

# International Rock Gardener

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In Britain the drought and heat have been remarkable, giving the natives a new excuse to moan about the weather. Terrible wildfires (as in California, pictured below) have devastated other lands at the same time as floods destroy life and volcanoes erupt. It has been some years since such an unpleasant list of natural disasters have dominated the news. Perhaps as gardeners we are more attuned to sensitivity to such events?



The pages of the IRG can, we hope, provide a diversion. In this issue John and Anita Watson describe two new viola species from Chile; we learn a little about grant aid available to students of our interest and remember Rod and Rachel Saunders of Silverhills.

Cover photo: *Cryptantha aspera*, macro photo by Ana R. Flores (Anita Flores Watson)

## ---Species description---

### **Two new rosulate annual species of *Viola* (Violaceae) from the initial and upper Andean foothills of Atacama Region, Chile.**

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#### **Abstract**

Two closely related novelties from section *Andinium* of the genus *Viola* located in the xeric climate zone of the inland hills, low mountains, subandean elevations and littoral of northern Chile are described herein: *V. marcelorosasii* and *V. dandoisiorum*. The first named has been known since the 19th Century, but was confused then with a different taxon, and has remained so since. We explain and resolve that misconception. Both new species belong to a small, closely allied, relict alliance of desert and semi-desert annuals from the Atacama and Antofagasta regions of the *Norte Grande* (Great North) with narrow individual distributions. This group is defined and its species are also keyed out here.

**Key words:** El Niño Southern Oscillation (ENSO), endemic, flowering desert, deflexed cilia, relict, restricted distribution, section *Andinium*, taxonomic confusion.

#### **Resumen**

Se describen aquí dos estrechamente relacionadas novedades de la sección *Andinium* del género *Viola*, que habitan la zona climática zérica de las colinas del interior, montañas bajas, elevaciones subandinas y el litoral del norte de Chile: *V. marcelorosasii* y *V. dandoisiorum*. Una de ellas se ha conocido desde el siglo XIX, pero luego se confundió con un taxón diferente, y desde entonces se ha mantenido así. Explicamos y resolvemos esa equivocación. Ambas especies pertenecen a una pequeña alianza reliquia de plantas anuales desérticas y semidesérticas de las regiones de Atacama y Antofagasta del Norte Grande, que son estrechamente aliada y tienen distribuciones restringidas. Se define este grupo y también distinguimos sus especies entre sí por medio de una clave.

# ---International Rock Gardener---

**Palabras claves:** El Niño-Oscilación del Sur (ENSO), endémico, desierto florido, cilia deflexionadas, reliquia, distribución restringida, sección *Andinium*, confusión taxonómica.

## Introduction

The first and only direct encounter by the present authors with these two undescribed species took place during a short field trip from the 16th to 21st of August 2017. This had been triggered by reports of a locally spectacular floration in the desert of Atacama Region, Chile (our country of residence), due to previous heavy rainfall and snow occasioned by the El Niño Southern Oscillation climate phenomenon. This is a result of the reverse every few years of the Pacific Ocean convection course, when warm currents normally confined to the west flow across to the South American coasts, replacing the cold Humboldt current and spreading mild, moist, cloudy air inland over usually arid desert areas (Couper-Johnston 2000).

As well as indulging in the wonderful and colourful floral biodiversity of this sporadic event, we also had a particular focus involving our main area of investigation, the Andino-Pacific violas (section *Andinium*), popularly known as the rosulates. Two sets of contacts and friends who live in the Region had advised us of significant flowering of both annual species featured in this account, and each offered to accompany us to their particular discovery. We also looked for a third species, another of the same alliance we had been advised of, but failed to find it despite an exhaustive search. Fortunately, the one we missed had already been published, and our informant has provided in situ photographs of it.

An account of the full coverage of these six days as a background and context for the formal description of the new violas here may be found in last October's issue of the [IRG](#) (Watson & Flores 2017). It contains the following relevant illustrations and text:

[Page 6](#), lower right. Juan Alegria, who led us to *Viola marcelorosasii*, with Anita (Flores). In fact we had received details of this species a few years ago from Marcelo Rosas, a botanist friend from adjacent Coquimbo Region, for whom the species is named, but this was our opportunity to see, photograph and collect it ourselves.

[Page 7](#), top. Juan (L), his fiancée and Anita (R) at the *V. marcelorosasii* type site.

[Page 7](#), bottom. Claire and Philippe Dandois, who discovered *Viola dandoisiorum* and guided us to two of the three locations known to themselves.

[Page 14](#). The habitat of *V. dandoisiorum*, a plant portrait, and close up of a flower.

[Page 22](#), bottom three illustrations. The habitat of *V. marcelorosasii* and two plant portraits.

[Page 27](#). John (Watson) at the *V. dandoisiorum* type site.

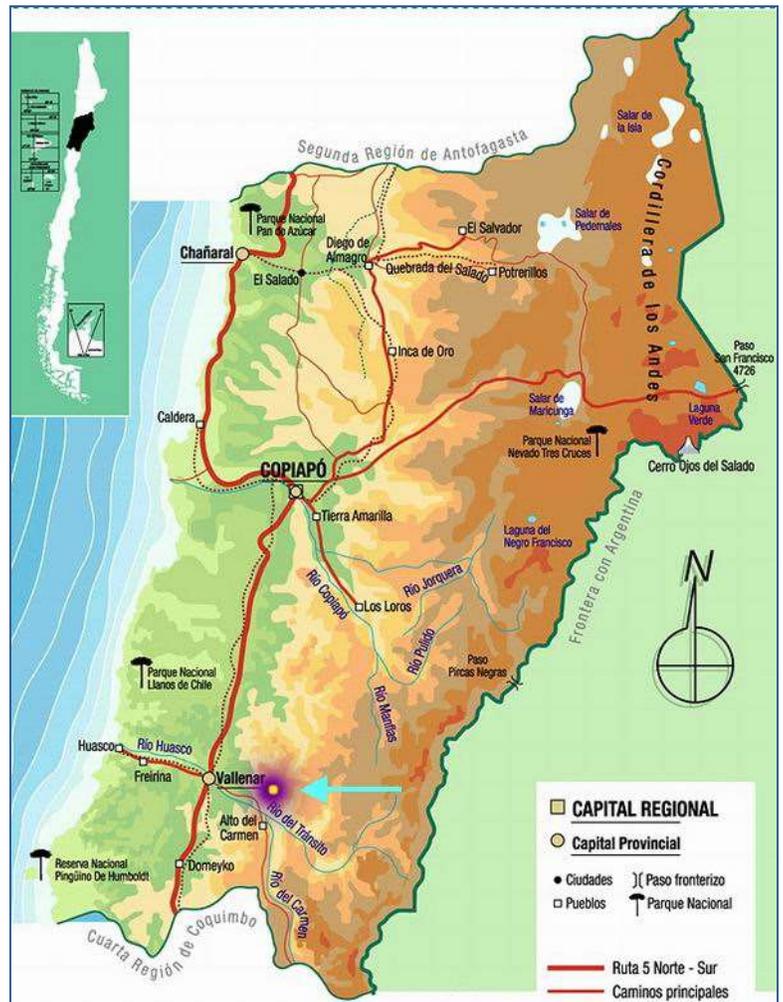


Relevant details of the immediate access routes are given in a short preface preceding each formal protologue below.

Distribution maps locate the two new species in South America [fig. 1], Chile [fig. 2], and Atacama Region [figs. 3, 4, 40, 41, 75]. The maps relevant to each one are also cited in its respective figure references.

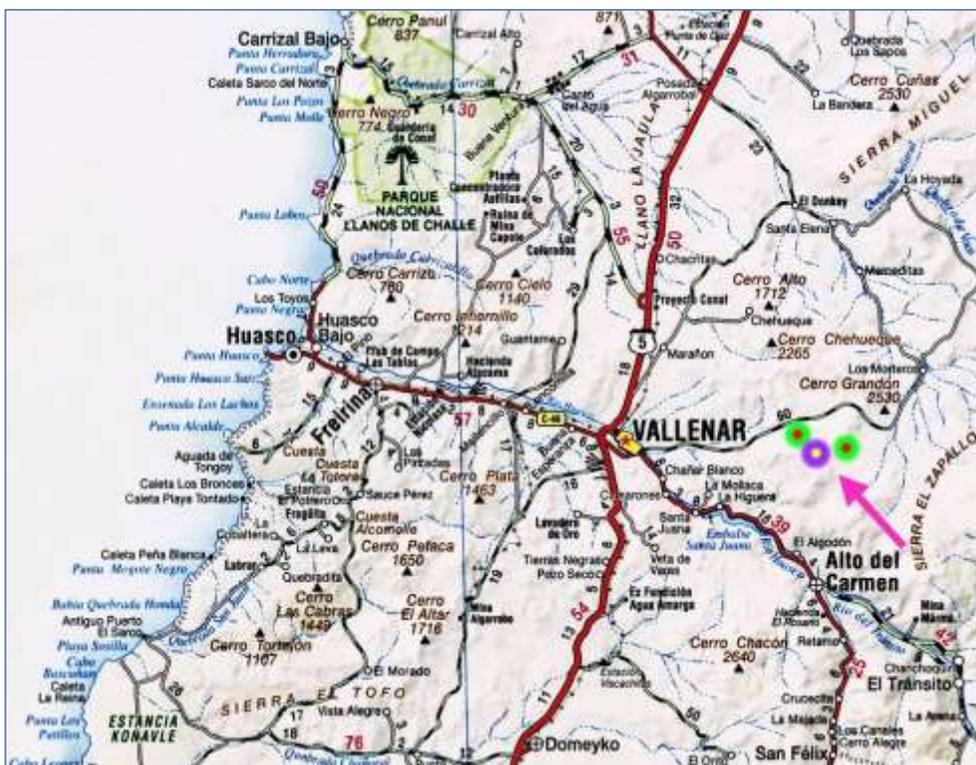
fig.1: Chile, where both new species are endemic.

# ---International Rock Gardener---



Above left: fig.2 The position of the Region of Atacama, the III (Third) Region, the political division which contains the two new species as marked.

Above right: fig.3 Region III, Atacama, showing the known general location of *Viola marcelorosasii*.



Left: fig.4 The *Viola marcelorosasii* total world distribution as a Vallenar Province, Atacama Region endemic. Type site violet, yellow centred - other two sites green, red-centred.

# ---International Rock Gardener---



fig.5 Juan Alegria, left, one of the discoverers of *Viola marcelorosasii*, at the type site with his fiancée, right, and Anita (centre). (20 Aug 2017. JMW)



Above left: fig.6 The minor unadopted road from Vallenar leading into the Andean foothills and towards the *Viola marcelorosasii* location. Above right: fig.7 The important small colony of rare-coloured *Tropaeolum tricolor* which Juan found and showed us. (both photos 20 Aug 2017. JMW)



fig.8 *Cistanthe longiscapa* doing what it does best - staining the landscape during an El Niño year. (20 Aug 2017. JMW)

## Preface 1

Our guide to the viola we had already known about for some years - but had never encountered ourselves - was Juan Alegria [fig. 5], an imposingly tall Chilean biology teacher from Vallenar, the main southern town in Atacama Region.

He and his fiancée led off from there in their station wagon, and we followed in the jeep, heading eastwards from the town towards the Andes along a road that very shortly changed from asphalt to tolerably dirt-surfaced [fig. 6]. Around the initial stage of the route were frequent reminders, in the form of prolific sheets of colours, that this was an El Niño flowering desert year, and that it had reached well inland and up to this elevation (ca. 1000 m). In fact its influence continues on into the upper mountain zone, but of course there are no seed banks of showy annuals there to create the same effect. More to the point though, it still stimulates an Andean floration way beyond the average.

Juan stopped not too long after the journey had begun to show us one of his discoveries, an unusual population of *Tropaeolum tricolor* Sw. with a mixture of typical red forms, rare pure yellows, and equally rare bicolors [fig. 7]. This was special for us as we study the genus. Nobody had to point out the ubiquitous magenta *Cistanthe longiscapa* (Barnéoud) Carolin ex Hershk. [fig. 8] though, one of the widespread mainstays of the flowering desert. It simply hit us all in the eye! We were unable to resist the temptation to get out our cameras and take yet more snaps, and as a result had to thank it for some less usual sightings. In the case of *Cruckshanksia pumila* Clos it was a breathtaking quantity such as we had never remotely encountered before, which coloured a hillside with its round, golden yellow floral bracts [fig. 9]. Among them were some unusual dark forms, which we also encountered later with the second viola [fig. 62]. A small clump of uncommon and discreet *Leucocoryne*

## ---International Rock Gardener---

*dimorphopetala* (Gay) Ravenna [fig. 10] among all this luxuriant exhibitionism required a sharper and more practiced eye to pick it out. *Viola polypoda* Turcz. [fig. 11] only tested our powers of detection for being the same colour and totally intermixed with the *cruckshanksia*. Once noticed, it too exceeded by far any quantity we had ever seen as one integrated colony before ... and we have seen many populations in our time.



Above left: fig.9 Yellow *Cruckshanksia pumila* stretching away in countless numbers. *Cistanthe longiscapa*, foreground, is one of those characters that has to be in every photo. (20 Aug 2017. JMW)  
Above right: fig.10 *Leucocoryne dimorphopetala* of an Amaryllidaceae genus of 20 or more species endemic to Chile. They are known as glory-of-the-sun. (20 Aug 2017. JMW)

Right: fig.11 Common annual rosulate *Viola polypoda*, which, like the *Cruckshanksia pumila* it grew among, we'd never before seen in such colossal numbers. (20 Aug 2017. JMW)

We had reached about halfway to our destination and stopped in a narrow section contained by steep rocky slopes and walls on either side where there was a lone very large tree - one of only two we saw anywhere. The place had signs of frequent previous barbecues and a child's primitive swing, so we stopped beneath the



## ---International Rock Gardener---

welcome shade for a bite to eat. Exploration for nearby plants was inevitable, and as well as several others, brought a special reward; a delightful dwarf form of annual *Cristaria cyanea* Phil. ex Baker [fig. 12], normally a fairly beefy grower.

Right: fig.12 A neat, attractive dwarf form of the annual *Cristaria cyanea*, spotted during our picnic lunch break well short of our destination. (20 Aug 2017. JMW)



Left: fig.13 The dead and untouched guanaco we passed en route, which had no indication of wounds or damage. (21 Aug 2017. JMW)

Continuing, and approaching our destination, we passed the sad sight by the wayside of a dead guanaco [fig. 13], one of the wild South American llama relatives. It looked apparently healthy enough, undamaged and in the prime of life, so perhaps had eaten something poisonous. At all events it must have died recently, as the sharp-eyed condors with their keen sense of smell had not yet discovered it.

Right: fig.14 The flat valley and boulder pile where we parked, with the base of our bare, gentle viola slope (foreground) and the higher, east-facing exposure behind. (21 Aug 2017. JMW)

On arrival at the viola site we drove off to one side and parked by a disorderly, random pile of boulders in the shallow valley the road passed through [fig. 14]. Far too big and heavy to have been moved by men or even local machinery, it



must have been the end point of a long, primeval rockfall, almost certainly occasioned by a massive earthquake. At least our next wildlife encounter of the day there was with a living Chilean animal this time, the black, turquoise speckled lizard *Liolaemus lorentzmuelleri* Hellmich [fig. 15], Lorentz's tree

## ---International Rock Gardener---

iguana (wot, no trees?). Like most of its kind, it was a camera-shy customer, and even the best of our hit-and-miss photos is far from perfect.



fig.15 *Liolaemus lorentzmuelleri* on the boulder pile where we parked. The unfortunate (or fortunate!) beast looks as though it has lost its original tail. (20 Aug 2017. JMW)

And so, in pursuit of our quarry we rambled up on the other side, an almost bare, shallow, west-facing slope of warm-coloured pale brown clay-soil, heavy and packed. The surface was channelled with parallel, dry, snaking rainwater run-off runnels [fig. 16]. Juan told us we would find it here, but during a long head-down search, for a good while I only saw a small cluster out of flower. This is explained by their distribution: they form very local, widely scattered colonies there. Once spotted though, more and more of the species described below fell to our cameras, as well as a few ending up in the press. The larger of the two populations found by Marcelo Rosas and colleagues is approximately four kilometres further along the road [figs. 18, 25-27, 29, 31, 76], while his other colony is a short way away in the opposite direction [fig. 4]. These, together with the type site, are the only three locations known to us

for certain.



fig.16 *The Viola marcelorosasi* habitat, showing the bare surface, soil colour, rainwater runnels and sparse cover. (21 Aug 2017. JMW)

## ---International Rock Gardener---



Left: fig.17 A typical small, local colony of *Viola marcelorosasi* in its habitat. (21 Aug 2017. JMW)

Below: fig.18 *Viola marcelorosasi* at another site nearby where the population is much larger and more extensive, with many more mature and larger specimens. (Undated. Darian Stark)



***Viola marcelorosasii* J.M. Watson & A.R. Flores, sp. nov.** [figs. 3, 4, 17-31, 38, 75, 76]

**Type:-** CHILE. III Region of Atacama, Vallenar Province, Llanos de Los Morteros, 28°35'40"S 70°26'20"W, 2240-2280 m, 21 Aug. 2017, leg. J.M. Watson, A.R. Flores & J. Alegria, F.& W. 13051 (holotype SGO; isotypes CONC, ULS, herb. Flores & Watson [omnia!])

**Diagnosis:-** The new species is most closely related to *Viola godoyae* Phil., to *Viola huesoensis* Phil., and to the other novelty described herein below, *Viola dandoisiorum* J.M. Watson & A.R. Flores. *V. marcelorosasii* differs from all three in its crenate as opposed to entire laminas, also from *V. godoyae* by the presence of a significant style crest, and from *V. dandoisiorum* by the glandular undersurface of its laminas. It lacks corolla indumentum, as is present in another ally, *V. huesoensis*.

**Description**

*Life form* annual, rosulate hemicryptophyte. *Rootstock* axial-filiform, to 6-10 cm long. *Rosette* to ca. 3-6 cm dia. × 2-4 cm high, solitary, open to imbricate; foliage depressed to suberect. *Leaf* ca. 2-3 cm when mature. *Stipules* ca. 0.4-0.5 mm, basal, ovate; margin minutely ciliate; apex acute, hyaline. *Pseudopetiole* 1-1.5 cm. *Lamina* 8-12 × 1.5-3.5 mm, oblanceolate to narrowly elliptical, cryptic light brown, dull green or grey-green; margins strongly 3-5-crenate, thickened, pale brown, more or less densely long-deflexed-ciliate; upper surface irregularly covered by minute indumentum and with prominent pale central vein and one secondary vein branching off through centre of each crenula; undersurface plane, invested sparsely with parallel long, linear, brown glands; apex acute to narrowly rounded. *Anthesis* more or less simultaneous. *Flowers* ca. 1.25-1.5 cm high × 1.25-1.5 cm wide, axial, solitary, forming ring around circumference of rosette. *Peduncle* ca. 1-1.75 cm, red, glabrous, or with short and sparse indumentum towards apex, or dense and long villose hairs around base of calyx. *Bracteoles* 1.5 mm, adnate with peduncle to midway, linear lanceolate; apex acute, hyaline. *Calyx* ca. 3-4 mm, with long, white, pilose hairs basally; sepals broadly lanceolate, sparsely short-pilose, superior shorter than rest, each with two prominent central parallel red longitudinal veins or glands; margin hyaline, briefly ciliate; apex acute. *Corolla* glabrous, violet, pink, white or at times some mixture of those colours, with evident or pale violet veining on face of all petals; reverse of petals pale, heavily veined dark violet; throat clear to rich yellow, extending forwards on inferior petal, where strongly veined dark reddish violet; superior petals 10-12 × 4-6 mm, obovate, cuneate-unguiculate, apex rounded-subtruncate to rounded-obtuse; lateral petals 10-12 × 3-4 mm, obovate, apex rounded-subtruncate to rounded-obtuse; inferior petal 8-15 × 8-10 mm, broadly obtriangular, rounded-emarginate to rounded-entire, with minute point in apical sinus or at apex; spur 2-2.5 × 3-3.5 mm, stoutly flattened-cylindrical, as long as wide, apex minutely retuse. *Androecium* and *gynoecium* concealed within throat. *Anthers* ca. 1.2 mm, lower pair with 0.05 mm broadly cylindrical nectar spurs; connectives 0.7 mm, orange-brown. *Style* geniculate basally, clavate; stigmatic aperture frontal, upcurved. *Style crest* apical, retrorse-trifid-incurved, papillose. *Fruit* orbicular, tri-valved capsule; seeds not seen.

**Other data**

**F.& W. 1305 field note:** Scattered as small, dispersed colonies over a shallow west-facing slope of heavily compacted argillaceous soil, and at its valley foot. The immediate habitat is almost bare of other coverage, accompanying vegetation consisting mainly of a few small colonies of individual tufts of a glaucous grass, invading *Erodium cicutarium* (L.) L'Hér. ex Aiton, and a very few scattered small xerophytic unidentified shrublets out of flower, many dead or moribund.

**Further specimens examined and reliable records:** CHILE. III Region of Atacama, Vallenar Province, Llanos Los Morteros, 28°35'40"S 70°25'31"W, 2211 m, 29 Oct 2010, leg. M. Rosas, M.R. 7101 (herb. Flores & Watson!), ibid. 28°34'18"S 70°29'30", 1600 m, 17 Nov 2010, leg. M. Rosas, M.R. 8899 (herb. Flores & Watson!).

**Distribution:** The species has been identified at three sites a short distance apart in the upper subandean zone (known as the *precordillera* in local Spanish) of southern Atacama Region [figs. 2-4,

# ---International Rock Gardener---

75]. They are separated by a maximum distance of approximately seven kilometres and inhabit a range of elevations between 1600 m and 2280 m. Considering the relatively limited and confined populations at all these localities, and their combined close proximity, *V. marcelorosasii* is therefore defined as a rare narrow endemic.

Overall environment and habitat: Eroded and rounded low relief upland hills and shallow peaks, with a general cover of subandean dry steppe type vegetation. Flora noted in the general area included: *Phacelia pinnatifida* Grieseb. ex Wedd. [fig. 32], *Phrodus microphyllus* (Miers) Miers [figs. 33, 34], *Adesmia filifolia* Clos [fig. 35], *Glandularia porrigens* (Phil.) J.M. Watson & A. E. Hoffmann [Fig. 36] and \**Adesmia odontophylla* Phil. [fig. 37]; also *Ephedra chilensis* K. Presl, *Aldama revoluta* (Meyen) E.E. Schill. & Panero, *Hypochaeris chondrilloides* (A. Gray) Cabrera and several currently unidentified *Adesmia*, *Astragalus* and *Cryptantha* spp.

\*Shrubby *Adesmia odontophylla* is a rare local endemic of Atacama Region which unfortunately was in the latter stages of flowering, but very probably has never been published as a photograph before.

Phenology: As known, flowers from April to mid-November, depending on the wide climatic variations from season to season in the northern half of Chile, and probably fruits and seeds for approximately one month after termination of anthesis.

Etymology: Named for the Chilean botanist Marcelo Rosas, who collected and photographed the new species, and was then first to bring it to our attention.

Considered conservation status: For the inland environments inhabited by three of the section *Andinium* alliance species with deflexed cilia, *VV. dandoisiorum*, *godoyae* & *marcelorosasii*, all aspects with bearing on their bionomics are effectively identical. Therefore the particular ecogeographical assessment is the same for each. Since a recent official government classification for *V. godoyae* exists (Watson et al. undated), it can also be applied for this species:

The threat of human intervention is low, with the possible exception of potential overgrazing by stock animals. However, there is a high probability that this species has a significant seed bank reserve, as do most or all annuals of these xeric ecosystems.

Nevertheless, due to its status as a relict known only as confined populations at three adjacent sites, it should be considered as at least vulnerable (VU) (IUCN 2012).

## Taxonomic note

Friedrich (or Federico) Leybold (1827-1879) was a scientific general naturalist and explorer of German birth, an immigrant permanently resident in Chile, who developed a special interest in *Viola* and described ten new species of that genus discovered in the country, mostly by himself \*. One of these, *Viola rhombifolia* Leybold (1859), a small annual species, was found at 2000 m, in the Santiago Andes. Subsequently, another German resident, the botanist Karl (or Carlos) Reiche, published a monograph of *Viola* in Chile (Reiche 1893). For his entry of *V. rhombifolia*, he cited two additional specimens. One had been collected in 1862 on the coastal range to the SE of Santiago, near Concumen (now Cuncumén) in adjacent Valparaíso Region. Identification of this specimen has not been confirmed. The third referred to a collection by an unnamed person (possibly R.A. Philippi) from 'Atacama Province' (now Atacama Region). No further detailed geographical information was provided. However, Reiche noted, "*Eine etwas abweichenden Form*" (a somewhat different form). Without doubt for us, that specimen was the first collection of *V. marcelorosasii* identified by Reiche as *V. rhombifolia*, and this error has been followed since without exception to the present (e.g. Sanso & Seo 2008, <sup>2</sup>Squeo et al. 2008, Rodríguez et al. 2018).

\*As a point of singular interest for serious rock gardeners, it was Leybold who published *Daphne petraea* before he emigrated to Chile, and *Tecophilaea cyanocrocus* when resident there. Some achievement!

It is therefore necessary to distinguish clearly between these two directly unrelated species, relying mainly on the type specimen drawing [fig. 38] and protologue by Leybold of his *V. rhombifolia*.

## ---International Rock Gardener---

To begin with, although similar geographical disjunctions may be found in certain section *Andinium* species, no such extreme ecological adaptation exists in any as between the temperate mediterranean climate of central Chile and the arid, xerophytic conditions of Atacama Region.

Apart from that, Leybold's plant, a mature specimen, is significantly much smaller than equivalent examples of *V. marcelorosasii*. Also, his drawing of the leaf (Leybold 1859) shows the margin has shallow undulations [fig. 38], not the deep crenate divisions of *V. marcelorosasii* as apparent on the specimen [fig. 39], and that its marginal cilia are short-patent [fig. 38] and not long-deflexed [fig. 39], the latter characteristic in fact being an adaptation unique to the desert alliance. Leaf undersurfaces of *V. marcelorosasii* are with glands, those of *V. rhombifolia* without. If all that is not even convincing enough to separate them taxonomically, then one final feature undeniably is. The style crest is the defining distinction between otherwise near-identical section *Andinium* species: i.e. its absence or presence, and form when there. In this case *V. rhombifolia* possesses an entire crest (fide Reiche 1893), while that of *V. marcelorosasii* is trifid [fig. 31], at present an unexampled configuration, the closest to it being the triflabellate crests of a small group of northwestern Argentinian species.



fig.19 A small juvenile group of dark forms of *Viola marcelorosasii* at the type site, the typical small foliage contrasting with large flowers. (21 Aug 2017. JMW)



fig.20 A pale, larger specimen of *Viola marcelorosasii* recorded previously at the type site; the change to mature foliage and form is evident. (26 Jul 2007. Juan Alegria)



fig.21 A juvenile *Viola marcelorosasii* plant closer to, showing the developing deflexed cilia. (21 Aug 2017. JMW)

---International Rock Gardener---



fig.22 A juvenile group of a more pink-flowered *Viola marcelorosasii* form at the base of the slope, where they were more plentiful. (21 Aug 2017. JMW)



fig.23 A most attractive pansy-like form of *Viola marcelorosasii* at the base of type site. (21 Aug 2017. ARF)



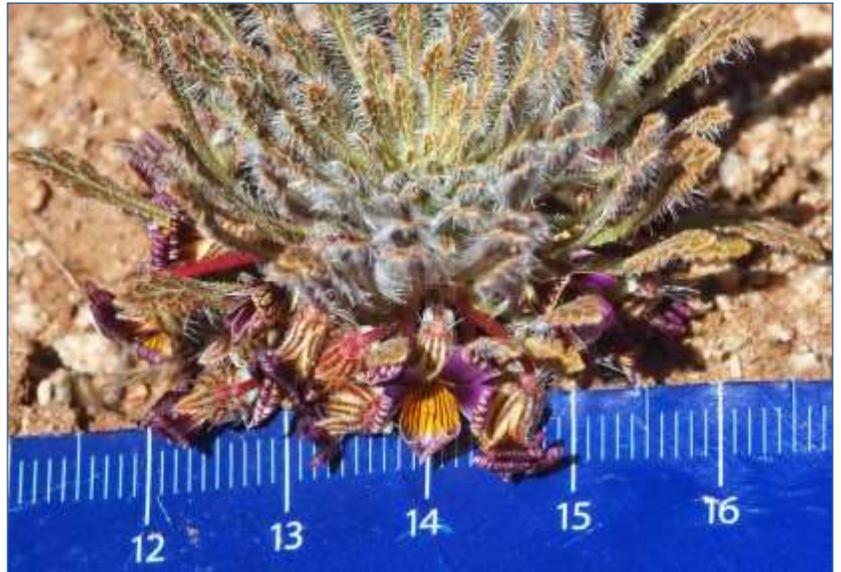
fig.24 Type site. A completely mature *Viola marcelorosatii* recorded in a remarkable early month by its finder, our host and guide. (7 May 2007. Juan Alegria)



fig.25 A group of fully developed *Viola marcelorosatii* with typical mature rosettes later in the season. (17 Nov 2010. Marcelo Rosas)

# ---International Rock Gardener---

Right: fig.26 5.75 cm across is the width of a mature *Viola marcelorosasi* rosette (17 Nov 2010. Marcelo Rosas)



Below: fig.27 A well-developed mature individual photographed later in the season. (17 Nov 2010. Marcelo Rosas)



Above: fig.29 A form of *Viola marcelorosasi* with strongly developed indumentum at the junction of the pedicel and calyx. (Marcelo Rosas. 17 Nov 2010)



fig.28 Type location. A dark violet form with glabrous pedicels. (21 Aug 2017. JMW)



fig.30 Close-up of *Viola marcelorosasii* flower showing trifid style crest in the throat of the corolla. (21 Aug 2017. JMW)



fig.31 A fine macro depiction of the unique style crest of *Viola marcelorosasii* (M.R. 7101) by its dedicatee, and no April fooling. (1 Apr 2011. Marcelo Rosas)

## ---International Rock Gardener---



Left: fig.32 *Phacelia pinnatifida* was spotted both at our lower lunch site and at the type site boulder pile. (21 Aug 2017. JMW)

Below: fig.34 *Phrodus microphyllus* flowers. (21 Aug 2017. JMW)



Below: fig.33 An attractive, very common and free-flowering Solanaceous shrub in the general type area, *Phrodus microphyllus*. (21 Aug 2017. JMW)



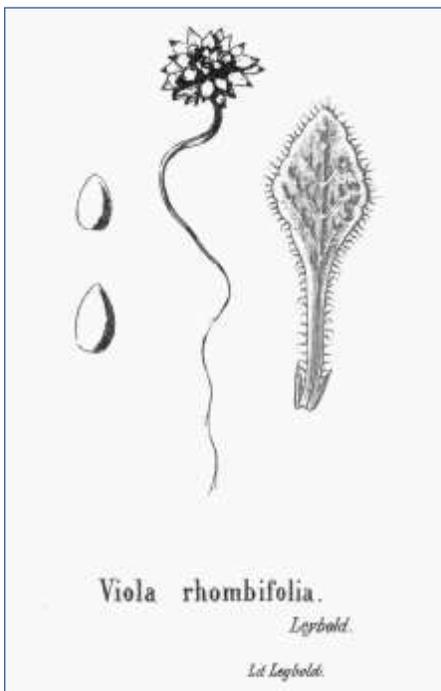
Right: fig.35 *Adesmia filifolia*, which we saw as a large colony slightly below the *Viola marcelorosasi* locality. (21 Aug 2017. JMW)





fig.36 It was good to see *Glandularia porrigens*, which we changed from a *Verbena* in our Andean field guide of 1998. (21 Aug 2017. JMW)

Right: fig.37 *Adesmia odontophylla* is a very rare endemic shrub of the Atacama Region. This may be its first photograph. (21 Aug 2017. JMW)



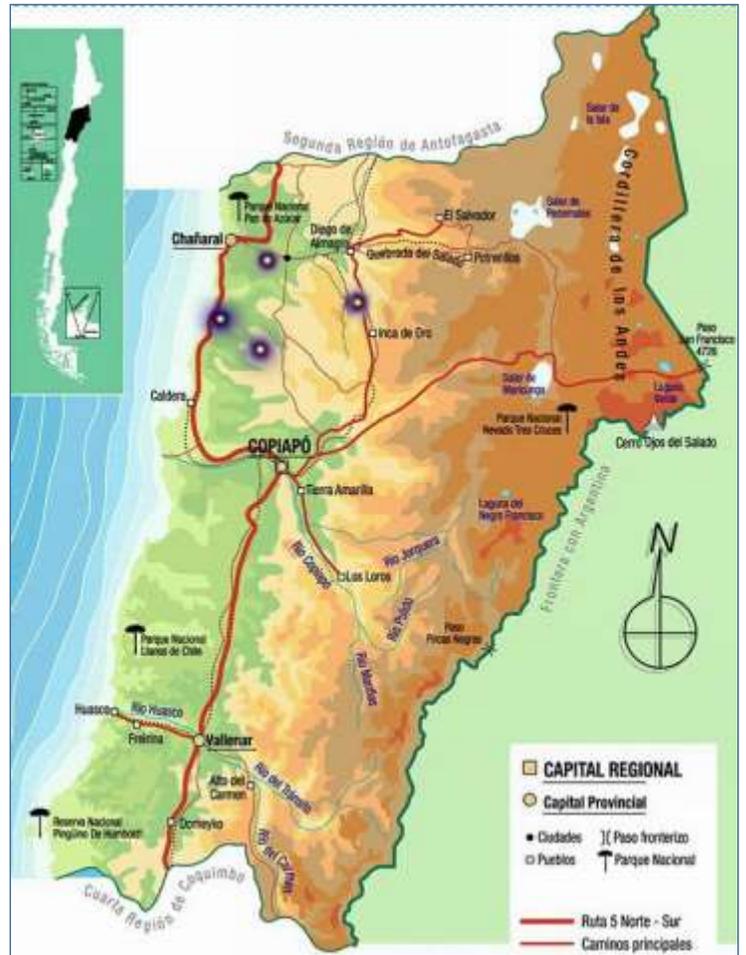
Above: fig.38 Leybold's drawing of the type of his *Viola rhombifolia* of the Santiago Andes, showing that it is quite different from *V. marcelorosatii*, which has been confused with it.

# ---International Rock Gardener---

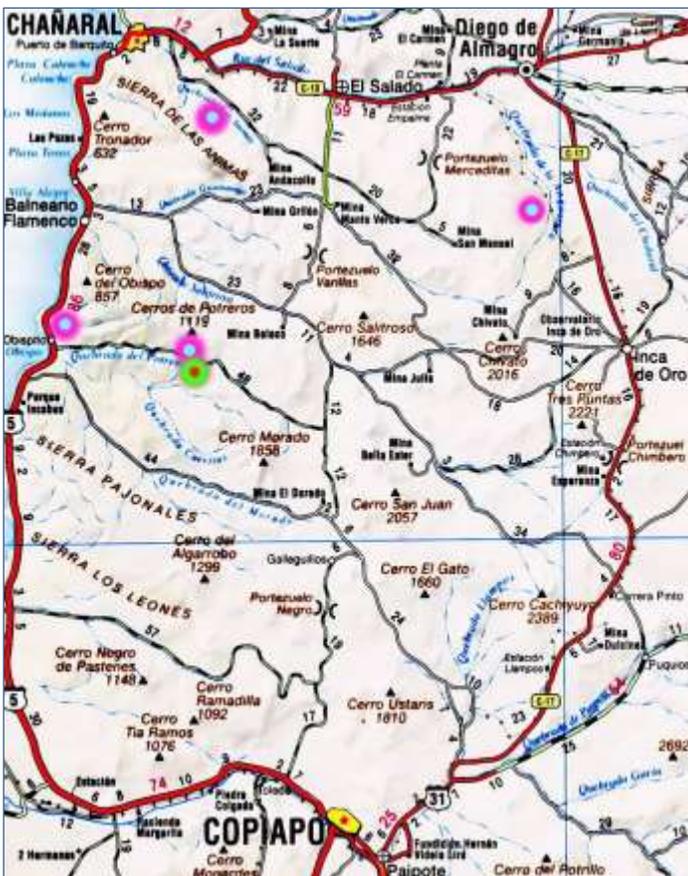


fig.39 A herbarium specimen of a well-flowered, mature *Viola marcelorosasi*. (Date unknown. Anon)

Right: fig.40 Region III, Atacama, showing the known locations of *Viola dandoisiorum*.



Below: fig.41 N Atacama Region, with the endemic total distribution there of *Viola dandoisiorum*, showing our base, Copiapó. Type site green, red centre - other localities pink, pale blue centre.



Above: fig.42 The dedicatees of the viola which bears their conjugal surname, Claire and Philippe Dandois in their front parking lot, with our jeep behind. (17 Aug 2017. JMW)

# ---International Rock Gardener---

fig.43 Claire and Philippe's new desert garden backed by a high rock and sand elevation typical of eastern outskirts of Copiapó. (17 2017. JMW)



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fig.44 Underway, their car leading, and nearing the *V. dandoisiorum* site. Lunching, from left to right, Philippe, Claire, Helga and Anita. (17 Aug 2017. JMW)

Below: fig.45 The roadside *Viola dandoisiorum* type site. Climbing up to it past *Cruckshanksia pumila*, Philippe (leading), Anita and Claire. (17 Aug 2017. JMW)





fig.47 An impressive colony of mature *Viola dandoisiorum* at the type site. Note how the seed had washed down a slight depression. (17 Aug 2017. Philippe & Claire Dandois)



Left: fig.48 A vigorous group of *Viola dandoisiorum*, illustrating the steepest angle of scree at the type site habitat it tolerated. (17 Aug 2017. JMW)



fig.49 A paler form of *Viola dandoisiorum* depicted at the type site by its discoverers (2 Aug 2017. Philippe & Claire Dandois)



fig.50 A perfect prizewinning pair of fully-grown *Viola dandoisiorum*. (17 Aug 2017. JMW)



fig.51 *Viola dandoisiorum*. Low Andes northeast of Copiapó. With care, Anita cleverly removed just petals to reveal the diagnostic spade-shaped style crest. (17 Aug 2017. ARF)



Above right: fig.52 F.& W. 12995 *Viola dandoisiorum*. A medium-sized type specimen. (6 Aug 2018. Scan, ARF)



fig.53 Type site. A mature *Viola dandoisiorum* among juvenile plants, possibly from its earliest flowering. The juveniles themselves have already seeded. (17 Aug 2017, JMW)

Right: fig.54 Type site. A large cluster of flowering juvenile *Viola dandoisiorum*, showing the notable contrast compared with mature specimens. (17 Aug 2017. JMW)



Right: fig.55 *Viola dandoisiorum* and *Viola polypoda* intermixed at the former's type site. (17 Aug 2017. JMW)





fig.56 A fifth population was found at the end of last year between Chañaral, Diego de Almagro and Inca de Oro. (24 Nov 2017. Mauricio Vargas)

## Preface 2

The Dandois pair [fig. 42], Claire, a kinesiologist, and Philippe, an academic geologist, who came to live in Chile from Belgium, settled in a modern house they had built in the open countryside on the western outskirts of the town of Copiapó in Atacama Region. Little needs to be said of the region as its very name resonates with overtones of the homonymous desert! They are satisfying their love of plants and nature by constructing and planting a garden in harmony with these arid natural landscapes, such as one sees in the southwestern United States [fig. 43]. In addition they have developed an unquenchable passion for exploring the surrounding Chilean countryside, above all for its flora.

We were generously hosted by them overnight before they led us next day to their new species. As often these days, it came to our attention via photographs they had posted on the social networks. After a quite short coastal drive north along the main Pan-American Highway (Rte. 5N), we turned off east into dry, rugged country along an immaculately maintained unadopted valley road between largely unvegetated high hills. On a number of occasions we pulled up to collect and photograph plants of interest, or enjoy our picnic lunch [fig. 44]. Eventually we drew to a final halt beside the stabilised foot of the scree slope where the *viola* grew, and climbed up to find it [fig. 45], our way illuminated by bright patches of *Cruckshanksia pumila* Clos [fig. 46]. The more we looked, the more plants of the following *viola* we saw.

***Viola dandoisiorum* J.M. Watson & A.R. Flores, sp. nov.** [figs. 40, 41, 47-56, 64, 65, 75, 77]

**Type:-** CHILE. III Region of Atacama, Caldera Province, Quebrada del Potrero, 28°48'27"S 70°32'26"W, 682 m, 17 Aug 2017, leg. J.M. Watson, A.R. Flores, P.J.S. & C.M.B.G. Dandois, F.& W. 12995 (holotype SGO; isotypes CONC, ULS, herb. Flores & Watson [omnia!])

**Diagnosis:-** This species closely resembles *Viola marcelorosasii* J.M. Watson & A.R. Flores, as presented above in this paper, also *Viola godoyae* Phil. and *Viola huesoensis* Martic. It can be distinguished from *V. marcelorosasii* and *V. godoyae* by its corolla indumentum, and additionally from former by the entire, not crenate leaves as well as from the latter by the presence of a distinct style crest. Its lamina undersurfaces are eglandular, unlike *V. huesoensis*, where glands are present.

**Description:—***Life form* annual, rosulate hemicyptophyte. *Rootstock* axial-filiform, to 12-18 cm long. *Rosette* to ca. 4-6 cm dia. × 2-4 cm high, solitary; foliage dense, usually erect in mature individuals. *Leaf* ca. 2-2.5 cm when mature, estipulate. *Pseudopetiole* 12 × 15 mm, narrowly winged basally. *Lamina* ca. 6-10 × 3-6 mm, entire, oblanceolate, elliptical or ovate, dark green or yellowish-green (leaves of juvenile flowering plants small, orange-brown); margin more or less bordered brownish red, densely long-deflexed-ciliate; upper surface glabrous, somewhat prominently veined; undersurface plane, invested sparsely with long, white, villous indumentum identical to cilia; apex acute to obtuse. *Anthesis* tending to successional. *Flowers* ca. 1-1.5 cm high × 1.2-1.5 cm wide, axial, solitary, forming ring around circumference of rosette. *Peduncle* ca. 1.25-2 cm, somewhat shorter than leaves, red, glabrous. *Bracteoles* 1.5-2.2 mm, inserted at  $\frac{1}{3}$  length of peduncle above base, linear, apex acute, hyaline, margin sparsely fimbriate. *Calyx* 4-6 mm, invested in sparsely scattered long, white, villous hairs; sepals ovate, shortly retuse-spurred, superior shorter than rest; margins broadly hyaline; apex reddish. *Corolla* face and reverse of all petals rich deep to medium violet, tinted deeper at base on face; throat clear to rich yellow, extending forwards on inferior petal, where strongly veined dark reddish violet; superior petals 8-10 × 5-6 mm, obovate, apex rounded-subtruncate to rounded-obtuse; lateral petals 8-10 × 4-5 mm, obovate, apex rounded-subtruncate to rounded-obtuse, base with small tuft of short, pilose indumentum; inferior petal 9-15 × 5-8 mm, broadly obtriangular, rounded-emarginate; spur 2-2.5 × 2-3 mm, apex retuse. *Androecium* and *gynoecium* concealed within throat;

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*anthers* ca. 3 mm, lower pair with 1.5 mm triangular-based, flattened, tapering, dark nectar spurs; connectives 2 mm, orange-brown. *Style* geniculate, clavate; stigmatic aperture frontal, narrowly rostrate. *Style crest* apical, retrorse-semicircular, entire. *Fruit* ca. 6 × 4 mm, ovoid, trilocular explosive capsule. *Seeds* 1-1.2 mm, oval, dark brown.

**Note:** If not a general basal broadening, the pseudopetiole wings may be former stipules which have become fully adnate and integrated.



fig.57 A typical and often seen form of *Viola polypoda*, as at the type site. (19 Aug 2017. JMW)



fig.58 To illustrate the dramatic variation of *Viola polypoda* forms, this one was photographed earlier in mist along the route to *Viola dandoisiorum*. (17 Aug 2017. ARF)

### Other data

**F. & W. 12995 field note:** Various separated groups were scattered across a stable area towards the base of a north-facing scree slope. The overall numerical count was appreciable. Apart from several insignificant dwarf herbs out of flower, one possibly a *Euphorbia* sp., among the sparse immediate accompanying flora observed was *Viola polypoda* Turcz. [figs. 11, 57, 58, 74) often growing in company with *V.*

*dandoisiorum*, and a solitary tight cluster of a few *Malesherbia humilis* Poepp. in flower [fig. 59], with more juvenile plants over a wider area. A forget-me-not relative with an inflorescence of very diminutive, white flowers, *Cryptantha aspera* (Phil.) Grau [fig. 60], was another local scree rarity. It was originally published as an *Eritrichium*.

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fig.60 (and cover image) Showing how a macro shot can reveal the intimate beauty of a quite insignificant little member of the forget-me-not family, *Cryptantha aspera*. (17 Aug 2017. ARF)



fig.61 A rare pale phase of *Cruckshanksia pumila* at the *V. dandisiorum* type site was not a form we had seen before. (17 Aug 2017. JMW)

Several small colonies of *Cruckshanksia pumila* Clos . [figs. 9, 46] included both unusual light [fig. 61] and seldom seen dark colour forms. [fig. 62]. By the roadside just beyond the base of the scree habitat were large solitary individuals of *Mirabilis elegans* (Choisy) Heimerl [fig. 70], much more common further back down the valley, and *Cruckshanksia hymenodon* Hook. & Arn. [fig. 63], as the white form usually encountered in these desert lowlands.



fig.62 A dark form of *Cruckshanksia pumila* at the type site such as we saw later elsewhere. Only two or three were seen there. (17 Aug 2017. JMW)



fig.63 *Cruckshanksia hymenodon*, best known as an Andean, is also widely spread along the northern desert littoral, mainly as this white form, photographed elsewhere. (30 Nov 2010. JMW)



fig.64 A group of *Viola dandoisiorum* from the small shaded population at the second site showing open, green, light-seeking rosettes. (17 Aug 2017. JMW)



fig.65 Another group of *V. dandaisiorum* from the small second population, these receiving more light but still with depressed rosettes. (17 Aug 2017. JMW)

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NB. During the late, brief stop at a second very small population in much less open habitat nearby, *Menonvillea filifolia* Fisch. & C.A. Mey. subsp. *filifolia* [fig. 66] and *Alstroemeria graminea* Phil. [fig. 67] were observed growing together with *V. dandoisiorum*.



fig.66 Cruciferous *Menonvillea filifolia*, which we only saw growing with the shaded second colony of *V. dandoisiorum*. (17 Aug 2017. JMW)

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fig.67 To give some idea of the arid environment, even the locally widespread and prolific alstroemeria here, *Alstroemeria graminea*, is the only annual of its genus. (17 Aug 2017. JMW)



fig.68 Compact, shrubby *Heliotropium linearifolium* with its striking rust-coloured flowers was scattered but common in the general area of the *Viola dandoisiorum* type site. (17 Aug 2017. JMW)



fig.69 The familiar showy pink-bracted form of perennial *Cruckshanksia hymenodon*, common in the Andes, but less so here in the desert lowlands. (17 Aug 2017. JMW)



fig.70 Free-flowering and colourful, large, eye-catching clumps of *Mirabilis elegans*, brightened the roadside right up to the *Viola dandisiorum* site. (17 Aug 2017. JMW)



fig.71 In sheltered, less arid habitats, lovely perennial desert *Alstroemeria violacea* appeared here and there. A match for any of the finest florist's hybrids! (17 Aug 2017. ARF)



fig.72 A mass of *Leucocoryne narcissoides* caught on our return in evening light near the *Viola dandoisiorum* type site. (17 Aug 2017. ARF)

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fig.73 One of a multitude of forms of *Viola pusilla*, the southern widespread species of its homonymous small annual alliance. (16 Sep 2004. ARF)



fig.74 Common throughout the range of the five deflexed cilia species, polymorphic *Viola polypoda* is the common northern species of the *Viola pusilla* annual alliance. (12 Oct 2010. JMW)

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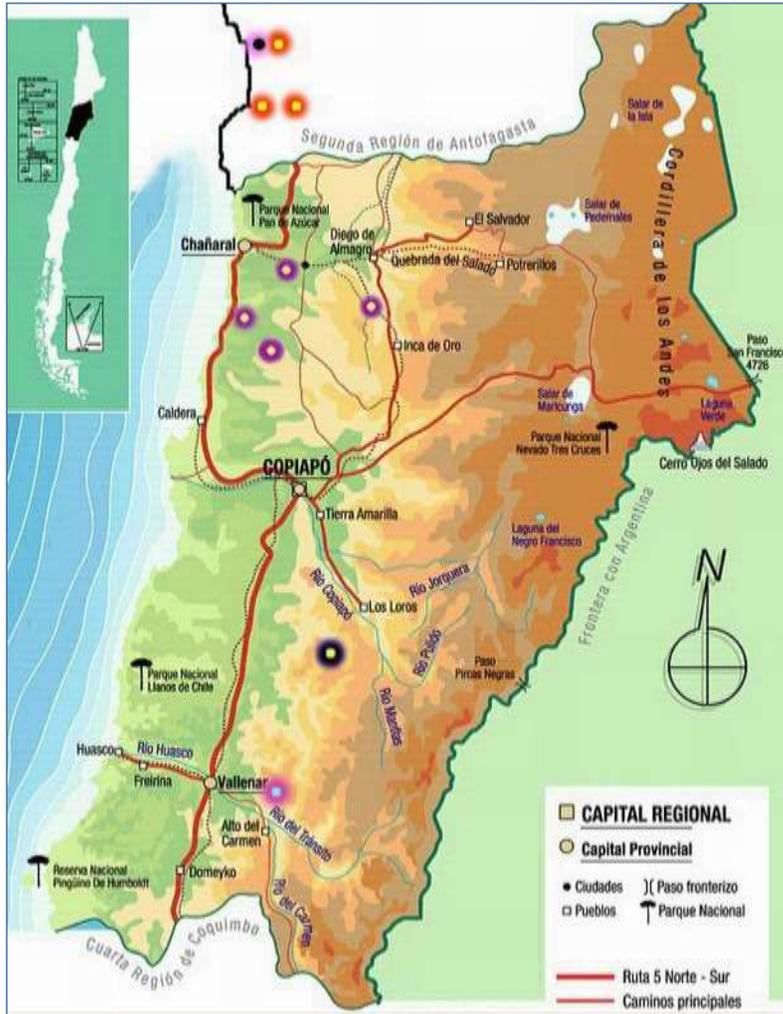


fig.75 Approximate distributions of the five deflexed cilia species in Atacama and S Antofagasta regions. The map shows the known locations of all five species of the alliance as coloured circles. From south to north: *V. marcelorosasii* (pink, pale blue centre), *V. godoyae* (black-violet, yellow centre), *V. dandoisiorum* (purple, yellow centre), *V. huesoensis* (red, yellow centre) and *V. johnstonii* (pink, black-centre).

fig.76 *Viola marcelorosasii*, the only species in the deflexed cilia alliance with crenate foliage. (18 Oct 2016. Rodrigo M. Barahona-Segovia)



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fig.77 *Viola dandisiorum* at a fifth location, Obispito on the Pacific coast. It is distinguished by a style crest and lack of leaf glands. (12 Nov 2009. Marcelo Rojas)

fig.78 *Viola godoyae* at Hierbas Buenas between Vallenar and Copiapó, the type and only locality. It is the only reflexed ciliate species without a style crest. (Undated. Riccardo Martini)



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Right: fig.79 *Viola huesoensis* has narrow leaves, leaf glands and indumentum on its corolla. (22 Oct 2005. JMW)



Below: fig.80 *Viola johnstonii* occupies the same Pacific littoral sector as closely allied *V. huesoensis*, from which it differs by flower shape and critical leaf features. (22 Oct 2005. ARF)



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Further specimens examined, and reliable records: CHILE. III Region of Atacama, Caldera Province, Quebrada del Potrero, 26°47'01"S 70°32'54"W, 700 m , 17 Aug 2017, leg. J.M. Watson, A.R. Flores, P.J.S. & C.M.B.G. Dandois, F.& W. 12998 (herb. Flores & Watson!). The Dandois have also recorded the new species at Chañaral Province, 40 Minas, 26°29'14"S 70°30'42"W on 13 Aug 2017, but without accompanying voucher specimens. In addition there is a well authenticated in situ photograph of the species by Marcelo Rosas at Obispito, Caldera Province [fig. 77], and another by Mauricio Vargas taken on 24 November 2017 halfway between Inca de Oro and Diego de Almagro [fig. 56]. Both of these digital images are on our files.

Note: A putative hybrid: While assessing images to accompany this text, we examined photographs of plants [figs.81, 82] which had been collected by our friends Claire and Philippe Dandois from another population four days before we arrived. At the time these were taken for slightly different forms of *V. dandoisiorum*, but in fact they correspond clearly in certain features to *V. huesoensis* [fig. 75]. This situation requires further investigation.



fig.81 The natural hybrid *V. dandoisiorum* x *V. huesoensis*, showing the shape of the latter's flowers, but no fringe on petals. (13 Aug 2017. Philippe & Claire Dandois)



fig.82 Another *V. dandoisiorum* x *V. huesoensis* at the same location, this time with differently coloured flowers. (13 Aug 2017. Philippe & Claire Dandois)

Until we recognised and published a natural hybrid from northern Patagonia six years ago as a named nothospecies (Watson & Flores 2014) no hybrids had been recorded between the 90 odd known species of *Viola* section *Andinium*, the so-called Andean rosulates, or were even suspected.

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Considering the freedom with which the vast majority of the other ca. 500 *Viola* species will cross in the wild, this was out of the ordinary, to say the least. Subsequently we have identified two more such natural hybrids for certain, and suspect several other populations may also be crosses, either stable, or still in the process of hybridization (Watson & Flores ined.). The northernmost of these occurs at about 26°45'S, so it can hardly be considered surprising to encounter the present possibility at 26°22'.

Distribution: The species has been identified at five distinct locations in central northern Atacama Region [figs. 40, 41, 75]. Three inhabit dry river valleys shortly inland, which are contained by rocky heights, the highest being the type site at 782 m. The most easterly location lies considerably further back in the hinterland and at the greater elevation of ca. 1200 m. The fifth was found in the Pacific littoral fog belt zone (*camanchaca* in local Spanish), its population consisting of no more than two plants as observed. They form an east-west kite-shaped quadrilateral with its tail towards the Andes, and ca. 70 km separating the two known extremities of the total range of the species [fig.75]. Based on this knowledge, *V. dandoisiorum* classifies as a narrow endemic.

Overall environment and habitat in the type sector: Sparsely vegetated, stony and rocky high hilly or low mountainous terrain. Vegetation in the general area is mostly along the flat seasonal flood-river valleys, and includes *Alstroemeria graminea* [fig. 67], *Argyria radiata* (L.) D. Don, *Heliotropium linearifolium* Phil. [fig. 68], *Cruckshanksia hymenodon*, chiefly the white form [fig. 63], but also occasional pinks [fig. 69], *C. pumila* [figs. 9, 46, 61], but not the dark form as seen at the type site, *Mirabilis elegans* [fig. 70], the beautiful perennial *Alstroemeria violacea* Phil. [fig. 71], *Leucocoryne narcissoides* Phil. [fig. 72], and shrubby *Nolana rostrata* (Lindl.) Miers. These were all registered in bloom. Several other scattered low xerophytic shrub taxa and the occasional individual medium-sized columnar cactus *Eulychnia acida* Phil. were out of flower.

Phenology: The earliest the species has been seen in flower is at the type site in mid-August, when many juvenile plants were present as well as mature specimens in full flower. The latest was in the latter half of November. It is likely that this wide extent of anthesis is dictated by the very variable climatic conditions of the Atacama Desert from season to season, as well as resulting from the relative longevity of individual plants. Fruiting and seeding probably develop for up to a month or rather more after flowering has finished.

Etymology: Although others had already photographed *V. dandoisiorum*, it had been misidentified. The married couple Philippe and Claire Dandois [fig. 42], Belgian citizens resident in Chile who have a deep interest in the national flora, also found this species. But they recognised it as probably new to science, informed us about it when we were in communication, and led us to its type site and another location. In recognition of this it commemorates them both with their surname.

Considered conservation status: For the inland environments inhabited by three of the section *Andinium* alliance species with deflexed cilia, *VV. dandoisiorum*, *godoyae* & *marcelorosasii*, all aspects of the environment are effectively identical. Therefore the particular overall ecogeographical assessment is the same for each. Since a recent official government classification for *V. godoyae* exists (Watson et al. undated), it can also be applied for this species:

The threat of human intervention is low, with the possible exception of potential overgrazing by stock animals. However, there is a high probability that this species has a significant seed bank reserve, as do most or all annuals of these xeric ecosystems. Nevertheless, due to its status as a relict known only as confined populations at five sites, it should be considered as at least vulnerable (VU) (IUCN 2012).

This assessment applies with respect to *V. dandoisiorum* as a species, its negligible, discrete Pacific coastal population is under much greater immediate threat due to human intervention (<sup>1</sup>Squeo et al. 2008), above all by uncontrolled, dense extensions of seasonal holiday habitations and a general

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increase of leisure activity along the littoral (pers. obs.). We therefore consider this particular element of the species' overall distribution qualifies without doubt as endangered (EN) (IUCN 2012).

## Discussion

The genus *Viola* is calculated to contain some 610-650 species (Wahlert et al. 2014, Watson & Flores 2018). Of that total, 98 as already published and accepted by the present authors - with the addition of the two novelties herein, belong in the predominantly rosulate section *Andinium* W. Becker. The section has an Andino-Pacific distribution from the equator in Ecuador to southern Patagonia (Watson & Flores 2014). 57 of its taxa are native to Chile, again including the two described here (Watson & Flores 2014, ined.).

Despite section *Andinium* having received no more than minimal molecular analysis to date (Marcussen et al. 2015, T. Marcussen pers. comm.), comparison of morphological characters indicates that it divides into a number of alliances, several of which are clear-cut and easy to identify (Watson & Flores ined.). Two such occupy the northern Chilean foothills and Pacific coast exclusively, and consist entirely of annuals.

One of these consists of a group of four vigorous, adaptive colonisers, which extend along the Pacific littoral and adjacent lower interior terrain from central southern Chile to South Peru. It includes *Viola taltalensis* W. Becker, which is violet-blue or white flowered. This, like another, the Peruvian endemic species *Viola weberbaueri* W. Becker., has a restricted local distribution.

The last named is yellow flowered as are the other two very closely similar, widespread and common species, *Viola pusilla* Poepp. [fig. 73] and *Viola polypoda* Turcz. [figs. 11, 55, 57, 58, 74]. Between them this pair have an almost continuous combined distribution of ca. 2200 km, within which both show a quite remarkable degree of physical heterogeneity (polymorphism), as may be judged from the small sample in our cited illustrations. *V. pusilla* occupies the southern half, and perhaps does not reach the geographical area covered by this account, while *V. polypoda* is found the length of Atacama Region. This alliance reproduces prolifically, and as individual plants have a short life, seed banks are clearly its main survival strategy during prolonged periods of drought. It is reasonable to interpret these four species as of recent evolutionary origin, perfectly adapted to the local mediterranean and desert conditions which were occasioned by Andean uplift, with the former established by 15 Ma (millions of years ago), followed by Atacama hyperaridity at about 4 Ma (Hartley 2003). All evidence also points to them still being in the process of active speciation.

By contrast, the other endemic desert alliance herein consists of five relict species, each relatively uniform, confined to local areas of the coastal mist-belt desert and inland semi-desert hilly and mountainous areas in northern Chile [fig. 75]. Three are known from the region of Atacama: from south to north - *V. marcelorosarii* [e.g. fig. 76], *Viola godoyae* Phil. (1892) [fig. 78] and *V. dandoisiorum* [e.g. fig. 77]. The other two, *Viola huesoensis* Martic. (2001) [fig. 79], which has the earlier illegitimate synonym of *Viola litoralis* Phil. (1860), and *Viola johnstonii* W. Becker (1927) [fig. 80] inhabit the southwestern Pacific littoral of Antofagasta Region.

Another distinct population was discovered by Claire and Philippe. As indicated above, pending further investigation this taxon is considered to be an interspecific hybrid [figs. 81, 82].

The map [fig. 75] shows the known locations of all five species of the alliance as coloured circles. From south to north: *V. marcelorosarii* (pink, pale blue centre), *V. godoyae* (black-violet, yellow centre), *V. dandoisiorum* (purple, yellow centre), *V. huesoensis* (red, yellow centre) and *V. johnstonii* (pink, black-centre). We consider these and the putative hybrid to be the remnant populations of an earlier lineage which was probably more widespread and interconnected (Watson & Flores 2007), but has been greatly reduced by the desertification process. The survivors have a much longer seasonal life-span than the *V. pusilla* group, and appear to have adapted to sustain this by their elongated and deflexed marginal cilia, which capture the frequent cool fog (*camanchaca*) drifting inland from the Pacific, and direct the condensed droplets down to the roots.

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Somewhat to the south, either just inside the southern boundary Atacama Region, or in the adjacent north of Coquimbo Region, are one published and two undescribed taxa which have an apparent looser relationship with the five species just indicated. The published species is *Viola ovalleana* Phil. The mountainous terrain of their habitats is subject to a less severe, although still at times extreme, northern mediterranean climate. Critically, the precipitation is notably increased. Although still deflexed, the marginal cilia are significantly shorter, probably due the less urgent need to catch fog moisture. Another species sharing the range of these last is *Viola aurata* Phil. This has the form and flowers of the *V. pusilla* group, but deflexed marginal cilia, and is probably a long-established, stable hybrid between the two alliances.

## Key to differentiate the six annual *Viola* sect *Andinium* taxa of the close alliance with deflexed cilia:

1. Lamina strongly crenate ... *V. marcelorosasi*
  - Lamina entire ... 2.
2. Lamina suborbicular to broadly obovate, apex rounded-obtuse, undersurface glandular ... *V. johnstonii*
  - Lamina oblanceolate to narrowly elliptical, apex usually acute, undersurface eglandular ... 3.
3. Corolla glabrous ... *V. godoyae*
  - Lateral petals with basal indumentum ... 4.
4. Upper margin of lateral petals ciliate. Inferior petal deeply emarginate into two distinct, rounded lobes, superior petals narrow. Style crest trilobed ... *V. huesoensis*
  - Upper margin of lateral petals glabrous ... 5.
5. Inferior petal shallowly emarginate into two broad, obtuse lobes, superior petals broad. Style crest entire ... *V. dandoisiorum*
  - Inferior petal deeply emarginate into two distinct, rounded lobes, superior petals narrow ... *V. dandoisiorum* × *V. huesoensis*

NB. The characters here are the minimum needed to establish the distinctions between the six taxa. There are various others which further accentuate their differences.

## Postscript

A sixth species with the distinctive deflexed cilia has come to our attention via photographs while we were writing this account. It is situated well within the existing range of the alliance and is quite dissimilar in several respects. At present no reference specimens exist, but as soon as any are collected we hope to publish this undescribed novelty in the IRG as an addendum to the related group detailed here.

## Acknowledgements

It goes without saying that we owe a great debt of gratitude to those who brought these new species to our attention, Marcelo Rosas, Juan Alegria, Claire and Philippe Dandois, and to the last three named for directing and accompanying us to their sites and accommodating us overnight. Mauricio Vargas provided data regarding an additional locality of *V. dandoisiorum*. We also thank our enthusiastic neighbour, Helga Petterson who, although not a botanist or even a naturalist, travelled with us eagerly on this occasion, as on various previous field trips, for pleasure and adventure, and to act as another pair of sharp eyes. Nor should we forget Ricardo Martini, who, sadly, recently died. Thanks to him we have recent knowledge and photographs of *V. godoyae*, which we have looked for ourselves twice at its type site sector - in vain.



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# ---International Rock Gardener---

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fig.83 At the start of our return journey. Anita and Helga stop to buy their favourite goats' cheese. (21 Aug 2017. JMW)



fig.84 Homeward bound. The Pan-American Highway, our main route, the tail end of the desert mist belt, and a last glimpse of the flowering desert till next time. (21 Aug 2017. JMW)

# ---International Rock Gardener---

## ---Remembering Lost Friends---

Rod and Rachel Saunders of Silverhill Seeds.

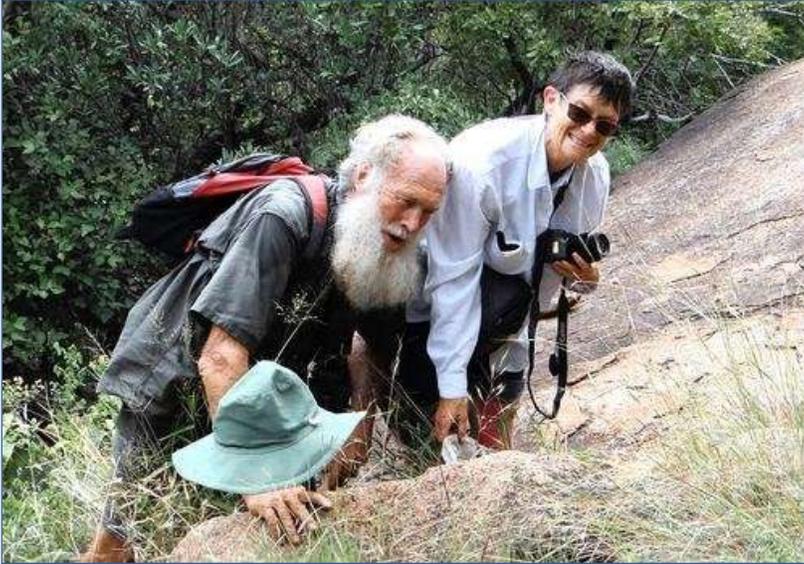
In early February of 2018, the English couple Rod and Rachel Saunders, who emigrated to South Africa in the 1970s and became famous to plant lovers as the owners of Silverhill Seeds, were working with Nick Bailey and a British documentary film crew. As the BBC team returned to the UK full of praise for the knowledge of these horticulturists and their help to the team in their search for a rare native plant, the Saunders moved their plant hunting on to another area.



On February 8, on social media, Horticulturalist and BBC presenter Nick Bailey posted this “selfie” with British couple Rod and Rachel Saunders.

Sadly, within days it appeared they had been kidnapped, robbed and, as we later discovered, brutally murdered. The shock which greeted this throughout the world of plants was palpable. Historically the life of plant hunters on their travels has been hazardous and the 21<sup>st</sup> Century is no different, in the last few years we in Scotland particularly have been saddened by the death in the field of Jamie Taggart in Vietnam in 2013 and Michael Wickenden in Burma in 2016 but this callous crime really brought home the dangers attending the work of such pioneers.

## ---International Rock Gardener---



Rod Saunders and his wife, Rachel were snatched on February 12 near the small town of Vryheid, in the southern KwaZulu-Natal province. While several people were arrested and charged quite quickly with their disappearance, it was some weeks before first Rod's body, then Rachel's, were recovered and their fate was finally known.

It is through their seeds that the Saunders reached a wider audience but their work in South Africa for the Indigenous Bulb Society was also of great merit. As sellers of seed worldwide as well as travelling to lecture and so on, the popularity of the couple made the loss of the Saunders very

keenly felt, with expressions of sympathy coming from many countries.

It is some comfort that the long-time colleague of Rod and Rachel, Ondine Lewis Schrick, right, has inherited the business, so Silverhill Seeds will continue.

Ondine says that she intends to keep "offering as many different varieties as possible and as things settle down collecting will start again. We will carry on buying in the seeds we used to and start collecting others ourselves. Anthony Hitchcock will be adding his knowledge and collecting skills to Silverhill, so we will certainly have a good seed selection."



It is also hoped to complete the publication of the book on Gladiolus species the Saunders were working on at the time of their murder. Donations towards the publication will be most welcome. The simplest method to make a donation is to use Paypal to send to Silverhill using [this email address](#) but you may [follow this link to the SRGC Forum](#) for fuller details.

Rod Saunders – photo by Panayoti Kelaidis.

# ---International Rock Gardener---



Ernie DeMarie “somewhere in the Cape with *Aristea major*, back in the early 90s”.

I am grateful to ErnieDe Marie and [NARGS](#) for permission to publish here Ernie’s affectionate remembrance of Rod and Rachel Saunders.

## **In Memoriam: Rod and Rachel Saunders**

Our community of plant lovers is a relatively close-knit extended family of sorts, and these last several weeks have been a tough time for many of us who knew Rachel and Rod Saunders. Reports first surfaced in February that they might have been kidnapped by ISIS sympathizers in the Drakensberg in South Africa, and, to our horror, we have learned over the following weeks that four criminal terrorists were involved and that Rod and Rachel are no longer with us.

Rod and Rachel are best known as the owners of Silverhill Seeds and provided seeds of innumerable species of southern African plants to plant enthusiasts worldwide. They were passionate about their craft and their collective knowledge of the local flora and its cultivation was immense. I was one of many people that have had the great honor of being hosted by them on a couple of visits to South Africa back in the early 1990s when I worked at the New York Botanical Garden. I remember staying with them as one of the highlights of my life. They were kind, knowledgeable and just really nice company. I learned what a “middelmantjie” is from them—it’s the dirt part of the driveway between the cement tire tracks they parked their “bakkie” (van) on. It’s a good Afrikaans word that we really don’t have a simple translation for in English. I remember vividly the numerous flowers growing in their middelmantjie from the leftover seed chaff they would scatter there after cleaning seeds. The ursinias, arctotis and other flower heads of the taller species would bounce up and down as we drove over them when taking the bakkie out for another floral adventure.

We went to the Tulbagh area one time to look for seeds of babianas and other bulbs along the road verges and I drank water from a mountain waterfall, somewhere near Franschoek I think. They told me with confidence that it was safe so I just stuck my mug into the cool fast moving water and drank it, something I would never have done had I not been with such experienced hikers.

## ---International Rock Gardener---

I learned from them not to press the button above the bed I slept in because it was a “panic button,” a not uncommon feature in South Africa that brings the neighborhood private security squad barging in the front door as the local police aren’t necessarily reliable nor quick.

I also think I first had honeybush tea at their place; it is the better known rooibos tea’s cousin. It is also made from a fynbos legume, in this case, *Cyclopia intermedia* rather than *Aspalathus linearis*, which is the source of rooibos (red bush) tea. I also remember being tasked by them to look for seed of *Aloe microstigma* when I went off with Ernst Van Jaarsveld to the Klein Karoo. I did manage to bring back a decent quantity of it and no doubt there are plants from that collection growing around the world. I helped clean seeds and learned the value of using different sized screens to separate seed from chaff.

Rod and Rachel were great conversationalists and gracious hosts who ably represented the best of South Africa. They had several long-term employees (along with Rachel’s mom) who worked for many years with them and they were also close to their cats, mostly rescues that changed over the years but were always well cared for. I had seen them briefly a few years ago here in New York after a talk they gave to the Manhattan NARGS chapter and I corresponded often with Rachel over the years.

When we got our current house in 2012, I was finally able to create the gardens of my dreams on the 0.63-acre plot. It includes a large South African garden, but there are many South African plants in all of the gardens (there is no lawn; I converted all land and even some patios to gardens). Many of those plants came from Silverhill Seeds. Indoors, when winter is at its harshest, many bulbs and other wonders of the Cape flora sustain my soul under lights; again, many if not most of them coming from Silverhill Seeds. I cannot look inside or outside our home and not be reminded and grateful for what Rachel and Rod have done over the many years I have known them.

We often have a dream of some sort that we hope will come true one day, and one of my dreams was that I would return one day to South Africa, perhaps after my retirement in a few years. I would meet up with Rod and Rachel, and we could wander the veld in search of treasures again. Or that one day they would come to the U.S. again and stay with us so that I could return the kind hospitality they showed me, and I could show them the fruits of their labors in my extensive gardens. I know I have invited them to do just that if they had a chance one day. Now Rod and Rachel have been taken from us, and these dreams of mine will remain unfulfilled. However, my memories of Rod and Rachel cannot be taken, nor will the wonderful plants I grew from their seeds. I am inspired, as I am sure many others are, to work even harder to preserve their legacy in our gardens and collections in the future.

Ernie DeMarie  
Briarcliff Manor, New York



Photo of Rod and Rachel, courtesy of Dave Lehmillier.

## ---International Rock Gardener---



"*Agapanthus campanulatus* and some white flowered ones, both grown from seeds. I like the *A. campanulatus* for its darker color (grown from Silverhill Seeds wild seed collections), it's also shorter than most of the hybrid sorts I grew from a variety of seeds. All agapanthus are beloved by hummingbirds, swallowtail and Monarch butterflies, and bees of all sorts here in NY". Ernie DeMarie

## ---Silverhills Flowers---



We thought it would be a fitting tribute to Rod and Rachel to share in these pages some photographs which have appeared in the SRGC Forum of plants grown from Silverhills Seed.

*Agapanthus* was previously listed in the Allium family but is now given as being in Agapanthaceae with a DNA relationship to Amaryllidaceae. A genus found in rocky grasslands to the south and east of South Africa. This photo from Tristan Hatton-Ellis in Wales.



## ---International Rock Gardener---



*Babiana odorata* is in the family Iridaceae. Grows in clay soils in the northwest and southwest Cape. The spicy fragrance is said to be similar to violets. Photo Fermi de Sousa.



*Bulbinella* is a rhizomatous genus in the Asphelodaceae (or Xanthorrhoeaceae family if you wish!) Mostly found in South Africa, though there are a few in New Zealand.

*Bulbinella latifolia* ssp. *doleritica* grows, as its name suggests, in areas of diabase clay on the Bokkeveld Plateau. This plant was grown in the Victoria, Australia garden of Fermi de Sousa.



*Gladiolus brachyphyllus* in the Iridaceae, was first described in Ann. Bolus Herb. 2: 103 1917. This plant from Silverhills Seed was grown and photographed by Joseph Tychonievich in Williamsburg, Virginia, USA. Joseph, editor of the NARGS Rock Garden Quarterly, kindly shared the photo with us.

The Pacific Bulb Society is dedicating most recent issue of its newsletter "Bulb Garden" to the memory of Rachel and Rod Saunders to show their appreciation of the work of the Saunders and Silverhills over so many years.

For that one issue only, the Bulb Garden will be freely available at once on the [PBS website](https://www.pbsociety.org/).



## ---International Rock Gardener---

*Gladiolus mortonius* (formerly *Gladiolus ochroleucus* var. *macowanii*) grows in open stony grassland of the Eastern Cape. Photos by Yvain Dubois, from Isère, near the Rhône Valley of France



*G. mortonius* on left and on right, *G. mortonius* alongside *Gladiolus oppositiflorus* ssp. *salmoneus*.



*Gladiolus oppositiflorus* subsp. *salmoneus* is another plant from the summer rainfall area, this time in the south. It grows on open, often rocky, grassland sites. Photo Yvain Dubois.

## ---International Rock Gardener---

*Gladiolus gueinzii* from the Southern Cape grows on coastal dunes. Photo by Wim Boens in Belgium.



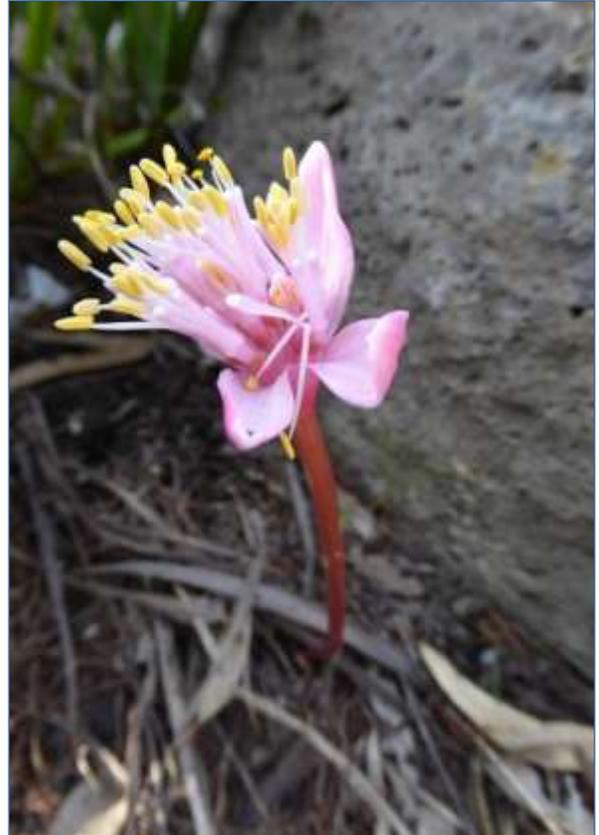
Above: *Gladiolus saundersii* Photo Wim Boens.



*Gladiolus saundersii* was named in 1870 to honour a botanical artist from Natal, Katherine Saunders. This is a summer grower from south and central Drakensberg in rocky and exposed screes. These areas have frequent winter snow cover. Photo Yvain Dubois.

## ---International Rock Gardener---

*Haemanthus barkerae* (Amaryllidaceae) grows near Nieuwoudtville, South Africa on the Bokkeveld plateau. Photos Fermi de Sousa.



Below:

*Haemanthus humilis* subsp. *humilis* is, according to the PBS wiki, "widespread but occurs in isolated and localised populations in specialised habitats, which may explain the great variation between populations." It is a diminutive plant of great charm. Photo Ray Evans, Australia.



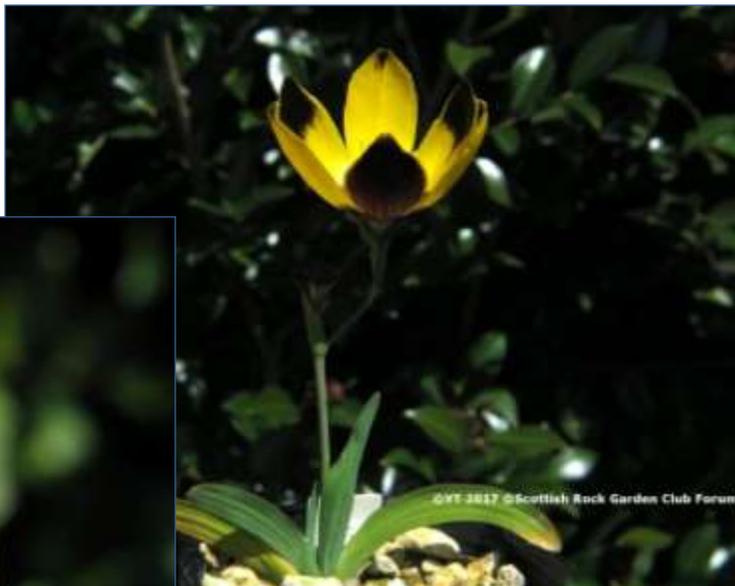


*Hesperantha humilis* is a neat little plant of shale and sandstone slopes in the Cape Floral Kingdom. Flowers which need warmth to open fully have darker stippling on their outers. Photos Tatsuo Yamanaoka in Shizuoka, Japan.



## ---International Rock Gardener---

*Hesperantha vaginata* grows on the Bookeveld Plateau and western Karoo in heavy clay soil. Pollination of this species in its native habitat is only by a scarab beetle, *Clania glenlyonensis*.



*Hesperantha vaginata*  
Photos Tatsuo Yamanaka.

Below: *Ixia* sp.



*Ixia* (Iridaceae) comes mainly from winter-rainfall areas of the Cape Provinces of South Africa.  
Photo Tatsuo Yamanaka.



*Lachenalia viridiflora* a short gem of this genus in the Hyacinthaceae, is found in Namibia and on granite outcrops in the Southwest Cape.

*Lachenalia viridiflora*,  
selected seedlings.

Photos from Tatsuo  
Yamanaka, one of the  
SRGC Forum's most  
dedicated and  
successful growers.



## ---International Rock Gardener---



*Lapeirousia oreogena* comes from clay soils in the northwestern Cape and has a most striking colouration. *Lapeirousia* (Iridaceae) can be found from Nigeria and Ethiopia, across sub-Saharan Africa to the southwestern Cape. Photos Rimmer de Vries in west central Kentucky, USA.



*Moraea atropunctata* Photo Tatsuo Yamanaka.

## ---International Rock Gardener---

*Moraea* is a large genus of more than 220 species in the Iridaceae. Most are found in sub-Saharan Africa, with more than 120 species native to the Cape Floral Province of South Africa. There are summer and winter growers in this most attractive genus.



*Moraea atropunctata*  
Photos Tatsuo Yamanaka



*Moraea atropunctata* Photo Ray Evans.

---International Rock Gardener---



*Moraea ciliata* Photo Ray Evans



*Moraea herrei* Photo Fermi de Sousa



*Moraea papilionacea* and *Moraea tricolor* Photos Ray Evans.



*Moraea tulbaghensis*, showing variation in colour and markings. Photos Ray Evans.

# ---International Rock Gardener---



*Moraea setifolia* Photo Ray Evans



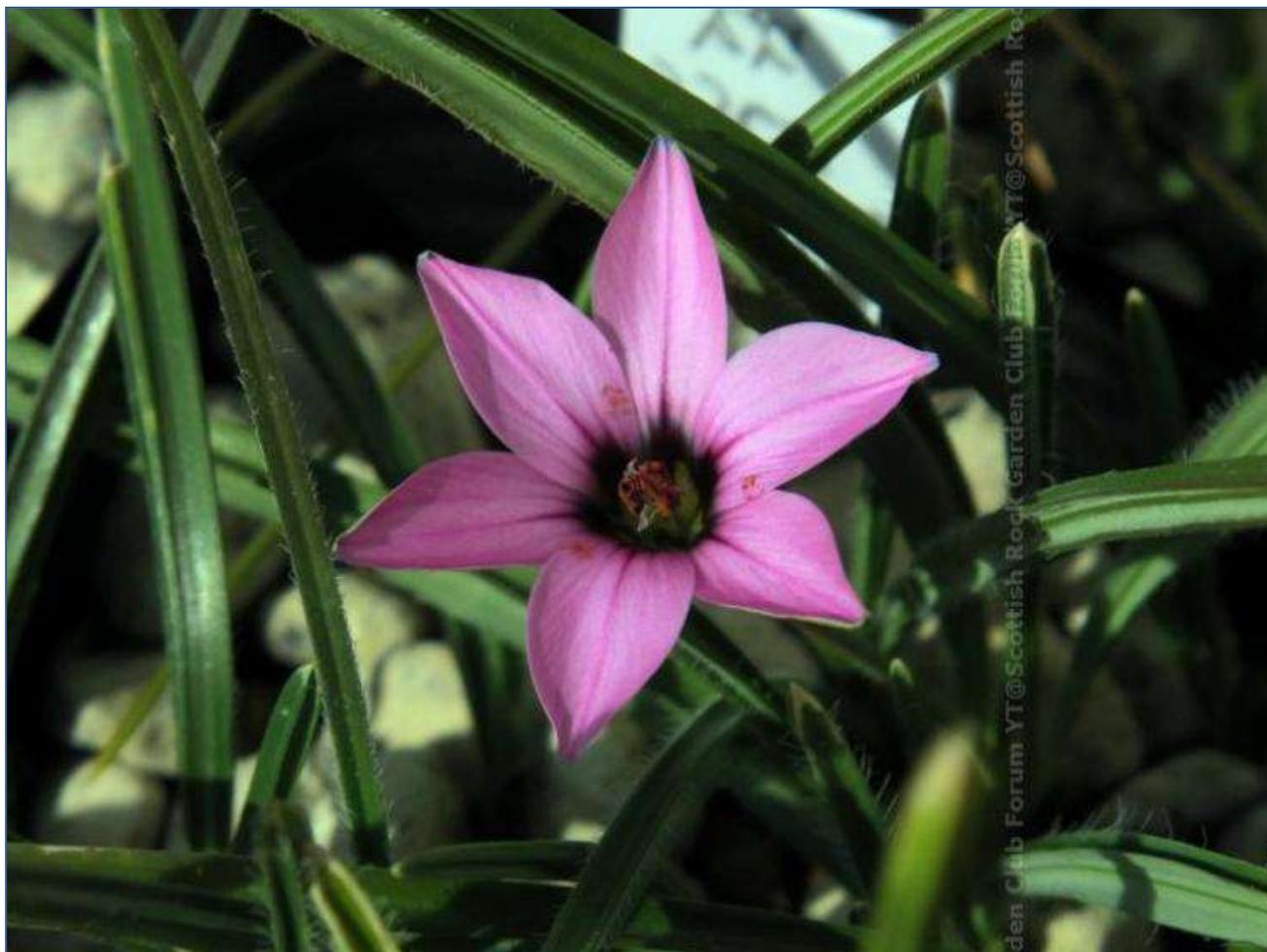
*Moraea villosa* Photos Ray Evans.



*Polyxena* is a South African genus in the Hyacinthaceae. Many species are now considered to be *Lachenalia*, as in the Edinburgh Journal of Botany 60(3): 533-568 (2004). Photo Rimmer de Vries.

## ---International Rock Gardener---

*Romulea*, from the Iridaceae, has about 90 species found both in South Africa and in Europe. The flowers can closely resemble crocus.



*Romulea tetragona* flowers in late winter in the clay soils of the dryer areas of the winter rainfall Cape. Photo Tatsuo Yamanaka.

*Scadoxus puniceus* is one 9 species in this genus in the Amaryllidaceae, found in tropical Africa. Usually found in thicket in coastal areas and river valleys. Plants can flower in less than 5 years from seed. Photo Yvain Dubois.

Though the Saunders are lost to us, we still have the plants, and the good news that Silverhill Seeds will continue.

M.Y.



# ---International Rock Gardener---

## ---Grant Aid---

### Scottish Rock Garden Club Grant Aid Available

As part of the SRGC remit to promote interest in and knowledge of rock garden and alpine plants, it is no surprise that the provision of grants is a part of the Club's work. Grants have been made to a wide range of applicants from the UK, Ireland, America, New Zealand and Tibet, to name just a few countries. Applicants need not be members of SRGC. Recipients are usually asked to provide a report on their project, an article for the Journal or perhaps a talk. You can read more [here](#) and [here](#).

**The Scottish Rock Garden Club has two main routes to Grant Aid - the Diana Aitchison Fund** which supports courses of study and the **Exploration Awards** to help finance projects or trips pertaining to rock garden plants. These awards can be of great assistance to students of horticulture with an interest in (broadly speaking) mountain and moorland plants and wildflowers as well as those with a desire to study such plants and their ecology in the field.

**GRANTS FOR ASPIRING ALPINE AND ROCK GARDEN STUDENTS:  
Are you interested in a career in horticulture? This could help!**

### THE DIANA AITCHISON FUND

The Diana Aitchison Fund of SRGC provides grants and bursaries to support young people who want to pursue a career in horticulture, and especially to further their knowledge of alpine and rock garden plants, and their cultivation. The fund was established thanks to a very generous sum of money made available from the estate of the late Diana Aitchison, a keen gardener and plantswoman who set up and ran her own nursery at Spindleston, near Belford, Northumberland.

Grants from the Diana Aitchison Fund are available each year. An indication of the value of awards made in previous years is given in the full information sheet available from the link below. Priority will be given to students following horticultural courses lasting one or more years and might go towards fees, living costs or travel expenses, either on a full-time course or at another location, such as summer work experience at a botanic garden or nursery. A personal contribution toward the cost of any course would be expected from any recipient.

To download a full **Information Sheet** as a pdf click [here](#).

To download a **D.A. Grant Application Form** as a pdf click [here](#).

There is at present a rolling deadline for applications.

**Send applications to the D.A. Fund Administrator, Matt Topsfield** - the address is in the Information Sheet.

If you know of any student who would benefit from a grant award from this fund please let them know about this excellent source of funding from the SRGC.

**N. B. The SRGC can offer a free electronic subscription for students with an interest in plants. Send your application to [this email address](#). (Please give your place of study and the title and date of the end of course of study.)**



# ---International Rock Gardener---

## SRGC EXPLORATION AWARDS

The Exploration Fund of SRGC was set up in 1985 to award grants to help finance projects or trips pertaining to rock garden plants. Feedback to the Club, for example in the form of articles, talks and photographs, is appreciated. Recipients of grants need not necessarily be members of the SRGC.

**Criteria for Award of SRGC Exploration Grants: [download HERE](#)**

**Please note that the next deadline for applications in 2018 is 15 November 2018**

The Committee Secretary, Carol Shaw, is the person to contact in the first instance, as per the application form, which can be downloaded by clicking [HERE](#)

**Contributions to the Exploration Fund are always welcome and would enable us to offer more support. Any donations should be sent to the SRGC Treasurer, Richard Green, Cedar Cottage, Aberfoyle Road, Balfron Station, Glasgow G63 0SQ UK.**

## BRITISH EXPLORING SOCIETY

SRGC is pleased to have an association with BES to provide support for BES students (aged 16 to 18 years) via our agreement with the Society. [Click here for link for application information.](#)



The young Percy Picton



Percy collecting cutting material



Galanthus 'Percy Picton'

## THE PERCY PICTON MEMORIAL FUND - GRANTS TO STUDENTS OF HORTICULTURE

Recently we have been pleased to assist the Trustees of this Fund to advertise its Grants to students of horticulture. This fund was established in 1987 as the Percy Picton Memorial Fund (Charity Number 518787), by the Wyche and Colwall Horticultural Society as a lasting memorial to their late president, Percy Picton, who had a special interest in encouraging people to learn more about the world of plants. The society organises an annual lecture to raise funds for the charity.

Percy Picton, 1904-1985, was a well-known plantsman, gardener, nurseryman, lecturer and broadcaster whose name is remembered today by [the gardens](#) and plants which bear his name. Percy always encouraged young people to further their interest in plants, evident from his granddaughter Helen, who works in the nursery today, continuing his legacy with her parents, Meriel and Paul and her husband, Ross Barbour.

Over the years many students have received aid with expenses connected with their courses, such as books and tools. The trustees of the fund have been fortunate to co-operate with Ashwood Nurseries, Great Dixter Gardens, John Richards Nurseries and Chris Pattison with short term working/learning placements.

Funds are available now. Applications are welcome and should be sent to Trustee Mr David Hodgson - Learn more via [this link](#).

**For further information on grants and bursaries available from organisations in the United Kingdom for horticultural projects, exchanges and travels, see this website: [Grants for Horticulturists](#).**