

International Rock Gardener

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Wild weather around the world may mean this is a good time to sit back with a coffee and relax with the latest IRG while gathering your strength for the garden. Certainly those worst affected by the storms will have a lot of work to retrieve the situation with broken plants, waterlogged soils or terrible fire damage.

We are hopeful that this IRG will bring you some distraction from all that. Sjaak de Groot & Ben Zonneveld describe two new tulip species from the Altai mountains in Kazakhstan, named for Anna Ivaschenko and Diana Everett. John and Anita Watson write more about the flora of South America and describe a

new rosulate viola species. Finally, Frazer Henderson shares a suite of photographs, as an “extra” to his article on the Tien Shan which was recently published in the Rock Garden 144, print journal of SRGC.

Cover photo: *Barneoudia major* F.& W.12595, photo J.M.Watson.

Alpines 2021 – International Rock Garden Conference



Every ten years a major international gathering for lovers of plants, gardens and mountains takes place in the UK. From 8th -11th May, Perth, a charming city in central Scotland, will be the venue for this event. We anticipate some folk may arrive early, so we plan a “Big Blether” for the evening of 7th May – a friendly Scots meet and greet! A spectacular line-up of speakers is planned for the Perth Concert Hall, the most modern in Scotland. The International Plant Show will also be held in the Perth Concert Hall. Booking is open now for the Conference and

the pre and post conference tours. There is ample accommodation in the area to suit all tastes and budgets and booking for some of those places is not possible until twelve months before the conference. However, conference booking is open until 31st March 2021– [see all details HERE](#) – and an ‘Early Bird’ discount is available to tempt you to early booking! From the 2021 pages on the [SRGC website](#) you can learn more about the programme, venue, the Perth area, accommodation links, the tours available and more.

International Rock Garden Conference 2021

07 - 11 May 2021
Perth, Scotland

A gathering for lovers of plants, gardens & mountains

www.srgc.net
alpines2021@gmail.com
@RockGarden2021

SRGC are delighted to have sponsorship from the Alpine Garden Society, the Czech Rock Gardeners Society, the Scottish Rhododendron Society and the Rhododendron Species Foundation.

We hope to welcome many of you to Scotland in May 2021 for this exciting event.

Contact alpines2021@gmail.com
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Scottish Rock Garden Club



Alpine Garden Society



Czech Rock Gardeners Society



Scottish Rhododendron Society



Rhododendron Species Conservation Group



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---Species Description---

Two new tulip species from the Altai mountains, Kazakhstan

J.J. de Groot & B.J.M. Zonneveld

J.J. de Groot (jacjdegroot@casema.nl) Beeklaan 9, 2191AA De Zilk, The Netherlands.

B.J.M Zonneveld (ben.zonneveld@naturalis.nl) Naturalis Biodiversity Center, Darwinweg 2, 2333C Leiden, The Netherlands. (PO box 9517, 2300RA Leiden)

Introduction: The Altai is a mountain region of about 600.000 sq. km situated in NE Kazakhstan, Russia, NW Mongolia and China. In the northeast it goes over into the Russian Sajan mountains. The several mountain ranges of the Altai stretch from southeast to northwest, with the highest peak up to 4500m. The yearly precipitation in the Altai varies from 50 to 400mm in the dry south-eastern part, to 400 to 2400mm in the north-western part. Hence this variable precipitation coupled with the differences in altitude make the Altai particularly diverse in plants and animals, with several endemics among them.



Ixiolirion tataricum form in Ust-Kamenogorsk.

Several species of the genus *Tulipa* can be found in or close to the Altai mountain country. *T. altaica*, *T. patens*, *T. kolbintsevii* and *T. biflora* grow in the western part, in foothills and steppe west of the Altai. *Tulipa annae* grows in the southwest and southern part of the Altai, and further to the south. Tulips are usually found in scattered places of the dryer parts.

T. heteropetala, *T. uniflora* and *T. cf. mongolica* are found in scattered places in the whole Altai region and further to the east and northeast. These last three species belong to the subgenus *Orithyia*. The new species *T. dianaeverettiae* is endemic to the Altai region and *T. annae* appears also in the Dzungarian Alatau of Kazakhstan, and in adjacent China.

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T. heteropetala on Marble Pass, Kazakhstan.



Gymnospermium altaicum on Marble Pass, Kazakhstan.



Fritillaria meleagroides on wet places and *F. verticillata* on dryer places, both in the Kalbinsky Hills.

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The vegetation is characterized by some other geophytes, among them are *Fritillaria* species like *F. meleagroides* and *F. verticillata* several *Allium* species, among them *A. altaicum*, *A. nutans* and *A. tulpifolium*, *Corydalis schanginii*, *Gagea* species, *Ixiolirion tataricum*, *Lilium martagon*, *Eremurus altaicus*, *Gymnospermium altaicum* and *Erythronium sibiricum*.



Erythronium sibiricum: habitat and some forms on Marble Pass, Kazakhstan.



Corydalis nobilis in the Kalbinsky Hills, Kazakhstan, a common plant on rocky places.

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Paeonia anomale in the Kalbinsky Hills, Kazakhstan.



Paeonia hybrida and *Iris bloudowii* in the Kalbinsky Hills, Kazakhstan.

Eremurus altaicus on Marble Pass, Kazakhstan.



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Taxonomic treatment

1. *T. dianaeverettiae* spec. nova J.J. de Groot & B.J.M. Zonneveld

The genus *Tulipa* contains 4 subgenera: *Clusianae*, *Tulipa*, *Eriostemones* and *Amana*. *T. dianaeverettiae* is classified here in the subgenus *Eriostemones* section *Biflores*.

T. dianaeverettiae sp. nova

Diagnosis: *T. dianaeverettiae* belongs to the section *Biflores* and it can be recognized by its distinct seedpod with a small dome on the top. It can be differentiated from *T. biflora*, *kolbintsevii* and *patens* by its short hairs on the stem and especially along the leaf edge. It is the only species of the section *Biflores* appearing at around 1800 m altitude in the Altai mountains.

Type: cultivated plant, grown in the Netherlands from seeds collected in Kazakhstan, Alatai pass, Altai region. The weight of DNA per nucleus is 99,4pg, and it is putatively tetraploid. The type plant is deposited in the Leiden herbarium of the Naturalis Biodiversity Center, number L.3986813.



View of Lake Markakol and Markakol village. The snow-capped mountains of the Kurchumskiy Ridge are in the background and on the far right is the Alatai pass is where *Tulipa dianaeverettiae* is found.

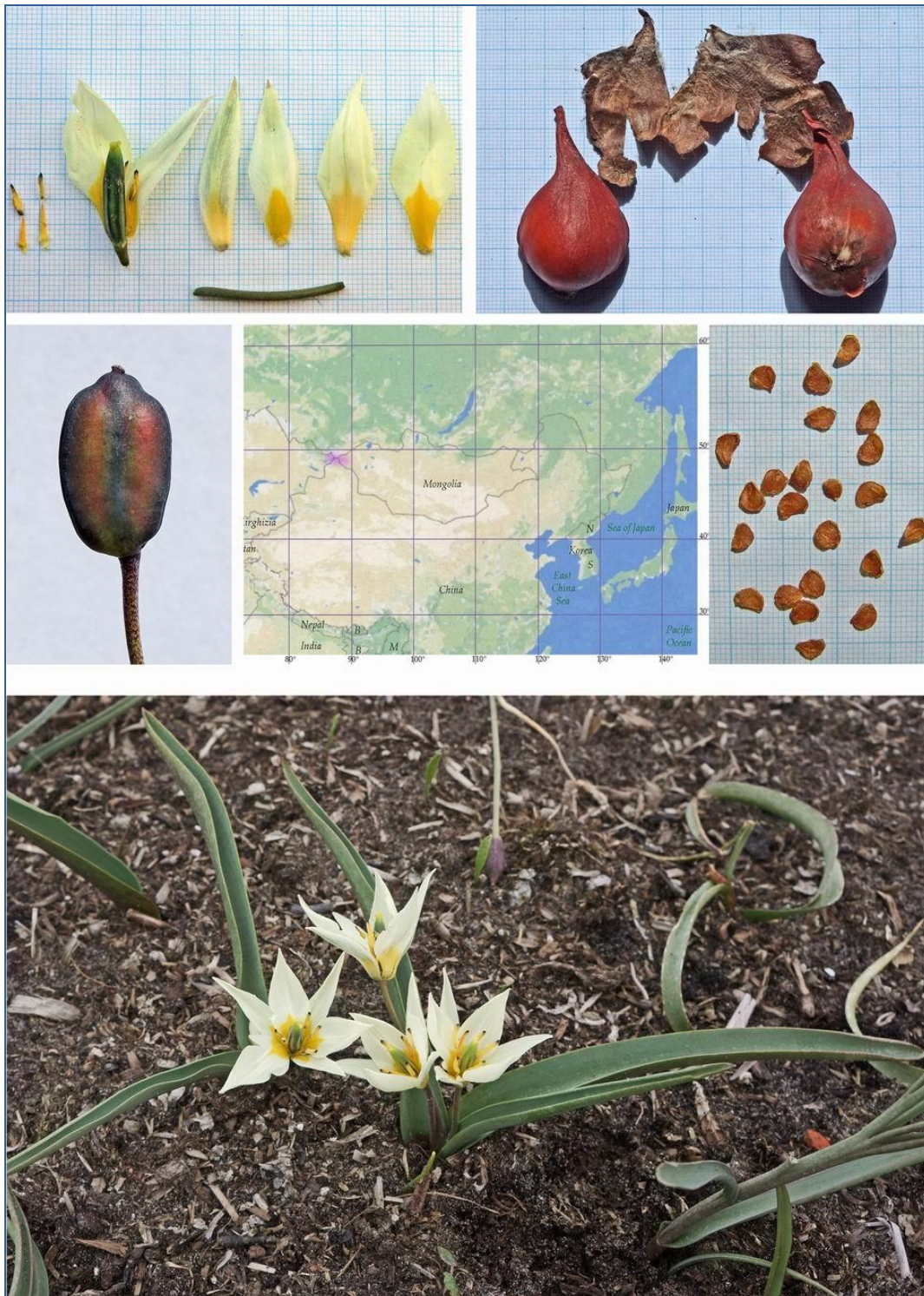
Description:

Herbs, perennial, the normal round bulb is up to 25mm in diameter, tunic reddish-brown which is covered at the top of the inside with woolly hairs. The flower stems up to four in number, are 30-50mm long, greenish-brown and covered with short hairs. The 2-3 glaucous-green, channelled leaves are covered with short hairs on the margins. The basal leaf is about 190 x 24mm, the second is 155 x 21mm. Flowers bisexual with 6 tepals in 2 whorls, tepals of the outer whorl are spear-shaped, 36 x 11mm, the outside is with pale bluish-grey along the centre, and on the base is a pale yellow blotch. The inside is cream coloured with a yellow basal blotch covering over 30%. At the base there is a rim of short hairs above the honey mark. The cream coloured tepals of the inner whorl are spade shaped, 38 x 16mm, with a yellow basal blotch, and a bluish mid-vein.

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The inside is cream coloured with a yellow basal blotch covering over 40%. At the base is a rim of short hairs, stretching to the margins above the honey mark. Stamens 6, unequal in length, 16 – 18mm long. The narrow triangular yellow filaments are 8-10mm long, with a rim of white hairs near the base and a few hairs above the rim. Anthers are yellow with dark grey tips and bases and the pollen is yellow. The ovary is dark green with brown stripes. Stigma is yellow with 3 small lobes. The seedpod is elliptic, with a small dome on the top.

Notes. It is not likely this species will be confused with related species as it is the only section *Biflores* species appearing at an altitude of 1800 m in the Altai mountains. *T. biflora*, *T. patens* and *T. kolbintsevii* grow only in the western part of the Altai at lower altitudes. The flowers have a sweet smell.



Plant and plant parts of *T. dianaeverettiae* from Alatai Pass, Kazakhstan.

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Flower parts of *T. kolbintsevii*

T. biflora

T. patens

Comparative table 1 of *Tulipa*:

	<i>T. biflora</i>	<i>T. dianaeverettiae</i>	<i>T. kolbintsevii</i>	<i>T. patens</i>
Bulb form	normal	normal	pear-shaped	pear-shaped
Tunic colour	light brown	reddish brown	light brown	light brown
Tunic covering	woolly hairs at the top	woolly hairs at the top	few short hairs	few short hairs
Stems	1-3	1-4	1-2	1-3
Stem covering	few short hairs	short hairs	hairless	hairless
Leaves	2	2-3	2-3	2-3
Hairs on the Leaf margins	few	yes	none	few
Hairs on the outer tepals	rim on the base	rim on the base	few on the margins of the base	none
Hairs on the inner tepals	rim + margins of the base	rim+ margins of the base	on the margins of the base	on the margins of the base
Seedpods	round top	dome on top	small snout	small snout



Plant and seedpods of *T. cf. dianaeverettiae* from Mongolia. Photos: Vladimir Kolbintsev

Ecology and distribution: *T. dianaeverettiae* is a tulip of the middle mountain belt, first collected by Mr. W. Lemmers, who collected seeds in 2001 on the Alatai pass, Kurchumskiy ridge, Kazakhstan 48.56.02.91N – 86.04.03.21E, at an altitude of 1800m, where this tulip grows between low and open vegetation in stony soil. When these seeds are sown and grown up to be flowering size bulbs, the plants are similar to species of the section *Biflores*, which are common on the Tien Shan ranges, such as *T. bifloriformis* etc. However, when the seedpods are mature, they show a small dome on

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the top, a characteristic never seen in any other tulip species. Perhaps this dome is an evolutionary intermediate when the descendants of the long-styled *Orithiya* tulips evolved to the short-styled *Eriostemon* tulips.

In 2014 when on tour in eastern Kazakhstan, our guide Vladimir Kolbintsev told me that he grows a small yellow tulip in his garden near Taras. During a tour in the Mongolian Altai he had collected a few bulbs in the Tabyn-Bogdo-Ula range, Tsagaan Us valley 48.50.51.18N – 88.06.42.19E 2150m. They grow in open sunny places in a dry sandy soil mixed with stones. When these tulips produced seeds, the seedpods showed the same dome as the tulips from Kazakhstan, and they are probably the same species.

Cultivation: *T. dianaeverettiae* is in comparison with *T. bifloriformis* not a good garden tulip as it is slow to multiply.

2. *T. annae* sp. nova J.J. de Groot & B.J.M. Zonneveld

T. annae belongs to the subgenus *Tulipa*, section *Kolpakowskianae*. Together with *T. altaica* and a dwarf species from the Saur mountains, it forms a natural group in the section *Kolpakowskianae*.

Diagnosis: *T. annae* has hairs on the lower base of the tepals, inside and outside. (In cultivation, on forms obtained from China, there are hairs on the ovary as well). This makes this species unique within the subgenus *Tulipa*. The surfaces of the leaves are covered with very short hairs, differing in that respect from the related *T. altaica* and *T. brachystemon*. It is the most northern occurring species of section *Kolpakowskianae*.

Type: Vegetative offspring grown in The Netherlands, from a few bulbs collected in 2008 on Marble Pass, Altai region, north-eastern Kazakhstan. The DNA-weight per nucleus (2C-value) 42,7pg, suggests it is a diploid. The type plant is deposited in the Leiden herbarium of the Naturalis Biodiversity Center, number L.3986814.



T. annae from Dzungarian Alatau -Taskora Valley



T. annae from China

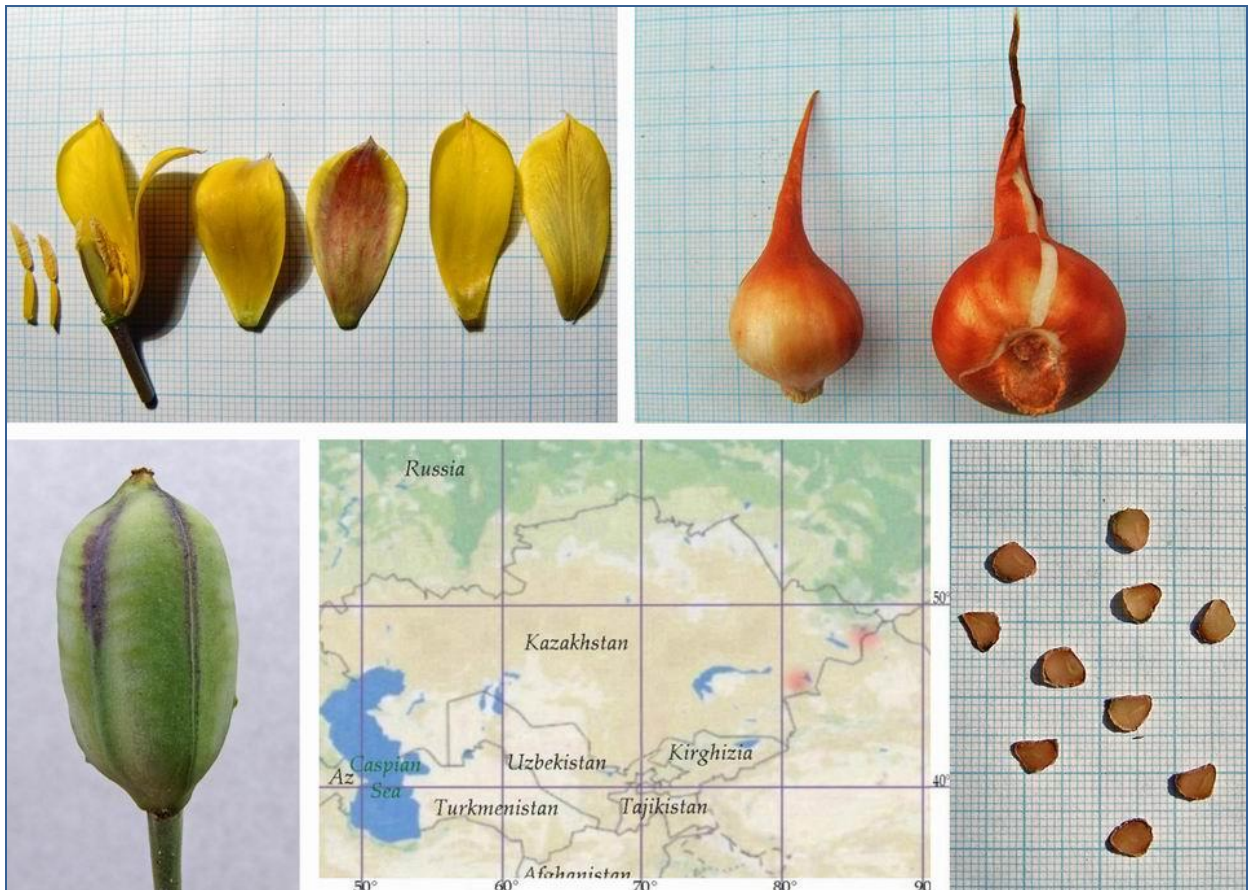
Description: Herbs, perennial, bulbs up to 35mm in diameter, tunic brown, elongated to a long chestnut brown nose covered with short brown hairs on the inside, the most hairs being at the top and the bottom. Stems 1, reddish-green, is up to 75mm long, including flower stem of 55mm. The flower stem is densely covered with short hairs. The three spear-shaped, channelled leaves are glaucous-green, with wavy margins. The surface is covered with very short hairs and the top leaf also has some hairs on the margins. The leaves are 100 - 115mm long and 12 - 30mm wide. The flowers bisexual, open to a wide cup, yellow on the inside. Tepals 6 in 2 whorls, outside of the outer tepals is dull pinkish-red with yellow margins, outside of the inner tepals is yellow with greyish-green stripes and veins, short hairs cover the tepals on both sides near the base. Stamens are yellow, unequal in length 15-16mm long including narrow oval filaments of half the length. Ovary bottle-shaped 15mm long, pale greenish. Stigma trilobed, yellow small protruding lobes.

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Cultivation: *T. annae* does well in cultivation. It needs to be grown on slightly acid soils, but it grows much better than *T. altaica* which need long cold winters.



Tulipa annae on Marble Pass, Altai region, Kazakhstan.

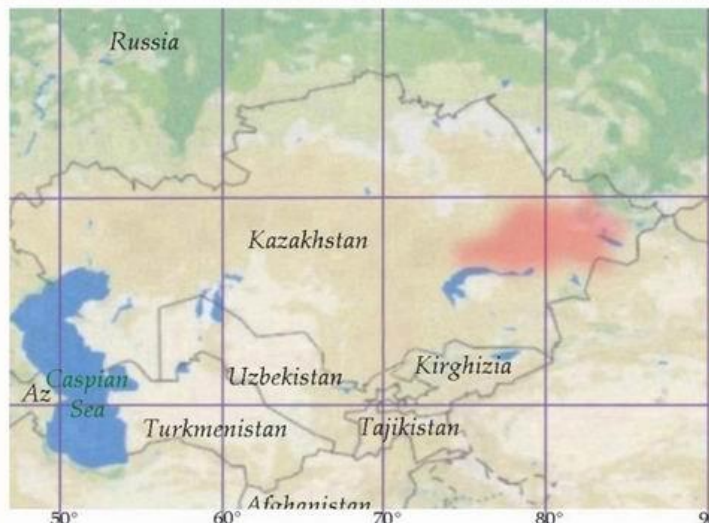


Plant parts of *T. annae* from Marble Pass. Type form.

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Comparative table 2 of *Tulipa*:

	<i>T. altaica</i>	<i>T. annae</i>	<i>T. brachistemon</i>
Bulb form	normal	elongated nose	elongated nose
Tunic covering	short hairs	short hairs	short hairs, felted on top
Stems	1	up to 5	up to 5
Stem covering	short hairs	short hairs	no hairs
Leaves	3 scattered	3-4 rosette	up to 5 scattered
Leaf covering	short hairs on margins	few hairs on the margins,	short hairs on margins
Leaf surface	no hairs	covered with very short hairs	no hairs
Flowers	no hairs	short hairs on the base of the tepals, inside and out	no hairs
Ovary	longer than stamen	shorter than stamen	shorter than stamen
Stigma lobes	wide, protruding	small	small
Seedpods	with clear snout	small	round top



Plant parts of *T. altaica*

Notes: *T. annae* forms, together with *T. altaica* and a dwarf species from the Saur mountains, a natural group within section *Kolpakowskianae*, and is the most north-eastern occurring species of this section. *T. annae* grows on the east and south of the distribution area of *T. altaica* in more mountainous areas. It differs from *T. altaica* by its smaller size, the leaves are waved, and they grow flat to the soil surface, the plants are in general more hairy, the ovary is shorter than the stamens and the bulb has a tunic elongated to a long nose.

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Comparing top leaves of *T. annae* on the left and right with *T. altaica* in the middle.



T. altaica in the Kalbinsky Hills, the most western part of the Altai area.

Etymology: *Tulipa dianaeverettiae* is named after Mrs Diana Everett, our travel companion over 17 years searching for tulips on their natural habitat. She is the painter and writer of the book *The genus Tulipa, Tulips of the world*. During our yearly tulip tours to one or more of the Central Asian countries,

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Caucasus, Iran or Turkey, she and her travel companion, Mrs Rosemary Steele, were always good cheerful companions, even when we had to camp in the most inhospitable campsites, or travelling in an old Russian bus packed like sardines in a can over hundreds of kilometres of bad roads. Also I must thank Diana for correcting my English in the book that I am writing about all the wild tulips and their evolutionary history.



T. altaica aff., a dwarf tulip from the western Saur Mountains that keeps its dwarf character in cultivation. It has leaves covered with short hairs on the surface as in *T. annae* but the number of leaves varies from year to year from 3 to 5, and it flowers much earlier than *T. annae*.



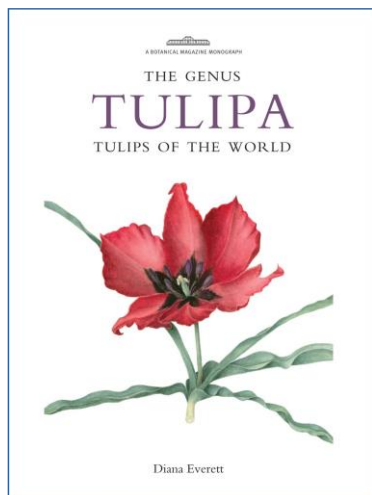
Diana Everett talking with the Uzbek guide. Other persons in the photo are Mr Hans-Olaf Aanensen, Mrs. Marit Aanensen, Mr Wim Lemmers and Mrs Rosie Steele.

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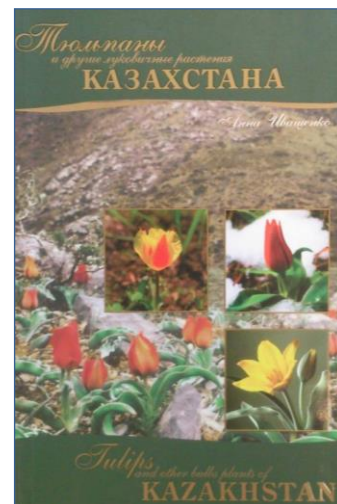
Tulipa annae is named after Dr. Anna Ivaschenko, a well-known botanist living and working in Almaty, Kazakhstan. She accompanied us during our tour to east Kazakhstan in 2008, when we came across this newly described tulip. She has written several books about the flora of Kazkhstan.



Dr. Anna Ivaschenko giving sweets to children in the little village Karasai, Saur mountains in east Kazakhstan.



The cover images of Diana Everett's tulip monograph and for Anna Ivaschenko's Tulipanu Kazakhstan.



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Dr. Anna Ivaschenko busy collecting data about *T. albertii*, north of Lake Balkas, Kazakhstan.

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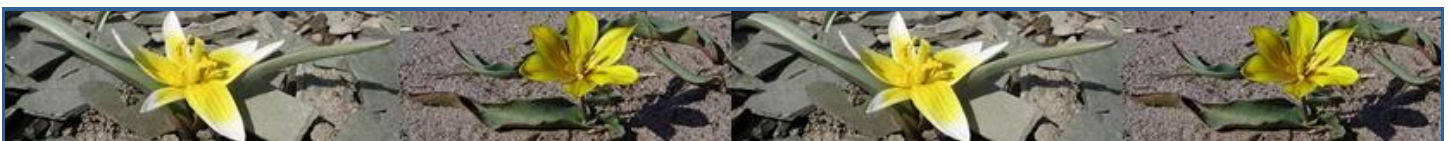
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---Species description---

Queen of all she surveys. A remarkable and distinct new rosulate viola (section *Andinium* W. Becker), a single-site endemic from the central Andes of Chile

John and Anita (Ana Rosa Flores) Watson

Casilla 161, Los Andes, Aconcagua Provincia, Valparaiso Región, Chile.

Email: john.anita.watson@gmail.com

Our indefatigable local explorer

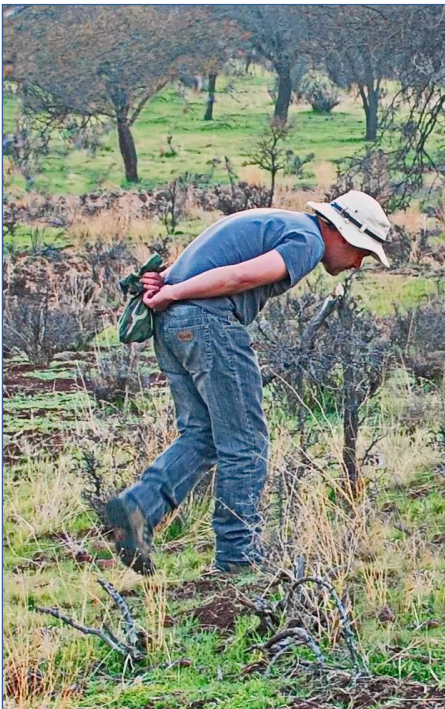


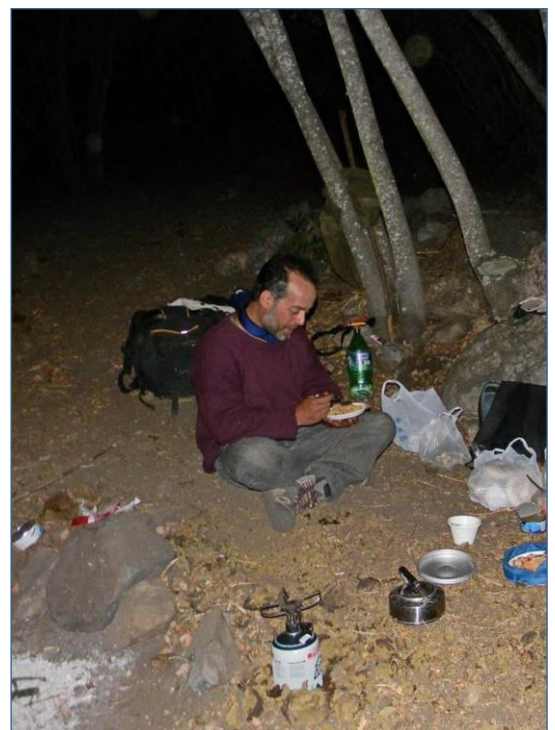
fig.1: Allow us to introduce you to the hero of this presentation, Carlos Celedón, in typical plant hunting mode. (18 Aug 2013. JMW)

A lucky spin of the wheel of fortune led to us meeting and teaming up with the late Carlos Celedón [figs.1, 2, 76]. He happened to have been a member of a mixed group of amateur and academic wildflower devotees called Chilebosque, who arrange short forays into the Chilean countryside looking for plants. But Carlos also sought the flora out as much or more on his own in the environs of his home at Los Andes north of Santiago. When young he'd accompanied his father in the general locality, seeking indigenous native artefacts, another of his passions, and recalled having noticed at one spot large colonies of what he now knew to be a little viola. So he returned in 2012, found it in flower, and then e-mailed the photos he'd taken to the authority on the botany of our Valparaiso Region, Patricio ('Pato') Novoa (2013), asking whether he could identify it. Pato replied something like, "Carlos, you're living almost next door to the two people who know more about these

South American violas than anyone else alive. Ask them." He gave Carlos our contact details and it all progressed from there.

fig.2: To spend more time exploring, Carlos would often back-pack minimal camping clobber to the heights and overnight there. (Photo Lucia Abello)

Although central, plants were by no means the only focus of his enthusiasm as a nature lover. An excellent photographer, Carlos created a website where he published the best of the shots he took while on his hikes and climbs. These included background vistas as well as animals, birds and insects [figs.3-5]. His greatest physical asset was his ability to climb tirelessly 'like a mountain goat'. In fact he enjoyed that aspect as a physical experience in its own right every bit as much as it being a means of getting to the Andean heights that interesting plants inhabit. He thought little of climbing 2000 m or more and back in the same day, although he would at times camp in the heights and stay longer [fig.2].



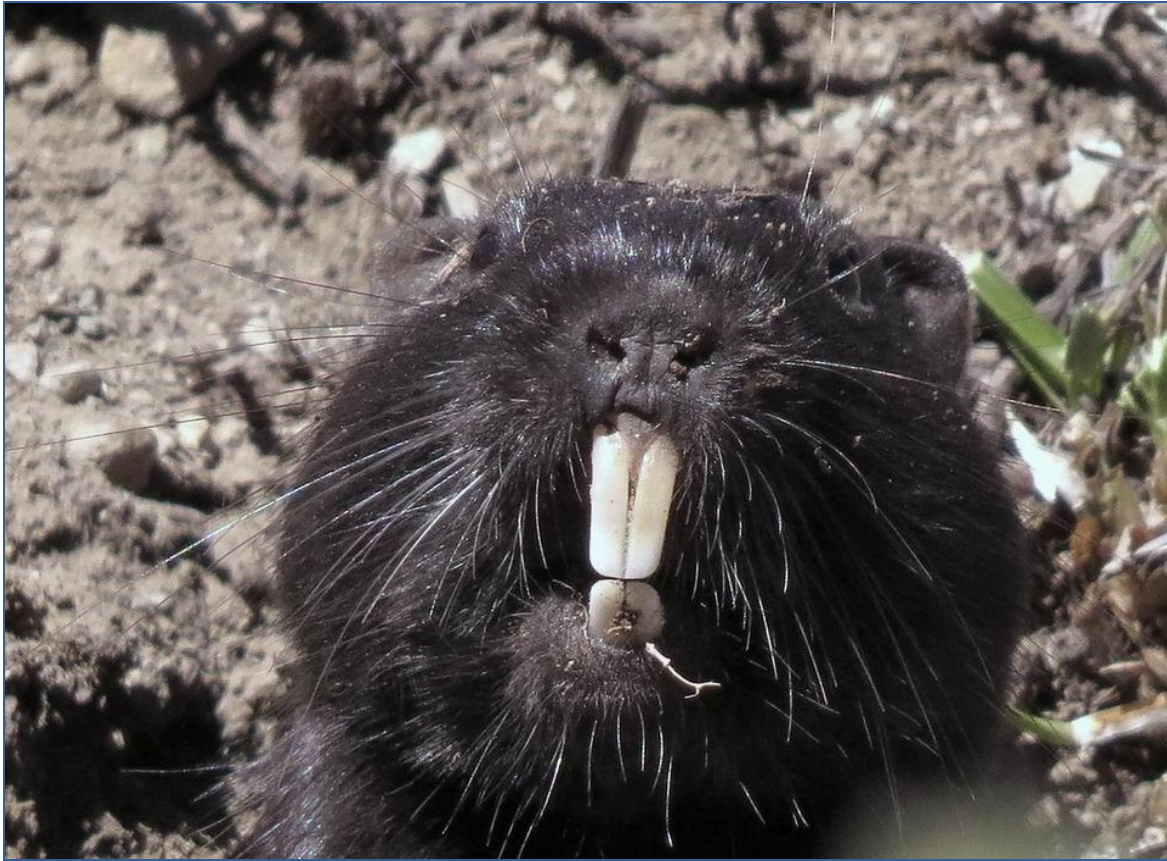


fig.3: No, It's NOT a 'selfie'! It's the cururo, *Spalacopus cyanus*, a tunnelling root and bulb eating rodent, snapped by Carlos while 'coming up for air'. (2 Feb 2013)



fig.4: Caught in late light. The vizcacha, a timid rock dwelling and quite common larger relative of the very rare chinchilla. (23 Oct 2011. C. Celedón)



fig. 5: One of Carlos's very best. A hen *Carduelis barbata*, the southern siskin, on an acacia twig. Someone suggested it for the National Geographic. (30 Mar 2013)

fig.6: In her mid- to late 20s poet-diplomat Gabriela Mistral (literary pseudonym of Lucila Godoy Alcayaga, the first Spanish American author to receive the Nobel Prize in literature) lived for six years (1912-1918) in the Los Andes house which Carlos's family occupies. She was a schoolteacher.



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The upper storey, attached family home in Los Andes, which is still occupied by his parents and brother with a mental disability, lies some 8 km by road N of our place. It's historically noteworthy due to the famous Chilean Nobel poet Gabriela Mistral (1889-1957) [fig.6] having lived there for six years from 1912 while a teacher at the local liceo (high school). Her Nobel Prize for Literature was awarded in 1945 (Wikipedia 2019). In Britain the street wall of the building would certainly contain a blue plaque to that effect. Unfortunately for the family however, it's become a bit of a cross to bear. They would like to be able to consider moving, but are not allowed to touch the building inside or out, and it's badly in need of renovation. Consequently they would get little return if they tried to sell it. Some while ago the local municipality indicated the intention to adopt the place and offer the family a fair compensation. Carlos's mother, Gloria, was even interviewed during a news broadcast of the regional TV channel and talked optimistically about it. But nothing further has happened.

All isn't entirely gloom and doom however. The rear of the house has a magnificent view across the Aconcagua River of the surrounding countryside, where the nearby high lateral Andean spurs containing the valley rise majestically on both sides [fig.7]. It isn't difficult to appreciate what a stimulus and inspiration this must have been for Carlos as he grew up. We two well know that, as when young we were highly motivated by such rural environments in Britain (John) and Chile (Anita).



fig.7: Looking N across the Aconcagua River valley to the lateral Andean range beyond. A view similar to that as seen from Carlos's family home. (24 Sep 2019. JMW)

Take this! ... and this! ... and this!

Carlos has already been introduced to regular readers of the IRG (Watson et al. 2018) as having been instrumental in our discovery and publication of the delightful dwarf *Alstroemeria piperata* [fig.8], but it didn't by any means end there. All began for us in 2013 when he took us 'just up the road' to

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see the *Viola* mentioned in the second paragraph above. It turned out to be *V. chamaedrys* [fig.9] (Watson & Flores 2014), a species not seen since the very early days after its first discovery and publication in 1864. In fact the locus classicus and only certain location of the species is the very general sector where Carlos found it, and where it has since also been recorded at two more nearby sites. Important though that was, it led us incidentally to the new alstroemeria in the same place. Further discoveries of undescribed species followed elsewhere in the wild environs of Los Andes where Carlos took us. An *Oxalis* we plan to call *O. ranchillos* [fig.10] and a *Hypochaeris* species are undoubted novelties, while an *Adesmia* may also prove to be when we've had time to investigate it thoroughly.



fig.8: left, F.& W.12823 *Alstroemeria piperata*, our delightful new species, found by chance at a location called the Chacabuco Pass that Carlos took us to. (30 Nov 2014. JMW)

fig.9: right F.& W.12585 *Viola chamaedrys*, rediscovered in the wild by Carlos at the same Chacabuco Pass site after being 'lost' for ca. 150 years. (8 Sep 2013. JMW)



fig.10: F.& W.12802 *Oxalis ranchillos*, ined., found at another of Carlos's locations and currently in the process of publication. (17 Oct 2014. JMW)



fig.11: *Cistanthe celedoniana* - as it is to be named. A little beaut he found all by himself. It's also undergoing publication now. If only he'd lived to see ... (30 Sep 2012. C. Celedón)

But Carlos didn't always need us to 'hold his hand'. He showed us photos of a *Cistanthe* (Montiaceae) he'd come across in 2012 [e.g. fig.11] just to one side along the Aconcagua valley towards Argentina and very near to Los Andes. We sent him back immediately it was in flower again in 2013, with strict instructions to make some herbarium specimens! This immediately evident new species is currently in the process of being published by our great friend Arve Elvebakk, Director of the Tromsø Arctic-Alpine Botanic Garden, and ourselves. It will be named *C. celedoniana* as a permanent tribute to our lost friend and colleague. Of no less value, Carlos also discovered *Olsynium chrysochromum* in Valparaiso Region, when it was only previously known from the Santiago Andes (Watson & Flores 1994). His was and is the first and only and photographic record of it (Watson & Flores 2019b).

These plus the following are significant contributions to the floras of Aconcagua Province and Chile, above all of at least five new endemic species. They underline the tragedy of his early loss in his mid-40s for his many friends and the worlds of science and nature lovers. We were in England visiting John's family in September 2015 when the devastating news reached us by e-mail: a heart attack induced by the Great God Tobacco. It was little more than two short years after we'd met, and we were hoping for a long period of fruitful cooperation, with him as our 'legs' and savvy spotter of rarities.

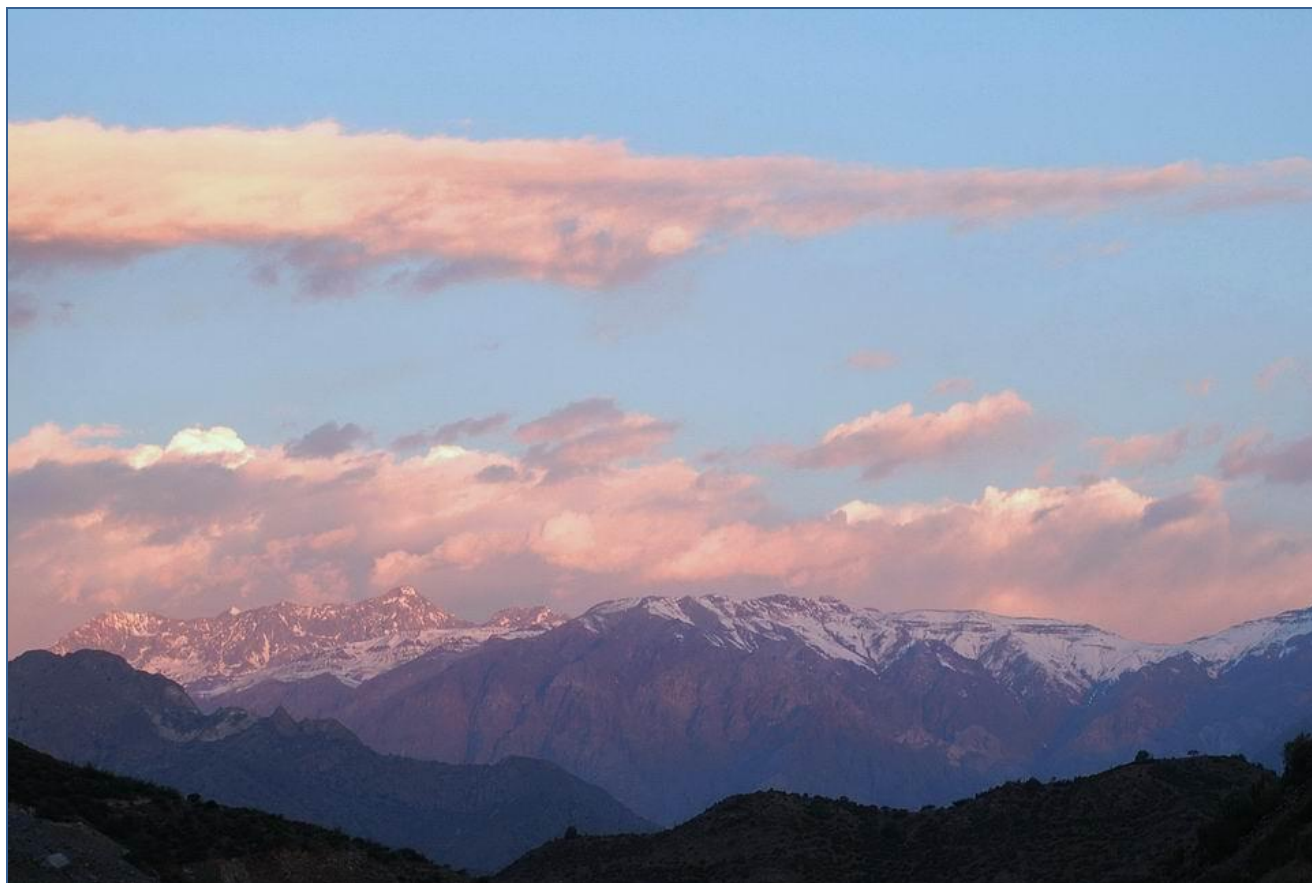


fig.12: The 'rose-coloured spectacles' panorama of the Andes of Aconcagua where Carlos Celedón found *Viola regina*. (10 Nov 2012. JMW)



13) An imposing mid-winter view of the snow-covered southern lateral range, including the sector *Viola regina* inhabits. (15 Aug 2009. ARF)

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The domain of 'The Queen' and her attendant condors

Now on to the viola, the subject of this publication. The upper Aconcagua valley itself is very familiar to us as we travel it every time we cross over to Argentina and return, or explore for plants anywhere along its length. Carlos discovered the new species on the lateral Andean range to the south of the valley [figs.12, 13, 30]. In fact Anita's father worked at the 3000 m Río Blanco (Codelco) copper mine there. She and John were actually introduced for the first time there when Adriana Hoffmann brought him with her in early 1988 to look for plants at the invitation of Anita's father. But the mine's a good bit further east towards Argentina. The location Carlos climbed to is situated less than halfway between Los Andes and the pass over to Argentina, and is at the level of a very narrow rock defile in the valley called the Salto del Soldado (the Soldier's Leap). A patriotic Chilean cavalryman did just that on horseback to escape from Spanish Royalists during the struggle for independence. Of such stuff are inspirational legends made. Well, just looking at the feature every time we pass - rather him than us! Carlos crossed over to the south side rather more easily by the bridge at a nearby village.

In his usual tireless fashion, on his first visit to the viola's habitat in February 2013 Carlos reached the upper ridges at 3000 m where condors soar [figs.14, 15] with plenty of time in hand to look around. By good fortune he lit upon several close-set colonies almost immediately [fig.16]. However, it was far too late in the season for any remaining flowers even, and he had to be satisfied for the moment with taking a few photos in the fruiting stage [figs.17, 18].



fig.14: Where the condor soars (above, right of centre). The Andean stronghold of *Viola regina*, the foreground being its habitat. (19 Nov 2013. C. Celedón)

At that time we'd already been in touch for a while, and being perfectly well aware of our involvement with these little plants, in a state of some excitement he showed us the photos. *Viola atropurpurea* [fig.19] occurs with relative abundance (for rosulate violas!) to the east at the Portillo ski centre and pass to Argentina. He'd never seen it, badly wanted to, and from the appearance of the rosettes

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presumed he'd found it at a new location. On available evidence we couldn't deny that strong probability, but wanted to see a photo and specimen of the flowering plant before confirming or otherwise.

The big stumbling block to achieving this was Carlos's deeply embedded resistance to collecting. Such was his concern for the welfare and conservation of natural organisms - and consequent care not to disturb them, that we had great difficulty in persuading him to take specimens. In the end he was swayed by the argument we use when trying to convince all of his ilk who share that reluctance, and who come up with succulent photos of new species, but won't collect them or even tell where they were found. If the scientific community and conservation movements don't know about the existence of a rarity and its location, how on earth can it be protected? Sadly, a number who photograph these desiderata still dig their heels in.

fig.15: A closer view of one of those condors in the Aconcagua valley immediately below the *Viola regina* location. (20 Oct 2009. JMW)

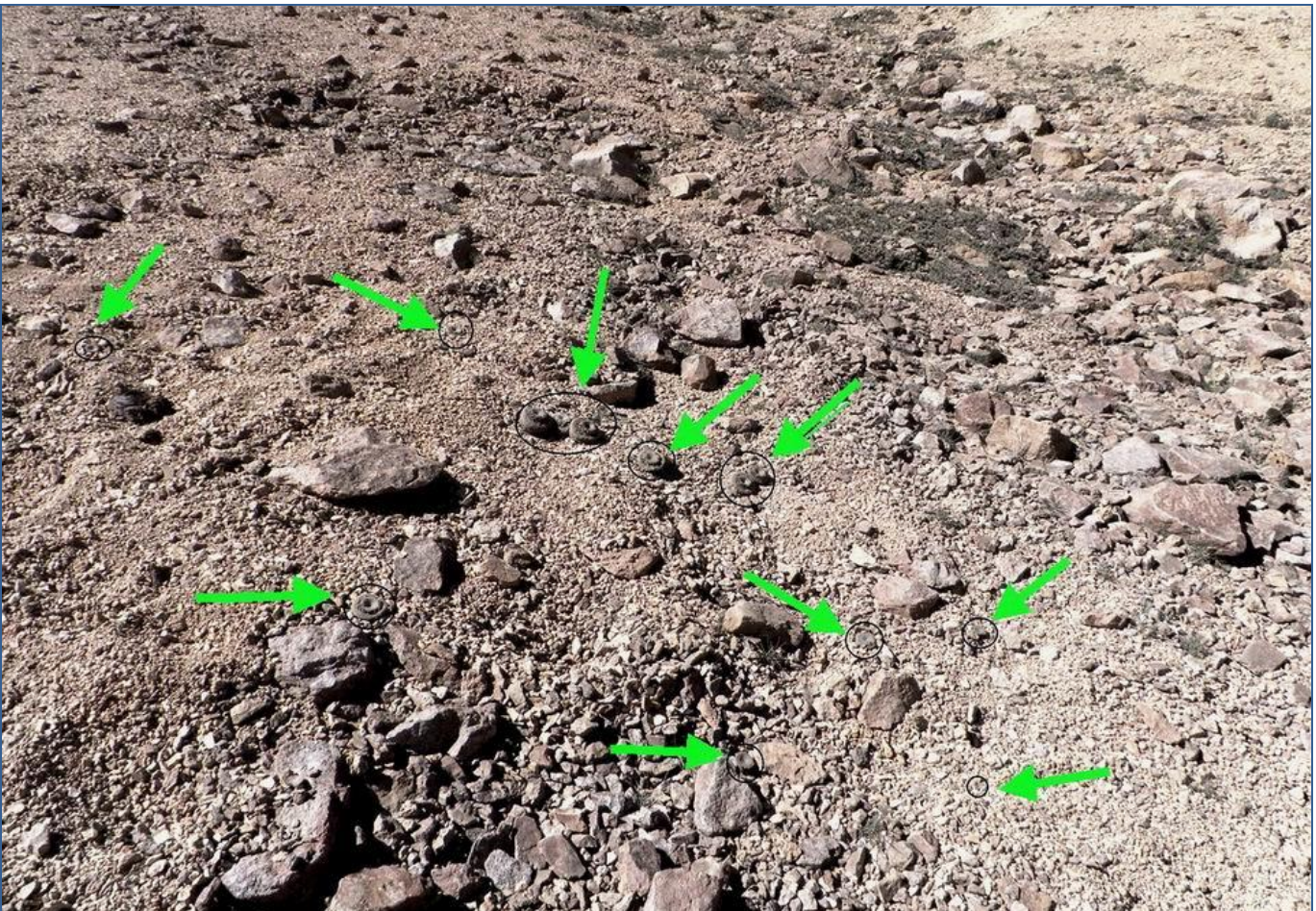


fig.16: A typical colony of *Viola regina* in its characteristic habitat. The eleven rosettes of all sizes are ringed in black and indicated by green arrows. (28 Nov 2013. C. Celedón)



fig.17: A size indication of his find, also that Carlos chain-smoked. Fanatically eco-conscious though, he never left empty packets around. (23 Feb 2013. C. Celedón)

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fig.18: left, this capsule of *Viola regina* with style and crest attached, as seen on the first encounter, was the only hint of what was to come. (23 Feb 2013. C. Celedón)

fig.19: right, Carlos supposed he'd stumbled on a new site for this common species in the region, *Viola atropurpurea*, which he'd not seen before. (25 Dec 2010. JMW)



fig.20: *Sanicula graveolens*, a common and rather 'odoriferous' Andean herb of the temperate Andes. (28 Nov 2013. C. Celedón)

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The consuming interest Carlos had in any and every wild plant led to him photographing or reporting the very few accompanying Andeans that he saw in the vicinity of the viola's habitat, a valuable addition to its environmental context. Surprisingly considering the very low overall number of taxa, they include two very distinct and different species of *Nassauvia*.

Not all were at their best, so his depictions of them have been augmented by a few others. As known they amount to *Sanicula graveolens* (Apiaceae) [fig.20], *Oriastrum* (formerly *Chaetanthera*) *lycopodioides* (Asteraceae) [fig.21], *Oxalis compacta* (Oxalidaceae) [fig.22], *Nassauvia cumingii* (Asteraceae) [fig.23], *Nassauvia lagascae* var. *lagascae* [fig.24] and *Barneoudia major* (Ranunculaceae) [fig.25]. Despite his wide interests, once he got to know us violas also become Carlos's main priority too, of course [figs.26, 27].

Now knowing that these particular rosulates usually flower in November and December, Carlos returned to the site nine months later on November 19th and showed us his camera-full of mouth-watering shots [e.g. figs.32-36, 66]. It takes little to imagine how thrilled we all were. But being the glutton for punishment he was, he'd set out on spur of the moment with nothing more in mind than a quick up-and-down, off-the-cuff, baggage-free reconnoitre and the intention of returning for specimens if necessary. Another nine days later we drove Carlos to his jump-off point, and up he went, loaded with the press and other collecting paraphernalia. In a few hours he returned with the taxonomic goods and a few more photos [figs.37-45, 65].



fig.21: Pretty little *Oriastrum lycopodioides* (formerly *Chaetanthera*). (28 Nov 2013. C. Celedón)



fig.22: The widespread *Oxalis compacta* occurs from ca. 1500 m to over 4000 m. Classified as always being annual in nature, it often looks more persistent. (28 Nov 2013. C. Celedón)



fig.23: *Nassauvia cumingii* forms large, vigorous and forbidding spiny-leaved clumps, like a defensive hedgehog! (Photo Marcela Ferreyra)



fig.25: F.& W.12595 *Barneoudia major*. Only 'early birds' catch this *Eranthis* look-alike thus, as it flowers with the snowmelt. Ours was a lucky tail-ender. (1 Dec 2013. JMW)

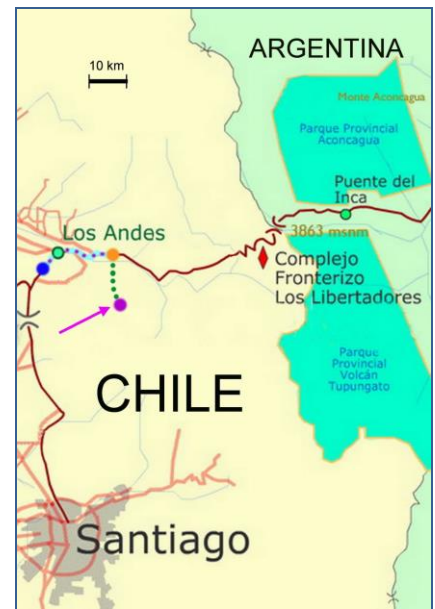


fig.26: Carlos brings home more 'viola bacon' from on high elsewhere. (6 Feb 2014. JMW)

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fig.27: Common and ubiquitous *Viola montagnei*, the species he returned with when we crossed to Mendoza, Argentina, on 6 Feb 2014. (19 Nov 2013. C. Celedón)



Left to right:

- fig.28: South America, showing the only location of *Viola regina*, in Chile, circled and arrowed blue.
- fig.29: Valparaíso Region, central Chile, where *Viola regina* is endemic, arrowed violet.
- fig.30: Our best estimation of the actual type and only *Viola regina* site. Blue dot - our home. Brown spot - Carlos's start point on foot. Violet arrowed - the type site.

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fig.31: A view of the lateral range with its rounded ridge crests where Carlos found *Viola regina*. Taken while we were on a picnic. (30 Dec 2016. JMW)



fig.32: A prize-winning in situ portrait of *Viola regina* in all its glory. (19 Nov 2013. C. Celedón)

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Taxonomy

Viola regina J.M. Watson & A.R. Flores, sp. nov. [figs.32-45, 66, 67]

Type: CHILE. Valparaiso Region, Aconcagua Province, to the south of the Aconcagua River valley and SE of Salto del Soldado, ca. 32°57'24"S 70°42'53"W, at over 3000 m, 29 November 2013, leg. Carlos Celedón s.n. (= F. & W. 12592) (holotype SGO; isotypes CONC, herb. Flores & Watson).

Diagnosis: *This distinctive new species belongs in section Andinium W. Becker. It is a constituent of the large but well-defined and self-contained infrasectional sempervivoid alliance, as represented by Viola atropurpurea Leyb., but without close affinities there. V. regina differs from most others of the alliance by its usually wide, frequently dome-shaped rosettes, and from all others by its large, heavily and densely black or inky blue-veined corolla, the lateral petals bearded with long, flattened, translucent white, clavate hairs. The flowers are set as a corona on and within the face of the rosette, a character otherwise only found in Viola coronifera W. Becker and Viola comberi W. Becker, both of which have smaller-sized yellow or orange flowers and lateral petals short-bearded at the base only.*

Description: Perennial acaulous, evergreen, rosulate hemicryptophyte, glabrous except for corolla; most commonly as large, individual rosettes, but at times forming mounds of up to 12 or more per plant. *Rootstock* ca. 25-40 cm long × 1 cm at junction with caudex, axial, vertical, stout. *Caudex* to 10 cm long × 1 cm dia., simple or shortly branched. *Rosette* to 6-8 cm dia. × 2-3 cm high, densely imbricate, usually dome-shaped with centre of face depressed, cryptic. *Leaves* ca. 2.5-4 cm, spirally arranged, spatulate. *Pseudopetiole* 1-3.5 cm × 2-3 mm, flat, carnose, at times more or less tinged reddish. *Lamina* ca. 6 × 5 mm when mature, broadly ovate to rhomboid, entire, leathery-carnose, rigid, pale glaucous greyish green; margin narrow, translucent-cartilaginous; apex shortly mucronulate. *Anthesis* more or less synchronous, with circular crown of 20 or more flowers within face of rosette. *Peduncle* ca. 0.8-1.5 cm, slightly shorter than juvenile upper leaves. *Bracteoles* 5-6 mm, basal, linear, membranous, acuminate. *Calyx* 7-9 mm, bulbous, entire and 4 mm dia. basally, free above, viscid-shiny, often entirely or partially red-tinged. *Sepals* lanceolate, subacute, superior slightly shorter and broader, inferior pair somewhat longer and narrower. *Corolla* 1.2-1.7 cm long × 1-1.5 cm wide, solitary, axial, clear to dull white or pale silvery grey, heavily veined black or dark, inky blue overall, most strongly on inferior petal where also forming a denser basal marking; superior petals 6-7 × 3-3.3 mm, obovate, glabrous; lateral petals 8-8.5 × 5-5.2 mm, broadly obovate with long white, flattened, clavate hairs in central zone; inferior petal 11-13 × 6.7-8 mm, broadly obovate, obtriangular or obcordate, throat with yellow triangle, apical lateral margins usually with sparse long white, flattened, clavate hairs; apex truncate or shallowly retuse. *Spur* 1.8-2 × 1.5 mm, conical, apex rounded. *Anthers* 2.6 mm connate around style, inferior pair with 3 mm tapering nectar spurs; connectives 1.4 mm, yellow, brown or dull orange. *Style* subgeniculate, capitate. *Style crest* 2 short, broad, stout recurved lateral lobes. *Stigma* as frontal opening. *Capsule* 5 mm long × 4.5 mm dia., rounded, three valved, apex pointed. *Seeds* 2 mm long × 1.5 mm dia., to 6 per capsule, lacrimiform, yellowish brown blotched black.

Etymology: Our denomination *Viola regina*, meaning queen of the violas, celebrates the regal beauty of the new species together with its crowning circle of corollas.

Habitat: The subnival zone at shortly over 3000 m, forming colonies of scattered individuals on shallow rocky slopes and gently rounded to flat-topped ridge crests almost devoid of other vegetation.

Distribution: Endemic to Aconcagua Province, Valparaiso Region, Chile, where only known from an E-W spur of the central temperate Andes south of the Aconcagua River as a diffuse population of several dispersed colonies of variable sizes. [figs.28-30]

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Conservation status: Not formally evaluated. *V. regina* inhabits a remote location in an area with no apparent anthropomorphic disturbance, and where no development of any kind is currently planned. Nevertheless, its extreme rarity as known from the type site only, where relatively few plants were observed (under 100), indicates that its formal status should be classified as endangered (EN) (IUCN 2012).

Background. *Viola* and its section *Andinium* W. Becker

Cosmopolitan *Viola* has a mainly temperate and high tropical mountain distribution. With ca. 610-655 known and accepted species it is the largest genus of the Violaceae family, and consists of 16 sections, mainly in the Northern Hemisphere (Wahlert et al. 2014). *Viola* evolved ca. 35 Ma years ago in what is now the southern end of temperate South America (Clausen 1929, Ballard et al. 1999, Marcussen et al. 2012, Marcussen et al. 2015). This early branching from the rest of the family has led to the conclusion that species of the most direct ancestral origin exist in the subcontinent in three of its sections, two of which are endemic there.

The largest of those 16 sections, when its undescribed but accepted species are taken into account, is section *Andinium* W. Becker (Watson & Flores 2019a), one of the two endemic to South America. Its 110 published taxa, together with the present species and others waiting to be described or collected, are known colloquially as the Andean rosulate violas. With a longitudinal distribution from the equator to southern Patagonia, their complement of published or known species as currently recognised by the present authors amounts to 146 (Watson & Flores ined.).

Apart from two regional floras, section *Andinium* was ignored botanically until the mid-1990s following the death in 1928 of its historical authority, Wilhelm Becker of Berlin-Dahlem. Indeed, it became rather better known to horticulture thanks to Sampson Clay (1937), despite some rather wild inaccuracies, and in particular his inclusion of B & W photos Harold Comber made in Patagonia. Taking this 'vacuum' into account, together with the inaccessible habitats and solitary or few known populations of many of its taxa, the fact that it is still relatively poorly understood is hardly surprising. Furthermore, as many as 40 species are currently unknown in the wild (Watson & Flores ined.), which serves to exacerbate the problems, as do the destruction of several important specimens and the difficulty of distinguishing between some taxa (Watson & Flores 2019a). Nevertheless, Marcussen et al. (2015) have been able to calculate that the section split from the rest of *Viola* as early as 29 Ma. This revelation, together with the section's specialised adaptation to regional geoclimatic conditions, explains why so many of its taxa are uniquely unlike the rest of *Viola* (Watson & Flores 2012, 2013a, 2013b).

Anyone who studied section *Andinium* seriously could hardly fail to notice that its 140-odd species divide up into a number of mainly very distinct alliances, with the exception of a few unique individuals with no close morphological affinities. Only one of these aggregations, consisting of not more than half-a-dozen species, has been recognised and defined so far - by Becker (1926) as the *Triflabellatae*, and not validly at that. We have made a considerable start on this important aspect, including provisionally grouping and keying out all allied sets of taxa. But more needs to be done before we are ready to publish scientifically. Meanwhile, our vision of how the section has evolved and split into these groups has at least been laid out informally (Watson & Flores 2012, 2013a, 2013b). Two conglomerations are particularly numerous, the lesser of them being the very distinctive sempervivoid association under consideration here. Its 26 known species occupy no more than the temperate southern third of the total range of the entire section. That is, down through Chile and Argentina from approximately 31°30'S to 49°S, some 1900 km [fig.46]. We hypothesise that due to its position at the point of evolution of the section and its distinctive morphology, this particular alliance evolved early to take advantage of ongoing vulcanism in the southern Andes (Watson & Flores 2013a).



fig.33: Another plant of the new *Viola regina*, which were mostly observed as large, solitary rosettes. (19 Nov 2013. C. Celedón)



fig.34: *Viola regina*. Close-up of a heavily marked black form. (19 Nov 2013. C. Celedón)



35) An inky navy-blue form of *Viola regina* in close-up. (19 Nov 2013. C. Celedón)

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fig.36: *Viola regina*. Flower close-up of a more lightly marked black form with notable red calyces. (19 Nov 2013. C. Celedón)



fig.37: *Viola regina*, a form with notably red peduncles and calyces curving inwards to develop the capsules between the leaves. (28 Nov 2013. C. Celedón)



fig.38: The main specimen of two being prepared for pressing. The upper half is the holotype of *Viola regina*, the lower is one of two isotypes. (29 Nov 2013. JMW)



fig.39: A cut-away dissection of the *Viola regina* growing point showing two new rosettes. As these develop plants will form mounds. (28 Nov 2013. C. Celedón)



fig.40: View of a *Viola regia* specimen rosette from below. (28 Nov 2013. C. Celedón)



fig.41: Leaf undersurfaces of a *Viola regia* specimen before being pressed. (29 Nov 2013. JMW)



fig.42: *Viola regia* flower with central style, stigma, style crest and orange-brown connectives arrowed blue. (29 Nov 2013. C. Celedón)

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fig.43: A developing *Viola regina* capsule submerged beneath rapidly growing and elongating leaves. (28 Nov 2013. C. Celedón)

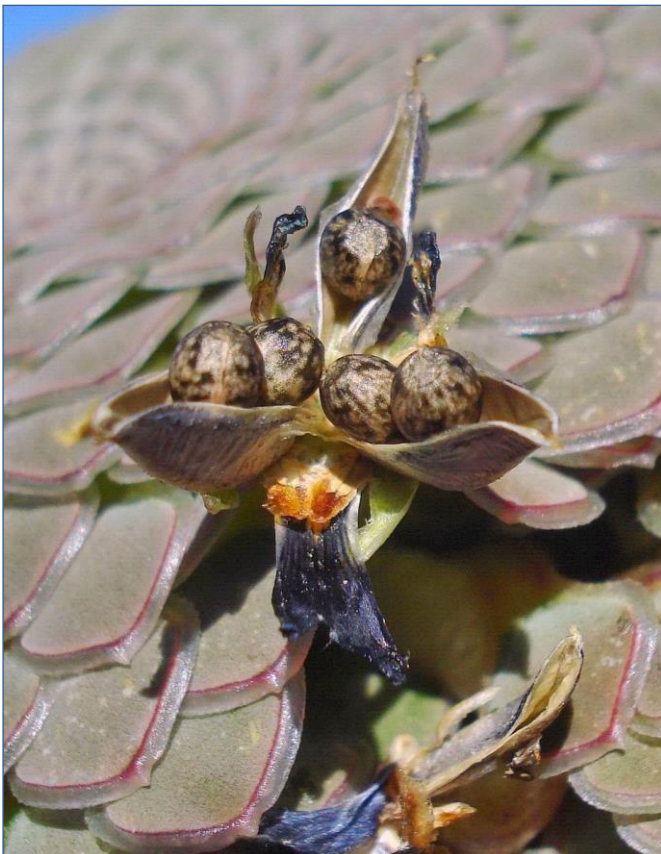


fig.45: A solitary seed capsule of *Viola regina* on the point of catapulting out its contents, photographed on the first encounter. (23 Feb 2013. C. Celedón)



fig.46: The full distribution of *Viola* section *Andinium* extends between the two pink lines. The sempervivoid alliance range in the south is marked by the blue lines.

The history of the sempervivoid alliance of *Viola* section *Andinium*

V. cotyledon was the first described of these species in 1824, 16 years after the very earliest of all the section *Andinium* taxa was made known to science. It took another couple of decades for the second to be published, those two being the only ones known by Gay (1846) when included in the *Viola* entry of his comprehensive multi-volume Chilean flora compilation. This was next followed by a monograph of the violas in Chile (Reiche 1893). Another four of these particular violas had been located meanwhile, and were added to the group Reiche called perennial rosulates. After a decade of no further advance, the all-time authoritative giant of *Viola*, Wilhelm Becker, came on the scene and began to turn his attention to the South Americans. From then to his untimely death in 1928 he described no fewer than seven new sempervivoids as collected by various others. These were augmented in the same period by two more from southern Patagonia discovered and published by the Swedish botanist Carl Skottsberg. Almost unbelievably there was no significant study of the section following Becker until 1994, when it was adopted by the present authors. Just one Peruvian species of a different infrasectional alliance was added during those 66 years! Our revitalising concentration on section *Andinium* has yielded another six taxa to the sempervivoid alliance since. Three more with specimens are on our waiting list, and one final very distinct and spectacular species is only known from photographs, alas.

Defining characters of the sempervivoid alliance

Plant perennial, evergreen, glabrous, dwarf acaulous herb, forming distinct, more or less imbricated and spirally foliate rosettes. Rootstock axial, often notably stout, branched below or not. Centre of rosette face depressed. Leaf pseudopetiolate, estipulate. Lamina broadly oblanceolate to wider than long, rigidly carnosely-coriaceous, entire, eglandular, smooth on both faces. Margin cartilaginous, usually glabrous, at times minutely ciliate or denticulate basally. Apex acute, obtuse or subtruncate, mucronulate with the rare exception of one taxon. Flowers never exceeding foliage, disposed around circumference or on face of rosette. Corolla glabrous or bearded, small to large. Style crest usually lateral, less commonly lateral and apical; apical in two taxa only.

Key to distinguish the 22 taxa of the section *Andinium* sempervivoid alliance

1. Inferior petal spur prolonged, 6-10 mm. Corolla white or pale yellowish ... 2.
 - Inferior petal spur short, 5mm or less, or if prolonged up to 10 mm, then corolla bright yellow to orange ... 4.
2. Corolla pale yellowish, small, lower petal bearded. Style crest lobes lateral, orbicular. (Chilean endemic of Santiago Metropolitan Region) ... *Viola sempervivum*
 - Corolla white or pale violet, medium to largish, glabrous. Style crest lobes lateral, narrowly linear ... 3.
3. Anthers and connectives ciliate. Style crest lobes slender, pendulous. (Chilean endemic of Santiago Metropolitan Region) ... *Viola santiagonensis*
 - Anthers and connectives glabrous. Style crest lobes stout, strongly recurved, (Argentinian endemic of Neuquén Province) ... *Viola rossowiana* [fig.47]
4. Corolla bright yellow to orange ... 5.
 - Corolla white, violet, pale blue, purplish, blackish blue or maroon-red ... 8.
5. Inferior petal spur elongate, to 10 mm. Style crest apical. (Argentinian endemic of Neuquén Province) ... *Viola coronifera* [fig.48]
 - Inferior petal spur 5 mm or less. Style crest lateral ... 6.
6. Corolla small, 6 mm or less wide. Lateral petals and at times superior and inferior petals densely invested in short, white, capitate indumentum. (Andes of central Argentina and Chile) ... *Viola atropurpurea* [fig.49]
 - Corolla medium or large, 10 mm or more wide, Lateral petals bearded basally only with sparse indumentum. Superior and inferior petals glabrous ... 7.

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Key to distinguish the 22 taxa of the section *Andinium* sempervivoid alliance - continued

7. Flowers as dense upright-facing ring on rosette face. Anthers ciliate. Style crest lateral and apical. (Argentinian endemic of Neuquén Province) ... *Viola comberi*
 - Flowers facing outwards round rosette circumference. Anthers papillose. Style crest lateral. (Argentina, Santa Cruz Province; Chile, Aisen Region) ... *Viola auricolor* [fig.50]
8. Flowers small, less than 6 mm wide ... 9.
 - Flowers medium to large, 10 mm or more wide ... 10.
9. Corolla glabrous white, more or less lined violet-blue. Style crest lateral and apical. (Argentinian endemic of Neuquén and Mendoza provinces) ... *Viola abbreviata* [fig.51]
 - Corolla densely bearded on lateral petals at least, blackish blue or maroon-red. Style crest lateral (Andes of central Argentina and Chile) ... *Viola atropurpurea* [fig.52]
10. Lamina narrow to narrowish, clearly longer than wide ... 11.
 - Lamina approximately as wide as long, or wider ... 16
11. Style crest apical. (Chilean endemic of Bío Bío Region) ... *Viola aizoon* [fig.53]
 - Style crest lateral ... 12.
12. Lateral petals bearded ... 13.
 - Corolla glabrous ... 14.
13. Plant more or less depressed, not regularly columnar, foliage usually lax, seldom imbricate. Flowers around rosette (Argentina, Mendoza to Chubut provinces; Chile, Santiago Metropolitan to Los Lagos regions) ... *Viola cotyledon* [fig.54]
 - Plant with columnar, imbricate rosettes. Flowers forming ring at upper outer rim of rosette. (Argentinian endemic of Neuquén Province) ... *Viola xblaxlandiae* [fig.55]
14. Corolla 1.5 cm or more wide. Style crest lateral, stout, large. (Argentinian endemic of Mendoza Province) ... *Viola beckeriana* [fig.56]
 - Corolla ca. 1 cm wide. Style crest lateral and apical, small ... 15.
15. Plant structure imbricate-depressed. Calyx glossy, usually black. (Argentina, Neuquén Province; Chile, Araucanía Region) ... *Viola dasyphylla* [fig.57]
 - Plant structure lax, ascending. Calyx matt, green. (Argentinian endemic of Neuquén Province) ... *Viola lologensis*
16. Rosette tightly imbricate and depressed-prostrate. Corolla blue. (Chilean endemic of Santiago Metropolitan Region) ... *Viola portulacea*
 - Rosette more or less columnar; strongly columnar if corolla blue ... 17.
17. Corolla glabrous (Argentinian endemic of Neuquén Province) ... *Viola pachysoma* [fig.58]
 - One or more petals bearded ... 18.
18. Inferior petal only bearded basally (Southern Argentina, Chubut and Río Negro provinces; Chile, Aisen Region) ... *Viola columnaris* [fig.59]
 - Lateral petals bearded ... 19.
19. Style crest lateral and apical. (Argentina, Mendoza Province; Chile, Maule Region) ... *Viola leyboldiana* [fig.60]
 - Style crest lateral ... 20.
20. Corolla medium, ca. 1 cm wide ... 21.
 - Corolla large, ca. 1.5 cm wide ... 22.
21. Superior and lateral petals as large or larger than inferior petal. (Chilean endemic of Maule Region) ... *Viola skottsbergiana* [fig.61]
 - Inferior petal notably larger than upper petals. (Argentinian endemic of Mendoza Province) ... *Viola xzwienerii* [figs.62, 63]
22. Flowers disposed around circumference of rosette. (Argentinian endemic of Río Negro Province) ... *Viola petraea* [fig.64]
 - Flowers forming corona within and on face of rosette (Chilean endemic of Valparaiso Region) ... *Viola regina* [figs.65, 66]



fig.47: F.& W.10705 *Viola rossowiana*. Cajón de los Nevados, Minas Dept., Neuquén Province, Argentinian N Patagonia. (8 Feb 2003. ARF)



fig.48: *Viola coronifera*. Cerro Colo Huincul, Huilches Dept., Neuquén Province, Argentinian N Patagonia. (Photo JMW)



fig.49: F.& W.12594 *Viola atropurpurea*. Portillo, Aconcagua Province, Valparaiso Region, Chile.
(1 Dec 2013. JMW)



fig.50: *Viola auricolor*. Santa Cruz Province, Argentinian S Patagonia. (17 Feb 2014. Arve Elvebakk)



fig.51: F.& W.11875 *Viola abbreviata*. Cerro Waylie, Minas Dept., Neuquén Province, Argentinian N Patagonia. (24 Nov 2009. ARF)



fig.52: F.& W.13092 *Viola atropurpurea*. Portillo, Aconcagua Province, Valparaiso Region, Chile. (28 Nov 2017. JMW)



fig.53: *Viola aizoon*. Termas de Chillán, Ñuble Province, Bío Bío Region, S Chile. (2 Jan 2003. ARF)

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fig.54: *Viola cotyledon*. Lonquimay Pass, Malleco Province, Araucanía Region, S Chile.
(20 Dec 2002. ARF)



fig.55: *Viola xblaxlandiae*. Copahue, Ñorquin Dept., Neuquén Province, Argentinian N Patagonia.
(13 Jan 2014. Kees Jan van Zwienen)



fig.56: F.& W.12365 *Viola beckeriana*. Portillo de Los Piuquenes, Tunuyán Dept., Mendoza Province, Argentina. (17 Dec 2012. JMW)



fig.57: F.& W.11566 *Viola dasyphylla*. Cerro Colorado, Lacar Dept., S Neuquén Province, Argentinian N Patagonia. (28 Dec 2007. JMW)

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Left to right:

fig.58: *Viola pachysoma*. Copahue, Ñorquin Dept., Neuquén Province, Argentinian N Patagonia. (Photo JMW)

fig.59: *Viola columnaris*. Bariloche, Pilcaniyeu Dept., Río Negro Province, Argentinian Patagonia. (2 Nov 2017. Marcela Ferreyra)

fig.60: *Viola leyboldiana*. El Choique Pass, Malargüe Dept., S Mendoza Province, Argentina. (23 Dec 2002. ARF)



fig.61: F.& W.12628 *Viola skottsbergiana*. Vergara Pass, Curicó Province, Maule Region, Chile. (17 Dec 2013. JMW)

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fig.62: F.& W.12600 *Viola x zwienenii*. Vallecitos, Luján de Cuyo Dept., Mendoza Province, Argentina. (2 Dec 2013. ARF)



fig.63: F.& W.12600 *Viola x zwienenii*. Vallecitos, Luján de Cuyo Dept., Mendoza Province, Argentina. (2 Dec 2013. ARF)

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fig.64: F.& W.10660 *Viola petraea*. Cerro Catedral, Pilcaniyeu Dept., Río Negro Province, Argentinian Patagonia. (30 Dec 2002. ARF)



fig.65: *Viola regina* for comparison, displaying well the outright difference between it and all others related. (28 Nov 2013. C. Celedón)



fig.66: The irresistible indulgence of one last loving shot of this glorious queen of the violas. (19 Nov 2013. C. Celedón)

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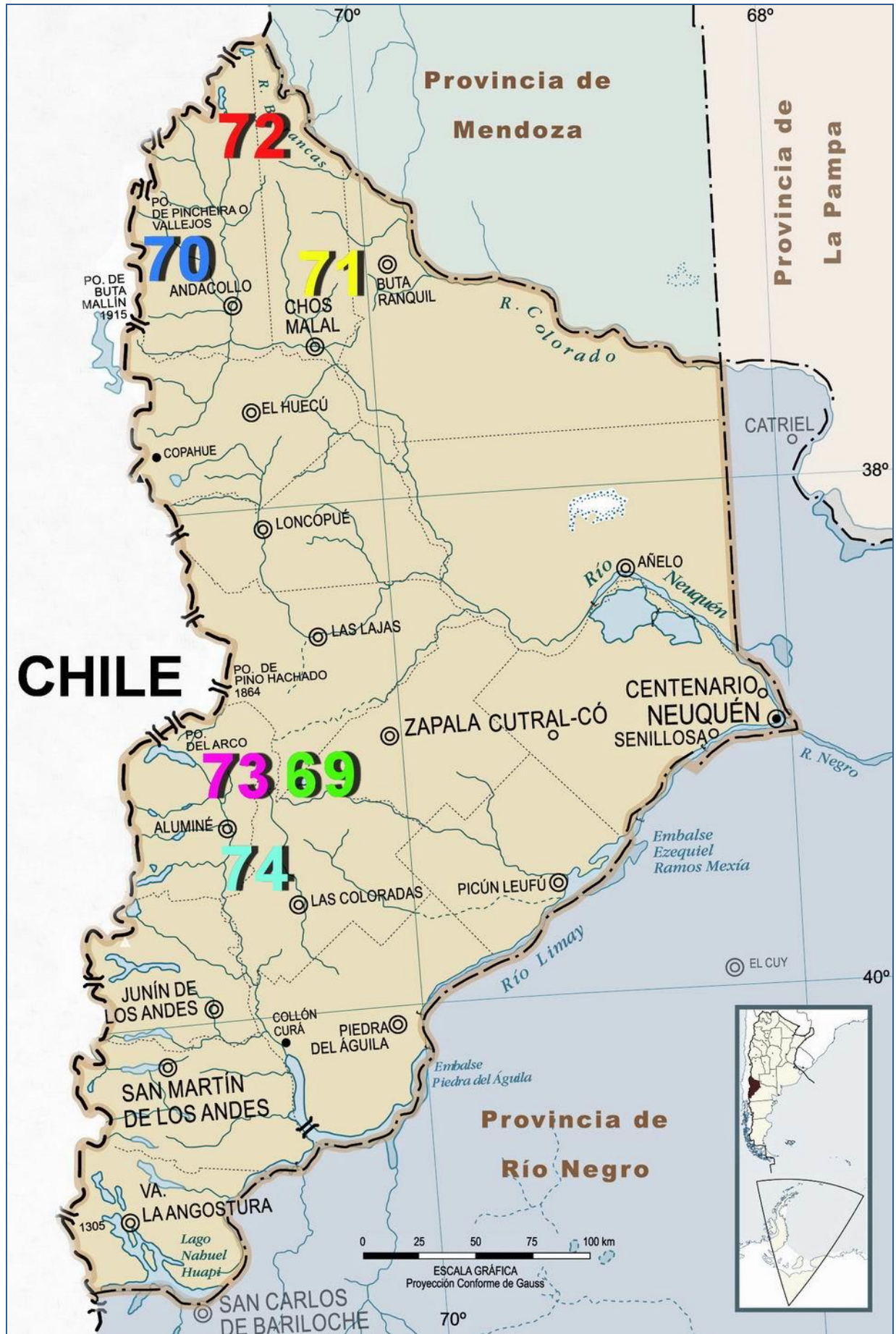


fig.67: Neuquén Province, N Argentinian Patagonia, showing the locations of the uncertain sempervivoid populations numbered as per the illustrations here.

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fig.68: F.& W.11566 *Viola dasyphylla*. Cerro Colorado, Lacar Dept., S Neuquén Province, Argentinian N Patagonia. (28 Dec 2007. JMW)

fig.69: below, **Viola A**, cfr. *V. dasyphylla*. Cerro Atravesada, Picunches Dept., Neuquén Province, Argentinian N Patagonia. (22 Dec 2007. ARF)





fig.70: F.& W.11872 **Viola B**, cfr. *V. dasyphylla*. Epulauquén, Minas Dept., Neuquén Province, Argentinian N Patagonia. (23 Nov 2009. ARF)



fig.71: **Viola C**, cfr. *V. pachysoma*. Near Volcán Tromén, Chos Malal Dept., Neuquén Province, Argentinian N Patagonia. (3 Nov 2003. ARF)

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fig.72: **Viola D**, cfr. *V. pachysoma*. Near Cerro Domuyo, Minas Dept., Neuquén Province, Argentinian N Patagonia. (4 Nov 2003. ARF)



fig.73: F.& W.11863 **Viola E**, cfr. *V. pachysoma*. Rahue Pass, Catán Lil Dept., Neuquén Province, Argentinian N Patagonia. (21 Nov 2009. ARF)



fig.74: F.& W.11858 **Viola F**, cfr. *V. pachysoma*. Cerro Atravesada, Picunches Dept., Neuquén Province, Argentinian N Patagonia. (23 Nov 2009. JMW)

And who, pray, are you?

The sempervivoid water is muddied by a number of populations, six as seen by ourselves, in Neuquén Province, northern Argentinian Patagonia [fig.67]. They closely resemble either *V. dasyphylla* or *V. pachysoma*, but differ from the existing morphological recognition of those taxa sufficiently to cast doubts on their identity. On the other hand they lack any distinct critical characters which would enable them to be considered as hitherto undescribed species. Are they unusual extreme variants of one or other of those two species, or possibly hybrids? A potentially definitive answer to that may only appear when or if they can be subjected to the modern technical process of molecular analysis. For a while that option looked to be optimistically in view, but unfortunately it has failed to materialize. Our apologia for this detailed and rather arcane paragraph is the hope that it may provide useful preliminary information for future investigators. To that end we have arranged representative illustrations of the six populations in logical morphological order, with the two relevant published species, *V. dasyphylla* [fig.68] and *V. pachysoma* [fig.75] at either end of the 'spectrum'. What all have in common is glabrous, basically white corollas of relatively similar shapes. *Viola A* [fig.69] from Cerro Atravesada is close to *V. dasyphylla*, but differs by its glaucous foliage. The relatively loose structure and narrow laminae of *Viola B* [fig.70] place it nearer to *V. dasyphylla* than any other. However, elevated rosettes, curious texture of the lamina surface and an atypically large, broad inferior petal lend it a quite different appearance. Nevertheless, we provisionally assign these last two to a rather more broadly defined *V. dasyphylla*. The remaining four differ critically from the latter species by wider, tightly imbricate foliage, which relates them to *V. pachysoma*. But that species is vigorous, multi-flowered and with large, more or less columnar rosettes.

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As may be seen, the geographical neighbours *Viola* C [fig.71] and *Viola* D [fig.72] are dwarf, relatively few-flowered plants with small rosettes and a tendency to form spreading cushions, as per *V. dasyphylla*. *Viola* D differs even more from that species though by its cryptic brown rosettes. The last pair, *Viola* E [fig.73] and *Viola* F [fig.74], can only be separated from *V. pachysoma* by the strongly coloured and dense veining of the corollas and crowded, abundant simultaneous florations. Regardless of other factors, this undeniably lends them a very particular aspect. Pending molecular evidence to the contrary, we incline to list the violas C-D under *V. pachysoma*, which also extends its existing geographical range, although retaining it as an endemic of the province.

NB. Far from including *V. lologensis* among these uncertain, botanists from Argentina synonymize it with *V. dasyphylla*. Our acceptance of it as distinct is based on firm biogeographical evidence. It lies exactly halfway between nearby pure populations of *V. cotyledon* and *V. dasyphylla*, and is comprised of a combination of clear morphological features of both. Although certainly of hybrid origin, it was reliably recorded as two separate but identical populations isolated from its postulated parents, for which reason we have redesignated it as a species, albeit recently evolved (Watson & Flores 2011).



Ffig.75: *Viola pachysoma*. Copahue, Norquin Dept., Neuquén Province, Argentinian N Patagonia. (13 Jan 2014. Kees Jan van Zwielen)

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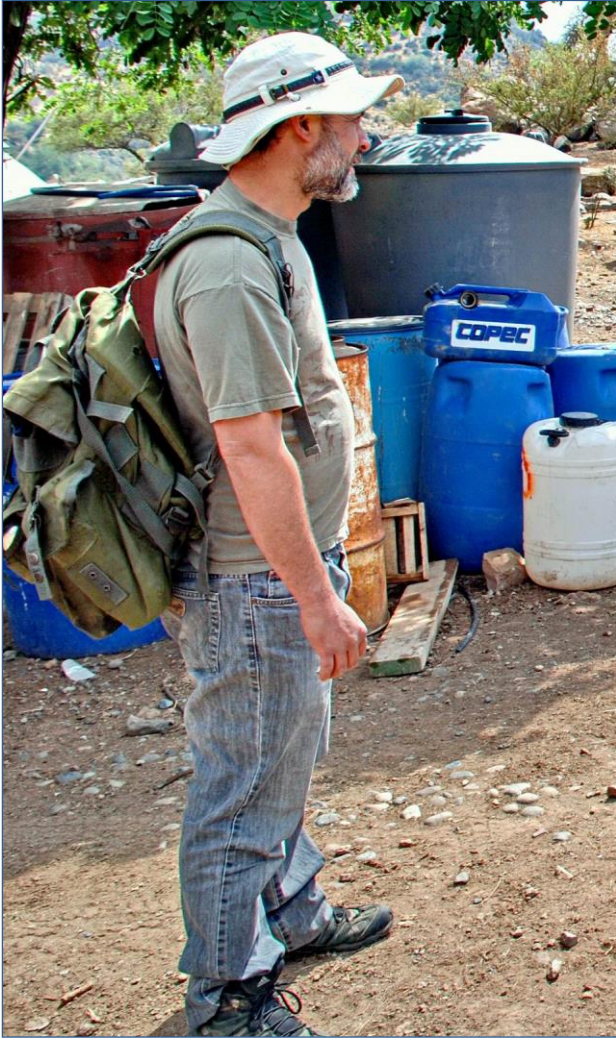


fig.76: Let's end up by paying a fond tribute to Carlos, who set this ball rolling with such an exciting new addition to these fascinating plants (30 Nov 2014. JMW)

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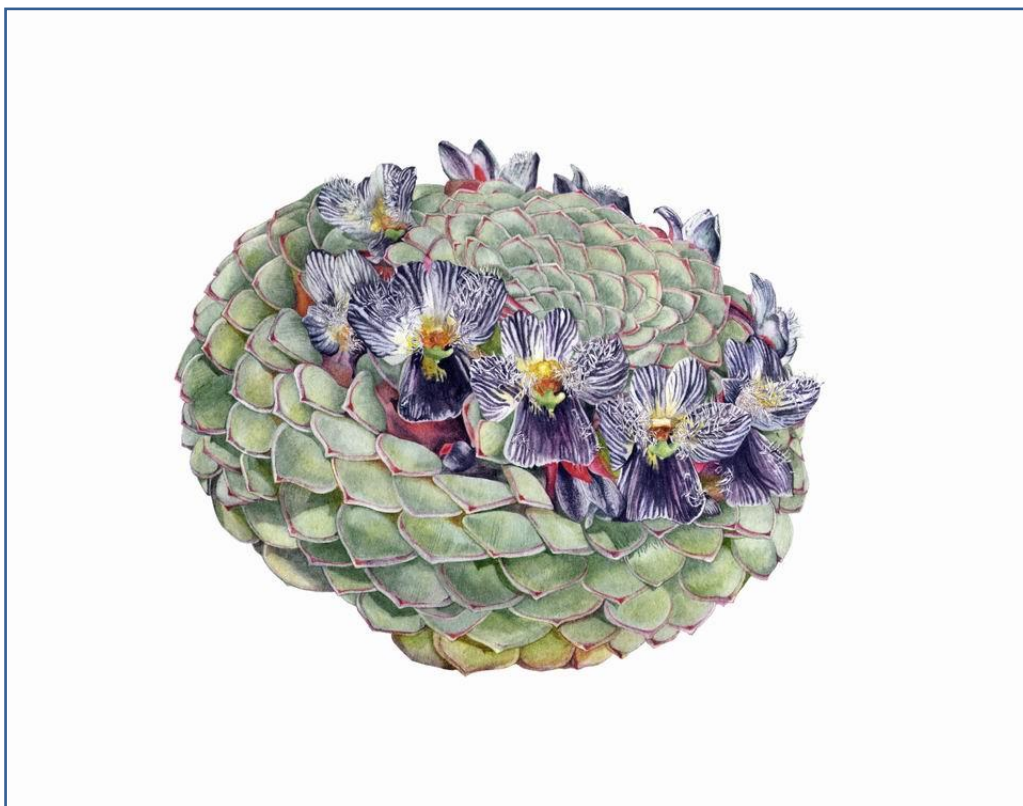
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Viola regina.
(Botanical painting
by Andrea Ugarte,
2015 in the
collection of John
and Anita Watson.)

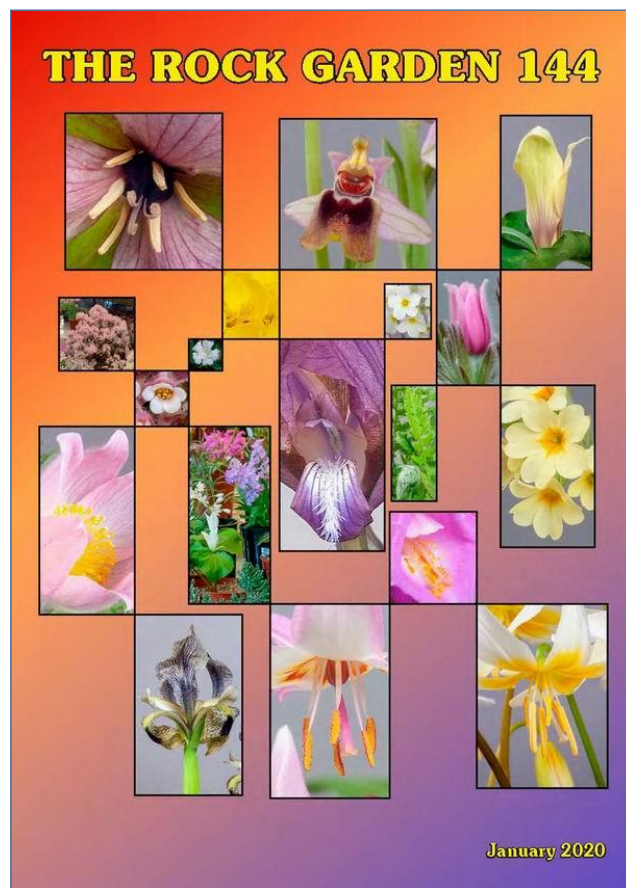
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An Alpine Garden in the Tien Shan – Frazer Henderson

Frazer Henderson, with Blaž Muhič and Nuraiym Syryak writes about the region around lake Song Kul in the recent issue of the SRGC journal, *The Rock Garden*, which is provided twice a year to members of the Scottish Rock Garden Club.

Kyrgystan's highest lake, Song Kul, lies at an altitude of around 3016 m in the central Tien Shan range, between the Song Kul-Too (north) and Moldo-Too (south) subordinate ranges. Song Kul is about 18 km long and 29 km wide, but is shallow, being only around 13m deep at maximum and is endorheic, that is to say, it has no outflows. Large numbers of sheep and goats graze the area in summer but there is still much to see for visitors interested in plants or birds.

Many thanks to Frazer for sharing some extra photos of the area here in the pages of IRG.



Song Kul - looking north to Song Kul-Too range.

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Song Kul - shore line looking north.



Song Kul - rocks with mountains in the near distance

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Song Kul looking to summer snow resting on Moldo-Too range.



Yurts in the distance.

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Song Kul - mist arriving quickly.



Rocky outcrop, snowfield and jailoo (summer pasture).

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Kyrgyz cattle.



Lichen covered rocks.

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A scree garden.

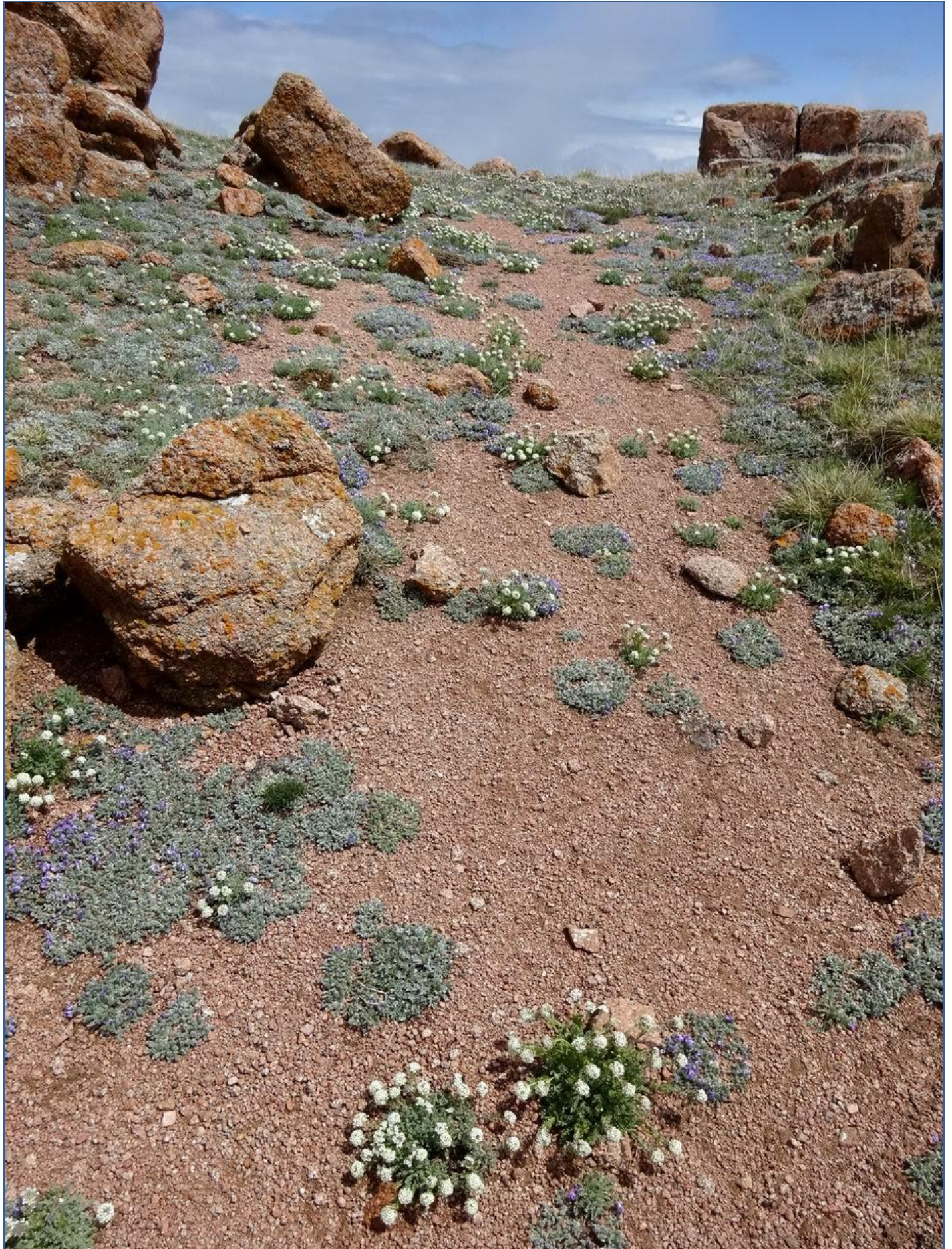


Oxygraphis glacialis



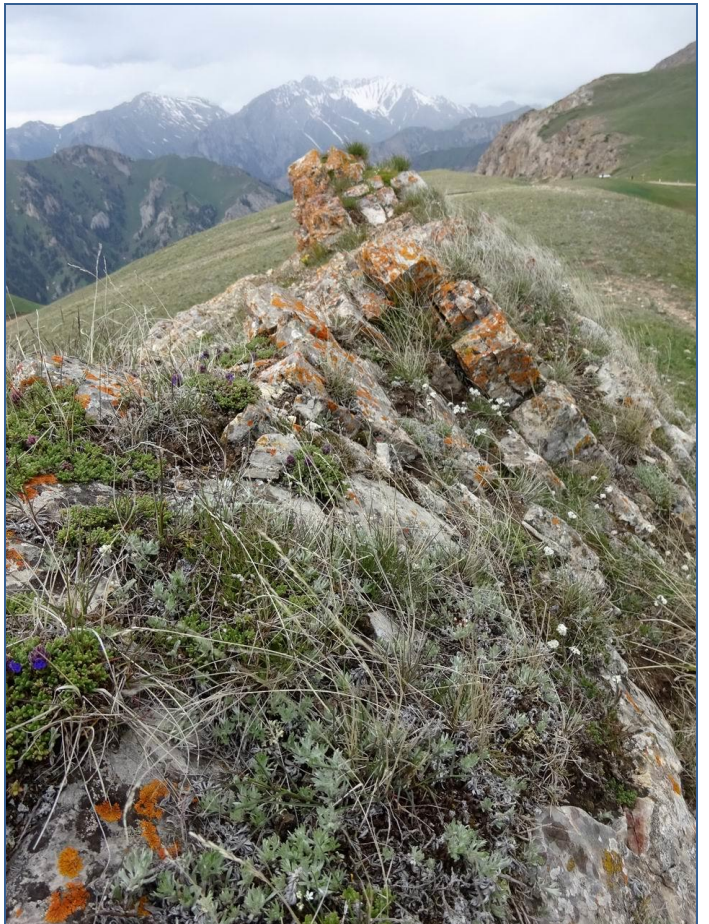
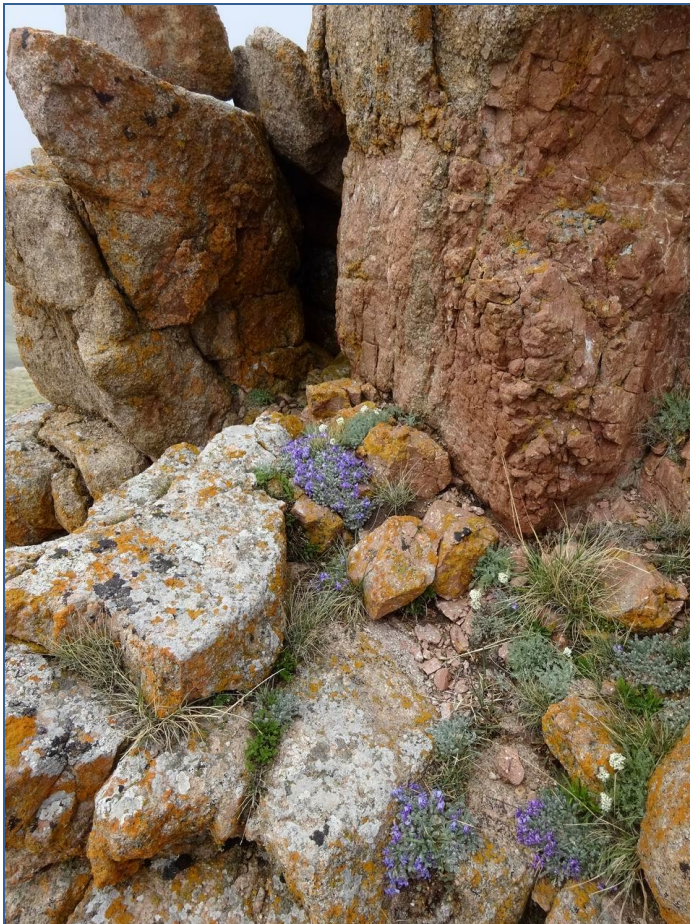
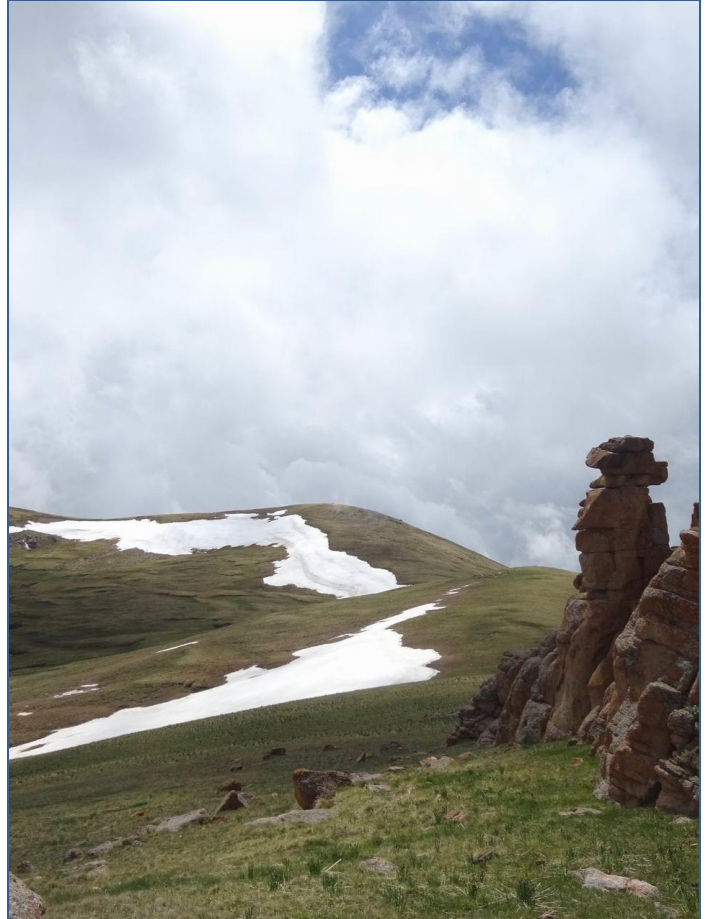
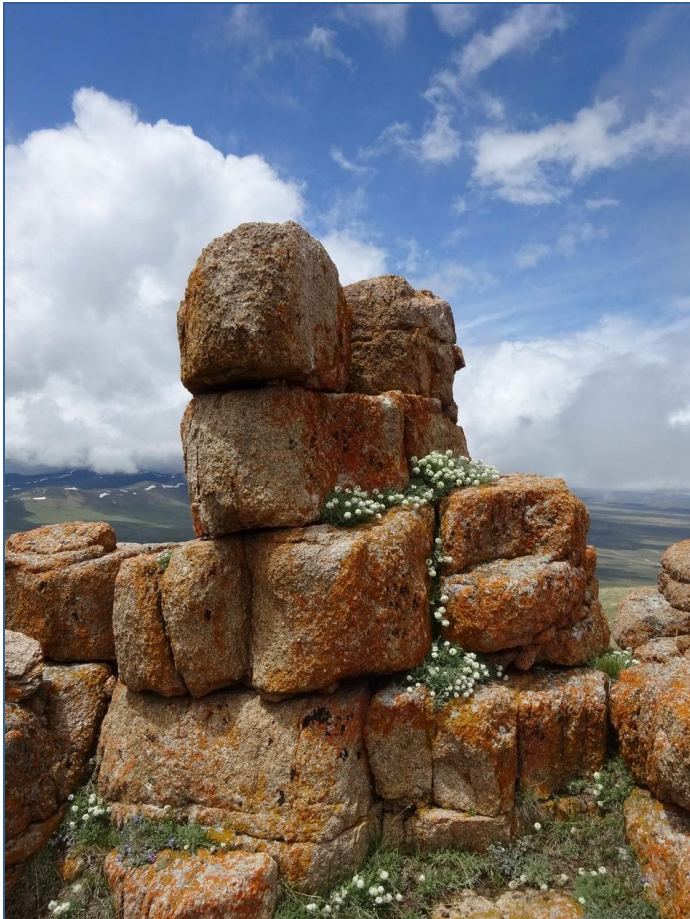
Song Kul - deep snow in the upper reaches.

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Fine scree with *Smelovskia claycina* and *Oxytropis chionobia*.

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Rocks with *Viola kunawurensis* (syn. *V. tianshanica*).

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Song Kul - Stellae of Tash-Tuulga.



Pedicularis sp. with butterflies.



Pedicularis oederi on slopes of Moldo-Too range.



Frog Orchid near lake shore of Song Kul.

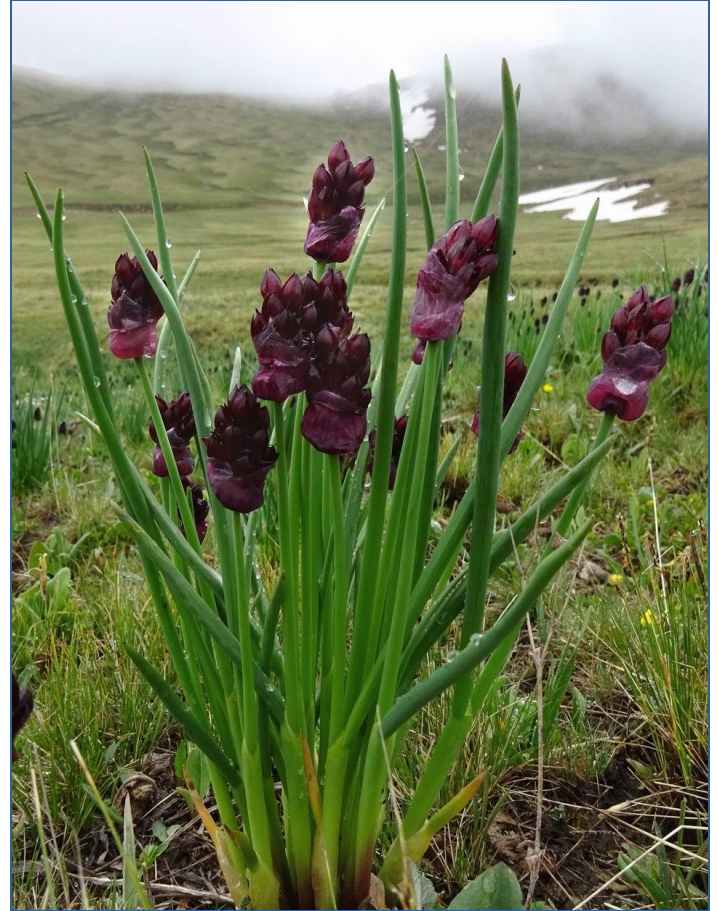


Chorispora songarica

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Morina parviflora



Allium atrosanguineum



Aster alpinus



Tulipa heterophylla

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Androsace sp.



Anemone narcissiflora subsp. *protracta*

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Viola altaica



Rosularia alpestris



Trollius lilacinus



Callianthemum alataevicum



Smelovskia calycina

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Oxytropis microsphaera



Leontopodium sp.



Trollius dschungaricus



Song Kul - rocky outcrop with *Oxytropis chionobia*

There's a lot to see in this wide countryside – thanks to Frazer for these images.