-2018). Robbed and murdered by Islamic terrorists in a South African national park.

Right: Fig.J: Alwyn Gentry (1945-1993). Killed in a light aircraft crash during an aerial ecological survey in Ecuador. (National Geographic)

There we have a context for our own 56 years 'in the business'. That's to say mine in Turkey and South America, together with 14 different companions at one time or another, culminating in the working and life partnership with Anita which began in 1991. I'm still alive, of course, but have often continued to be so by no more than the skin of my teeth.

We can think by comparison of our own Robert Rolfe, who described in 1993 how, in northeastern Turkey, he lost his footing on a steep snowdrift in a high stream valley, slid helplessly down at speed, and had miraculously come to halt with no more than a broken ankle, poised on the lip of a several hundred metre waterfall drop onto rocky ground below. Robert has also kindly written me the following about a death-defying acrobatic by the well-known Kew orchid authority, Philip Cribb: "While searching for a *Cypripedium* on precipitous cliffs, composed of razor-sharp limestone, in Sichuan, he lost his balance, did a backwards somersault, and somehow ended up on his feet, on a ledge, several metres lower down. His guides thought that this action was deliberate and gave enthusastic applause. Henry Taylor did something similar in northern India when he tripped, became caught up in his walking poles, and plummeted headlong down a steep slope." A participant in a flower tour became separated from the group and completely lost in wild country, only finding the way back to the others by sheer luck just as darkness was about to fall. We've heard that one of our contemporaries had a potentially serious vehicle accident in the field that could have had fatal consequences, but he never wanted to discuss it.

Left: Fig.K: Nicolai Vavilov (1887-1943). Beaten and starved to death in a Stalinist gulag for supporting the 'ideologically wrong' (Mendelian) form of genetic inheritance.

Below: Fig.L: Modern all-terrain vehicles can take you as far as it's possible to drive. The Andes of Atacama Region, Chile. (19 Aug 2017. JMW)

That last incident introduces what I'd always assumed to be the greatest threat to latter day plant explorers, which has certainly proved true for us. The motorized vehicle, usually four-wheel drive, has become the standard method both to reach locations and bases, and frequently to explore them to the limit of mountain tracks as well [Fig.L]. We've driven many thousands of kilometres in Europe, the Near East, and particularly South America. From 1966 to 2000, there have been six occasions when I still don't know to this day how almost certain terminal accidents were avoided, so inevitable did each seem. I therefore assumed an insurance assessor would consider the vehicle to be the biggest risk factor. Yet for all that, there doesn't appear to be a single example of any modern plant hunter or botanist whose life has been lost this way while exploring.

Still, we've been fired at or threatened by guns several times in Turkey during the 1960s and 70s. Two Syrian soldiers used a palpably reasonable-sounding excuse to separate Martyn Cheese and his partner Margaret from us (“us” being J.M. Watson and S. Albury). They then abducted them into the wilds with some kind of sexual assault in mind, but got severely beaten up by big Martyn for their pains. Had they been able to get at and use their firearms, all four of us might have been shot. I've fallen from a near vertical rock face and only saved myself by reflexively and immediately grabbing a sharp projecting rock, which cut in deeply to the bone. Another of our contemporaries is said to have a horror of lightning when in the field. There's nothing unreasonable about that. On the open high Andes of Peru bolts thudded into the ground no more than a few metres away from me. Anita and I drove through an almighty thunder-storm in northern Argentina with the same happening all around us [Fig.M]. While examining a track leading up to an aerial in north Patagonia we encountered a similar experience to mine in Peru. An interesting flora absorbed us, so we hardly noticed the build-up of cumulonimbus until a fierce clap of thunder alerted us. High ground! I immediately shouted a warning to Anita and turned back rapidly down to the jeep. She just laughed at my lily-livered anxiety. Shortly after, another sharp bark came from immediately overhead, and a flash of lightning lit the surrounds. Anita ran back looking pale. She said the static had raised the hair on her head. No, that was pure fear, I retorted! As we drove back along the flat steppe in the gathering gloom we saw an isolated clump of monkey-puzzles burning so fiercely that the flames were still visible when we were far distant. We might have been struck on any of those three occasions.

Fig.M: The perfect storm. Shortly after this was taken the heavens opened and bolts of lightning struck a short distance away as we drove. La Rioja Province, Argentina. (Jan 2007. JMW)

Fig.N: 44 inadequately clothed young recruits and a sergeant froze to death in 2005, caught in a blizzard on a night training march. Their memorials below Volcán Antuco, Bío Bío Region, Chile. (2 Dec 2009. JMW)

Risks of one kind or another are omnipresent, even if we seldom give them a thought until they menace us directly. A tragic series of memorials along the track where forty-four young Chilean recruits died in 2005 during a route march in a white-out snowstorm at night around the foot of the Antuco volcano [Fig.N] serves to remind us of the lurking unseasonal treachery of mountain weather [Fig.7]. Once, dressed only in the lightest of clothes, Anita and I set off up a not over-steep but very long, tiring Patagonian mountain trek on a lovely hot, sunny morning. A few hours later cloud covered the sun and a bitter polar wind sprang up. Although tantalisingly close then to our objective, luckily we had the sense to turn back immediately. Even so, we had to take off our shoes and ford a numbingly cold stream, leaving thinner skinned me shivering uncontrollably and literally quite blue when we returned to the tent and jeep. Anita had to keep feeding me hot soup, despite which I didn't fully recover for a couple of days. That was a very near hypothermic squeak. Which brings us to the core of this article ...

Our very special new species

In 2007 we gratefully received generous funding from the Alpine Garden Society towards our ongoing programme of exploring South America in search of the so-called rosulate violas, known botanically as section *Andinium*, our main area of investigation. In fact not quite all are rosette forming [e.g.Figs. 61, 62]. Although there's benefit in finding and studying any of them in situ, our main ambition is to discover species hitherto unknown to science, which are in fact still turning up at fairly regular intervals, and these days often find their way as innovations onto the pages of the IRG (as noted in the following paragraph).

This particular fieldwork cycle took place between the 18th December 2007 and 25th January 2008, mainly in the northern Patagonian Province of Neuquén, Argentina, a particularly rich area for these fascinating little plants. It figures among our most successful hunts ever for them, with 16 collections of 12 species. One was a first record for the flora of Chile, noted at the border as we crossed over into Argentina. Eight others were new to science then, three having been published since - *VV*. *farkasiana* (IRG, May 2018), *rubromarginata* and *trochlearis* (IRG, October 2018); while five of that eight were completely new for us personally. Neither we nor anyone else had seen them before, or at least recorded the fact if they had. The following account describes our discovery of the most remarkable and exciting of the latter five and is followed by its formal botanical description.

In 1925 and 1926, during his expeditions to Patagonia in search of interesting shrubs and trees for his wealthy sponsors, Harold Comber discovered no fewer than six new currently accepted violas of the section *Andinium* rosulate alliance. In 1928 these were published in the Kew Bulletin of Miscellaneous Information (since simplified to Kew Bulletin) by the great German historical authority of the genus, Wilhelm Becker. They included one strikingly attractive rich yellow- or orange-flowered species which has become very well known in alpine gardening literature, *Viola coronifera*. [Fig.18]. That and three of the others are also regularly encountered during floral tours to the area, as well as by independent travellers in search of plants there. One taxon and a variant of another had never been seen since Comber collected them though, and nobody had searched for them again either. They were the main focus of our project. Ironically, we found neither!

The one relevant to the present narrative, and which led to the discovery of the new species in question, was named *V. coronifera* var. *minoriflora* by Becker. Although nowadays considered no more than a synonym of the main species, it is of considerable interest due to being much reduced in all its parts, as the Latin epithet indicates for the flowers. Just as significant a consideration, if not more so, was the type form of *V. coronifera* itself never having been seen anywhere but at its original location, while var. *minoriflora* is located 150 km to the north [Fig. 1]. The latter was accordingly our declared objective here.

Fig.1: A distant view from the Zapala road of the Bardas de las Lajas cliffs N of Primeros Pinos, Neuquén, Argentina, where Comber found the *Viola coronifera* dwarf form. (11 Nov 2008. JMW)

There are two possible approaches to this mountainous sector. The most direct for us from Chile crosses the Andean watershed via the Pino Hachado Pass, turning due south almost immediately in Argentina along a very minor road which leads to the invitingly scenic Aluminé river and lake, and then on down to the Rahué Pass, itself of considerable floral interest, as we shall see.

The alternative is to take the better known main Route National 40 from Mendoza leading to southern Patagonia, which skirts the wonderfully biodiverse Tromén Regional Park en route to our present destination, an irresistible temptation for all who know it to visit again and again. When the RN40 reaches Zapala, a local highway, the Route National 13, branches off and heads straight towards Chile, eventually joining the Aluminé road. Halfway along is the small community of Primeros Pinos, absolutely vital to this narrative, and a little beyond it a gentle pass leads over a dip in the north to south ridge where Comber found his viola. We made the first discovery of our new species featured here at its type site in this general area on 22nd of December 2007 after arriving from the Zapala direction [fig. 56].

Fig.2: A wind and dust storm as we set out from Zapala. Note wooden crate bowling merrily along to give an idea of the force! Nequén Province, Argentina. (21 Dec 2007. JMW)

Not long after we'd left our Zapala hotel, and while we were filling up at a fuel station in town, a wind-driven dust storm hit with astonishing force, bending trees almost double, knocking one person over, and driving quite large, bulky items along, including across the road surface. It continued for a while as we drove off west [Fig.2], causing us considerable apprehension, but fortunately abated as quickly as it had begun. So much so that not far along and out onto the flat steppe we came upon dense, compact *Junellia cedroides* [Fig.3] bushes in almost still conditions, laden with their pinky violet, scented inflorescences. Quite a way further on a patch of bright golden yellow splashes in the shelter of an isolated clump of rather taller shrubs could hardly have been missed, and drew us to our second halt. *Alstroemeria pseudospathulata* [Fig.4] it was, in rather short mode and often with just solitary flowers, which made it appear like a slightly displaced *A. patagonica*. Or might it be a wild hybrid between the two? *A. pseudospathulata* is much better known from 'next door' in Chile, where it was described and published.

Fig.3: On the steppe beyond Zapala the warm night air is laden with the honeyed fragrance of *Junellia cedroides* (Verbenaceae). Note distant Andes. Neuqén Province, Argentina. (22 Nov 2009. JMW)

Fig. 4: F.& W.11588. It may look like *Alstroemeria patagonica*, but it's not. It's a 'mini' form of *Alstroemeria pseudospathulata*. Zapala Department, Neuquén Province, Argentina. (10 Jan 2008. JMW)

The eight botanical volumes of Flora Patagonica have long made identification of plants seen during tours in the zone, or collected there and cultivated, much easier, quicker and more reliable. With Martin Sheader & Co's excellent AGS guide, 'Flowers of the Patagonian Mountains', the region has become more accessible still via a wealth of colour photographs, even to non-travellers. So a context already exists for our encounter on the outer Zapala steppe with low, shrubby *Junellia thymifolia* [Figs.5, 6] of the Verbenaceae. The plants we saw were notably photogenic for their neat habit, extreme floriferousness, and the crystal brightness of their whitish lilac-blue corollas.

Figs.5,6: Above, F.& W.11587 *Junellia thymifolia* at its free-flowering finest and right, at its icy purest it's equally delightful at distance or close-up, as here on the Steppe of Zapala Department, Neuquén Province, Argentina. (7 Jan 2008. JMW)

Having set out late, and spent much time being distracted by a variety of interesting flora along the way, we hadn't advanced very far by late afternoon. We therefore decided to stop for the day at Primeros Pinos with time for a look around and a leisurely meal under the isolated small grove of wild monkey-puzzles that gave the pleasant spot its name, 'pino' being a local tag for *Araucaria araucana*. As it's the only permanently inhabited place along the entire route, albeit by an army camp plus no more than a sparse handful of civilians, we hoped we might get some local information from the latter on how to access the Barda las Lajitas, where Comber found his plant somewhere along the exposed, high, cliff-bordered ridge top [Fig.1]. We got talking to a very friendly and helpful family with two young daughters. Hearing of our interest, they gave us a first sight ever of another of our new species, *Viola trochlearis*, in their backyard of all places (IRG, October 2018)!

Fig.7: The Cerro Atravesada ridge west of Primeros Pinos in sudden treacherous weather during high summer. Picunches Department, Neuquén Province, Argentina. (10 Jan 2008. JMW)

Information they provided on our intended location was far from encouraging though. It was some distance away to the north and couldn't be accessed by motor vehicle; a cross-country horseback trek being the only solution. They reckoned it would require three days all told at that. To add to our bad luck, they told us we would also have to find

an available willing guide with horses for hire to accompany us, but the Christmas break had already begun, so chances were very low. However, we were offered an alternative glimmer of hope. The upland chain containing Bardas las Lajas drops to a low point where the road to Aluminé crosses. It then continues down the southern side, where we now were, rising in elevation again. A primitive vehicle track leads a good way towards the base of its principle southern high point, the mountain Cerro Atravesada (Traversal Mountain), which tops out at over 2300 m [Fig.7]. It still left a long hike to the scarp itself, which then had to be scaled. Well, OK, we decided to give it a try next day after a good night's sleep.

Fig.8: The well-proportioned dwarf F.& W.12621 *Caltha sagittata*, best known of three Andeans related to the Australian species *Caltha introloba*. Paso Vergara, Curicó, Chile. (17 Dec 2013. JMW)

The track began over flat volcanic sand fields vegetated by an endless vista of wiry bunch grasses, but at least containing another population of *Viola trochlearis*, and with the mountains and their remaining snowdrifts forming a backdrop. In fact plants of interest en route to Cerro Atravesada were scantily few on the ground, but at least notably and encouragingly choice, and not to be passed by without adding to our records. We were following a stream valley, and at one point had to cross the water in the jeep. In the damp gound there a patch of pallid but extremely comely *Caltha sagittata* [Fig.8], one of the dwarf, Southern Hemisphere marsh marigolds with curiously folded leaf-lobes, caught our attention. It has been assigned to section *Psychrophila* and there has been - maybe still is - a taxonomic move to raise that to genus level, when the species becomes *P. sagittata*: but we've refrained from adopting this as yet, since few other authorities have. During our long footslog to the mountain we came across the second of just three excitements, a colony of classic viola rosettes. Although past flowering it was definitely not *V. coronifera* as we know it, so was marked down for

revisiting at the right time on our next visit. This was fulfilled two years later and a month earlier, in November 2009, when the colony was in full flower. They were a delight, with large, heavily veined pale violety violets [Fig.9]. But the mystery remains, as they're not quite like any known species on the one hand, but not sufficiently different enough on the other to be given a botanical identity of their own with confidence.

Fig.9: F.& W.11858, a mystery rosulate viola along the track to Cerro Atravesada. Picunches Department, Neuquén Province, Argentina. (22 Nov 2009. ARF)

Fig.10: F.& W.11546 *Jaborosa volckmannii,* with an exquisite scent to match its outstanding visual appeal. Cerro Atravesada, Picunches Department, Neuquén Province, Argentina. (22 Dec 2007. ARF)

Jaborosa volckmannii [Fig.10] is no less lovely but otherwise something else. Stopping for it refreshed both our spirits and tiring legs. It greatly impressed Harold Comber, probably the first European visitor to see it. Camouflage brownish green pinnate leaves with lobes like

tiny (but not prickly) holly leaves form a perfectly prostrate, wide rosette. At its centre sits what might forgivably be taken for a posy of large, white jasmine flowers with a sweet scent that merely reinforces the impression. But it in fact belongs in the potato family, no less. It has a final trick up its sleeve in that the flower buds initiate below soil level, where the fleshy fruits are also produced, thereby presumably protecting them from hungry would-be gourmets.

Eventually, and it really seemed like an eternal eventually, after three kilometres length and 250 m of steady upwards elevation, we reached the foot of the unpromising, barren looking Atravesada ridge, which reared up before us, streaked vertically by the long tongue of a dirty grey-surfaced persistent snowdrift. Anita wanted none of it. She decided to wait for me below. In fact it was only another 250 m or so to the top, but that is an entirely different kettle of fish over a horizontal distance of about a couple of hundred metres up the sort of the ever-steepening scarp that now faced me.

Fig.11: Upper Cerro Atravesada, approaching 2000 m and almost bereft of plant life. Picunches Department, Neuquén Province, Argentinian Patagonia. (22 Dec 2007. JMW)

The higher the fewer. First impressions had indeed been prophetic: tricky rock rubble and unhelpfully slanting barriers of outcrops to surmount were almost entirely unrelieved by vegetation [Fig.11]. Yes, almost, as I did admittedly find a few flowering plants of *Valeriana philippii* tucked away into rocky recesses, its long, neatly divided glaucous foliage looking like a cross between a fern and some exotic plucked musical instrument. This might have raised a smidgen of enthusiasm under other circumstances considering it was also my first ever sighting. As the the ground began to level off the ridge summit seemed tantalizingly close, but depressingly it never came; the whaleback slope just went on and on curving up over the horizon. Furthermore, it was getting late, and a prudent time to turn back or Anita would soon start to worry. But damned if I was going to give up and let this brute beat me without getting up there and seeing whether Comber's viola could make all the pain worthwhile. At least the views were some sort of consolation. High up there was a panorama over to the south, with a spectacular dark inky blue tarn shortly below me, called appropriately the Laguna del Inca! [Fig.12].

Fig.12: The 'Ink-a Lake' from near the top of Cerro Atravesada, looking south to the lower latitudes. Picunches Department, Neuquén Province, Argentinian Patagonia. (22 Dec 2017. JMW)

Yet another difficult boulder and outcrop barrier faced my unwilling body and numbed mind. I sought handholds to hoist myself up and over, head level with the terrace above, when ... Eureka! right in front of my eyes was a tiny rosulate viola popping up here and there among the shattered, angular rock débris [Figs.13, 14]. That this pint-sized miracle grew at all in this desolate high wasteland seemed astonishing enough. But that is was also completely unique and different from any other ever described didn't even require a second's thought. It was instantaneously as new to science for me as had been *Fritillaria alburyana* in Turkey when we stumbled across it 41 years earlier. Strange how physical strength and intense mental vivacity returned to my 71-year-old frame on the spot.

Fig.13: My first glimpse of new wee viola, F.& W.11550, peeping up here and there down among the rubble. Cerro Atravesada, Picunches Dept., Argentina. (22 Dec 2007. JMW)

The increasingly urgent necessity to get back down was thrown out of the window. I just had to hunt around for the best available photo opportunities in the fading, slanting light of a sun on

the point of sinking below what remained above me of the ridge to the west. Future type specimens were also absolutely essential. The colony contained relatively few individuals, so it needed care to extract a limited sample from several, including the critical underground organs, and leave the rest of each to regenerate, rather than digging up whole plants. All this took time.

Fig.14: And here is F.& W.11550 in all its tiny glory, justifying being named for its precious dedicatee. Cerro Atravesada, Picunches Dept., Argentina. (22 Dec 2007. JMW)

Fig.15: Almost six in the evening, shadows lengthening, and still on top of Cerro Atravesada. Leg it down smartly, Watson! Picunches Department, Neuquén Province, Argentinia. (22 Dec 2007. JMW)

When these requirements were satisfied I climbed back down as quickly as was safe in the approaching dusk [Fig.15]; but on reaching the spot of our prearranged rendezvous ... Anita was nowhere to be seen! It didn't take a genius to work out she'd become worried, thought I might have had an accident on the treacherous rockwork, and had gone up to try to find me. Supposing she'd suffered a serious injury herself? I searched the skyline above for her in vain. The heat of the day was diminishing fast, night would bring biting cold in these southern mountains, and the pair of us were dressed in nothing more than shorts and T-shirts. We were completely out of touch, lacking anything like mobile phones, so each fearing never to see the other alive again. What should I do? Choking with bitter emotion at the probability - due to my obsessive selfishness - of losing the one who meant everything in my life, if not already having lost her, I was in a helpless quandary. Dashing back to the jeep as quickly as I could and driving off to try to get help back at Primeros Pinos offered no chance of finding Anita before daylight next day: too late for sure. So should I wait and hope against hope she would come back down, so as not to risk the possibility of a continuing traumatic loss of contact? Or could I find the strength to return up the scarp to search for her in the gloaming?

As I was turning this trio of unpromising options over in my turbulent mind, I shaded my eyes for one last forlorn scan of the highlighted horizon above the ridge. Something, some tiny, black, upright, ant-sized silhouette caught my eye and appeared to move. I looked again and ... nothing ... nothing but a trick of my febrile imagination. But my gaze was still riveted to the spot, and yes, there it, or she, was again, and most certainly not static. I immediately fixed the spot and headed up towards it as fast as my weary legs would carry me. We met up with inexpressible relief and joy some way below the ridge top. I split the palm of my hand open on a sharp rock edge coming down - almost without noticing in my euphoria: and we used up the last remnants of our spent energy on another endless trudge returning to the jeep in the dark, at least downhill that time. But who cared?

Our heart-stopping adventure produced one last gain. While waiting for me earlier Anita had explored the lower slope for a short while with her camera and found yet another different rosulate, apparently a most intriguing glaucous form of *Viola dasyphylla* Fig.16], something never before or since recorded by ourselves or anyone else.

Fig.16: Another puzzling Cerro Atravesada viola, narrowed down as a most unusual glaucous form of *Viola dasyphylla*. Picunches Dept., Neuquén Province, Argentina. (22 Dec 2007. ARF)

Fig.17: The return two years later to the ridge beyond Primeros Pinos where we found *Viola coronifera* past flowering. Fingers crossed for better luck. (22 Nov 2009. JMW)

As a footnote and another positive outcome, driving west a day later we stopped to explore when we reached the highest point of the gentle rise over the ridge at exactly 1900 m Fig.17]. There, immediately by the roadside, we found what undoubtedly **were** rosettes of *V. coronifera* this time. It too had finished flowering, and again we returned two years later, this time in bone-chilling, snowy weather, but caught it in flower nevertheless [Fig.18]. It was the standard typical form, not Comber's dwarf, but certainly reinforced his discovery of the species in the sector.

Fig.18: And here it is! F.& W.11892 Viola coronifera, an unusual brown-veined form too. W of Primeros Pinos, Picunches Department, Neuquén Province, Argentina. (29 Nov 2009. JMW).

Oh no, not again ...

The equivalent drama a fortnight later, when the new species was unexpectedly found for a second time, was shorter, sharper, sooner and even more realistically terrifying. The setting, Cerro La Ventana (The Window Mountain), lies just 12 km in a straight line due southwest of Cerro Atravesada, the type site.

Very occasionally we've reached its general locality by following the direct local route mentioned above, which hugs the border and connects with the Pino Hachado ("Axed Monkey-puzzle") Pass to the north, where we often cross from Chile. It has the benefit of being a mere 50 km long. Usually, however, we explore somewhere or other further south first as well, and this time it was the sector of our other Comber objective towards the bottom end of Neuquén Province close to the town of Junín

de Los Andes. Following a thorough but fruitless search there, we returned from the south to where Cerro La Ventana is situated. First we headed up via Catán Lil and along its homonymous river valley, then we took the Route National 46 due west over the Rahue Pass which traverses a mountain range, also named Catán Lil ("Jagged Boulders" as translated from the indigenous Mapuche Indian language). The RN 46 finally connects with the community of Rahue on the Route National 23, which follows the course of a river valley gradually upwards, passing the only other major centre of population along the road, and ultimately skirting a highly scenic Andean lake [Fig. 19]. Between them this trio of geographical features bears another repetitive homonym: Aluminé.

Fig.19: The lovely Lago Aluminé near the border with Chile. Aluminé Department, Neuquén Province, Argentinian Patagonia. (23 Dec 2007. JMW)

Fig.20: For the second time in Argentina (earlier in the high NW Andes) we found a viola on the maintenance road accessing an aerial mast. Rahue Pass, Aluminé Dept., Neuquén Prov. (23 Nov 2009. JMW)

Fig.21: Introduced dandelions advancing relentlessly on native monkey puzzles. Maybe an analogy for European settlers and local inhabitants. Rahue Pass, Neuquén Prov., Argentina. (23 Nov 2009. JMW)

But we're running ahead of ourselves. We can't leave the Rahue Pass [Fig.20] without filling in a paragraph or two covering its flora. Perhaps what would most set visitors from other temperate lands back on their heels are the vistas of common dandelions, which provide a major part of the background colour [Fig.21]. It's a sobering thought that if I hadn't declared unconditional war on *Taraxacum* from the moment we first occupied our Chilean garden in 1997 it would probably look like that now too!

The very highest point of the pass is marked by a relay aerial mast [Fig.22], then solitary, but which with little doubt in this day and age is now being kept company by a plebeian mob of mobile phone equivalents. We stopped because the gently sloping heights to the north, still clothed in snowdrifts here and there, looked unexplored botanically, so a promising and likely-looking location for new violas. In fact it became clear that prospect could be nothing more than a future option, as we should need much more time and possibly an arrangement for a horseback trek as well, there being no access whatever for vehicles.

But the halt proved well worthwhile nonetheless.

Fig.22: The relay aerial mast marking the high point of the Rahue Pass. Aluminé Department, Neuquén Province, N Argentinian Patagonia. (23 Nov 2009. JMW)

Below: Fig.23: F.& W.11579 *Adesmia parvifolia*. A vigorous plant of the yellow form at the Rahue Pass. Aluminé Department, Neuquén Province, Argentinian Patagonia. (4 Jan 2008. JMW)

The relay mast was accessed by a track to the south side of the road, and it was while walking up this that we registered most plants of interest. *Adesmia parvifolia* is as notable for its highly contrasted variety of flower colours and presence or absence of foliar indumentum as for its attractively prostrate and free flowering, stemless habit. There were two such forms here and no intermediates.

More frequent and common was the yellow [Fig.23], apparently a less typical colour of the genus overall, but the occasional accompanying violet [Fig.24] yielded nothing aesthetically to it. No taxonomic distinction has been made between all these quite dissimilar forms. Martin Sheader suggests very reasonably in 'Flowers of the Patagonian Mountains' that they might amount to several closely related species.

Fig.24: F.& W.11573 *Adesmia parvifolia*, the contrasting violet form. Probably more common than the yellow - but not here at Rahue. Aluminé Dept., Neuquén Province, Argentina. (4 Jan 2008. JMW)

The pass catered for cushion-loving fans with *Azorella caespitosa* [Figs.25, 26], smothered in its clusters of small, clear sulphury yellow umbels, and usually sitting in splendid isolation among continuous rock fragments. It made a change from the similar but solitary-flowered *Azorella monantha* we encounter much more frequently.

Fig.25: F.& W.11574 *Azorella caespitosa*. A neatly mounded specimen in 'show competition' mode. Paso Rahue, Aluminé Department, Neuquén Province, Argentinian Patagonia. (4 Jan 2008. JMW)

Fig.26: F.& W.11574 *Azorella caespitosa* living up to its name by being a densely tufted mat. Rahue Pass, Aluminé Department, Neuquén Province, Argentina. (4 Jan 2008. JMW)

Fig.27: F.& W.11864 You'll be lucky to find *Oxalis adenophylla* larger-flowered or more exquisitely bejewelled than this. Rahue Pass, Aluminé Dept., Neuquén Prov., Argentina. (23 Nov 2009. JMW)

The next two in line will be no strangers to most readers. In these latitudes a very familiar old friend, both from cultivation and in the wild, *Oxalis adenophylla* [Fig.27], is a bit of a 'Kilroy was here' plant - it's almost surprising not to find it anywhere. But it's none the less welcome for that: few mountain species can rival it at its best, whatever their continent of origin. And this superb Rahue form did indeed demand the camera. One of the very first 'legendary' Patagonian plants I got to hear about as a 15-year-old alpine neophyte (from the Greek *phyton*, plant - what a perfect coincidence!) was *Perezia recurvata* [Fig.28]. Although I was unaware of the fact then, its introduction was certainly due to the devoted enthusiasm of Mrs Ruth Tweedie for the flora around their their southern Patagonian family ranch, Stag River. It abutted the eastern slopes of the Andes, and at that time she was sending back material to Jack Drake, including superb little *Calceolaria uniflora* (then *C. darwinii*). The plants on the nursery where I weeded part-time, Robinsons of Sidcup, Kent, were undoubtedly obtained from him. *P. recurvata* became well-known for its unexpected overall unusualness as a member of the daisy family. But in its native haunts it has a particular outstanding relevance at its best as one of very few 'proper' blue flowers in temperate South America. There are four varieties, and the one at Rahue is var. *patagonica*, the same as Mrs Tweedie's.

Fig.28: F.& W.11557 *Perezia recurvata* subsp. *patagonica*. S Neuquén Province, Argentinian Patagonia. (27 Dec 2007. JMW)

Having completed our 'survey' at the top, we began our descent to the west. But we hadn't gone much further than a few hundred metres before being brought up short by an eye-catching colony of *Grindelia prunelloides* [Fig.29] growing in the bare stony border of the immediate roadside. Its prostrate cartwheels of neat, glaucous foliage bore a circumference of large, bright yellow daisies. Showy is the only word to describe it. One introduced vagrant, *Taraxacum*, provided half the Rahue background colour, while another, *Echium vulgare* [Fig.30] by the fieldful, matched it in quantity. Maybe its excuse for being there is the relative absence of native blues.

Fig.29 : F.& W.11581 *Grindelia prunelloides*, sunny like the wretched overrunning dandelions - but native and choice! Rahue Pass, Aluminé Dept., Neuquén Prov., Argentina. (4 Jan 2008. JMW)

Fig.30: Beyond the blue, the horizon. F.& W.11582 *Echium vulgare*, a more respectful immigrant. Rahue Pass, Aluminé Department, Neuquén Province, Argentina. (4 Jan 2008. JMW)

Just as this ramble around the pass opened on the theme of violas, so it closes with them. At the very pinnacle, exactly where the mast is sited, to our delight we discovered a largish population of a classic rosulate, very vigorous, including some appreciably-sized individuals. But it had already finished flowering, so like the Atravesada equivalents, was marked down for future investigation a month or so earlier. In 2009 we encountered both within two days of one another. At first sight those at this location [Fig.31] look as near identical as dammit to the Atravesada plants [Fig.9] and every bit as attractive with its generous display of pale violet corollas veined

overall in darker violet. But on closer examination the side-petals of this new find had indumentum, whereas those of the others were glabrous, and its style crest was double the width or more. Flower hair and the style formation are defining features, so the two cannot be lumped as one species. Nor can either be assigned to any known rosulate. These scattered and differing but similar populations in northern Patagonia with no definitive identification are frustratingly baffling, and probably can only be resolved by molecular analysis.

Fig.31: Some were impressively large ... F.& W.11863, the Rahue Pass viola. Another mystery, like its Cerro Ventana look-alike. Aluminé Dept., Neuquén Province, Argentina. (23 Nov 2009. JMW)

Fig.32: Our stop beside the alluring Aluminé River with John in the cool shade looking at the fish. Neuquén Province, Argentinian Patagonia. (4 Jan 2008. ARF)

It was still quite early after we'd driven down the other side and joined the road alongside the peaceful, trout-infested River Aluminé. But by then we were already peckish, so stopped immediately for an al fresco meal and to enjoy the gorgeous, scenic surroundings [Figs.32-35]. With reluctance we dragged ourselves away from this delightful picnic spot and continued on past Aluminé village and along the river's upper valley [Fig.36] with the intention of exploring any accessible height just once more for Comber's elusive dwarf *Viola coronifera*.

Fig.33: Brunch beside the Río Aluminé. Never with time to catch trout for dinner though! Neuquén Province, Argentinian Patagonia. (22 Nov 2009. JMW)

Below left: Fig.34: ... as if we could! Only Schubert's song 'Die Forella' ('The Trout') - sympathetic towards the fish, not the angler - was lacking as background music. Río Aluminé. (4 Jan 2008. JMW)

Right: Fig.35: Rising morning vapour lends the Aluminé River an appropriately moody romantic atmosphere. Neuquén Province, Argentinian Patagonia (4 Jan 2008. JMW)

Fig.36: The upper Río Aluminé valley further on, approaching Cerro la Ventana. Neuquén Province, Argentinian Patagonia. (4 Jan 2008. JMW)

Chance again then played its integral part. By what might be termed 'an error of navigation', we arrived at the foot of Cerro Ventana via a dead-end access lane while seeking a non-existent short-cut. Once there, we were befriended by the kindly resident local Argentinian livestock-holder, don Arnaldo, his wife, granddaughter [Fig.37], and at times his son. But not by his aggressive turkey cock, which attempted to attack me while gobbling fiercely! We didn't doubt the mountain had never been explored botanically. Arnaldo informed us there were pretty flowers up there and offered to

guide us on horseback to the shallow summit, a trek too long and circuitous for hiking in a day. All in all, here was too good an opportunity to pass over. But it was already late that day, January the 4th, and he was not available again until the 6th, so we fixed that as our return date.

Fig. 37: Arnaldo (centre), host and guide at Cerro La Ventana, with wife and granddaughter (L) and Anita (R). Aluminé Department, Neuquén Province, Argentinian Patagonia. (7 Jan 2008. JMW)

What to do on the 5th?
I suppose we should have 'gone to work', continuing our hunt for violas in the vicinity. But we didn't. We'd already visited nearby Lago Aluminé [Fig.19] during our first field trip to the sector in December, and it had captivated us. So we decided guiltily to have a relaxing break and kill time lazing around its shore as common or garden tourists. Returning to the Ventana mountain the next morning, we set off early on two of his horses with our host leading on his and followed a small valley [Fig.38].

Fig.38: You only nearly die once ... or twice .... or ... A view of the near-fatal valley at the start of the trek. Cerro La Ventana, Aluminé Dept., Neuquén Prov., Argentina. (6 Jan 2008. JMW)

Shortly after leaving his homestead our mounts had to ford its rock-strewn stream and continue up the very steep opposite side which was, at first, not too far short of vertical. Arnaldo crossed, reached more level higher ground and waited. Anita, an experienced rider [Fig.39], followed, with cowardly me bringing up the rear as usual. Her steed had cleared the narrow opposite shore and begun scrabbling up the most precipitous section when I watched with utter helpless horror as it lost hold on a slippery rock surface and toppled over backwards into the stream, throwing Anita off behind and below as it fell. She lay in the relatively shallow and slow-flowing water with her face just above the surface, eyes shut, motionless. At least the beast hadn't landed on top of her, and she'd missed protruding rocks: but what about below the surface? Had she broken her back? Might she be paraplegic, or quadriplegic like Christopher Reeve? Was she still alive, even? Fortunately that last terrible question was answered almost at once when she blinked. Arnaldo waded in to carry her out and I shouted to stop him in case she'd broken any bones. To move someone is the worst thing to do in that case. Then she gradually and cautiously began to stir of her own volition, and eventually crawled out, all limbs, body and head intact, if a bit bruised here and there. There's no need to describe my feelings. She'd actually landed on one of the very few stretches of the stream bed consisting solely of small water-worn pebbles, with no subaquatic projections.

Fig.39: Unlike 'rookie' John, Anita is an accomplished horsewoman, so the 2008 accident came as a totally unexpected shock. Maule Region, Chile. (12 Jan 2015. JMW)

I wanted to drive her to hospital in Zapala to check all was well, but Anita insisted that was not necessary, begging us to continue and find something rare to provide a 'happy ending'. So Arnaldo fetched his son, who took her on the back of his horse to their place to rest and recover, while Arnaldo and I [Fig.40] rode on without further incident and completed the circuit, admiring scenic views from 'The Window' as we went [Fig.41], and even occasionally spotting plants from the saddle.

Fig.40: Horsed-up and ready. See - I can do it if the occasion demands and I really must. Equestrienne daughter, Nicola, would be so proud of this! Maule Region, Chile. (12 Jan 2014. ARF)

Fig.41: A green, ponded oasis in a dry, stony Andean surround, looking down from the upper Cerro la Ventana circuit. Aluminé Department, Neuquén Province, Argentina. (6 Jan 2008. JMW)

Fig.42: F.& W.11585. The second encounter with our exciting new viola here, this time on the Cerro la Ventana summit ridge. Aluminé Department, Neuquén Province, Argentina. (6 Jan 2008. JMW)

Fig.43: F.& W.11586 *Oxalis erythrorrhiza* makes us forget momentarily the hatred we bear for its weedy kin in our garden. Rahue Pass, Aluminé Dept., Neuquén Province, Argentina. (6 Jan 2008. JMW)

Fig.44: F.& W.11583 *Sisyrinchium humile* (*S. chape*lcoensis of Ravenna), a dwarf mountain ecotype species. Cerro La Ventana, Aluminé Department, Neuquén Province, Argentina. (6 Jan 2008. JMW)

Thus it was that, having dismounted halfway round for a good poke about on the summit area at just below 2000 m, I discovered here and there almost imperceptible little viola rosettes with dark red-bordered leaves, either solitary or as clusters of a few [Fig.42]. Without doubt they belonged to our same new species as at nearby Atravesada. Only one plant eventually encountered still had just a single flower [Fig.57], but that was enough to clinch identification beyond any lingering doubt. Here their almost exclusive rhizomatous spreading habit was far more evident. This was a quite different ecosystem too, the ground stable and surfaced with soil between the small flat rock outcrops. It was inhabited by a very dwarf Andean steppe flora. Most notable of these was dense cushion-forming *Oxalis erythrorrhiza* [Fig.43] with its stemless, glossy golden corollas, and a magnificent large-flowered form of creamy, brown-eyed *Sisyrinchium humile* Fig.44]. It would have any serious alpine gardener drooling and seized by an uncontrollable urge to own it. Ravenna described and published it as *Sisyrinchium chapelcoense*, which is therefore a later synonym of *S. humile*. Although it was in fact described by Philippi from Linares in Chile, Argentinian botanical authorities claim it as an endemic of their country. Furthmore, they list the completely different *Sisyrinchium laetum* [fig. 45] as a synonym!

Fig.45: For comparison. *Sisyrinchium laetum,* confused with *S. humile*, but as can be seen - nothing like it. Cerro Waylie, Parque Tromén, N Neuquén Province, Argentina. (24 Dec 2002. ARF).

Fig.46: The new viola, F.&W.11585, threading its way through the protective dome of a large *Azorella madreporica.* Cerro la Ventana, Aluminé Dept., Neuquén Prov., Argentina. (6 Jan 2008. JMW)

Fig.47: Close up of new viola F.& W.11585 growing through flowering *Azorella madreporica.* Cerro la Ventana, Aluminé Department, Neuquén Province, Argentinian Patagonia. (6 Dec 2008. JMW)

For all the beauty of these though, the most fascinatingly unusual sight was a plant of the viola creeping about below a mature *Azorella madreporica* and popping its rosettes up here and there through the densely packed wide mound of tiny, silvery, hairy-leaved shoots, several of them bearing one or two pale yellow flowers [Figs.46, 47]. On the way down a widescreen vista of the distant main Andean chain with its occasional protruding pyramidal or rounded volcano tempted me to take one final photo of the day [Fig.48].

Fig.48: Looking towards the main Andean chain from Cerro la Ventana, The erupted Llaima volcano, centre, the snowy Lonquimay group far right. Aluminé Dept., Neuquén, Argentina. (6 Jan 2008. JMW)

Fig.48: As we caught the very start of the eruption of Volcán Llaima way over in Chile. Seen from Catán Lil Department, Neuquén Province, Argentinian Patagonia. (1 Jan 2008. JMW)

Fig.50: The same erupting Llaima volcano seen later from Chile. How two delicate Andean violas can inhabit this active cinder heap beggars belief! Araucania Region. (Jan 2008. Kim Blaxland)

It also brought vividly to mind a dramatic moment we'd experienced a short time before. Again we were in the general area, up high and looking around, with a similar view of the mountains and Chile beyond. After a while we noticed a thin line of smoke in that direction begin and gradually rise vertically, before bending horizontally as a higher wind current caught it. We gave our opinions. I'd been caught out embarrassingly a few years before by informing a tour group knowingly that a similar phenomenon was the start of a volcanic eruption, when in fact it had been a wildfire. Not prepared to make a fool of myself again, I told Anita it must be a similar forest fire in the mountains. She doubted and opted for the volcano alternative. She was right. Soon the smoke began billowing up with explosive force in ever greater quantities [Fig.49]. We'd actually been witnessing the very start of one of the periodic pyroclastic discharges of Volcán Llaima in Chile, over the far side of the Andes. By sheer chance, while on a flower tour in Chile at the same time, our dear friend Kim Blaxland took photos from a closer viewpoint a day or so later when it was in full, fiery blast [Fig.50].

When Arnaldo and I got back down later in the afternoon, we discovered to our intense relief a happy Anita on the front lawn being given relaxing curative therapy by the affectionate ginger cat of the family. "*The cat has too much spirit to have no heart*" - Ernest Menaul (whoever he was!).

And so, with only a couple of weeks separating them, we'd just about survived two of those occasional but omnipresent mortal perils attendant on plant hunting. We'd also witnessed a potential third - the volcano! However, without them there would have been no wonderful new viola ...

This tract of northern Patagonia, little known and underexplored for its flora, would certainly be well worth anyone's time and trouble to visit. It surely cannot have yielded up all its secrets yet. But please

give horses a miss, and do be careful not to wander off alone in scanty clothing. Oh, and consider taking a seismograph along too!

Taxonomy

***Viola anitae* J.M. Watson, sp. nov.** [Figs.13, 14, 42, 46, 47, 53-57, 59, 63]

Type: ARGENTINA. Neuquén Province, Picunches Department, Cerro Atravesada, 38º56'S 70º38'W, 2300 m, 22 Dec 2007, leg. J.M. Watson, F.& W. 11550! (holotype CONC; isotype herb. Flores & Watson)

Diagnosis: *Viola anitae* is a unique species of section *Andinum* W. Becker, remote systematically from all others in the section for its rhizomatous habit and imbricated, acaulous rosettes in combination. *Viola escondidaensis* W. Becker, the only other consectional species to possess equivalent rhizomes, is cauline, not rosulate, and differs in other critical morphological respects such as lamina outline, style crest formation and having glabrous lateral petals.

Description: *Life form*–perennial, glabrous, rhizomatous, rosulate hemicryptophyte. *Rootstock* vertical, axial 3 cm long x 1.5 mm dia. as known, with stout feeder roots to 5 cm long branching from subterranean tip; multiple simple, filiform white rhizomes to 10 cm or more long radiate from crown of rootstock, each terminating as black to dark reddish simple or branching caudex 1-15 cm long culminating in solitary acaulous, depressed aerial rosette; caudex extended and with more or less sparse, much reduced foliage where below open, loose, fragmented surface rock. *Rosette* ca. 1-2 cm wide x 0.5-2 cm high on maturity, imbricate to subimbricate. Leaf ca. 5-12 mm long when mature. *Stipules* ca. 1.7-2 mm, narrowly ovate to linear-lanceolate, acute, white hyaline. *Pseudopetiole* 2.5-8 mm. *Lamina* 2.5-4 mm long x 1-2 mm wide, entire, spathulate, fleshy, dull and slightly glaucous green; margin dark maroon; face with weakly expressed venation; apex rounded-obtuse. *Anthesis* simultaneous. *Flowers* ca. 10-11 mm long x 8-9 mm wide, axial, solitary, integral with foliage, forming outward-facing circle on upper circumference of rosette. *Peduncles* ca. 4-5 mm, shorter than leaves; *bracteoles* 1 mm, inserted 1 mm above peduncle base, entire, linear-lanceolate, acute, white hyaline. *Calyx* 3 mm; *sepals*–laterals and inferiors 2.5 x 1.5 mm, lanceolate, acute; superior shorter, 2 x 1 mm, ovate, obtuse; all sepals entire, dull maroonish green; margin narrow, pale-translucent. *Corolla* pale blue-violet, lateral and superior petals with few, irregularly scattered short dark violet lines and dots, upper margin and apex unmarked; inferior petal densely marked dark violet except at margins, throat yellow; *superior petals* 4 x 3 mm, oblong to obovate-oblong; apex rounded, obtuse to subacute; lateral petals 4-4.5 x ca. 2.5 mm, oblong, to obovate-oblong with central tuft of long, white clavate hairs basally, these continuing sparsely to midway, when becoming much shorter in length; apex rounded, obtuse to subacute; *inferior petal* 6.5 x 3 mm, broadly oblong; apex round-emarginate: spur 1-1.2 mm, cylindrical, truncate. Anthers ca. 2 x 1-1.2 mm, with 2 close-set, erect, pointed, hair-like bristles at apex; basal nectar spurs apparently absent; orange connectives of similar length to anthers. *Style* straight, head subclavate; *stigma* porrect, shortly beaked; *style crest* a long, recurved, stout, lateral linear-lanceolate lobe either side of style head. *Fruit* and *seeds* unknown.

Field note: On an exposed upper mountain ridge surfaced by continuous rock débris between low, flat outcrops, and devoid of other immediate vegetation. A few small colonies as locally scattered populations were observed, with individual plants occasionally forming a compact cluster, but usually spreading underground by rhizomes and appearing dispersed on the surface as solitary rosettes or in small numbers.

Other material examined: Argentina, Neuquén Province, Aluminé Department, Cerro La Ventana, 39º00'S 70º45'W, 1990 m, 6 Jan 2008, leg. J.M. Watson, F.& W. 11585! (paratype herb. Flores & Watson).

Distribution: This rare species is only known from two localities 12 km apart in western-central Neuquén Province, northern Patagonia, Argentina. It therefore classifies as a very narrow endemic [Figs.51, 52].

Fig.51: Map of the Argentinian provinces, showing Neuquén, where the new viola is endemic.

Fig.52:
Map of the relevant sector of the Argentinian province of Neuquén with the two known locations of *Viola anitae.* Type site is the pink, yellow-centred circle.

Fig.53: F.& W.11550, the new viola, *Viola anitae*. A single plant in situ showing its full extent. Cerro Atravesada, Picunches Department, Neuquén Province, Argentinian Patagonia. (22 Dec 2007. JMW)

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Overall environment and habitats: The new species inhabits level or fairly level mountain tops at ca. 2000 m in a climate zone with a long, fairly dry growing season, and significant precipitation, mainly in the form of snowfall, from late autumn to early spring. Its two localities are markedly unalike in their geology and flora. The type site consists predominantly of angular boulders and rock fragments between low, flat, slanting outcrops, with occasional short vegetative cover in dispersed patches, but completely absent from the immediate vicinity of the violas. By contrast, the other habitat is stable and favourable for a variety of southern Andean dwarf and cushion species, which form a biodiverse, integrated local summit community, incuding the viola.

Phenology: Flowering has been observed in late December and early January. Fruiting and seed dispersal may be assumed to occur approximately a month after anthesis.

Etymology: This very special species is named for a most exceptional person, my dear wife, Anita Flores. She is my indispensable partner and muse in our work on the flora as in every other aspect of my life. Our personal relationship demands that it bears her particular diminutive, Anita. It's a viola, a genus which delights us and is the focus of our botanical studies together. And her life was seriously at risk in the two occasions it was discovered, the first when looking for me, thinking I was in trouble. Partly as a result, and sadly, she has never seen it in its natural habitat. What plant could be more appropriate than this to bear her precious name? [Figs.33, 37, 39, 58].

Fig.54: A type specimen of *Viola anitae* F.& W.11550 from Cerro Atravesada prepared for pressing. Picunches Department, Neuquén Province, Argentinian Patagonia. (22 Dec 2007. ARF)

Left: Fig.55: Another type specimen *of Viola anitae* F.& W.11550 showing prolonged caudex and flowers. Cerro Atravesada, Picunches Department, Neuquén Province, Argentina. (22 Dec 2007. ARF)

Right:
Fig.56: A closer view of a third type specimen of the new F.& W.11550 viola, *V. anitae*. Cerro Atravesada, Picunches Department, Neuquén Province, Argentina. (22 Dec ARF)

Above left: Fig.57: F.& W.11550. The Cerro La Ventana flower of *Viola anitae*, showing anchor-shaped style crest in throat - also longer hairs of lateral petals in this population. (6 Jan 2008. JMW)
Above right: Fig.58: The Tenth Latin American Botanical Congress held at La Serena. Anita beside our presentation poster of the genus Viola in Chile. (7 Oct 2010. JMW)

Fig.59: Sterile rosettes of the *Viola anitae* F.& W.11550 at Cerro Atravesada as seen from above. Picunches Department, Neuquén Province, Argentina. (22 Dec 2007. JMW)

Fig.60: F.& W.10658 *Viola sacculus*, the *Andinium* species with rosettes most closely resembling those of the new viola. Cerro Catedral, Río Negro Province, Argentina. (30 Dec 2002. ARF)

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Fig.61: F.& W.10632 *Viola escondidaensis*, the only other rhizomatous *Andinium* species. Parque Provincial Tromén, Chos Malal, Neuquén Province, Argentina. (24 Dec 2002. ARF)

Fig. 62: F.& W.10772 *Viola escondidaensis*, violet-veined form, upper section. Parque Provincial Tromén, Chos Malal, Neuquén Province, Argentina. (28 Nov 2003. ARF)

Fig.63: F.& W.11550. A similar depiction of *Viola anitae*, here from Cerro Atravesada, for comparison. Picunches Department, Neuquén Province, Argentina. (22 Dec 2007. ARF)

Proposed conservation status: Considering its remote, scarcely visited locations, with no evidence of actual or intended human intervention, *Viola anitae* does not appear to be under any threat. However, its notably small, confined populations and very restricted distribution in areas without formal protection indicate that it should at least be classified as vulnerable (VU) by IUCN standards.

Note: *Viola anitae* is so distinctive that the systematic relationship to other species of its section is difficult to work out. At least those that appear allied to it in any way are found in the same part of northern Patagonia. The rosettes [fig. 59] closely resemble small versions of those of *Viola sacculus* [fig. 60]. However, although that species can also possess a similar exceptionally long caudex when buried by rock fragments, it is not rhizmatous as such. *Viola escondidaensis* [figs. 61, 62] is the only other species of sect. *Andinium* with subterranean true rhizomes, but it has a long, leafy stem above ground, with no more than a rudimentary rosette at the tip, and the leaf blades are narrow and elongated. The flowers of those two species and *V. anitae* [fig. 63] also differ considerably from each other. Taking into account that the genus *Viola* evolved in southern South America about thirty million years ago before later spreading up into and across the Northern Hemisphere, its present representatives from around the geographical zone of origin have had plenty of time-span to develop very marked characters - and even sets of characters - of their own.

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Anita and John Watson

Ed.: I hope the Watsons will forgive me for adding this photo in celebration of the naming of *Viola anitae*. Congratulations, Anita! Deseo expresarle mi más calurosa felicitación!