

# International Rock Gardener

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The Scottish Rock Garden Club

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Dark November days in Britain are less than enjoyable – thank goodness for the chance to escape to beautiful habitats and fabulous plants around the world in these pages! Panayoti Kelaidis' photos are of the floral gems seen on a 2018 trip to Georgia in the Caucasus region of Eurasia. He was accompanied by some other “stars” from the botanical and horticultural community in America and it is not hard to see why they were pleased with their trip – which was primarily to seek seed of course, but who could fail to notice the fine plants in flower that they found? From Belgium, Wim Boens gives a name which honours a familiar author for IRG readers to an anemone cultivar he has been growing. Across in South

America, John and Anita Watson write of an interesting viola hybrid from the Andean range. They name it for their grandson and accompany it with great hope for the future of us all – but particularly the very young and vulnerable.

Cover photo: *Primula ruprechtii* in the Bakuriani Mountains. Photo Panayoti Kelaidis.

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## International Rock Garden Conference 2021

Looking ahead, let us take a moment to think about the major event being planned by the SRGC for the year 2021..... Alpines 2021 will be the eighth International Rock Garden Conference; held in the UK every ten years since 1951. This unmissable event will be held in Scotland, based in the historic city of Perth. The main venue for this event 8 -11 May 2021 will be the [Perth Conference and Concert Hall](#). The list of internationally renowned Speakers is being finalised for this gathering for lovers of plants, gardens and mountains. There are a fine variety of accommodations available in and around Perth which should suit all budgets and we hope will be convenient for our visitors.

Full details will be released later and registration will open in Spring 2020. Everyone in the Scottish Rock Garden Club and especially the organising group – which includes no less than four former SRGC presidents and our current President, Julia Corden (and what a wealth of experience they have!) – are excited to welcome you to Scotland to celebrate and share our passion for alpine and rock garden plants from the mountains of the world.



**We look forward to welcoming you to Perth, Scotland in May, 2021 !**



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## ---Expedition Report---

Extract of Report on Plant Collecting Collaborative, Georgia 2018 – by Panayoti Kelaidis, Boyce Tankersley and Peter Zale.



*Campanula saxifraga*, Kazbegi.

Collection dates: April 23<sup>rd</sup> - May 11<sup>th</sup> 2018

Collaborators: Chicago Botanic Garden, Denver Botanic Gardens, Institute of Botany of Ilia State University, Longwood Gardens.



The authors, Panayoti Kelaidis, Boyce Tankersley and Peter Zale.



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Panayoti Kelaidis is Senior Curator and Director of Outreach at Denver Botanic Gardens; Boyce Tankersley is Director of Living Plant Documentation at Chicago Botanic Garden; Peter Zale is Associate Director, Conservation, Plant Breeding and Collections at Longwood Gardens. Other participants included Dr. Sun Weibang, Director Hang Sun, and Tao Geng of the Kunming Institute of Botany, CAS.

Local support, expertise, and permitting was generously provided by:

Dr. Shalva (Nukri) Sikharulidze, Director, Institute of Botany and Bakuriani Alpine Botanical Garden of Ilia State University.

Dr. Manana Khutsishvili, Botanist and Director of Herbarium, Institute of Botany, Ilia State University

Dr. Davit Chelidze, Botanist, National Botanical Garden of Georgia, Tbilisi.

Temuri Siukaev, Institute of Botany and Bakuriani Alpine Botanical Garden of Ilia State University.

David Kverenchkhiladze, Contract Driver.

Dr. Hino Memiadze, Head of Local Flora and Conservation Department, Batumi Botanical Garden.

On-location funding for this trip was provided by:

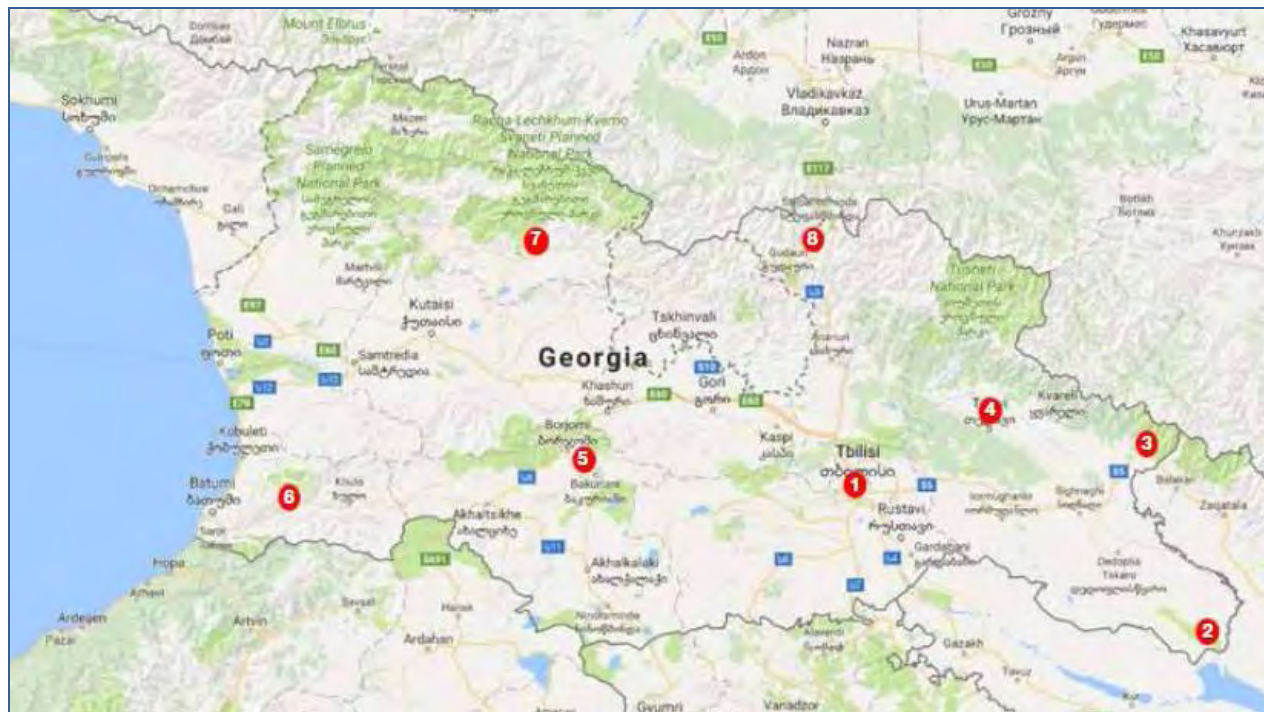
Bartlett Tree Experts; Franklinia Foundation; Plant Collecting Collaborative.



*Veronica liwanensis* Samtskhe Javakheti Region, Borjomi Municipality. On the west side of Tsagvheri-Kimotesubani-Tadzari Road.



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Collection locations: 1) Tbilisi 2) Vashlovani 3) Lagodekhi 4) Telavi 5) Borjomi, Bakuriani 6) Khulo 7) Samegrelo – Zemo Svaneti 8) Gudauri.

## Collection objectives

The botanist Armen Takhtajan includes the region where this collection trip was focused as part of the Caucasian Province of the Holarctic Kingdom, containing a distinctive flora with many endemics and representing a transition between the mountain floras of Europe proper (Pyrenees, Alps, etc.) and Euxine province (the Hyrcanian forest flora of the Caspian region). The lower elevation elements of this region are perhaps better classified as elements of the Armeno-Iranian province (a subset of the Irano-Turanian Region), which straddles much of Western and Central Asia.

Plants from the Caucasus have proved extremely hardy and durable in cultivation across the United States. Several Plant Collecting Collaborative expeditions have focused on the region, including a September 2017 expedition that included two of this trip's participants. The autumn trip targeted woody and larger herbaceous taxa. This trip was timed primarily for spring bulbs: principally members of the genus *Corydalis* and *Galanthus*, although, as it turned out, a much wider variety of germplasm was ripe, resulting in more than 100 seed collection numbers. The weather cooperated: Day after cool sunny day provided a perfect backdrop for spectacular spring bloom at the higher elevations and lots of seed and flowers in both montane and steppe ecosystems. The harvest of seed, photography, and information exceeded our fondest hopes!

## Arrival in Tbilisi

Boyce, Peter, and Panayoti arrived at the Tbilisi Airport in the very early morning hours of Monday, April 23. They were whisked off to the GTM Kapan hotel in Tbilisi's Old Town as daybreak approached. The picturesque lighting of the ancient church next door and the modernistic buildings that are spotted below the old town clearly indicated that the trip would take place in a romantic and somewhat exotic setting. Cool, sunny weather greeted the party (as it did practically every day of this trip that was blessed with perfect weather). After settling in, the group embarked on a tour from the hotel through the historic district, ending at the Institute of Botany, situated on the eastern boundary of the National Botanical Garden of Georgia, before returning to the hotel.



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Tbilisi Botanic Garden

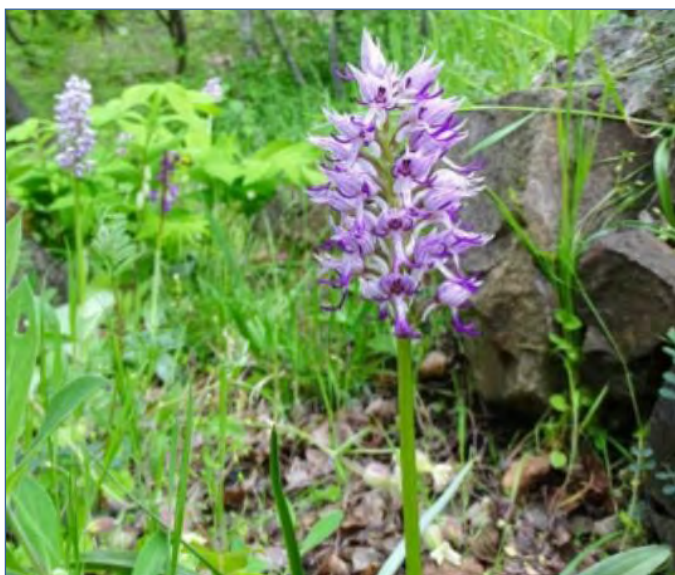
## Institute and Botanical Garden

We were driven through the narrow streets of the old town up a track that seemed to narrow as it rose to the gate leading to the large building where the Institute of Botany is housed. There we were met by several staff of the Herbarium, who prepared coffee and sought out Dr. Manana Khutsishvili, who had planned and who would accompany us on the whole trip. We also met Professor Weibang Sun, Ph.D., director of Kunming Botanical Garden, and two

of his colleagues, who would accompany us on the first half of the expedition.

We proceeded to visit with Shalva (Nukri) Sikharulidze, Ph.D., Director, Institute of Botany, as well as Tamaz Darchidze, Director of the National Botanical Garden of Georgia, where we spent most of the rest of the day.

The botanical garden occupies much of the high ground directly to the south of the old town of Tbilisi, comprising nearly 400 acres of mostly wooded ground on the crest of the steep hills that overlook the entire capital. Redbuds, lilacs, and various fruit trees were in full bloom at the time, including *Orchis italica*, which is common in much of the Mediterranean. Growing nearby there were numerous stems of *Ophrys caucasica*, which is a local specialty. Superficially resembling some of the bee orchids of Greece, this displays the same pseudocopulation strategies displayed by other members of the genus.



*Salvia daghestanica*

*Orchis simia*



After spending much of the day at the Garden, we took time to explore the crooked streets of the old town and the many shops featuring all manner of practical goods, but also vibrant shops with strings of *churchkela*, nuts and dried fruit encased in dried fruit leather, forming colorful knobby sticks like segmented candles. We returned to the hotel and then went with our Chinese colleagues to an elegant restaurant for a banquet, which was accompanied by the first of many bottles of Georgian wine to be sampled on the trip.



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*Corydalis marschalliana* (syn. *Corydalis cava*), purple form at Sabaduri Forest.

**Sabaduri Forest (Tbilisi National Park), and the Mtskheta region Zedazeni Monastery area, Dzveli Shaumta restaurant.**

After breakfast at the hotel, Temuri Siukaev and Manana arrived with two vehicles for the first field trips. In the morning we drove approximately 20 miles (30 km.) north-west of Tbilisi to the Sabaduri forest in Tbilisi National Park, a series of low hills covered with thick, mature forest. Top of the pass, in mixed deciduous forest: dominants include mature *Fagus orientalis* forest, *Populus*, *Prunus divaricata*, *Prunus spinosa*. Many spring ephemerals in peak bloom.

*Primula macrocalyx*, Sabaduri fieldtrip.



*Astragalus bungeanus*, Meskheti



We found the understory of the forest with the spring ephemerals in peak bloom with a surprising variety of bulbous and tuberous perennials as well as flowering shrubs and larger perennials. Although we made only three collections, including two *Corydalis* and *Galanthus kemulariae*, these were some of the target species of the trip! It was thrilling to find two species of *Primula* in full bloom, and the first of many sightings of *Cyclamen vernum*, *Cardamine quinquefolia* (white and pink), and a dozen other choice wildflowers.

We proceeded a short distance nearer to the Zedazeni Monastery region, which was characterized by a diverse, mostly deciduous woodland on a slightly sloping hillside site: *Fagus orientalis*,



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*Juglans regia*, *Carpinus* sp., *Prunus* sp., *Quercus iberica*, *Corylus avellana*, several large *Picea orientalis* (probably planted) senescing, and *Alliaria officinalis* (Garlic Mustard), which is a pernicious invasive in the United States. Many of the same ephemerals found at the first site recurred here, as well as a number of new taxa. It is somehow pleasing to find seed of something as familiar as *Scilla siberica*, only here with a known wild provenance! *Corydalis marschalliana* grew here as well, likewise in both purple-rose and yellow-white color phases.

The third stop of the morning was on a steep, south-facing slope dominated by *Carpinus caucasicus*. Some of the same species seen on the woodland grew here, especially abundant masses of *Cyclamen vernum* (*coum*). New plants to us included *Acer* aff. *capadocica*, *Symphytum grandiflora*, *Melica* aff. *nutans*, *Orchis* aff. *laxiflora*, *Helleborus caucasicus*, *Crocus speciosus*, *Polygonatum glaberrimum*, and *Dioscorea caucasica*.

We stopped in a village, Samikitno, midway during the collections for a characteristic varied luncheon with our first (but not last) bowl of lobio, the delicious Georgian bean soup served with hearty cornbread and a side dish of peppers and vegetables.

Our last stop of the day was on a grassy hill with a simple church on top and much overgrazed pasture dotted with many *Paliurus spina cristi*, roses and *Viburnum*, and ruderal vegetation including *Euphorbia helioscopia* (a weed in America as well), *E. palustris*, and *Salvia aethiopsis*. *Merendera trigyna* was reported to be abundant here, but must have gone dormant. None were found, although the hill was dotted with numerous *Ornithogalum navadina*.

Enormous seedheads of *Echinops sphaerocephalus* (well-known from gardens) persisted from the previous year, and the ubiquitous and universal *Capsella bursa-pastoris* was scattered in the grass.

*Glaucium grandiflorum*

*Asplenium septentrionale*



*Hedysarum sericeum*

*Physoclaina orientalis*





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*Jurinea carthalinae*, Meskheti.





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*Linaria schirvanica*



*Podospermum idae*



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*Pulsatilla albana*



*Saxifraga moschata*

*Salvia compar*



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*Saxifraga kolenatiana*



*Sedum pilosum*



*Scutellaria orientalis*, Meskheti.



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*Sempervivum* sp.



Slesia Fortress, Moktseva, Meskheti.



Turtle Lake and Tbilisi.



*Celtis* sp. near Turtle Lake.



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The second day of collections concentrated near the capital, stopping just north at Turtle Lake, a popular destination for picnicking at the edge of the city. This is a small lake approximately 4 km. west of Old Town Tbilisi, with a trail winding up a ridge overlooking the lake and much of Tbilisi below. The ridge is covered with sparse, dwarfed woodland of second growth oak and a variety of shrubs and small trees, with a diverse herb layer below in the clearings and on the many rock outcrops.

The exposed rocky summit had steppe vegetation offering a distinct assortment of vegetation to the morning's woodlands, including a few capsules of *Corydalis angustifolia* and very few late *Iris caucasica*, both high on our list of desiderata.

A surprising number of plants considered garden classics could be found here, including Cornelian cherry (*Cornus mas*), *Dictamnus caucasicus* (although a different species from *D. albus* that's commonest in cultivation), and the tall *Filipendula ulmaria* and yellow *Alcea rugosa*, a classic of perennial gardens. Two poppies were especially remarkable: the miniature, hairy *Glaucium grandiflorum* on gravelly sites that we were to see again and again, and the tall, striking scarlet *Papaver commutatum* with dark black heart that was likewise abundant on fallow fields across the country.

After lunch we explored an open woodland in the Kvemo - Kartli Region that had a rich assortment of ephemerals including the by now familiar *Anemone caucasica*, *Scilla siberica*, and *Ficaria ledebouriana*. New to us were *Arum albispathum*, *Dactylorhiza flavescens* with cool yellow flowers, and *Lilium szovitsianum*, which showed great promise with husky shoots rising from the ground. But *Galanthus alpinus* and *Corydalis angustifolia* rewarded us with some valuable seed. On the road from Teleti was a level plain planted with *Cupressus sempervirens* and other conifers in rows. We walked half a kilometre to a steep slope where many herbs were found.



Panayoti Kelaidis with masses of *Papaver commutatum*





Vashlovani Nature Reserve

### **Kakheti Region (Vashlovani Nature Reserve, ending at Lagodekhi)**

We took off on a very long drive to the far eastern end of Georgia in the morning. One of the least productive days for seed collection, this day was nevertheless a high point of the trip for scenery and for finding super plants in bloom. Disappointingly, most of the morning consisted of uninterrupted driving due to the flat, uninteresting landscape consisting entirely of degraded steppe that was dominated by coarse grasses — either deliberately planted, or the only plants that could survive the millennia of heavy grazing on this landscape.

We stopped briefly at one less damaged spot in search of *Sternbergia colchiciflora*, which we hoped to find seed of (but didn't find any), but did find *Merendera trigyna* and photographed a few forbs in a village en route. The landscape began to get a bit more hilly and less disturbed bits of steppe began appearing amid vast plantations of *Yucca gloriosa*, which had been lined out on dozens (if not hundreds) of acres, apparently for its potential as a crop for fiber production. The massive clumps are almost impossible to remove now, but must at least make a beautiful spectacle when they bloom. Since Pronubia moths are not native to Eurasia, the plants mercifully do not set seed, or this could become a pretty formidable invasive plant.

We stopped for lunch at Vashlovani Nature Reserve headquarters for rangers — at the edge of a steep slope looking onto scenic badlands covered with chaparral-like vegetation, notably *Pistachia mutica* (a local endemic), and both *Acer iberica* and *Quercus iberica*. People are often confused by the epithet **iberica** which is almost always attached to plants from the Caucasus and eastern Mediterranean, whereas Iberia was the name given by the Romans to the peninsula



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that is now Spain and Portugal. Both usages trace to an Aryan tribe of Celts called Iberians, who at one time were the dominant population in both ends of the Mediterranean, but were ultimately absorbed by the Roman population in Iberia, and other language groups in the eastern Mediterranean.

There was a surprising variety of wildflowers in the gullies to the east of the headquarters, including our second sighting of a spikethrift (*Acantholimon fominii*) — alas, not in bloom or seed yet. *Bellevalia speciosa* was a charming little bulb in bloom, and other gems were found here and there on the steep slopes.

We continued on a gravel road along a stream through rather dry canyon country reminiscent of the American West, only instead of Utah and Rocky Mountains Juniper, we saw the very similar-looking *Juniperus phoenicea* and *Juniperus foetidissima*, which are both wide-spread from the Mediterranean region through the Irano-Turanian highlands. A surprising number of taxa mirrored similar species of the American Canyonlands, such as *Stipa* cf. *capillata* and *Astragalus stevenianus*, which are practically identical to North American taxa in the same genera. *Polygala hohenakeri* looked somewhat like the Colorado plateau endemic *Polygala subspinososa* — only the Eurasian species was a wonderful azure blue, butterfly-shaped blossoms.



*Polygala hohenakeri*, Vashlovani Nature Reserve.

Other plants familiar to us from cultivation included *Colutea arborescens* (which is adventive in the West) and the more typical green leaf form of Smokebush (*Cotinus coccygria*), which is usually grown in its purple leaf phase in cultivation. Only a few specimens of *Gladiolus segetum* were found, a striking bulb that would likely be of value in gardens.



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*Polygala hohenakeri*

We eventually emerged onto an extensive area of relatively undisturbed steppe en route to the village of Kvenso Kvedi to the west. The spectacular views of the mountains to the north and the border of Azerbaijan not far to the east were stunning. The sunny day and perfect weather were a wonderful backdrop to the greatest surprise of the trip so far, namely vast colonies of fernleaf peony (*Paeonia tenuifolia*) that crowded the side of the road on both sides. We had gotten *lost*, a

consequence of the difference in Russian and Western GPS coordinate systems that insisted we drive into Azerbaijan (we didn't) to locate a known population of *Merendera trigyna*. In the process of working our way back along the border, we discovered this unknown population in peak bloom. Everyone demanded the drivers stop again and again as we moved through one of the most spectacular vistas most of us had seen: the vast chain of the Great Caucasus looming in the distance and rolling hills as far as the eye could see dotted with scarlet mounds of *Paeonia tenuifolia* glowing in the late afternoon sunshine, in perfect ostentatious blossom!



Fernleaf peonies (*Paeonia tenuifolia*) on the Caucasian steppe.



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We arrived rather late in the day in the village of Lagodekhi. We stayed at a guest house called the Green House, tucked in the middle of the charming town, with our hospitable hosts, Nana and Vazha. The owners are also keen gardeners with many ornamentals, so the setting was even more charming. Here we were treated to a delicious dinner and great camaraderie after a long but very rewarding day for experiences, if not the best for seed collection.



*Aristolochia iberica*



*Cephalanthera damasonium*

We were to spend the first part of Friday on a hike in the Lagodekhi National Park (694m altitude), a heavily wooded preserve that was established in 1912 as the first Nature Reserve in Georgia. There are a number of rare and endemic plants protected in the 94.41 square-mile preserve that borders both Azerbaijan and Russia (Dagestan). Once again, beech (*Fagus orientalis*) comprised the dominant tree species, but a variety of other trees were also present, including three species of maple (*Acer campetre*, *A. cappadocica*, *A. pseudoplatanus*) and even a remnant stand of chestnut (*Castanea sativa*).

The forest is quite humid, and there is a profusion of ferns in the understory, including lush stands of *Asplenium adiantum nigrum*, *Asplenium trichomanes*, *Dryopteris filix-mas*, *Polypodium vulgare*, and *Polystichum aculeatum*. Many of the understory herbs are typical of plants you might find in the European Alps, like *Ajuga reptans*, *Cephalanthera damasonianum*, *Galium odoratum*, *Geranium pusillum*, *Lamium album*, or *Sanicula europaea*. Others, like *Scilla siberica*, are widespread in Asia as well. The local endemics, however, were noted particularly, including *Aristolochia iberica* (again!), *Staphylaea colchica*, *Symphytum caucasicum* and a distinctive ivy, *Hedera pastuchovii*.

We were delighted to find an enormous patch of *Pachyphragma macrophylla* in ripe seed: this woodland crucifer is quite showy and should make a fine addition to the woodland garden, and although it's been collected and grown in the past, it has not yet gained a strong foothold in horticulture. Perhaps this collection will change that. On our way back to the vehicles for the afternoon excursion, we found a large patch of *Parentucellia latifolia*, a strange little parasitic herb in the Broomrape family. This is widespread in Eurasia, but has naturalized in the Americas and also Australia.

That afternoon we explored a number of sites, including the village of Sighnaghi, (which has the reputation as the City of Love) on top of a fortified hill. The views of the Caucasus chain from the tavern by the fort were splendid. The vicinity had obviously been cultivated and otherwise



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disturbed repeatedly over the centuries, but many ruderal wildflowers persisted, as did a large colony of shrubby pomegranate trees on a steep hill that yielded some ripe seed. Milk thistle (*Silybum marianum*) was conspicuous along the road.

Gremi, Telavi district.  
Georgia.

### Depart Lagodekhi, leave for Tbilisi

In the morning, we took leave of the Green House, re- turning to Tbilisi on a much more winding and interesting path that took us through a variety of ecosystems and plant communities.

We stopped in the historic town of Telavi in the Alazani valley, graced with a medieval fortress and churches, and an ancient

plane tree in a plaza that we all photographed (*Platanus orientalis*). As we drove westward, one of our first stops was a long slope leading up to Gombori Pass, where we explored an open woodland with a deep layer of undecayed leaves. This was one of our first sightings of Lily of the Valley in the wild (*Convallaria majalis*), but also the rarer, endemic *Daphne albowiana*, with its

suckering habit and greenish flowers. We took the car a short distance higher onto the top of Gombori Pass, which consisted mostly of open pseudoalpine grassland that was obviously heavily grazed, but still had quite showy masses of oxlip in peak bloom (*Primula macrocalyx*). The bright yellow of the primrose was complemented by the bright blue of *Muscari szovitsianum* that grew with it. It is common throughout Eurasia, yet we were still fascinated to find large patches of the coarse but beautiful *Petasites alba* in full bloom, and another of our goals, *Galanthus alpinus*, with ripe seedpods.

*Galanthus alpinus* in seed.

We proceeded southwestward through low areas that were heavily impacted by grazing and human activity, near the village of Algeti, where we sought out *Iris iberica* near its type locality. We found only a single plant in this area, so we drove nearby to the Red Bridge area, which, although still grazed, had not been impacted so severely. There were





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more plants of the *Iris iberica* in this area, although none were in truly ripe seed. We did find *Amberboa glauca*, a strikingly beautiful composite that is the local representative of this section of *Centaurea* that is now elevated to the generic level. *Amberboa* is a classic Irano-Turanian genus, distributed primarily in Iran and the other Stans, although extending to the Chinese portions of Turkestan. There were also striking specimens of bright pink *Astragalus stevensianus* in the area, a species we saw several other places in the steppe portions of Georgia. We arrived in late afternoon once again in the Capital, in time to prepare for the next, longest loop through the westernmost parts of Georgia.



*Amberboa (Centaurea) glauca*,  
Red Bridge (Tsiteli Khidi).

*Astragalus stevensianus*  
Carthalinia.





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*Genista transcaucasica*



*Verbascum phoeniceum*



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## The road to Bakuriani

Leaving Tbilisi and heading in a southwesterly direction, we passed through a hilly area of shrub-steppe vegetation and scenic gullies with rocky outcrops — mostly grey sedimentary material with bands of rounded rock between claylike amorphous layers of near shale (possibly volcanic outwash). The hills were dotted with three species of gnarly junipers (*Juniperus oblonga*, *Juniperus polycarpa* var. *rufescens*, and *Juniperus foetidissima*) and several other small trees and shrubs (*Ulmus minor*, *Prunus divaricata*, *Populus* hybrid). Everywhere we looked we saw drifts of wildflowers in bloom. This region was called Carthalia when Georgia was under Roman rule, and that name commemorates many plants that were first described from here. At our first stop at a small gorge next to a bridge, we found a tremendous variety of plants new to us, including the endemic pink *Astragalus cyri*, the larger (familiar) *Astragalus stevenianus*, a brilliant miniature yellow broom (*Genista transcaucasica*), and a variety of umbels including an endemic species, *Malabaila dasyacantha*.

We were struck by the brilliant blue borage, which contrasted with a compact, bright yellow composite, *Podospermum canum*. Another daisy, the bachelor-button cousin *Centaurea carthaliae*, confirmed we were in the right Roman province!

We proceeded into the foothills of the Lesser Caucasus a short way further south into mixed deciduous/coniferous forest near the town of Daba, which boasts thermal waters. Here, *Ulmus* sp., several species of *Acer* and *Picea orientalis*, the endemic *Caucasian* hazelnut (*Corylus caucasica*), and *Cornus mas* grew on a steep slope heavily grazed by cattle. Even so, a tremendous variety of woodland wildflowers were growing thickly under the shrubs and trees, including *Helleborus orientalis*, *Veronica chamaedrys*, *Arum megobrebi*, *Cyclamen coum* var. *caucasicum*, *Lathyrus aureus*, *Paeonia caucasica*, *Galanthus alpinus*, and *Primula woronowii*. We continued higher along the smooth gravel road to where the slope to our east formed a steep granitic cliff facing south that was dotted with shrubs, including several roses (*Rosa* spp.).



*Helleborus orientalis*



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*Helleborus orientalis* in seed, Samtskhe-Javakheti Region, Borjomi Municipality, in mixed deciduous coniferous forest.

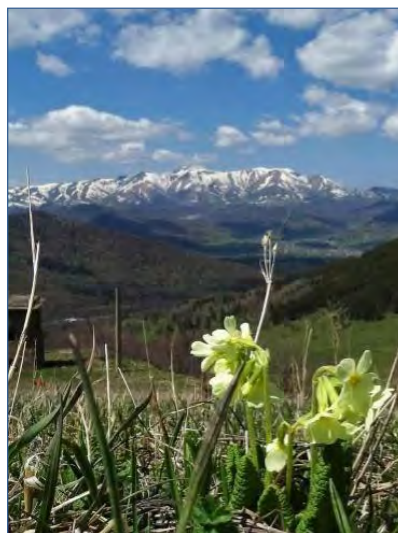


*Arum megobrebi*, Samtskhe-Javakheti.

*Muscari szovitsianum*, Gambori Pass.



*Paeonia caucasica*, Samtskhe-Javakheti.



*Primula ruprechtii*, Tskhratskaro Pass.



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*Onosma armena* Samtskhe-Javakheti, on the west side of Tsagvheri-Kimotesubani-Tadzari Road.



Charming composite, again on the Tsagvheri-Kimotesubani-Tadzari Road.



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We were surprised to see bright cobalt splashes on the cliffs, which turned out to be *Veronica liwanensis*, a tight, ground-covering evergreen mat introduced to cultivation by the MacPhail and Watson expedition to Turkey in 1977 and now a popular groundcover in much of the United States. Jamie MacPhail and John Watson collected this in the Pontic Alps of easternmost Turkey, very near as the crow flies to these populations in Georgia.

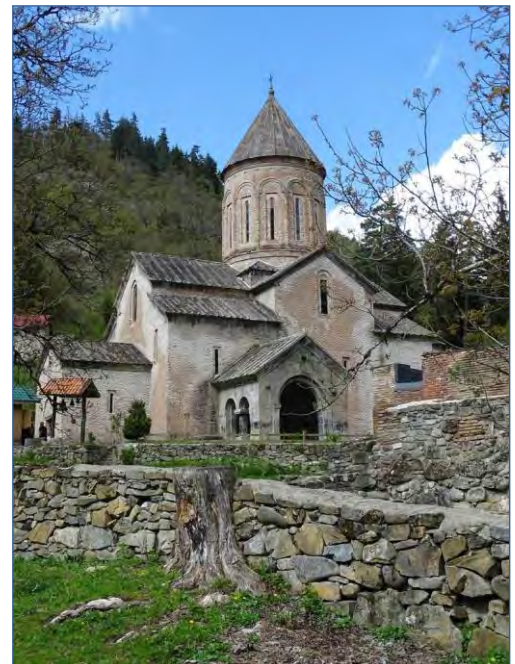


Another spectacular plant, *Eremurus spectabilis*, a beautiful foxtail lily that grows the furthest west of any in the genus, studded the cliff face (wherever goats feared to tread). Alas, they were still only in bud, but very striking nonetheless.

Other taxa, like *Campanula sarmatica*, *Polypodium vulgare*, *Asplenium trichomanes*, and *Veronica chamaedrys*, were far more familiar, but it was still reassuring to find them in the wild. The local variation on Lenten Rose, *Helleborus caucasicus*, was here as well, in addition to two saxatile species in *Scrophularia* and *Parietaria* (this last being similar to the ubiquitous weed of Mediterranean cities like Istanbul).

A short distance southward, the Timotesubani Monastery is perched picturesquely in a vale surrounded by rich woodlands. This medieval structure was built between the twelfth and thirteenth centuries, purportedly with some of the best examples of frescoes of the period. Almost within the shadow to the north of the church, a hillside had masses of *Helleborus caucasicus*, along with *Anemone caucasica* and *Galanthus alpinus*.

From here we proceeded through the spa city of Borjomi (famous for its mineral springs) to the ski mecca of Bakuriani, where we were scheduled to stay in a modern ski lodge for the next two nights. We enjoyed a spectacular sunset that night behind the dramatic, snowy peaks that surround the village in a big arc to the south and west, where we would venture forth in two days.





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On Monday (April 30) we spent almost the whole day in a long loop trip through a mountainous steppe bordering Turkey in the rain shadow of the Pontic Alps and Little Caucasus. The wildflowers along virtually the whole road were in peak spring bloom, and a fantastic variety greeted us at every stop. The first stop at Kvabishevi in Borjomi National Park produced the familiar tiny broom *Genista transcaucasica* and the shrubby, not very showy *Astragalus microcephalus*, one of the few shrubby plants in this very large genus of herbs. Here we found a succulent *Euphorbia armena* similar to *E. myrsinites* again (and would many more times). The annual *Asperula purpurea* was common here.

Our next stop was not far from a medieval castle (near Slesa Fortress, also called Moktseva) on a steep, south-facing slope with a remarkable number of showy plants. There were quite a few different low shrubs and small trees in the vicinity, like *Rhamnus pallasii* with its narrow linear leaves, and silvery *Pyrus salicifolius*, and an unidentified hawthorn. Scattered Scots pines (*Pinus sylvestris*) and black poplars along the river (*Populus nigra*) provided the drivers a little shade while the botanically inclined clambered up the rocky slope marveling at the enormous variety of herbs. Some, like *Glaucium grandiflorum*, *Euphorbia armena*, *Scutellaria orientalis*, and *Veronica liwanensis*, we'd seen previously. There were a large number of herbs new to us, including *Centranthus longiflorus*, *Gypsophila elegans*, *Hedysarum sericeum*, *Helianthemum grandiflorum*, *Heracleum* sp., *Sempervivum armenum*, and *Onosma sericeum*. Two saxatile plants were especially dazzling and, alas, not in seed yet: *Jurinea carthalinae* formed dense, silvery clumps on the cliff, with showy, pale pink double bachelor's button flowers. *Salvia compar* grew nearby, up to a foot in height with trim rosettes of grey-blue leaves and spectacular deep purple blue flowers. Both of these would make unique and showy xeriscape perennials if they were ever introduced to cultivation.

A short distance further south of Atskuri we stopped again along the river in a wide, dry slope that had another wide assortment of completely new plants, including *Adonis aestivus*, *Astragalus bungeanus*, *Caragana grandiflora*, *Limonium meyeri*, *Nitraria* sp., *Oxytropis* sp., *Peganum harmala*, *Podospermum idae*, *Ranunculus* sp.. It surprised many of us that such a hot dry spot could have such diversity. The gem of this stop was unquestionably *Linaria schirvanica*, a violet-purple toadflax with brilliant yellow and orange markings. Unfortunately, it is extremely rare and local in nature. Another few miles along the Mtkvari river was yet another dry slope with a new assortment of plants (and some of the same, of course) with *Acantholimon armenum* and *Verbascum georgicum* adding to the list and a welcome recurrence of *Sempervivum armenum* and *Veronica liwanensis*.



*Cardamine quinquefolia*



*Lathyrus vernus*,

Our last stop was relatively near to the dramatic Vardzia Cave town (a vast medieval monastery complex being developed as a tourist destination). In the bend of the river a more north-facing slope harbored a remarkable variety of more mesophytic plants, including two rock ferns, *Asplenium ruta-*



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*muraria* and *Asplenium septentrionale* (which also occur in North America), and a tremendous variety of bulbs and rock plants: *Berberis iberica*, *Campanula raddeana*, *Centarea* cf. *pulchra*, *Fritillaria caucasica*, *Myosotis* sp., *Nonea* sp., *Phlomis tuberosa*, *Physoclaina orientalis*, *Primula macrocalyx*, *Pulsatilla albana*, *Saxifraga kolenatiana*, *Saxifraga moschata*, *Saxifraga sibirica*, *Sedum (Hylotelephium) caucasicum*, *Sedum (Rosularia) pilosum*.

A previous PCC expedition had stopped at this same spot and collected seed of a highly local *Sambucus tigranii*, which we were lucky to see in full bloom. It was amazing that an area that seemed so dry and unpromising from a distance produced some of the most beautiful plants we'd seen on the whole trip— and lots of them! The day was getting late at this point, so we turned back north and returned for another night in the picturesque village of Bakuriani.



*Gagea* sp. in the Bakuriani Mountains.



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*Gentiana angulosa*, Tskhratskaro Pass.



*Primula ruprechtii*, Tskhratskaro Pass.

### Bakuriani mountains

This day was spent almost entirely at high altitudes, which resulted in fewer collections than we would have liked, but we nevertheless saw great numbers of spectacular wildflowers and fantastic scenery the whole way. Not far above Bakuriani we explored on a subalpine slope facing north with second-growth *Fagus orientalis*, a few birch, and fewer *Picea orientalis*. Here again we found the tall white and purple *Corydalis marschalliana* and petite dark pink *C. caucasica*. These were accompanied by the usual *Cardamine quinquefolia* and *Anemone caucasica*. In addition, we observed a whole new suite of large perennials that would have been spectacular to view over the coming months: *Pulmonaria dacica*, *Veratrum lobelianum*, *Paris incompleta*, *Paeonia steveniana*, *Digitalis ferruginea*, *Digitalis ciliata*, and *Myosotis* sp. A few hundred yards higher up the slope we added *Trollius patulus*, *Tussilago farfara*, and *Caltha polypetala* to the list.

The vehicles continued climbing until we reached treeline, and had to stop for pictures and



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movies of the spectacular valley below. Here we found three more novelties along the roadcut: *Cardamine uliginosa*, *Sedum oppositifolium*, and *Sedum acre*. As we climbed further above treeline, we had to stop once again as masses of alpine flowers above us demanded a closer look. The modest *Trollius patulus* and *Caltha polypetala* now formed masses of bright yellow and orangey color, and a great variety of vivid alpines were dotted among them, including yellow *Draba bifida*, *Primula kuznetsowii*, and *Primula macrocalyx*. Looking almost identical to the star gentian of the Alps, *Gentiana angulosa* flashed cobalt among the grasses.



*Fagus orientalis*



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*Trollius patulus*



Bakuriani Mountains



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*Scilla rosenii*





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The highlight of the mountain (and one of the summits of the entire trip) was seeing the masses of *Scilla rosenii*, arguably the most beautiful species in its large genus, forming an azure mist of color for acres all the way to the top of the mountain. Each flower was reflexed, resembling a blue erythronium in form, but positively glowing in the backlight. Everyone scuttled about taking pictures for quite a while, the flowers at our feet, and the vast valley down below ringed with high, snow-covered mountains. A quaint village nestled in the base of the highest peak, called Tsikhisjvari, had been visited by previous expeditions. The residents were mostly Greeks who had escaped in the distant past from Turkey during ethnic hostilities. We were to see most of these flowers all the way to where we were stopped by a large snow-bank from driving to the top. Here, we added *Androsace villosa*, and a bright yellow *Gagea* sp. which we have not yet determined as to species.



*Anemone ranunculoides*, Bakuriani Botanic Garden.

Turning around at the snowbank, we returned to Bakuriani, where we spent an hour or so exploring the Alpine Botanical Garden, where quite a number of plants we hadn't seen were thriving, including several species of snowdrops such as *Galanthus alpinus*, *G. woronowii*, and *G. platyphylla*. We took another short trip south of Bakuriani in the afternoon to explore some steppe habitat, where we found many familiar plants like *Euphorbia armenum*, *Echinops sphaerocephalus*, *Veronica liwanensis*, and *Astragalus microcephalus*, but also a suite of new taxa including the icy-blue-leaved *Papaver fugax* just starting to open its strange, peach-colored flowers, an annual *Aethionema*, *Poa vivipara*, and a white-leaved *Tanacetum candidissimum*. We found a few small plants of *Coluteocarpa vesicaria*, a rare Anatolian endemic crucifer with white flowers and baggy seedpods, here at the fringes of its range — which is successfully established at Denver Botanic Gardens.

The last stop of the day was higher up in dense *Pinus sosnowskyi*, *Picea orientalis*, *Abies nordmanniana* forest. *Carlina vulgaris*, *Orobus vernus*, and *Polystichum aculeatum* are well-known European wildflowers that are fun to see in the wild. It was somewhat surprising to find *Melissa mellisopyllum* (popular in herb gardens) here along-side these, which one thinks of as liking lower altitudes.





*Primula woronowii*

*Primula woronowii* occurs yet again in another different color phase, but the surprise at the last stop was *Saxifraga repanda*, which has been subsumed by the Eurasian *S. rotundifolium* in recent treatments. We returned to Bakuriani late in the afternoon to celebrate several extraordinary days in exquisite countryside, and prepared for the next leg of this long trip toward the coast.

*Astragalus* cf *argillosus*,  
Badlands Bakuriani-Khulo.

### From Bakuriani to Khulo

We departed Bakuriani in the morning of Wednesday 2 May. The travel today traversed two major ecosystems — the more continental flora of the Samtskhe-Javakheti Region near Bakuriani, then crossing into the Colchic flora zone in the afternoon as we got nearer to the sea, with a much more humid, Maritime flora. The first stop en route to the coast was at seriously eroded Badlands





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on south-facing slope north of the road. Much eroded sandstone in various colors was visible on the roadcuts and on outcrops over the pass. The areas near the road were overgrazed, but when one walked a few hundred feet from the road, native wildflowers prevailed. As was the case again and again, these drier spots possessed a much greater diversity of species than one would find in woodlands. Many species we'd seen before recurred, such as *Adonis aestivus*, *Glaucium grandiflorum*, *Lamium album*, *Pyrus salicifolius*, *Rhamnus pallasii*, and two xeric buttercups, one large, one small, that we've not determined yet. But the list of what was novel was much larger: *Ajuga chamaepitys* subsp. *chia*, *Astragalus* cf. *argillosus*, *Atriplex hortensis*, *Berberis* cf. *iberica*, *Convolvulus* cf. *nitidus*, *Helianthemum* sp., *Hippophae rhamnoides*, *Kochia prostrata* (looks like *Frankenia*), *Lamium album*, *Linum* cf. *perenne*, *Merendera* sp., *Ornithogalum* sp., and *Podospermum laciniatum*.

Four taxa that are regarded as noxious weeds in the United States were also present here: *Convolvulus arvensis*, *Cardaria draba*, *Chelidonium majus*, and *Hyoscyamus niger*. Although they grew in somewhat disturbed habitats here, and could be regarded as ruderal weeds, they are likely native, and didn't appear to have the invasive habit they display where they occur in the Western Hemisphere.

We got back into the cars, gaining a little altitude where coniferous forest (*Abies nordmanniana* and *Picea orientalis*) began to close in again, and we stopped for lunch at a quaint roadside stand with welcome cold beer and *shashlik* (the universal term for shish kebab used throughout Eurasia). A short distance from our vehicle, we found small mounds of a tufted, purple-red *Astragalus* sp. we weren't able to identify at the time, but which would have made a lovely ornamental.



*Astragalus* sp. tufted, Bakuriani to Khulo.

A little further up the road onto the high pass we enjoyed a longer stint in the same habitat, finding a great many more species, some familiar, like *Tussilago fanfara* and *Primula woronowii* (albeit in a deep violet color phase). Many more plants appeared for the first time on the trip: *Corylus avellana* in bloom, *Fragaria* sp., *Scrophularia chrysantha*, *Myosotis* sp., two species of widespread *Eurasian Veronica* (*V. repens* and *Veronica* cf. *filiformis*), and we were excited to find large masses of *Rhododendron luteum* still deciduous from winter, but with buds that were swelling. Continuing higher on the pass (in much the same biome,

although we were now noticing *Acer trautvetteri* among the conifers), we found a steep hillside covered with a thick stand of *Colchicum speciosum* in ripe seed.



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*Scilla winogradowii*  
and with  
*Gagea* sp.

Near the summit of the pass we noticed clumps of a distinctive azure color and had to stop to investigate. It turned out to be an extensive colony of *Scilla winogradowii*, a distinct and showy bulb in full bloom that is not well established in cultivation in the United States. We regretted none were anywhere near seed yet. They made a fine contrast to yet another bright yellow *Gagea* sp.



*Rhododendron luteum*

From here, we dropped down to a valley where we noticed our first mosque of the trip, which tipped us off that we were in Adjara (where many Georgians are of the Muslim faith). We saw a bright flash on the hillside and had to stop. Here the *Rhododendron luteum* was in full golden yellow, fragrant bloom! One of our party wandered a bit further along and found its distant cousin, *Rhododendron ponticum*, blooming with purple lavender blossoms as well. Two robust ferns, *Matteucia struthiopteris* and *Athyrium filix-femina*, further evidenced the increasing humidity of the climate. We were delighted to also find *Orobus aureus*, a subtle but attractive legume, growing by the margins of the woodland.

In the late afternoon we arrived in the village of Khulo, where we were a tad chagrined that we



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would be lugging luggage up 20 steep flights of stairs at our otherwise pleasant hotel. That evening we were sad to part with our Chinese botanist colleagues, who had to return to Tbilisi in time to fly to Uzbekistan — their next destination on an extensive plant collecting trip.

*Rhododendron ponticum*, Adjara Region.



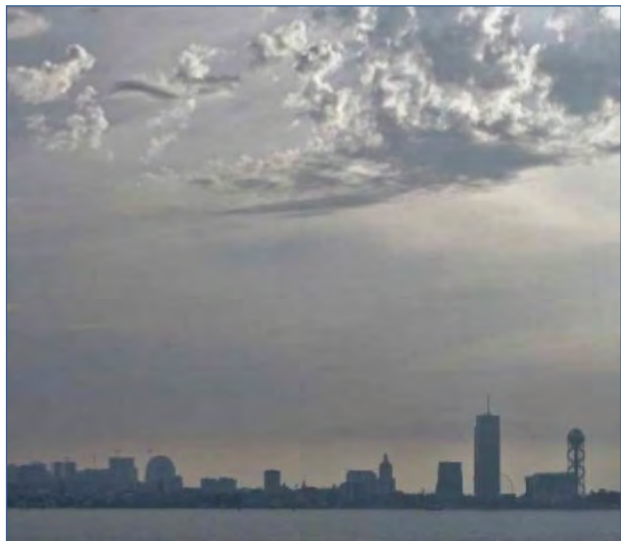
### From Khulo to Batumi

After saying goodbyes to our colleagues from Kunming in the morning, we headed deeper into Adjara. One of our party noticed some distinctive taxa in a mixed deciduous/coniferous forest along steep road bank. Obviously adventive *Catalpa bignonioides* and *Robinia pseudacacia* from America greeted us, and also weedy *Convolvulus arvensis* and *Echium vulgare*. But an amazing variety of new taxa were also present, including many robust plants of *Epimedium pubigerum*, a target species we were hoping to find, in full explosive seed. There were a couple of old friends, like *Polypodium vulgare* and *Helleborus orientalis*, as well. These are some of the novelties we found at this site: *Campanula pontica*, *Convolvulus cantabricus*, *Dorycnium pentaphyllum*, *Euphorbia* cf. *myrsinites*, *Helianthemum* sp., *Helleborus orientalis*, *Juglans regia*, *Lotus corniculatus*, *Muscari szovitsianum*, *Pisum elatior*, *Poterium minor*, *Pteridium aquilinum*, *Scabiosa* sp., *Silene italica*, *Verbascum georgicum*, and *Veronica* sp. A few miles lower down the road, we spied big mounds of chartreuse *Origanum rotundifolium* and had to stop to photograph. As we continued to drop, the landscape grew somewhat drier and *Quercus iberica* began to appear among the coniferous trees. We stopped to admire the large, shrubby mounds of *Astragalus sommierii* that dotted the steep slope — very unlike any milkvetch any of us had seen, with lustrous green foliage on almost succulent stems and showy flowers. *Cistus ponticus* confirmed we were in a more Mediterranean climate regime, and *Smilax excelsa* forming dense masses in a shadier spot was to be served to us repeatedly in the coming weeks as a dish at many dinners (steamed or boiled). Numerous other interesting plants were also on this slope, such as *Cyclamen vernum*, *Fragaria* sp., *Mespilus germanicus*, *Polygala amoenissima*, *Ranunculus* sp., *Rosa* sp., *Sedum dasyphyllum*, *Sedum hispanicum*, and *Silene* cf. *armeria*.



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As we continued down the highway, we soon spied the towers of Batumi in the distance and found ourselves driving through this rather exotic seaside resort that was studded with a large number of rather futuristic, artistic skyscrapers that promised this was no ordinary seaport but something of a fun-loving beach resort to boot!



Batumi skyline

We drove through the city and followed the highway as it curved around a large bay to the north, where our likewise modernistic hotel was situated on a spit of land that offered a crisp view of the entire Batumi skyline from our comfortable rooms. There was enough time after lunch to spend the rest of the day at the Batumi Botanical Garden very near our hotel — an extensive and wonderful arboretum featuring many exotic plants as well as large areas of Georgian and especially Adjarian native plants. In the Garden we met Dr. Hino Mermaidze, head of the local flora and conservation department at Batumi Botanical

Garden, who assisted with obtaining permits and helping us find plants while botanizing in Adjara. Certain parts of the garden seemed almost wild, and a large slope covered with *Galanthus woronowii* in full seed appeared to be truly native there. This distinctive snowdrop with broad green leaves has been developed as a commercial crop in Georgia, sustainably harvested for the Dutch bulb trade. As evening approached, we went to a large restaurant near our hotel where once again we enjoyed a lavish Georgian feast.

### Batumi hills to the east

This day was spent on a long, looping drive east of Batumi into the hills that were heavily wooded and quite lush deciduous forest with some conifers near the Turkish border. We saw a few large chestnuts, and a great variety of other shrubs. There were small farms along the river, but much of the landscape was rugged and wild and seemed relatively pristine (although it must have been logged repeatedly over the millennia). Our first destination was a steep, north-facing slope, much of it a diverse meadow and a bracken field with a great diversity of herbaceous and woody plants. As we climbed, the landscape became more and more heavily covered with *Rubus* sp. at higher elevations: spiny and very difficult to traverse. But plunge ahead we did — this is the locus classicus of *Galanthus krasnovii*, and we were determined to find it.

The variety of herbs among the bracken at lower elevations was impressive, including *Alchemilla oxysepala*, *Aristolochia iberica*, *Asplenium adiantum nigrum*, *Athyrium filix femina*, *Carpinus caucasicus*, *Duchesnea indica*, *Doronicum orientale*, *Ilex* sp., *Lycopodium annotinum*, *Matteucia struthiopteris*, *Paris incompleta*, *Polystichum aculeatum*, *Pteridium aquilinum*, *Ranunculus* sp., *Rhododendron ponticum*, *Rubus* sp., *Salvia glutinosa*, *Sambucus nigra*, *Saxifraga cymbalaria*, and *Scrophularia* sp.

After an extremely long and exhausting hike, we suddenly began finding the snowdrop (*G. krasnovii*) in great quantity and in perfect seed — a reward we had richly earned with many bramble scratches to prove it.

After scrambling back down off this mountain we got back in the vehicle, crossed and recrossed the river below us, and wound up taking many hairpin turns until we found ourselves near treeline on a nearby peak. The season here was early spring, but many of the herbaceous plants were already in action, including *Ajuga pyramidalis* and *Draba hispida* in full bloom, and *Crocus vallicola* in seed. There were many novel small plants at this site, including *Fragaria* sp., *Muscari* sp., *Polygonatum* cf. *odoratum* and *Potentilla micrantha*.



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*Ajuga pyramidalis*, *Alchemilla oxysepala*, Batumi Hills, east.



*Draba hispida*



*Paris incompleta*

*Galanthus krasnovii* in seed.





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*Scrophularia lunariifolia*



*Saxifraga cymbalaria*

But it was the woody plants that riveted our attention, including a new oak, *Quercus pontica*, and whole slopes completely and densely covered with dark-leaved, evergreen rhododendrons, notably the endemic *Caucasian Rhododendron smirnowii* and *Rhododendron ungerii*. We were wishing we could stay for another month when these would be in full bloom. Lower down, *Rhododendron ponticum* would appear now and again — never ubiquitous and weedy as the plant going by this name in Western Europe.

It began to sleet and we snaked our way back down the mountain where we were met by the Georgian Border Guard. They checked our permits and then invited us to give them a call the next time we were in the neighborhood, noting their recruits would happily collect seeds for us, even if it was sleeting!



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*Matteucia struthiopteris*, Batumi Hills east.



*Rhododendron smirnowii*



*Corylus avellana*



*Galium soboliferum*, Batumi Keda valley.





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## Batumi: Keda Valley

We returned once again to Keda Valley, this time accompanied by a local botanist, and gained some altitude when we spotted some patches of color on a steep meadow on peninsula surrounded by highway heavily grazed by cattle. Several of the offending cows eventually came to check out what we were up to and hastened our departure, but we were still able to photograph a great variety of plants.



*Centaurea adjarica*, Batumi Keda valley.



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*Cistus ponticus*



*Convulvulus sp.*



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*Galanthus caucasicus* in seed, Batumi Keda valley.



*Matteucia struthiopteris*



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*Polygala amoenissima*



*Polystichum aculeatum*



*Pteris cretica*



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*Pyracantha coccinea*, Batumi Keda valley.



*Scabiosa volanovskyana*

We drove a few miles further, where we stopped to have lunch near a charming waterfall with loudly croaking frogs we first took to be *Bufo viridis* but were in fact *Pelophylax ridibundus*. A great variety of herbs were found here too, including *Asphodeline lutea* on cliffs and *Epimedium pubigerum*. Yet another oak made an appearance: *Quercus petraea* var. *djugharicum*. We drove further up into the mountains, stopping at a steep, north-facing slope with a variety of deciduous trees, including *Juglans regia*, *Corylus avellana*, and *Ostrya orientalis*. Here we found *Galanthus caucasicus* in abundance, and in ripe seed! *Saxifraga cordifolia* grew here as well, yet another in the genus we hadn't seen yet.



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The afternoon was advancing and we finally turned back toward Batumi, noticing, however, some new distinctive foliage on a shady slope. We stopped and were surprised to find two classic woodland borages, *Brunnera macrophylla* and *Trachystemon orientalis*, growing intermixed on the slope — both with similar heart-shaped leaves, but utterly distinct blossoms and seedpods. Although well established in cultivation, it would be good to have these in collections from known wild provenance. We continued driving further down the valley toward Batumi, and made one last stop at only 148 m. elevation, where a shady slope was filled with ferns (*Pteris cretica* and *Poylstichum aculeatum*). We were very pleased to find the spiny, monocot shrub *Ruscus colchicus* with ripe seed. Once again, full of lively impressions and many new plants, we returned to Batumi for our last evening in the city.



*Sedum dasyphyllum*, Batumi Keda valley.



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## Batumi to Imereti

We left Batumi at 10 a.m. then stopped at a store to buy honey. We also briefly visited a nursery that had a variety of ornamentals we suspect may have been grown in Italy, including a fine selection of Arizona cypress one of our party would have liked to take home! It was a warm, humid day as we drove parallel to the shore through heavily cultivated areas with little trace of native vegetation. A lot of *Eucalyptus*, *Robinia*, and *Gleditsia*, and of course orchards and fields. We started driving inland in time to stop past Kutaisi, where we had lunch at a *Stalagmite* restaurant near Prometheus' cave — a typical rustic country restaurant with expansive outdoor seating. The weather in this part of Georgia is similar to that of much of California, where outdoor living is possible much of the year.

From there the scenery got more wooded and wild, with a great variety of hardwoods, including the expected *Juglans*, *Corylus*, *Alnus*, *Ulmus*, and *Staphylea colchica*. We also saw adventive *Catalpa* and *Paulownia* along the way. As we got nearer the Great Caucasus, we thought there might be interesting plants in the woods. We stopped and found enormous numbers of *Colchicum woronowii*, which was in perfect seed among masses of *Rubus* (even spinier than that we had encountered with the *Galanthus krasnovii* near Batumi). Once again we found *Asplenium adiantum-nigrum* (which seemed to occur wherever there was igneous rock).



*Colchicum woronowii*

A little further along the highway we came onto a large limestone cliff area, and suddenly a different flora appeared: This site had a wonderful assortment of herbaceous plants — many of them new to us, but a few old friends as well.



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*Asplenium adiantum-nigrum*, Imereti.



*Campanula beschamensis*, Imereti to Tbilisi.





*Draba imeretica*

We were struck with *Draba imeretica* in full golden flower on the limestone cliffs, and especially *Seseli petraeum*, which resembles Moon Carrot (*Seseli gummiferum*); only it appears to be perennial. We drove on to Tsageri, the center of the municipality, where we were to stay the evening enjoying yet another lavish dinner with the remarkable endemic cuisine.



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*Campanula hohenackeri*





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*Daphne pontica*



*Dictamnus caucasicus*

*Gymnocarpium  
robertianum*







*Polygonatum* sp.



*Seseli petraeum*



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*Staphylea colchica*



*Veronica imerethica*





Barakoni Church of the Mother of God, Imereti to Tbilisi.

## Imereti

We left on the morning of May 7 from Tsageri for the long trek back to Tbilisi, but not before having several extremely productive and interesting stops in the nearby gorges. We found a number of plants not seen before, including *Kemulariella colchica*, an endemic Asteraceae from this region. We were surprised to find *Gymnocarpium robertianum*, a lime-loving oak fern common in parts of the American Midwest. The giant, monophyletic *Datisca cannabina* was budding up to bloom in a swale — which likewise has an American cousin in the American Southwest mountains. It was too early to see *Campanula beschamensis* (pink *alliarifolia*) in bloom, and likewise an unidentified *Verbascum* with green leaves and perennial habit.

We stopped to admire the view of a medieval church Barakoni with soaring mountains behind, where we found several new taxa of interest: Yet another attractive milkvetch, *Astragalus kemulariae*, and the endemic *Muscari alpanicum*, which was in early seed. We drove further through rolling countryside covered primarily with second-growth deciduous woodland and stopped near a lake, where Manana recalled that *Erythronium caucasicum* grew abundantly. After a few false starts, we found the spot, and there were indeed tremendous numbers of the *Erythronium* in the woods with fat seedpods, many turning yellow. We found several species of orchid in a clearing of *Corylus avellana*, including *Coeloglossum viride* and two color forms (yellow and purple) of the showy *Dactylorhiza romana*. Another prize through the woodland were many ripe capsules on *Galanthus shaoricus*.

Then we dropped lower onto the broad, cultivated valley of central Georgia, where the native vegetation was likely supplanted many millennia ago, but the fields and orchards were nevertheless fun to watch as we sped by.

One of the intriguing features of the villages we passed was that each seemed to have a local specialty appealing to the tourist trade: thus one village seemed to specialize in bread — with



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attractive loaves gathering highway dust outside of innumerable little bakeries along the road. The next village might specialize in hammocks, with similar displays of hammocks hanging colorfully from rigging every few dozen feet as we sped through town. Many towns had large, open-air gift shop areas under lath, where you could buy no end of rustic knickknacks, especially ceramic portraits of Joseph Stalin that you might want to bring back to a nostalgic relative. Soon the modernistic towers of Tbilisi loomed, and we realized we would have a serious task at hand to prepare our collections to be posted and otherwise get ready for our return to America. But there were still a few nights and two full days ahead, and some spectacular plants yet to be found!



The Great Caucasus from Imereti.

### Gori Region

With two days remaining, we decided to visit a reported site of *Galanthus angustifolius* (otherwise known only from the northern Caucasus in Russia). The locality where this grows is in the foothills on the border of the planned Teleti National Park in the Gori municipality, only 30 air miles from Tbilisi to the west and slightly north, but much further by road. From the parking lot we crossed a wet meadow and entered a woodland of *Acer campestre*, *Carpinus betulus*, and *Picea orientalis*. On this, the only somewhat overcast day of the trip, we were accompanied by a friendly local dog that seemed to enjoy our company, as we did his. On a slightly sloping hill we began to find the snowdrops, never thick but fairly frequent among *Corydalis angustifolia* and not too many other ephemerals.

Our mission accomplished, we returned to Tbilisi to continue our packaging and cleaning of seeds and preparations for our return.



# ---International Rock Gardener---

## Mt. Kazbek

The day looked a bit threatening, and we debated whether to go to Mt. Kasbek, as we had originally planned, or stay and complete packaging with a bit more leisure. The grey skies over Tbilisi were rather pessimistic, but someone found that things might not be so bad toward the Caucasus. Although most of the party had been to the area before, it had never been quite so early in the year, so we couldn't be sure what to expect. So with some trepidation we took off on the famous Georgian Military Highway, crossing the now familiar lowlands pockmarked with farms and villages, for the rugged scenery ahead.



*Primula algida*

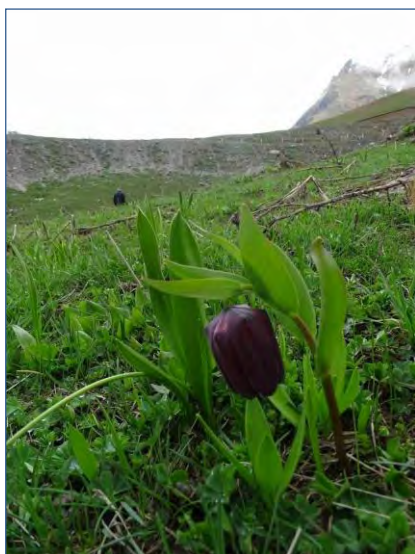
We did make a brief stop and collected two lowland plants that held promise (*Verbascum* and *Podospermum*), but as we approached the mountains, sunlight did occasionally shine forth, and we grew more and more excited. Much to our surprise, as we rose higher on the mountains, quite a bit of bloom showed up on the roadside. We stopped just above treeline, where a rocky knoll was studded with the yellow mounds of *Draba bryoides*, one of the choicest plants in the genus! A nearby swale oozing with freshets was filled with *Trollius patulus* in full bloom along with many clumps of bright pink *Primula algida*.

Another kilometre or so higher, Manana directed the car to stop, and we all hustled over a rock wall through fields of alpine flowers in early glory. A valley opened up to the west with a bright stream tumbling down surrounded by masses of *Galanthus platyphyllus* in full, glorious bloom! After seeing so many snowdrops in seed, it was gratifying to finally get high enough to see this choice



## ---International Rock Gardener---

and extremely distinctive species with its flared outer segments growing quite large in big clumps at the very side of the stream, not to mention on the grassy fields sloping up to either side. Growing with it, although much more sparingly, the huge nodding tulip flowers of *Fritillaria latifolia* gleamed their distinctive purple-chocolate shade — a striking contrast!



*Fritillaria latifolia*

We proceeded to the alpine village of Sioni for lunch at a rustic tavern where we enjoyed our last delicious lunch of stuffed, boiled dumplings (Khinkali or Chinkali) accompanied by a local beer. From the village we drove on through the surprisingly large town of Stepantsminda. The highway began to climb again from here, and on a chilly pass we got out to examine a strange out-crop that turned out to be a sort of travertine, still wet and obviously growing. Masses of *Primula*

*auriculata* grew in the turf around the seepage, an unusual bright pink primrose largely restricted to the Caucasus and Asia Minor. We stopped again at another knoll with a fantastic view of the valley below us and a rock outcrop with *Campanula aucheri* in full bloom. We were very near the Russian border, and could see the customs buildings and a long line of trucks in the distance. We parked at an imposing Dariali monastery parking lot, where a striking *Muscari alpanicum* was spotted here and there — with icy white flowers at the top of its clusters, and bluish ones below.



*Fritillaria collina*

Here we turned back, returning to Stepantsminda, where we drove westward toward the Gergeti Trinity Church perched high on a nearby mountain with Mt. Kasbek itself in the distance peeking at us while clouds kept swirling past to hide it from us. As we drove toward the church on a new road that had been recently built, in the moist forest we spied yet another fritillary, the gorgeous yellow speckled *Fritillaria collina*, and with it a suite of new and wonderful taxa including a brilliant golden saxifrage, *Chrysosplenium dubium* and a little-known *Corydalis emanuelii* var. *pallidiflora*.



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*Chrysosplenium  
dubium*

The mountain had yet to exhaust its possibilities — a large woodland slope nearby was covered with ephemerals including the dark purple *Primula meyeri* and its yellow-flowered cousin we'd seen before, *Primula ruprechtii*, and sure enough their strangely colored intermediate hybrid was there too, *P. x amoena*!



*Primula meyeri* (left)  
and  
*P. ruprechtii* (right).





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*Primula meyeri* and, below, with *Primula x amoena*.





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*Saxifraga juniperifolia*

Another stop further down revealed enormous cushions of *Saxifraga juniperifolia* (a Caucasian specialty) that had largely finished flowering, although a few last yellow blooms persisted. A purple *Pulsatilla albana* was still in fresh bloom.



*Saxifraga paniculata*



*Pulsatilla albana*



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*Draba rigida*



*Galanthus platyphyllus*



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*Sempervivum* sp.



*Primula auriculata*



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*Daphne glomerata*





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*Daphne glomerata*

We passed through Sioni once again, and on a steep last few curves of the alpine turf we stopped to photograph *Daphne glomerata*, the glorious endemic of the Caucasus and Pontic Alps of Turkey. It is one of the showiest of all daphnes, but alas, also one of the most difficult to bloom. Everyone forgot to sniff to see if the flowers were as foul-smelling as they're reputed to be — the other downside of this spectacular plant.

This was an ideal endpoint for a productive trip blessed with ideal weather conditions and the extraordinary hospitality of our Georgian hosts, and a great sense of camaraderie among all the participants!





# ---International Rock Gardener---

## ---New Cultivar Named---

### **Newly named *Anemone blanda* cultivar: *Anemone blanda* 'Jānis' - text and photos by Wim Boens.**

In 2010 I received a rhizome of *Anemone blanda* ex Akseki from Jānis Rukšāns and in the first year of flowering, it was clear it was one of the most beautiful forms I had ever seen. In bud the flower is steel blue, but when the flowers open, the magic happens. The outside of the 16 - 17 tepals has a dark blue colour and the inside is the purest white possible. When the flower is completely open and the sun illuminates it, the blue shines through, giving it an almost silvery appearance. The stamens and anthers in the heart of the flower are a pure yellow. The plant forms huge (more than 10 cm in diameter), solid, almost round rhizomes which make it difficult (but not impossible) to divide the plant.



*Anemone blanda* 'Jānis'

After many people told me this was an extraordinary plant and to quote Brian Mathew: "*The plant shown in your photograph is a very striking variant of the species. It is well worth distinguishing from other forms as a cultivar. The external colour is richer than other forms I have seen*", I thought it really needed a name. I talked to Jānis and on receiving his permission, I decided on the name *Anemone blanda* 'Jānis'. This is fitting in more than one way. Not only is it wonderful to name this superb cultivar to show respect and admiration to the great plantsman that Jānis is, but at the same location where this form was found, another cultivar was found which was named by Jānis himself in honour of his wife, *Anemone blanda* 'Gunīte'.



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We could say this lovely couple of Anemones were found growing and flowering in the same spot in the wild, just as their namesake's's love has been growing together for many years in Latvia.

Origin of the plant: *Road from Akseki higher than the road to Čimikoyu, passing rubbish deposit place just on the pass, alt. 1430-1510m – Irmasan Gecidi.*



*Anemone blanda* 'Jānis'





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*Anemone blanda* 'Jānis' – just opening.



*Anemone blanda* 'Jānis' in full flower, in sunshine.



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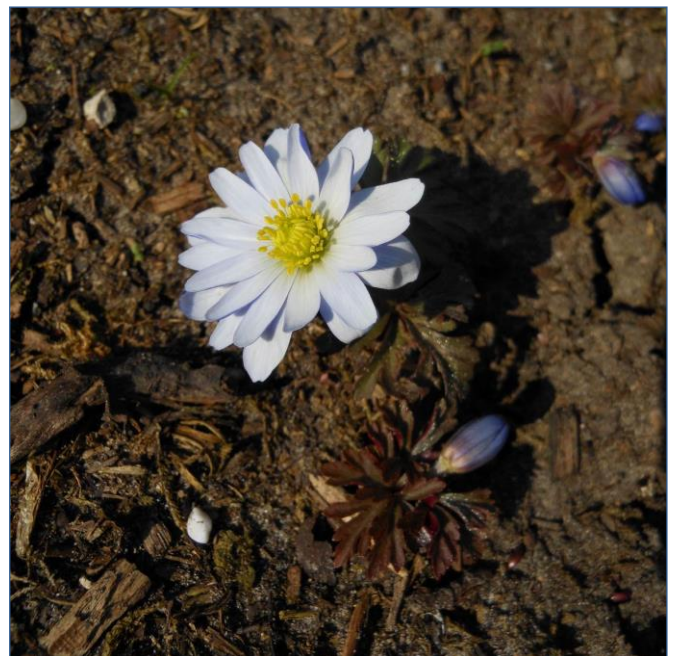


Above: *Anemone blanda* 'Gunīte' photo Jānis Ruksans.



Left: Guna and Jānis at a celebration.

Below: *Anemone blanda* 'Jānis'





# ---International Rock Gardener---

## ---Plant Description---

### **One new to science for our coming generation. *Viola* × *josephii* of section *Andinium* W. Becker from the Andes of northwestern Argentina.**

John and Anita Watson

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

Email: [john.anita.watson@gmail.com](mailto:john.anita.watson@gmail.com) Published in IRG 119 November 2019, pages 69 -115.

#### **What next?**

Will this publication still be around and available for the young and those being born now to read when they grow up? Will there still be a recognisable world for them to live in? Those questions are neither absurd speculations nor unfounded pessimism. They're a realistic assessment of the fairly immediate future based on what we see and know is going on all around us. Man-made causes and natural effects that is, as presently recognised by every reputable scientist not in the pay of some political or commercial interest which would suffer if counter-measures were seriously implemented. Climate change is the big global theme of the moment.

Of course, experts then in the know tried to wake us all up way back in the 1970s, but too often with alarmist warnings of almost immediate catastrophes. When those failed to materialise, they were accused of 'crying wolf' by antagonistic parties, and any who followed fell under that shadow. On our home bookshelves we have a sober assessment entitled 'Global Warming' (Brown 1996). Its 228 pages of narrative still make sense today. But the term 'global warming' became so contentious that it had to be replaced by our present 'climate change'. Another fairly long-term resident on our shelves is the well-known 'An Inconvenient Truth' (Gore 2006). Again, it dispassionately analysed the situation as it was and drew conclusions which also largely hold good. In fact, if anything, those forecasts are proving too conservative. But powerful lobbies managed to partially spoke Al Gore's wheel by accusing him of being the puppet of left-wingers on the make. Some ironical joke, eh? And even now various leading politicians who hold the reins of power rank among the diminishing number of cynical denialists. Any excuse for climatic catastrophes and their consequences will do them; from 'it's always been happening throughout geological time' to 'a natural effect of the sun's elliptic course being at its closest'. The two clinching factors they choose to ignore are the perfect temporal matching of the graphs displaying the beginnings and upward rises of the Industrial Revolution and global temperatures, and the same with the explosive increase in human population and the alarmingly growth of the flora and fauna extinction rate coupled with massive reduction of wilderness.

As a faint ray of optimism, we're reminded of the story of the 1212 Children's Crusade by the lead their latter day equivalents are taking; to greater effect, we must hope. Charismatic individuals and large, organised groups of them in many democratic countries are demonstrating and publicising internationally their concerns and fears about what awaits them as adults. They're demanding action be taken to stabilise and reverse the terrible threat to ourselves and the magical natural world we've inherited.

For the rest of us, their elders but hardly better, we can and must do whatever each of us can. We two have added our signatures to a world petition by any and all scientists for a series of stated actions. It has amounted over 9,000 names and is aiming for 11,000. Possibilities also exist personally for us in publications such as this. Que sera sera? The future may not be ours to see, but at least we can try to influence it positively.

So what relevance has this prologue to the viola described here? Answer: it's named for our one and only little grandchild, no less, as a representative of his generation everywhere, with several more depicted here [figs.2, 29, 30, 56]. Should he get to read this, we want him to know we cared and did our best.



# ---International Rock Gardener---

## Now to business as usual

Much of the background context leading up to discovery of the new natural hybrid described here has already been covered in two of our regular publications in this periodical (Watson & Flores 2018, 2019b), in particular the latter IRG 115 account of *Viola xanthopotamica*. So in an attempt to bore readers as little as possible, we'll leave anyone interested to find fuller accounts there, and merely outline salient points here.



The geographical focus in question is the north-western Argentinian province, Tucumán; the immediate locality being the Infernillo Pass between the outlying Andean ranges of Cumbres Calchaquies and Sierra de Aconquija [fig.1]. Our presence there resulted from realisation of a long-standing, hopeful desire to hunt for a number of 'long-lost' Andean violas endemic to these underexplored mountains. That we were able to afford to spend a long enough period there to be able to achieve anything significant was down to the generosity of the Alpine Garden Society, whose Travel Award fund added considerably to the insufficient amount we were able to invest in the project ourselves.

fig.1: Physical map showing the three Andean outlying ranges of NW Argentina we explored in 2007 (with the new viola area as green, arrowed violet)

## Orphans of the storm. How things began ... and soon ended

Our prior investigations revealed the beginning of January as the most promising start period, with March as the latest month to find the violas still in flower. We arrived in Argentina on New Year's Day 2007, and reached the Infernillo Pass [figs.59, 60] a week later. (In case you're wondering, 'infernillo' doesn't mean infernal or hellish as might be supposed, but translates as a small portable cooking stove. Why here, who knows?)



While approaching the pass from the western side via Amaicha del Valle [fig.59] on the 8th of January for our first visit that year, by good fortune we encountered one Mario, having stopped to ask for information. He turned out to be the friendly paterfamilias of a delightful local pastoral family there [fig.2], who 'adopted' us from then on. It went further. Mario provided valuable information, and later became the guide for our most ambitious exploration of the entire project - into the northern end of the Sierra de Aconquija, beginning at Infernillo.

fig.2: Our friend and field guide at Infernillo, Mario (with beard), his wife, centre, and their brood. (24 Feb 2007. ARF)



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After superficially taking in the immediate roadside flora on either side of the pass, the night was spent in a hostel at Tafí del Valle, a resort at the foot of the mountains to the southeast, on the way down to the provincial capital, San Miguel de Tucumán. A resort for what though? Our room rapidly became a torture chamber as dozens of mosquitoes from a nearby stretch of water arrived for their nocturnal blood-feast. By happy chance though we'd brought with us a small tent which can be sealed from insects by netting. We set it up on the floor and slept peacefully inside [fig.3] - apart from a bit of inevitable itching and scratching!

fig.3: 'Ils ne passeront pas' ('they shall not pass'). With our bed abandoned, test zipping the netting of the tent to escape the mosquito plague. Tafí del Valle. (8 Jan 2007. ARF)

Next morning, the 9th, apart from making fruitless inquiries as to whether horses and a guide were available for trekking, which had been our reason for stopping at Tafí, we left that community to the 'mozzies' from then on and became permanent night lodgers at Mario's during our stays there.

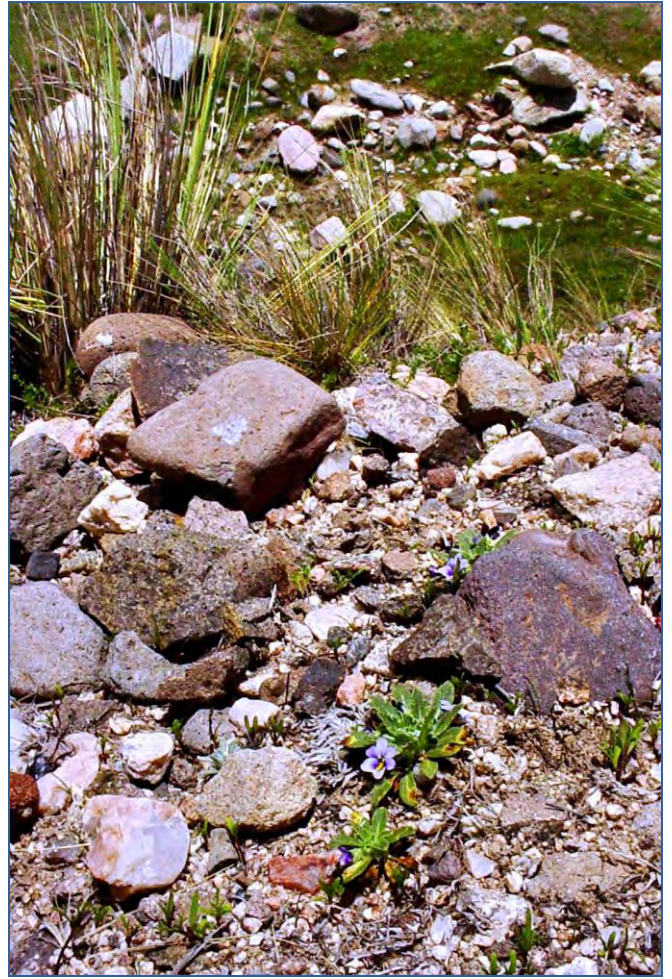


But on the way back to his place we embarked on a more focused mission, in fact our prime reason for being at Infernillo. We'd previously examined *Viola* specimens at the herbarium of the local Fundación Miguel Lillo natural history museum in the Tucumán provincial capital. Those included a collection made by the roadside along the top of the Infernillo Pass in 1952 by the Swedish amateur botanist Benkt Sparre. He'd identified it as *V. triflabellata*, one of those we were looking for, albeit the commonest: but any would do us for a kick off! It was also the easiest to reach of the only three fairly exact *viola* locations we had marked down for the project, and furthermore the most precise (i.e. beside the stone slab marked as kilometre 87 west of Tucumán city).

If we supposed finding that *viola* would be a mere formality, we were in for a rude shock. To begin with the distance number on the marker had almost weathered away, and it took us a good while to decipher which of several similar blocks of wayside stone it was. Having solved that, we found ourselves looking down at a stream valley running below and parallel with the road [fig.4], and containing a small farmstead at one point. Anita decided to climb down and ask whether anyone there could offer useful information. So we separated, and John walked on down the pass for about a further half kilometre to where the surroundings looked untouched and so a more promising potential habitat. But an intense scrutiny of the streamside terrain for a very long time yielded absolutely nothing. At the lowest point of his search he noticed a hilly rise just ahead and beyond which looked likely, and decided on trying that as a last chance before giving up what was rapidly becoming a pointless wild goose chase. As he moved towards it down the valley, he was riveted by something he saw close beside his feet [figs.5]. Yes, a handful of the *viola* in question, right by the stream and in flower! After rattling off a few photos he clambered back up as the sky was clouding over rapidly and shouted and searched for some time for Anita. The folks at the farm hadn't been able to help, so she'd hiked way up a valley across the other side of the road and drawn a blank. It seems John had hit on the one and only place where it grew. We found a number of other individuals nearby. All were fairly homogeneous, with very small rosettes, similar foliage, and like-coloured corollas [figs.6, 7].



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Left – fig.4: The streamside habitat of our very first NW Argentinian viola, F.& W.11345. Infernillo Pass, Tucumán Province. (9 Jan 2007. ARF)

Right – fig.5: Part of the small colony of the F.& W.11345 *Viola* from the Infernillo Pass, Tucumán Province, as John first saw it at his feet in passing. (9 Jan 2007. ARF)



fig.6: F.& W.11345, the first *Viola* at the Infernillo Pass in January. Note small rosettes compared to flowers - all were similar. Tucumán Province. (9 Jan 2007. ARF)

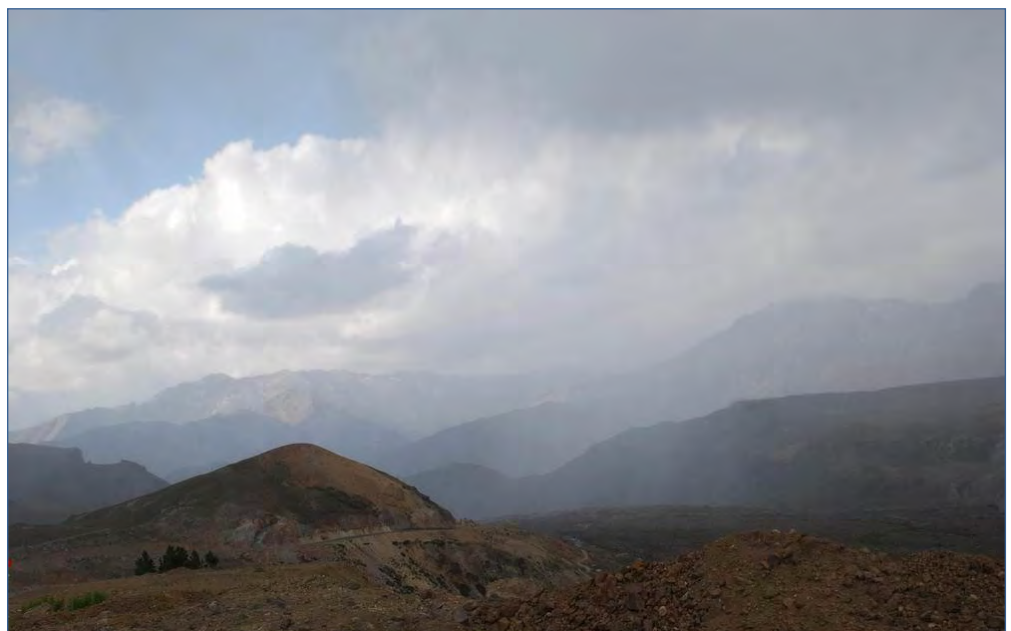
So at last the first of the thirteen we were seeking (Watson & Flores 2019b) was tucked under our belts, even if it was only the most commonplace on our wants list ... or so we supposed.





fig.7: Another individual of F.& W.11345 from the same population at Infernillo with typically similar rosettes and flowers. It was taken at the same time. (9 Jan 2007. ARF)

fig.8: The night after we'd found the first viola, a massive downpour, the culmination of a series of storms like this, put paid to our collecting for a whole month. (7 Jan 2007. JMW)





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A succession of storms from systems driving in off the Atlantic [fig.8] had been making life difficult for us on and off since shortly after we arrived. It rained all that night. In the morning we set off back up to the pass and beyond to extend and complete our explorations there before moving on to pastures new. But mud, rocks and stones washed down from above blocked roads in several places, and we sometimes had to wait a bit until a way through was cleared. Everywhere was saturated, and apart from the immediate roadside, impossible to botanise. We only managed to notch up two more non-*Viola* collections before turning back to sit it out at Mario's.

After dark the mother and father of violent downpours accompanied by endless thunder and lightning only allowed us to sleep fitfully in the little empty building Mario had 'loaned' us. How thankful we were not to be in the tent!

Obviously plant hunting was now quite out of the question for the foreseeable future. In the morning we decided not to throw good time after bad, but instead return home to Los Andes down south across the border, and resume when the weather had calmed. A short way beyond Mario's a steep valley (quebrada) had spilled a massive mud avalanche across the road. We became part of a long queue of trapped vehicles, with a delay of over half an hour before the bulldozer did its stuff and our temporary withdrawal could be resumed (Watson & Flores 2019b).

As we made our way back to Chile during the 11th and 12th, we frequently had to cross great sheets of water in the lowlands which covered the road [fig.9]. Around and beyond, storms still raged in the mountains, but the weather gradually cleared as we moved southwards.

A fuller and more immediate illustrated account of those productive but ultimately ill-fated initial twelve days appeared in the *Alpine Gardener*, entitled 'Riding the Storm' (Watson 2009).



fig.9: As we made our way temporarily back home to Chile over the next few days, the roads were often flooded like this or much deeper. (14 Feb 2007. ARF)



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fig.10: Strutting his funky stuff. The confident pet native burrowing parrot, *Cyanolaisus patagonus*, of Mario's family at Infernillo. (11 Jan 2007. ARF)

## If at first ... the bad pesos are back on the trail

We next visited the Infernillo seventeen days after our return on the 5th of February to a climatically more favourable north-western Argentina. Again we were welcomed with delighted open arms by Mario's brood and their various pets, including with open wings by a confiding free range burrowing parrot [fig.10] which had become a totally integrated member of the family. IRG readers have already been introduced in issue 109 (Watson 2019) to this strikingly attractive and gregarious species as it is in the wild.

Tucumán is known as 'El Jardín de la República', the Garden of Argentina, and at 22,524 km<sup>2</sup> is the second smallest of the country's 23 provinces after Tierra del Fuego [fig.58]. The outlying Andean chain within its boundaries stretches for little more than 130 km, yet contains one of the most numerous assortments of these rosulate violas as endemic to northwestern Argentina. Four species lie to the north of the Infernillo Pass, no more than one of them, *V. triflabellata*, with a fairly precise location. We assumed we'd already found that anyway. Although only two are situated south of the pass and within reasonable reach, they're both accurately noted as having been collected at 3900 m on a named mountain, Cerro Muñoz, so presented a far better proposition. In fact one even bears the homonym *Viola munozensis* W. Becker. Our failed attempt at Tafí del Valle the month before to arrange an equestrian trek had Cerro Muñoz as its intended objective, a one-way distance of 16 km over a rise of 2000 m. Now we should have to approach from a different angle on a slightly longer route along the mountain ridge, but at least with 1000 m less inclination to confront us from start to finish [fig.60].

fig.11: Getting ready for the off. The sixteen sturdy limbs that are destined to carry us and our gear to hunt for violas ... and to get us back.  
(22 Feb 2007. ARF)

## Horsing about

And so it came to pass on the morning of 22nd February that Mario and an assistant assembled four steeds [fig.11], two for us, one for himself, and an accommodating white mule to bear all our camping and plant collecting gear [fig.12]. Given the



distance, the terrain, and the time needed to explore, there was no possibility of a return that same day. Among our family photos there's a pre-World War Two black and white print of normally stoically brave baby John perched on a seaside donkey's back, looking like a pimple on an elephant and howling his poor little head off. By now though he felt he was a pretty experienced jockey as a result of a ride in the hills of Tipperary during the mid-1960s and a short haul up a Patagonian mountain slope in 1997.



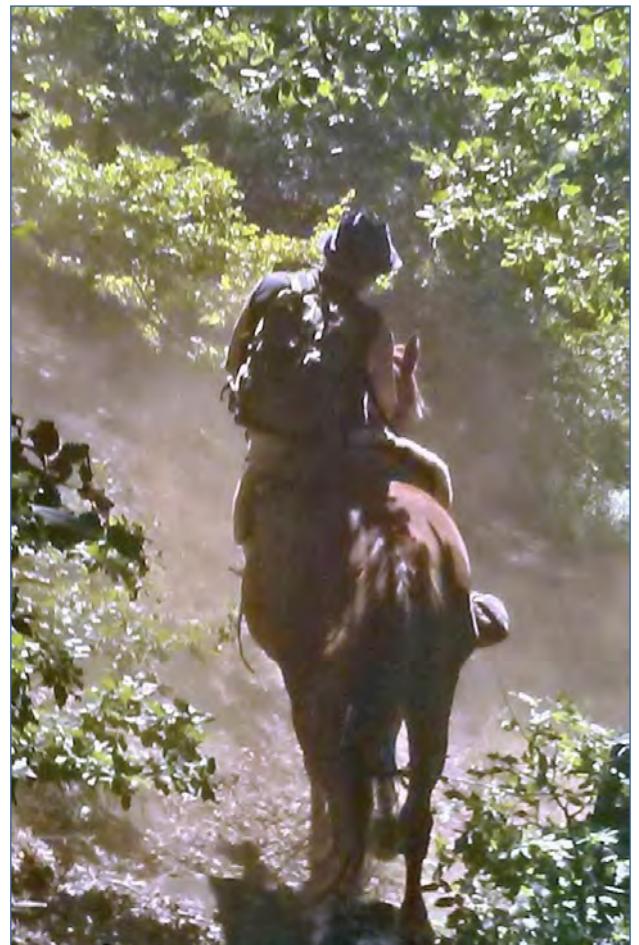
## ---International Rock Gardener---



fig.12: Sometimes the only feasible access to violas is by 4-hoof drive. John, a confirmed biped, reflects on the prospect apprehensively. (22 Feb 2007. ARF)

It might be said that if dreams can be realised on horses, cowards will ride. Pride was also at stake. Wife Anita is completely at home in the saddle, and horses are to his daughter Nicola what cycles used to be to him when he was young and fit. Notwithstanding, John's apprehension at the thought of having to play the gaucho for two full days couldn't be held entirely in check. In the main, apart from one minor incident as described below, those fears were unfounded, and all went hunky-dory for him [fig.13]. The lie of the land together with its few inhabitants were completely familiar to Mario, so he'd mapped out in his mind exactly what route to follow to reach our goal and where to stop for the night.

fig.13: So this is what it's all about. But you were already nearly 71-years-old back then, you mad fool Watson! (12 Jan 2014. Helga Petterson)





## ---International Rock Gardener---



We started just below the pass, turning off south at a gulch called the Río Corneles and following its boulder-strewn dry torrent bed gradually upwards [figs.14, 21]. An auspicious omen greeted us almost before we'd begun. We could hardly have failed to notice a fine specimen of *Calceolaria teucroides* [fig.15] by the cliffside, its multi-branched inflorescence of long yellow slippers looking more slipper-like than ever for the genus. It's one of three species we know from the Infernillo sector.

fig.14: Here's the surprisingly nearby habitat of the day's first viola, F.& W.11423, destined to become the *V. ×josephii* type site. Infernillo Pass. (22 Feb 2007. ARF)

fig.15: But before the viola we opened with this tasty appetizer, F.& W.11440 *Calceolaria teucroides*. NW Argentina contains several such choice species. (22 Feb 2007. ARF)

As if that wasn't enough, while our mounts were still picking their way cautiously between the smoothly rounded rubble towards the end of the flattish gulch, and before we'd covered a sixth of our journey even, we were astonished to see from our viewpoint up on the saddles a showy flowering population of the very violas we sought. They were spread about below us among the water-worn stones, rocks and gravel [figs.16-20, 67, 69]. Some of the flowers were similar to those we'd found nearby in January [figs.6, 7]. But all the plants were bigger, much bigger, and several specimens [figs.19, 67] bore no obvious resemblance to the previous population at all. In fact, taken as a whole they were distinctly variable. However, we provisionally identified the plant on the spot as a surprisingly more mutable colony of the same *V. triflabellata*. As we photographed and collected specimens for the press Mario had unpacked for us, he tightened the animal's girths, which had loosened up during the uneven, jolting going [fig.21].





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fig.16: F.& W.11423 *Viola* ×*josephii*, type population. Large, dull-coloured rosette, most usual-coloured flowers. Río Corneles gulch, Infernillo Pass, Tucumán. (22 Feb 2007. ARF)



fig.17: F.& W.11423 *Viola* ×*josephii*, type population. With a large, dull-coloured rosette, and the most usual-coloured flowers. Río Corneles gulch, Infernillo Pass, Tucumán. (22 Feb 2007. ARF)





fig.18: F.& W.11423 *Viola* ×*josephii*, type population. Large, green rosette, entire and glabrous leaves, pale flowers. Río Corneles gulch, Infernillo Pass, Tucumán. (22 Feb 2007. ARF)



fig.19: F.& W.11423 *Viola* ×*josephii*, type population. Large, dark rosettes, entire, ciliate leaves, violet flowers. Río Corneles gulch, Infernillo Pass, Tucumán. (22 Feb 2007. JMW)



## ---International Rock Gardener---



fig. 20: F.& W.11423 *Viola* ×*josephii*, type population showing flower and foliage of most common form there. Río Corneles gulch, Infernillo Pass, Tucumán. (22 Feb 2007. ARF)



Left – fig.21: While we deal with the viola, Mario sits on a boulder and sorts out the equine gear ready for the climb ahead. Río Corneles course, Infernillo Pass, Tucumán. (22 Feb 2007. ARF)  
Right – fig.22: We've made some height. Looking back at the Río Corneles course and Infernillo Pass from our lunch spot towards the Altos de Muñoz, Tucumán. (22 Feb 2007. ARF)



fig.23: Annual plant, F.& W. 11424 *Nototriche pygmaea* with its mismatched choice flowers and coarse foliage. Well, you can't have everything! (22 Feb 2007. ARF)



We soon left the gulch valley behind for more open country, and began to climb steadily. The narrow, bare, pale Río Corneles course winding below and back into the distance resembled a piece of rope [fig.22]. After a few more kilometres, and with us having already risen 500 m or so, a stop was called for late lunch and to give the animals a break. On looking around there we met up with the next excitement, our first ever annual *Nototriche* species, the aptly named *N. pygmaea* [fig.23]. It's quite likely that non-botanists who are interested in the genus, who know quite a bit about it, and who have perhaps even seen species in the Andes, may not be aware that it includes a few annuals. It certainly took us a good while to discover that fact. Indeed, when first trying to identify this obviously related little Malvaceae back at home, we supposed it might perhaps be a dwarf *Malvastrum*, an *Acaulimalva* [cf. fig.41], or something of that ilk. The pale violet-blue cups with their fetching eyelash lines radiating at the base do undoubtedly look nototriche-ish. But the foliage??? You might well be forgiven if you took it for a mini-version of common hogweed (*Heracleum sphondylium*), which it could hardly resemble more!

Continuing upwards, we soon reached an extensive and more or less level plateau area at an average elevation of about 3600 m called the Vega Altos de Muñoz [figs.27, 34, 43], which runs to the south and includes the mountain of that name. By the time we'd covered more distance it was already getting well into the afternoon, and we were approaching the destination Mario had picked for our overnight stop. But there was still time for two more significant discoveries to be added to the cameras and plant-press.



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The first of them was another, and from an alpine gardener's point of view the best, of those aforementioned three *Calceolaria* species. Its very name, *C. glacialis* [fig.24], is enough to whet the appetite of aficionados. If only it had proved as easy to photograph as it was to spot though! The cushion plant itself inhabited one of the occasional low outcrops scattered across the plateau. The foliage was tucked away unnoticeably in a dark rocky crevice, which served both for good moisture retention and as a protective measure against herbivores. The solitary, clear bright yellow flowers have large, wide, flat pouches, reminiscent of the lip plates of Mursi tribe women. As the flowers appear on their short stems they emerge just sufficiently from the shade to catch the full blaze of the Andean sun and shine out like tiny beacons, clearly to draw the attention of pollinators and plant hunters. But unfortunately regular camera technology can't cope with those extremes of light. Edit out the shade so the leaves can be seen - and the flowers turn almost white. Get the yellow as it should be - and the rest of the photo is almost black. None we took there and then on the Muñoz trek could be modified. In the end we've had to include one taken elsewhere, which is not quite so bad, though very far from perfect.



fig.24: By contrast - with F.& W.11403 *Calceolaria glacialis* you've got everything except good light for photography. Cerro El Globo, Catamarca Province, Argentina. (13 Feb 2007. ARF)

The last for the day was a third but smaller-sized population of our same viola [figs.25, 26, 63], again variable, not only in flower colour, but also by rosette diameter - some just as small as our original discovery. It was spread across a barish stretch of loose, pale, sandy textured crystalline soil on a locally more undulating sector of the plateau.

### Meet the Diaguitas

With ample daylight remaining to organise ourselves and settle down for the night we reached our camp site, a picturesque small huddle of single story thatched dwellings interspersed with animal corrals [fig.27]. The walls consist of adobe bricks or vertical paving-stones. Its occupants are Diaguitas, indigenous Amerindians [figs.28-31]. Along with the Qulla (pronounced Koya) they are



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the two Andean peoples subjected by the former Inca Empire who still inhabit Argentina today. They total over 155,000, with a somewhat greater number of them in northern Chile. Many live in towns, but a good few still pursue their original rural way of life. While incorporating benefits of the wider modern world into their lives, they've proudly maintained their cultural traditions and ethnic identity, above all those from small isolated communities such as this one.

They were extremely friendly, and curious about us, our way of life, and the reason for our going to the trouble of this long trek into the wilds. While they may not have gone so far as actually killing the fatted calf for us, they generously shared a good portion of meat from recent butchery [fig.28] as part of a right royal feast. Fortunately, we'd already unpacked and set up the tent, so were able to collapse straight into the sleeping bags until we awoke with some difficulty next morning.



fig.25: Habitat of our second collection of *Viola x josephii* for the day F.& W.11426, showing variable flower colours. Vega Altos de Muñoz, Tucumán Province. (22 Feb 2007. ARF)



fig.26: A fine individual plant of F.& W.11426 with broad green leaves and the most usual flower colour. Vega Altos de Muñoz, Tucumán Province. (22 Feb 2007. ARF)



fig.27: The overnight stop with native Diaguita people on the Vega Altos de Muñoz. John (R) is preparing to erect our little two person tent. (22 Feb 2007. ARF)



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fig.28: Hanging out meat, not washing, to dry! (22 Feb 2007. ARF)



fig.29: The children were particularly bemused by us. (22 February 2007. ARF)



fig.30: I wonder who or what these strange creatures are? (23 Feb 2007. ARF)



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fig.31: Our set-up may look like yours, but we're working, not fiddle-faddling about with scraps of animal pasturage like you over-privileged nerds. (23 Feb 2007. ARF)

### A good haul, all in all

Having breakfasted, packed and bid our fond farewells, we got underway, our immediate aim the promising flat areas not far from the village. Yet again our luck flowered - literally - almost immediately, and once more as spotted from on high-horse (perhaps drones will become essential plant-hunting equipment soon!). Although we'd already noted it for the first time elsewhere exactly ten days earlier, *Caiophora nivalis* [figs.32, 33] then had been a solitary plant with one mud-splashed flower. Here it was at its photogenically most inviting. Your average *Caiophora* has distinctive, large, scallop-dome lampshade-shaped red or orange flowers, usually nodding or outwards-facing, which may be covered in stinging hairs like the rest of the plant. Occasional species are white, or rarely yellow. The usual habit is a twiner or tall herb, which occasionally reduces to a neat 'touch-me-not' cushion. But there are also a couple of endearing white dwarfs, the



dainty carpeting *C. pulchella*, as illustrated in Watson & Flores (2019a), and this prostrate rosette-forming species with its upright, goblet-shaped corolla composed of five tapered petals and the colourful inner floral organs. Both these species have relatively few hairs, so might not ape stinging nettles - but don't take that as read!

fig.32: And here's one of those tasty morsels for goats, sheep, horses and llamas, F.& W.11427 *Caiophora nivalis* in all its unspoilt little glory. (23 Feb 2007. ARF)





fig.33: A view of the colourful reproductive organs inside the flower-cup of F.& W.11427, *Caiophora nivalis*. Vega Altos de Muñoz, Tucumán Province. (23 Feb 2007. ARF)



fig.34: The Vega Altos de Muñoz with the habitat, as barer patches in the foreground, of our last site for *Viola xjosephii*, F.& W. 11428. Tucumán Province. (23 Feb 2007. ARF)



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Little needs to be added about the next desideratum to appear on another locally sparse sector of the plateau [fig.34], as it was the fourth, the last, and by far the most polymorphic colony of our omnipresent viola [35-40, 61, 62, 64-66, 68]. Particularly notable were the deep marginal leaf divisions of some individuals [figs.38, 65, 66], and the dark coloration of several rosettes [fig.64]. We were beginning to rack our brains to think of any other rosulate viola of such variability. The only one to come to mind was *Viola cotyledon*. But that species comprises dozens of populations found in diverse habitats and at a range of elevations from 900 to 3300 m across a total extent of ca. 760 km. Even so, the margins of its leaves are consistently entire and glabrous, while the rosettes themselves are never any colour but some shade of green. Here, by contrast, were just four populations in close contact, spread over no more than 10 km [fig.60].

Although we'd reached little more than halfway to the peak of Cerro Muñoz, after packing, leaving and doing justice to our latest finds we found most of the morning had already slipped away. In order to get back that day we were obliged to turn round there and then. And who were we to complain? Not to mention the half dozen other choice species of the Andean flora we'd already encountered, or our memorable stay with the hospitable local native herdspeople, there was that viola. For sure we hadn't come across a different species of the genus we'd never seen before, but the new information accumulated about the variability, relative abundance and geographical distribution of this one was incalculable. Little did we know then just how incalculable.

But the Vega plateau still held a bonus or two for us at another of its bare patches. We could hardly have failed to miss the showy *Acaulimalva nubigena* [fig.41], an appropriate Latin epithet which means 'cloud-dweller'. This attractive close relative of the nototriches would surely be welcome in anyone's alpine house, and if anything be more likely to flourish there. We can hardly claim *Polygala corralitae* [fig.42] would set the gardening world on fire though. In fact it has to be admitted that without stopping for the acaulimalva we would certainly have missed its inconspicuous little green cushion with the white, dark-striped, pointed petals playing hide-and-seek among the foliage.

Backtracking across the plateau we came upon a small pack of llamas grazing [fig. 43], something quite unexpected so far south. We were more than happy to see these domesticated South American camelids though, as they graze without destroying plants, unlike the wretched ubiquitous introduced goats which infest much of the Andes!

Often one doesn't notice when riding up a mountain how steep the gradient is, but that can become unnervingly apparent on descending back down again, as here. It takes an effort of balance to stop pitching forward over the head of one's mount, which may well be slipping and sliding on rocks as well. Perhaps feeling enough of that was enough, at one point John's Beast of Burden decided to unburden itself of its burden. It refused to budge, then folded its legs, sank slowly to the ground, and that was that! At least it had the grace not to roll over on top of him this time though (Watson & Flores 2019b)! It was easy to see where the phrase 'stubborn as a mule' comes from, because not even Mario could activate it. John was left with no alternative but to walk the rest of the distance down to the gulch and as far as the road, fortunately not too far. It actually paid dividends in floral terms though when he took a slightly different track from the two remaining equestrians and lighted on gaudy *Portulaca fulgens* with a red, yellow-centred flower, a form not seen by us previously [fig. 44]. Lower down, at the crest of the Infernillo Pass, there's a quite large and conspicuous colony, but composed entirely of the yellow form [fig.45]. The floral patio display of our home in Chile was recently enhanced by a soft brownish orange coloured one in a hanging pot, as bought at a street market [fig.46]. Sadly, it eventually succumbed this winter without issue.

While photographing this we noticed a small, colourful insect we'd never seen before, but on close inspection were able to identify in a flash. Anyone with the slightest interest in our six-legged friends is likely, as we had, to have seen pictures of the exotic-looking velvet ants. They're known in the States as cow-killers, although they aren't aggressive and only sting agonizingly in last-ditch self-



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defence. But this was our first brush with a live one in habitat. They are in fact flightless female wasps. Apart from an irrational revulsion towards earwigs, and natural caution where known stinging or biting beasts are concerned, John has no fear of arthropods, and being careful not to provoke it, was happy to let this one pick her way through the hairs on his arm while Anita photographed. With more than a little help from the Internet, the species is identified as *Traumatotilla ocellaris* [fig.46] (Bartholomay et al 2019). Presumably the 'Traumato' bit may refer to the effect on anyone unlucky enough to be stung! In fact Mario's place provided several most interesting insect photos for our digital collection, not least the remarkable mating process of tiphiid wasps, again where females are flightless [fig.47].



fig.35: Habitat of our fourth and last *Viola* × *josephii*, F.& W.11428, showing predominant pale and white flowers. Vega Altos de Muñoz, Tucumán. (23 Feb 2007. ARF)



fig.36: F.& W.11428 *Viola* × *josephii*. Multiple, dull-coloured rosettes, divided margin, pale flowers. Vega Altos de Muñoz, Tucumán Province. (23 Feb 2007. ARF)





fig.37: F.& W.11428 *Viola* ×*josephii*. Dull-coloured rosette, divided margin, most usual-coloured flowers. Vega Altos de Muñoz, Tucumán Province. (23 Feb 2007. ARF)



fig.38: F.& W.11428 *Viola* ×*josephii*. Dull-coloured rosette, deeply divided, glabrous margin, pale flowers. Vega Altos de Muñoz, Tucumán Province. (23 Feb 2007. ARF)



fig.39: F.& W.11428

*Viola ×josephii*.

Dull-coloured rosette, divided, glabrous margin, violet flowers. Vega Altos de Muñoz, Tucumán Province. (23 Feb 2007. ARF)



fig.40: F.& W.11428 *Viola ×josephii*.

Dull-coloured, small rosette, glabrous margin, pale flowers. Vega Altos de Muñoz, Tucumán Province. (23 Feb 2007. ARF)







fig.41: *Acaulimalva* is an Andean genus of 20 species, apparently without a dud, though inevitably some, like F.& W.11430 *Acaulimalva nubigena* here, are showier than others. (23 Feb 2007. ARF)



fig.42: F.& W.11431  
The recently described *Polygala corralitae*. One of the dwarfest of its genus, but hardly the most conspicuous, to say the least! (23 Feb 2007. ARF)



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fig.43: Domesticated llamas on the Vega. Their wild relative, the guanaco, inhabits down to Patagonia, but we've only seen llamas up near Peru before. (23 Feb 2007. ARF)



fig.44: F.& W. sin num. *Portulaca fulgens*. This showy, variably coloured species is an endemic of Argentina, mainly in the Andean NW of the country. (23 Feb 2007. ARF)



fig.45: As we've seen it, the most common form of *Portulaca fulgens* is this yellow F.& W. 11435 by the road at the Infernillo Pass, Tucumán Province. (23 Feb 2007. ARF)



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fig.46: For comparison - the attractive soft colour form of *Portulaca fulgens* as it grew in a hanging pot in our garden until it gave up the ghost this winter. (24 Feb 2019. JMW)



fig.47: *Traumatotutilla lasiogastra*, a velvet ant, on JMW. It's actually a wingless female wasp. Known as 'cow killers', they have a ferocious sting - if annoyed! (23 Feb 2007. ARF)



fig.48: Parasitic tiphiid flower wasps, possibly *Tiphia tucumanensis*, mating. Contrary to expectation, the tiny hanger-on is the female. It lays eggs on beetle grubs. (9 Jan 2007. ARF)

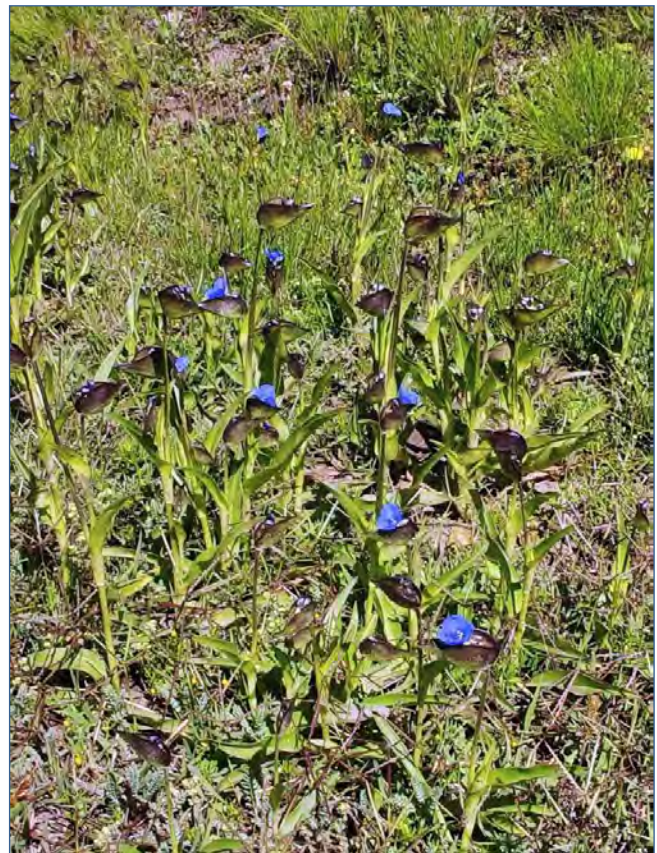


fig.49: Striking F.& W.11436 *Commelina tuberosa* (syn. *C. alpestris*) with its eyecatching azure blue flowers emerging from dark, beak-like spathes. (23 Feb 2007. ARF)





fig.50: The tri-petalled Tradescantia look-alike flowers and prominent spathes of F.& W.11436 *Commelina tuberosa* in close-up. Infernillo Pass, Tucumán. (23 Feb 2007. ARF)

### To pass or not to pass

We never tire of the biodiverse flora at Infernillo, which must surely have helped to inspire the popular sobriquet 'Garden of Argentina' for the province. No matter how many times we stop, there always seems to be something we haven't seen before, or if we have, in a more photogenic state. So when we arrived back rather earlier than expected at the road, we decided to give it yet another once over.

Conspicuous, pure blue as associated with gentians is uncommon in the Andes, even in the South American flora as a whole. The obvious outstanding and emblematic example is recently twice rediscovered *Tecophilaea cyanocrocus* (Eyzaguirre & Fonck 2016, Watson 2018), but other than that, a few mainly taller items such as salvias, lupins and the lowland nolanas are the only ones to come readily to mind. But this bit of northwest Argentina produces two to treasure, *Evolvulus sericeus* (Watson & Flores 2018) and the commelinas with their unique Mickey Mouse-eared petals. The usual problem with that genus is either being sprawly, or small-flowered, or both, like one which has brought itself to our Chilean garden. But although flowers of *Commelina tuberosa* [figs.49, 50] are still somewhat modest sized compared with the plant, the stand-out azure colour compensates for that, and they have the additional advantages of a neat, upright carriage and unusual horizontal, dark and pointed spathes, which bring to mind *Strelitzia*.



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fig.51: A delightful unidentified fern fit to grace anyone's shade garden or pot collection. Infernillo Pass, Tucumán Province. (23 Feb 2007. ARF)

Our comprehensive attempts to identify a charming and graceful little fern photographed in a cool niche [fig.51] ended in frustration. There are abundant names on offer of species known from Tucumán, but scarcely an image, whether as a drawing or photograph. We'd have loved it to be one in particular which is recorded from the province, *Gaga*

*marginata*, to celebrate 'her ladyship', but alas it ain't! Should we ever chance to discover a new species of that genus, what else to call it but *Gaga gagae*? In case you're wondering, yes, the genus was named in 2012 for the person herself.



Another good blue, but this time just minimally touched with red, had popped up out of a dense tuft of wiry grass in the form of handsome *Perezia pungens* [fig.52] of the Asteraceae. This widespread and common mainly Andean genus of something over 30 species contains a number of these 'not-quite-gentian' blues, and is well represented by descriptions and illustrations in Sheader et al. (2013).

fig.52: F.& W.11438 *Perezia pungens*. Blue perezias became familiar during the 1950s following Mrs Tweedie's introduction of Patagonian *Perezia recurvata*. (23 Feb 2007. ARF)





fig.53: Dwarf F.& W.11437 *Oxalis famatinae*, characterized by the red-fringed basal petal zone. Infernillo Pass, Tucumán. (23 Feb 2007. ARF)

We've already eulogised recently over dwarf, red fringe-centred *Oxalis famatinensis* [fig.53] (Watson & Flores 2019b). As its best population known to us is at Infernillo, nothing more is needed than to simply leave the photo from there to speak for itself. By contrast, to our knowledge no illustration of *Hypseocharis pimpinellifolia* [fig.54] has been published for ten years (Watson 2009), and that's quite likely its only visual reference ever in general literature of the wild flowers of South America. *Hypseocharis*, a small genus in the Geraniaceae, consists of about five accepted species, two of them in Argentina. But this, by far the most commonplace as well as the showiest and best known, is like no geranium you've ever seen. In fact, until morphological studies a few years ago the genus was included in the Oxalidaceae. As can be seen, *H. pimpinellifolia*, although an erodium-ish foliaged plant, produces an oxalis style of flower, appropriately scarlet pimperl-coloured and with a yellow centre. It's neat, brilliantly coloured, and insects of all kinds and sizes love it, as gardeners surely would if they could.

If you know *Sisyrinchium bermudiana*, aka *S. angustifolium*, aka *S. graminoides*, or whatever you like to call it, including 'E.K. Balls' (aka 'Ball's Mauve'), as John has since the teenage start of his obsession with plants, then you effectively know *S. chilense* [fig.55]. They're pretty much dead ringers. Past confusion existed as to which taxon the epithet *chilense* belonged, but there's now general agreement that this is the plant as originally described by Hooker. Somewhat variable, above all in height, it's a ubiquitous species with an extremely extensive distribution and an elevation range from sea level to about 4000 m. It inhabits 20 Argentinian provinces and 12 Chilean regions from Tierra del Fuego to the borders with Peru and Bolivia, and continues northwards as far as Ecuador. It's also recorded from Paraguay, Uruguay and even a bit of Brazil.



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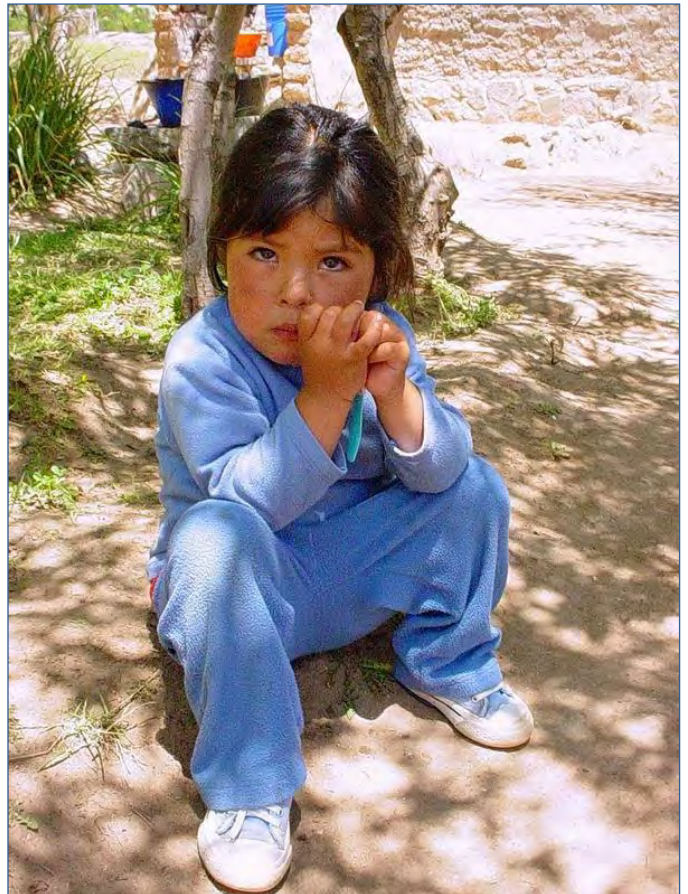
fig.54: F.& W.11340 *Hypseocharis pimpinellifolia*. What wouldn't we give to have been able to introduce this little gem into cultivation! Infernillo Pass. (7 Jan 2007. ARF)



fig.55: F.& W. sin num. *Sisyrinchium chilense*. at the Infernillo Pass, Tucumán Province. Note the dreaded introduced dandelion behind. (Jan 2007. ARF)

fig.56: After our return we get an old fashioned look from one of Mario's granddaughters. "What's the idea, stealing our gramps away for all this time?" (24 Feb 2007. ARF)

And so our two-day excursion drew to a close, taking us back to the bosom of Mario's family [fig.56], and leaving us to work out when we got back home what to make of the remarkably multi-faceted viola, which we have done as follows.





## Taxonomy

*Viola* × *josephii* J.M. Watson & A.R. Flores, nothosp. nov. [figs.5-7, 16-20, 25, 26, 35-40, 60-69, 70, 73].

= *Viola triflabellata* W. Becker × *V. tucumanensis* W. Becker.

**Other illustrations:** Watson (2009: 238), Watson & Flores (2019b: 18, fig.19).

**Type:** ARGENTINA. Tucumán Province, Tafí del Valle Department, Río Corneles dry gulch, 2.40 km S of Infernillo Pass from Monteros to Cafayate, 26°44'12"S 65°48'02"W, 3025-3030 m, 22 Feb 2007, leg. A.R. Flores & J.M. Watson, F.& W.11423 (holotype CONC, isotypes SGO, herb. Flores & Watson).

**Diagnosis:** This new natural hybrid of section *Andinium* W. Becker combines morphology of the other four members of its small intersectional alliance, *Triflabellatae* W. Becker. However, *Viola hieronymi* W. Becker and *Viola tucumanensis* W. Becker possess glabrous, not ciliate, stipule margins, while stipule lengths of *Viola joergensenii* W. Becker and *Viola triflabellata* W. Becker are distinct. *Viola* × *josephii* also differs critically from all four of those closely allied species by the wide variation range of the following characters within its populations, extremes of which are rarely found in any of the other related taxa: rosette diameter, leaf length, stipule length, leaf undersurface glandular or eglandular, lamina margin entire to divided and glabrous to pilose, foliar and corolla colours, and petal indumentum. Its style crest is also unique. These significant comparative polymorphic syntheses determine its nothotaxon status as presented herein.

**Description:** *Life form* perennial, rosulate, evergreen hemicryptophyte. *Rootstock* axial-fusiform, usually slender, to ca. 4-10 cm long × ca. 1.5-3.5 mm dia. at junction with caudex, subligneous, with few fibrous feeder roots, usually simple, at times 2-branched. *Caudex* ca. 1-3 cm, corrugated with basal vestiges of previous vegetation, simple to few close-branched, branches to 1 cm. *Plant* usually solitary rosette, rarely to 3. *Rosette* ca. 2-6 cm dia., more or less prostrate to part-ascending, centre of face usually slightly depressed. Foliage loosely radial, obscurely spiral, subimbricate, bright to dull green, or bronze-tinged green with reddish brown margin, or pale to dark bronze. *Leaves* 0.8-2.5 cm when mature: *stipules* ca. 3-6 × 0.3-1 mm, basal, entire, finely linear, hyaline, ciliate, apex acute; *pseudopetioles* ca. 4-12 × 0.3-2.5 mm, plane, thin, with broad, glabrous, hyaline margins; *lamina* ca. 0.5-3 cm × 1.5-6 mm, elliptical to oblanceolate, rarely subobovate, cuneate to pseudopetiole, succulent but not thick; face alveolate reticulate with veins more or less prominent; undersurface smooth, with or without dark, linear glands; margin entire, or subentire with irregular shallow to deep divisions, or regularly and deeply 3-incised, concolorous with face or with narrow dull red border, glabrous, or ciliate at base to pilose-ciliate throughout; apex acute to subacute. *Anthesis* somewhat successive. *Flowers* as wide as high, ca. 6-7 mm, axial, solitary, forming ring on face of rosette, with maximum of nine open simultaneously on one plant as seen. *Peduncle* ca. 0.7-1.5 cm, shorter than surrounding leaves, glabrous, or rarely with few pilose hairs; *bracteoles* 1-3 mm from base of peduncle, 3-6 × 0.5-1.2 mm, finely linear, hyaline, apex acute. *Calyx* 4-5 mm; *sepals* 2-5.5 × 0.5-2 mm, entire, acute, slightly extended to rear; margins hyaline, glabrous or ciliate in apical half, including on same plant, superior shortest. *Corolla* pale to deep blue-violet to purple-violet, to white tinged pale violet, to pure white, always with darker dense violet veining on basal half of inferior petal and lightly and sparsely so at base of lateral petals and at times superior petals; or white with much reduced venation, or pure white; all inferior petals with yellow, linear tongue-shaped throat marking; reverse of petals commonly dark to blackish violet, or darker lined on white when corollas pale, or white in rare white-flowered forms. *superior petals* 4.5-6 × 1.5-3 mm, obovate, cuneate to base, apex rounded; *lateral petals* 5-6.5 × 2-3 mm, obovate, cuneate to base, apex rounded; face with short, stout, translucent white clavate hairs as tuft at



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centre of basal half; *inferior petal* 5-8 × 4.5-8 mm, broadly obcordate, margins slightly upcurved towards base; apex shallowly emarginate, usually with small mucron in sinus, glabrous or with two basal patches of short indumentum; *spur* 0.5-2.5 mm × 0.5-1.5 mm, cylindrical or conical, apex rounded. *Androecium* and *gynoecium* concealed or part-concealed within throat; *anthers* 1-1.2 mm, inferior pair with 1.5-2.2 mm nectar spurs, tapering towards apex; connectives shorter than anthers, 0.5-0.8 mm, pale brownish orange; *style* 0.5-1.2 mm, geniculate, clavate; *stigmatic opening* at front of style head; *style crest* as discrete, retrose lateral and apical truncate-flabellate white lobes on style head, these stipitate with crispate apex, and at times deeply divided into 2-4 stipitate sublobes. *Fruit* 5 mm, ellipsoid, tri-valved capsule; *seeds* 1.5 mm, narrowly lacrimiform, blackish brown.

**Field note:** The immediate habitat is a south to north running, seasonally dry, flat torrent bed of water-worn small boulders and stones set on sand. Its course is contained by steep rock walls, but the relatively wide bed has an open exposure. The dominant local flora consists of sparsely scattered clumps of tall, vigorous tuft-grass and small shrubs. The new *Viola* was collected from a medium-sized population spread intermittently for several metres along the western fringe of the torrent bed in bare clearings of gritty sand and pebbles between coarser vegetation. [fig.14]

**Other material examined:** ARGENTINA. Tucumán Province, Tafí del Valle Department, 1.10 km to SW below crest of Infernillo Pass from Monteros to Cafayate, shortly by north side of road, 26°44'08"S 65°47'10.50"W, 3018 m, 9 Jan 2007, leg. A.R. Flores & J.M. Watson, F.& W. 11345 (paratype herb. Flores & Watson). Ibid., Vega Altos de Muñoz, 6 km SE of Infernillo Pass from Monteros to Cafayate, 26°46'30"S 65°49'23"W, 3550 m, 22 Feb 2007, leg. A.R. Flores & J.M. Watson, F.& W. 11426 (paratypes CONC, SGO, herb. Flores & Watson). Ibid., 9 km SE of Infernillo Pass from Monteros to Cafayate, 26°46'18"S 65°50'04"W, 3675 m, 23 Feb 2007, leg. A.R. Flores & J.M. Watson, F.& W. 11428 (paratypes CONC, SGO, herb. Flores & Watson).

**Distribution:** The new taxon is only known from the equatorial end of the Sierra de Aconquija range in Tucumán Province, NW Argentina. It covers a total span of 9 km running NNW to SSE from the Infernillo Pass at from 3018 to 3675 m as two small local colonies and two larger more widespread populations, their four locations more or less equidistant between themselves. [figs.1, 57-60]

**Overall environment and habitats:** *Viola ×josephii* occupies the northern sector of an outlying range of the central Andes exposed to favourable moist Atlantic weather systems. At its Tucumán extremity the high point of the range dips to about 3000 m and meets the southern end of the Cumbres Calchaquies range. A rock-walled gulch with a torrent bed from the south terminates there, and a stream in a valley runs down to the west between the two ranges. These sectors contain the lower populations. They inhabit bare sandy or stony environments near, but not in, water courses, including at times ledges and crevices on and between low outcrops. Other local vegetation is vigorous but very sparse, and no other dwarf Andean flora was noticed in the immediate vicinities. On the crown of the Sierra de Aconquija a longitudinal high elevation plateau at ca. 3550-3650 m, the Vega Altos de Muñoz, runs north to south between parallel, moderately sloping mountain ridges. This is the location of the two higher populations. Extensive wiry-tufted grasslands predominate on this plateau, with some barer sectors of fine crystalline, sandy soil and rock fragments forming habitats for occasional colonies of less vigorous Andean flora, including the present taxon. [figs.4, 5, 14, 21, 34]

**Phenology:** Anthesis for *Viola ×josephii* commences in early January and continues into February. It is presumed to conclude in early March. Several capsules had ejected their seeds in mid-February, and fruiting is likely to follow flowering of individual corollas by approximately one month, as is typical for section *Andinium* taxa.



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**Etymology:** This little viola hybrid derives its specific epithet *josephii* from the first name of our endearing and lively grandson, Joseph, known to everyone as Joe. He's just celebrated his fifth birthday. His mother is John's younger daughter Nicola, whose own mother, Adrienne, was John's first wife. But Joe and Anita, his step-grandma, love one another as fondly as could any two blood members of the same family. One only has to see them communicating during our weekly Skype contacts to appreciate that. Sadly, he suffers from a degree of autism which affects his ability to communicate by speech, although he is equal or ahead of his school contemporaries in maths, reading, writing and drawing. His own determination to learn, his brightness and notable intelligence are fortunately leading him to integrate more with other children, and also to gradually overcome his verbal handicap as time goes on. Our fondest wish is for him to achieve effective mastery of spoken language in time, so that when he grows up he will be able both to read and comment on this tribute to him by his caring ones. As stated in the opening paragraphs, his name in this context is also a token of our heartfelt desire for the best future outcome for his generation and the forthcoming state of the world in the light of present uncertainties. We equally wish it to express our concern for all other children with disabilities and those who care for them. [figs.75-80]

**Proposed conservation status:** As observed, *V. ×josephii* was fairly common locally, and spread over four distinct habitats free of human habitation. No indication of excessive grazing was seen, nor is there evidence of intended anthropomorphic intervention of any sort. Despite this viola appearing to be under no threat, we propose the provisional IUCN (2012) red list classification of VU, vulnerable, based on the overall fairly limited number of individuals noted and the taxon's narrow distribution.



Left – fig.57: South America, with the position in Argentina of Tucumán Province and *Viola ×josephii* circled and arrowed light blue.

Right – fig.58: The provinces of Argentina, with Tucumán, where *Viola ×josephii* is endemic, coloured violet.



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fig.59: General location of *Viola x josephii* within Tucumán Province, with the Infernillo Pass, its type site, area shown by blue arrow.

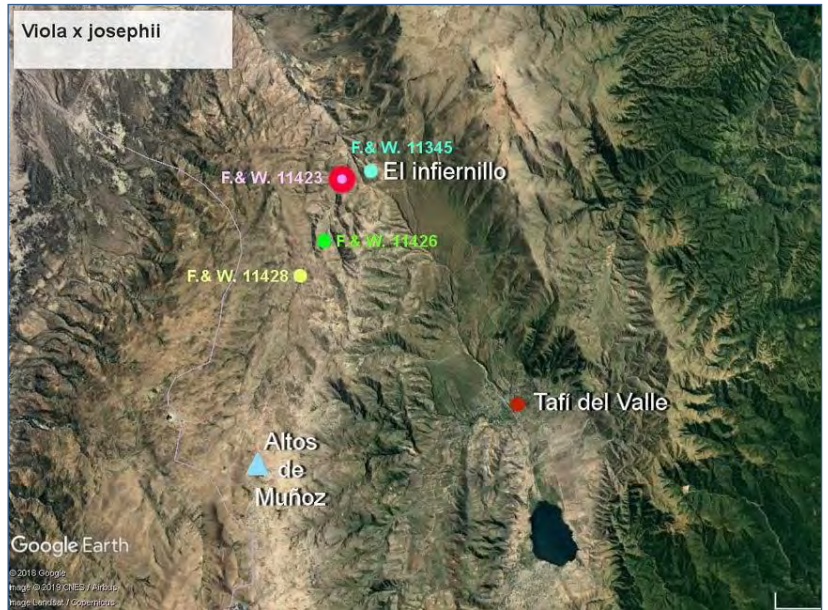


fig.60: *Viola x josephii* distribution and locations. January site pale blue. Nearby type site red, pink centred. Upper sites green and yellow. (Courtesy Google Earth)



fig.61: F.& W.11428 *Viola x josephii*, uppermost site. Small, dull rosette, entire and glabrous leaves, most usual-coloured flowers. Vega Altos de Muñoz. (23 Feb 2007. ARF)



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fig.62:  
F.& W.11428  
*Viola ×josephii*,  
uppermost site. Dull  
rosette, divided and  
glabrous leaves, most  
usual-coloured  
flowers. Vega Altos de  
Muñoz. (23 Feb 2007.  
ARF)



fig.63: F.& W.11426  
*Viola ×josephii*, 1st upper  
population. Small green  
rosette, subentire and glabrous  
leaves, white flowers. Vega  
Altos de Muñoz, Tucumán. (22  
Feb 2007. ARF)



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fig.64:  
F.& W.11428  
*Viola ×josephii* ,  
uppermost site.  
Dull rosettes, entire  
and glabrous  
leaves,  
all-white flowers.  
Vega Altos de  
Muñoz, Tucumán.  
(23 Feb 2007.  
ARF)



fig.65: F.& W.11428 *Viola ×josephii*, uppermost population. Green rosette, divided and glabrous leaves, white flowers. Vega Altos de Muñoz, Tucumán. (23 Feb 2007. ARF)



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fig.66: F.& W.11428 *Viola x josephii*, uppermost population. Greenish rosette, divided and glabrous leaves, white flowers. Vega Altos de Muñoz, Tucumán. (23 Feb 2007. ARF)



Right - fig.67: F.& W.11428 *Viola x josephii*, uppermost population. Small, dark rosette, divided and subciliate leaves, white flowers. Vega Altos de Muñoz. (23 Feb 2007. ARF)



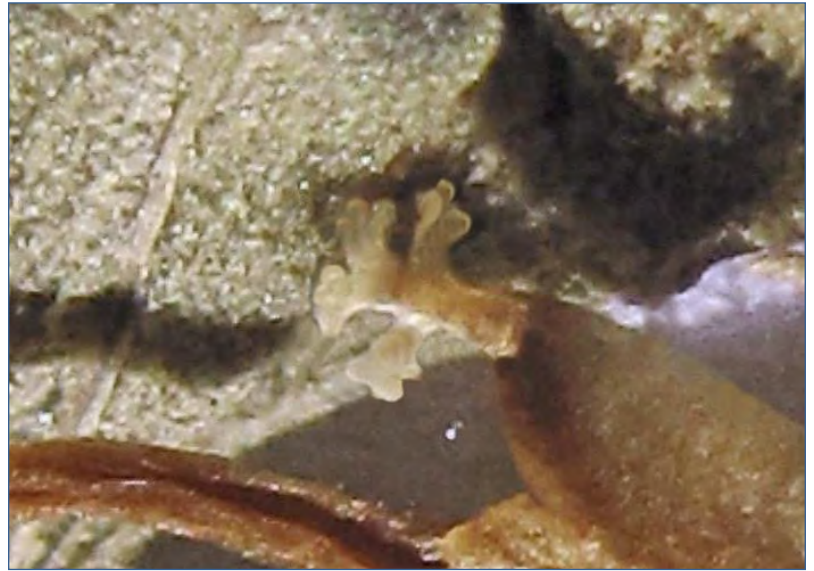
fig.68: F.& W.11423 *Viola x josephii*, type population. Dark rosettes, entire leaves with ciliate margins, violet flowers. Río Corneles gulch, Tucumán. (22 Feb 2007. ARF)



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fig.69: F.& W.11423 *Viola x josephii*, type population flower of the most common colour with triflabellate style crest arrowed. Río Corneles gulch, Infernillo Pass. (22 Feb 2007. ARF)



Right - fig.70: Magnification from a photo of an F.& W.11426 *Viola x josephii* specimen showing the unique crispate style crest still adhering to the dry capsule. (4 Nov 2019. ARF)

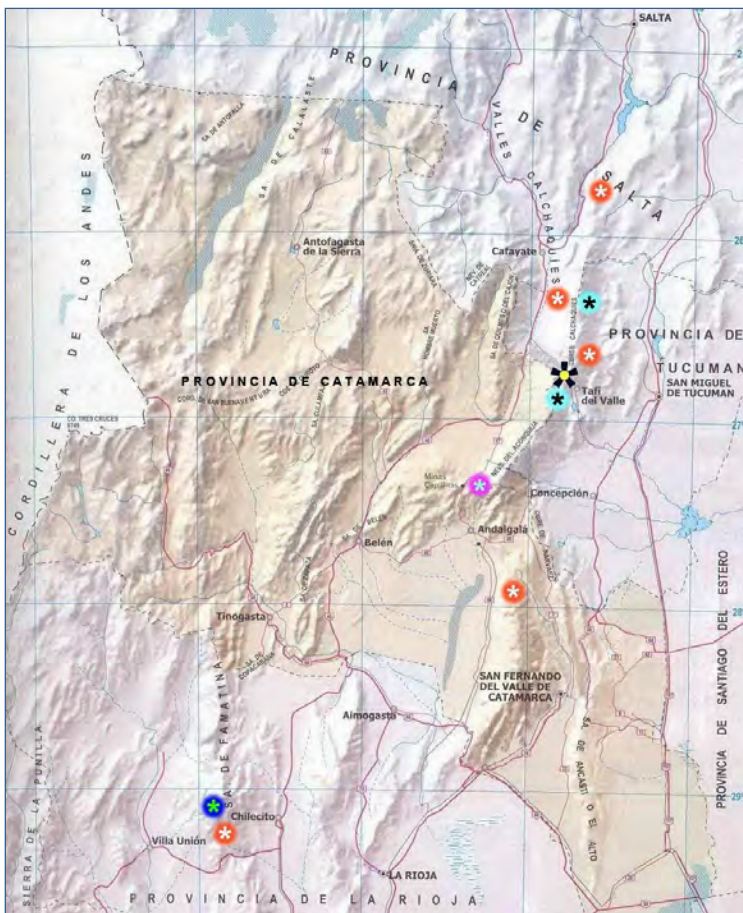


fig.71 *Triflabellatae* alliance distribution key

- Orange circle with white asterisk – *Viola triflabellata*.
- Pale blue circle with black asterisk – *Viola tucumanensis*.
- Pink circle with pale blue asterisk – *Viola joergensenii*.
- Blue circle with green asterisk – *Viola hieronymi*.
- Large black asterisk with yellow centre – *Viola x josephii*.





fig.72: F.& W.11397 *Viola joergensenii*, the only *Triflabellatae* species with underleaf glands as in most *Viola* ×*josephii*. Cerro El Globo, Catamarca Province. (13 Feb 2007. ARF)



fig.73: For comparison - A typical *Viola* ×*josephii*, but with white flowers. F.& W.11426 from upper Vega Altos de Muñoz, Tucumán Province. (22 Feb 2007. ARF)





fig.74: One of the putative parents of *Viola* ×*josephii*, *V. triflabellata*, here F.& W.11525 from Cerro Mesada, Sierra de Famatina, La Rioja Province. (14 Mar 2007. ARF)

### Deduced hybrid status

We have already expounded recently on the tricky subject of natural hybrids (Watson & Flores 2019a). However, some importantly different aspects have occurred to us while investigating and preparing the present novelty, as explained immediately below.

All taxonomic classifications represent the judgement of whoever publishes them. Beyond that though, some are effectively indisputable, others not. Wild, i.e. natural, hybrids tend to fall into the latter category. Yet the widespread and important role of hybridization in the evolution of life on Earth, especially plant life, is now generally recognised (e.g. Mallet 2005, Preston & Pearman 2015).

Nevertheless, for a number of reasons botanists, especially taxonomists, tend to shy away from the subject. "The slow recognition of hybrids ... still influences the extent to which they are recorded today. Many identification manuals only include the commonest hybrids, and many botanists, similarly, only attempt to identify a few easily recognised examples." (Preston & Pearman 2015). To that we would add that intensive fieldwork and extensive knowledge of plants in situ is obviously an enormous advantage for finding hybrids, not least when they only exist as a very few individuals where extensive populations of their parents occasionally meet. A significant number of monographers of genera which inhabit widespread locations and are often not readily accessible don't live in the area concerned. They spend relatively limited periods in the field and may fail to cover the full range of target plants, relying heavily on others' herbarium specimens. For that reason their monographs fail to include hybrids known to those who inhabit the region or explore it regularly



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and thoroughly over time. Examples are *Tropaeolum* (Sparre & Andersson 1991) with only one widespread nothospecies treated, whereas a further five wild crosses are known (pers. obs.), and *Calceolaria* (Ehrhart 2000), hybrids of which were later illustrated in a guide by Sheader et al. (2013) and noted in the field (pers. obs.). Correa (1969) did not mention hybrids in her monograph of the orchid genus *Chloraea*, but a number have since been identified in the literature (Sheader et al. 2013, Novoa et al. 2015, Rojas & Watson 2015).

How to recognise a hybrid? That might appear to be an absurdly pointless question with an obvious answer: 'Easy - a plant that can be seen to be intermediate between two known species'. Without denying that some hybrids are as obvious to diagnose as falling off a log, unfortunately it isn't always that simple (Stace 1989). Many stumbling blocks await the investigator. Sometimes the hybrid grows with no potential parents anywhere nearby. A hybrid can have more than two progenitors. Hybrids can differ in traits from any of their parents. Although some species are very distinct, others look relatively similar, with their hybrids closely and confusingly in-between. One or more parents may be extinct or as yet undetected. The range of morphology of a highly variable hybrid may make it difficult to decide whether closely similar individuals might be parent or progeny (Stace 1989). This is exacerbated where there is also a degree of variation in parent species (e.g. Watson & Flores 2012, 2019a). Often what represents and identifies hybrid status is taken as read or assumed implicitly in the literature, with no helpful guidelines. However, Stace (1989) is widely quoted for providing much fundamental information on the topic. He writes, "Usually intermediacy is sought in terms of morphological characters, since these are most easily recorded; both quantitative and qualitative characters are of value." He goes on to describe formal illustrative tabular systems of achieving this, but adds, "By no means always, however, do more sophisticated methods produce better results." Stace sums up, "It is thus clear that there is no invariable formula or set of clues for identification of hybrids. Each case has to be judged on its own merits, using as many ... criteria as possible."

A further obstacle lies in wait. Suppose you wish to find out for some reason what, if any, hybrids of a given large genus are already known and have been made public, and what their actual or putative parents are. Well, there are two ways of recording a hybrid as far as formal nomenclature goes. The more exacting option is to describe it as if it were in fact a species, when it's known as a nothospecies to signify its hybrid status (e.g.. *Viola* × *josephii*). For that alternative an obligatory current requirement is that at least one parent be known or presumed likely, and be named (Turland et al. 2019). Following publication it will be listed in the major international reference source of all published plants, IPNI (2019). Such hybrids will have their parent species indicated if described in modern times, as for example by Hellwig (1990) for the genus *Baccharis*. But those from historic periods may well not. The other system is known as a hybrid formula. For this the plant receives no name and needs no description, it is merely known as 'species A × species B'. It will not be listed by IPNI either, so you are lucky to learn of its existence, and probably never will! Such is the situation for the 18-odd postulated natural hybrids of *Escallonia* (cf. Kausel 1953). Oh, and as a necessary word of warning, some reference works don't list any hybrids at all, not even nothotaxa.



Without doubt, modern technology has contributed enormously to confirming suspected crosses: "... analyses of sequence divergence, haplotype structure, and allele frequency distributions in genomic data have fundamentally improved our ability to detect hybridization ..." (Payseur & Rieseberg 2016). First distinguish your suspected potential hybrid though, which takes us right back to Stace (1989) and personal judgement! Nor are such refined laboratory techniques available to us Watsons. We must rely on our long-standing knowledge of these violas and our capacity to analyse them by means of fundamental comparative morphology alone. On that basis we have no reservations in defining *Viola* × *josephii* as a natural hybrid.

fig.75: 3-year-old Joe displays his gusto for life and food! (8 Nov 2017. JMW)



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TABLE SHOWING VARIABILITY OF *VIOLA* × *JOSEPHII* ACROSS ITS RANGE.

| <b>CHARACTER</b>                                 | <b>FIRST COLONY<br/>F.&amp; W. 11345</b> | <b>LOWER COLONY<br/>(TYPE)<br/>F.&amp; W. 11423</b> | <b>UPPER COLONIES<br/>F.&amp; W. 11426<br/>&amp; F.&amp; W. 11428</b> |
|--------------------------------------------------|------------------------------------------|-----------------------------------------------------|-----------------------------------------------------------------------|
| ROSETTE USUALLY SOLITARY,<br>SOMETIMES MULTIPLE  |                                          | X                                                   | X                                                                     |
| ROSETTE ALWAYS SOLITARY<br>ONLY                  | X                                        |                                                     |                                                                       |
| PLANT NEVER LARGE OR WITH<br>MULTIPLE ROSETTES   | X                                        |                                                     |                                                                       |
| MOST PLANTS LARGE, AT TIMES MULTI-<br>ROSETTED   |                                          | X                                                   | X                                                                     |
| FOLIAGE ALL-GREEN<br>ONLY                        | X                                        |                                                     |                                                                       |
| FOLIGE ALL-GREEN OR OTHER<br>COLOURS             |                                          | X                                                   | X                                                                     |
| STIPULES LONG, MORE OR LESS<br>6mm               | X                                        |                                                     |                                                                       |
| STIPULES SHORT, MORE OR LESS<br>3mm              |                                          | X                                                   | X                                                                     |
| LAMINA WITH GLANDS ON<br>UNDERSURFACE            |                                          | X                                                   | X                                                                     |
| LAMINA MARGIN ENTIRE OR SUBENTIRE                | X                                        | X                                                   |                                                                       |
| SOME LAMINA MARGINS STRONGLY<br>INCISED          |                                          |                                                     | X                                                                     |
| LAMINA MARGIN ALWAYS GLABROUS<br>OR SUBGLABROUS  | X                                        |                                                     |                                                                       |
| LAMINA MARGIN AT TIMES NOTABLY<br>PILOSE-CILIATE |                                          | X                                                   | X                                                                     |
| FLOWER ALWAYS MID- TO PALE VIOLET                | X                                        |                                                     |                                                                       |
| SOME FLOWERS MID- TO PALE<br>VIOLET              |                                          | X                                                   | X                                                                     |
| SOME FLOWERS BASICALLY DARK<br>VIOLET            |                                          | X                                                   | X                                                                     |
| SOME FLOWERS PALE OR WHITE, WITH<br>VIOLET BASE  |                                          | X                                                   | X                                                                     |
| SOME FLOWERS COMPLETELY<br>WHITE                 |                                          |                                                     | X                                                                     |
| <b>CHARACTER UNIQUE</b>                          | <b>6 (72%)</b>                           | <b>0 (0%)</b>                                       | <b>2 (18%)</b>                                                        |
| <b>CHARACTER PART-SHARED</b>                     | <b>1 (28%)</b>                           | <b>10 (100%)</b>                                    | <b>9 (82%)</b>                                                        |
| <b>TOTAL CHARACTERS HERE</b>                     | <b>7</b>                                 | <b>10</b>                                           | <b>11</b>                                                             |

## Family background

The number of published hybrid (nothotaxa) *Viola* names listed by IPNI runs well into three figures out of a total for the genus of around 3000, so is quite significant (this figure excludes any known solely as hybrid formulae). How many would stand close investigation is another matter, which also applies to the non-hybrid names, of course.

Almost without exception those hybrids have been recorded as between Northern Hemisphere pansies or violets. They have a history stretching back into the 19<sup>th</sup> Century in Eurasia (e.g. Wiesbaur 1880) and continuing into the modern era (e.g. Nitikin 1996). No small numbers have also been registered for North America (e.g. House 1924).

Considering the genus *Viola* originated in South America, where the largest of its 16 sections is endemic (Watson & Flores 2019b), it's remarkable on the face of it that no natural hybrids were recorded for the subcontinent until this century (Watson & Flores 2012, 2019a). The present novelty is the third to be described, all perennials from that large section *Andinium*, and spread along much of Andean Argentina: one in northern Patagonia, another in the centre of the country, and this one up in the northwest corner.



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There may be several reasons for this extreme paucity of hybrids, and the failure of any to be recognised and published until less than a decade ago. The evolutionary cradle of *Viola* is South America, so the most ancestral lines are found there. Hybridization is far more common among recently evolved organisms, therefore its predominance among younger Northern Hemisphere violas is to be expected. We judge the latest most likely developments of section *Andinium* to be its two major annual lineages. Consequently, hybrids might be expected among those more than the perennials. The following general observation of Preston and Pearman (2015) denies this, however: "There are few annual or biennial hybrids and they tend to be sterile and closely associated with the parents ..." Most Andean perennial violas are also separated by rugged mountainous or densely vegetated terrain, so tend to be more or less isolated from one another and hence out of reproductive contact. By contrast, different Northern Hemisphere species often grow together in habitats that readily allow for expansion and spreading. Thirdly, the history of European botany in particular, but also that of North America, is long-standing and intense, with its protagonists frequently living close to easily accessible floras. Against that, many areas where violas grow from Columbia southwards are still remote and underexplored. Furthermore, the subcontinent's *Viola* flora remains poorly understood by comparison, due to next to no study of it throughout much of the last century.

It remains to be seen how many more *Viola* hybrids of section *Andinium* may eventually come to light. Our judgement is that they will be few, but critical in what they have to tell us about the past and continuing evolution of these fascinating little plants.

## Presumed parentage

Information as follows on physical aspects and geographical ranges of all taxa except the new hybrid is drawn solely from the original descriptions and later identifications of the same taxa from different localities by Becker (1922, 1925, 1926a, 1926b, 1928).

Comparative analysis of *Viola* ×*joepheii* and its four immediate *Triflabellatae* relatives reveals that it combines morphology of them all, and possesses one unique character [fig.70]. But, as is evident in the photographs of 21 different individual plants here, it also exhibits an exceptionally wide range of variation in five of six of their common characters, which exceeds that of any of the others: i.e. rosette diameter; leaf length; marginal division; absence to presence of marginal indumentum; corolla colour and markings. Furthermore, one extreme of each of those five characters is not found in any of them. As an additional factor, one comparative feature per species differs completely from its equivalent in *V.* ×*joepheii*. This combination in the latter of extensive polymorphism, differentiation, and shared common aspects determine it beyond doubt as a hybrid, with putative parents among those related species as described by Becker.

But which are the putative parents? Of the four, we are proposing *Viola triflabellata* [fig.73] W. Becker and *Viola tucumanensis* W. Becker as progenitors on the strength of a combination of those morphological factors and geographical positioning. "... some of the most useful circumstantial evidence for the identification of hybrids comes from a study of the species present in the locality. Those found near to the hybrid are obviously more likely parents than those found at some distance." (Stace 1989). The distribution map [fig.71] reveals that both *V. joergensenii* and *Viola hieronymi* W. Becker are only reliably known from single type collections. As can clearly be seen from the illustration, *Viola joergensenii* W. Becker [fig.72] also differs notably in its leaf appearance from all forms of *V.* ×*joepheii*. Although *V. hieronymi* has much shared critical morphology in common with *V.* ×*joepheii*, it is over 300 km distant.

For these reasons we discount both as parents in favour of *V. triflabellata* and *V. tucumanensis*, which are known from populations in proximity to the new taxon. This does not exclude the possibility that other known, undiscovered or extinct species may be involved instead or as well.



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## SIMILARITIES AND DIFFERENCES BETWEEN *VIOLA* ×*JOSEPHII* AND ITS PUTATIVE PARENTS, *VIOLA TRIFLABELLATA* AND *VIOLA TUCUMANENSIS*

| CHARACTER                  | <i>Viola triflabellata</i> | <i>Viola</i> × <i>josephii</i> | <i>Viola tucumanensis</i> |
|----------------------------|----------------------------|--------------------------------|---------------------------|
| Rosette diameter 2-3 cm    | X                          | (X)                            | X                         |
| Rosette diameter 4-6 cm    |                            | (X)                            |                           |
| Stipules 5 mm              |                            | (X)                            | X                         |
| Stipules 2-3 mm            | X                          | (X)                            |                           |
| Stipules glabrous          | (X)                        |                                |                           |
| Stipules ciliate/fimbriate | (X)                        | X                              | X                         |
| Lamina entire/subentire    | X                          | (X)                            | X                         |
| Lamina margin divided      |                            | (X)                            |                           |
| Lamina reverse glandular   |                            | (X)                            |                           |
| Lamina reverse eglandular  | X                          | (X)                            | X                         |
| Lamina margin glabrous     | (X)                        | (X)                            |                           |
| Lamina margin subciliate   | (X)                        | (X)                            |                           |
| Lamina margin ciliate      |                            | (X)                            | X                         |
| Bracteoles glabrous        | X                          |                                |                           |
| Bracteoles ciliate         |                            | X                              | X                         |
| Sepals glabrous            | X                          | (X)                            |                           |
| Sepals ciliate             |                            | (X)                            | X                         |
| Inferior petal glabrous    |                            | (X)                            |                           |
| Inferior petal pilose      | X                          | (X)                            | X                         |
| Crest lobes stipitate      |                            | X                              | X                         |
| Crest lobes entire         | X                          |                                | X                         |
| Crest lobe apex crispate   |                            | X                              |                           |
|                            | 12 total (8 common)        | 18 total                       | 11 total (9 common)       |

RED PRINT: Character shared by all taxa (5).

BLUE PRINT: Character shared exclusively by *V. triflabellata* and *V. ×josephii* (4).

GREEN PRINT: Character shared exclusively by *V. tucumanensis* and *V. ×josephii* (5).

BROWN PRINT: Character exclusive to *V. triflabellata* and *V. tucumanensis* (1).

BLACK PRINT: Unique characters (7).

Brackets indicate that the character is more variable for the taxon.

**Note 1:** *Viola joergensenii* is the only species of the *Triflabellatae* recorded with (a few small) leaf undersurface glands (Becker 1926a). However, leaves of that species as seen at Cerro Globo, a locality very near to the type site, all lacked glands (pers. obs.)

**Note 2:** The distinctive crispate apex of the *V. ×josephii* style crest lobes [fig.70] is not possessed by any of the four described species. However, we have seen photographs of an undescribed triflabellate viola where it is clearly present.



fig.76: "I love you, Auntie Sarah." "And I love you too, Joe." Visit to RHS Gardens, Wisley. (9 Nov 2017. JMW)



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fig. 77: A tree planting ceremony at his granny's garden in Battle, Sussex, to commemorate Joe's upcoming first birthday. With mum Nicola and dad Ben. (19 Sep 2015. JMW)



fig.77: The family picnic in Alexander Park, Hastings. Joe, enchanted by his stepgranny Anita, and she by him. Grandpa John sorts out a bit of biscuit. (7 Sep 2015. Sarah Watson)

## Afterthought

It may appear odd that while most violas from north-western Argentina were described from remote and relatively inaccessible locations, this one beside a principle route and also not far from there remained unknown for so long. While true that Sparre did collect it, his misidentification shows he was unfamiliar with the *Viola* flora of this geographical sector. Considering the length of time it has taken us to sort them out, we regard that as hardly surprising still less incompetent. The main reason historical collectors didn't find *V. xjosephii* seems likely to us to be that they discovered those more outlying species by approaching from different directions, almost certainly Tafi del Valle in this instance.

fig.79: Joe and scampi. Not quite such a messy eater now. Look at the inscription on that huge personal drinking mug! (Summer 2018. Adrienne Norbury - Joe's grandma)





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## Acknowledgements

Nearly all we wish to thank publicly for financial backing, help and hospitality have already been detailed in the main text. But to enumerate them again, they are the Alpine Garden Society, Mario, his family, and the Diaguitas of the Vega Altos de Muñoz. To those we must add the staff of the herbarium at the Fundación Miguel Lillo natural history museum (LIL), and the kind doctor at Tucumán who provided a free medical consultation after John suffered mildly from altitude sickness. As in previous accounts covering the geographical sector, we add our appreciation of the preliminary visits there with Robert Rolfe, and later the Haselgroves, which supplied valuable basic knowledge.



fig.80: The man himself. Gosh, don't they grow up quickly! Joe, now approaching his 5th birthday, photographed at his first school. (Summer 2019)

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## ---The Beauty Slope ---



Recent photos by Zdeněk Zvolánek and Zdena Kosourová.



Some photos from the garden of ZZ and Zdena in Karlik - clockwise from top left, above - *Cyclamen mirabile*; *Zauschneria septentrionalis* now to be known as *Epilobium septentrionale*; *Calylophus lavandulifolius* blooming as a six month old plant from John Stireman seeds; and the Mexican *Tagetes tenuifolia* pretending that it is perennial.