

RECENT AND ATTESTED HISTORICAL RECORDS FOR CHILE OF THREE *VIOLA* L. (VIOLACEAE L.) SPECIES FIRST DESCRIBED BY CARL SKOTTSBERG IN 1916

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ABSTRACT

Viola auricolor Skottsberg., *Viola sacculus* Skottsberg. and *Viola columnaris* Skottsberg., well-documented Andean elements in the flora of Patagonian Argentina, are added as new records for Chile. They are supported by cited specimens. All three were first described from multiple syntypes. An explanation is given of unresolved problems experienced while trying to trace these in herbaria, which nullified the intended selection of lectotypes here, as would be preferable in the interests of modern taxonomy. Related topics discussed include systematic complications due to morphological variation and insufficient critical information, as well as difficulties that can arise when ascribing national distributions.

Key Words: Argentina, international boundaries, lectotypes, syntypes, *Viola* sect *Andinium*.

RESUMEN

Certificación de registros, históricos y recientes, para Chile de tres especies de *Viola* L. (Violaceae L.) descritos la primera vez por Carl Skottsberg en 1916. *Viola auricolor* Skottsberg., *Viola sacculus* Skottsberg. y *Viola columnaris* Skottsberg., elementos andinos bien documentados en la flora patagónica Argentina, se agregan como nuevos registros para Chile. Esto es apoyado con los especímenes citados. Las tres fueron inicialmente descritas desde varios sintipos. Se explican los problemas sin resolver que se encontraron durante el seguimiento en los herbarios, lo que ha eliminado la intención de seleccionar aquí lectotipos, como hubiese sido preferible en el interés de la taxonomía moderna. Se discuten asuntos relacionados, que incluyen complicaciones sistemáticas relacionadas con la variación morfológica e insuficiente información crítica, como también con las dificultades que pueden aparecer cuando intentamos establecer la distribución nacional.

Palabras claves: Argentina, límites internacionales, lectotipos, sintipos, *Viola* sección *Andinium*.

INTRODUCTION

The three species considered here belong within the exclusively South American section *Andinium* W. Becker of the genus *Viola* (Becker 1925b), formerly known as division *Rosulatae* (Reiche 1893). This large section is made up of a provisionally accepted 105 perennial and annual species of dwarf chamaephytic herbs, predominantly rosulate in life-form, some still awaiting publication (H.E. Ballard pers. comm., J.M. Watson and A.R. Flores unpubl.). They extend along cordillera to Pacific coastal regions of the Andes from the equator to 48°S latitude. 48-49 published species were recently recognised for the flora of Chile (Watson and Flores 2007).

Between December 2004 and February 2005 a team of Chilean botanical and biological scientists from Santiago undertook a comprehensive field exploration in the remote Jeinimeni region of Aisén, south of Chile Chico, which formed part of a long-term study. Gloria Rojas of the Museo Nacional de Historia Natural led the fieldwork. They collected *Viola auricolor* Skottsberg. Early on, and later also registered *Viola sacculus* Skottsberg., both of which belong in sect. *Andinium* and are recorded here as new for the flora of Chile.

Independently, members from the Alpine Garden Society of Great Britain have also been investigating the distribution, ecology and taxonomy of that *Viola* section in Patagonia during short annual visits to various austral zones of South America. Their study area from 23 November to 17 December 2006 covered the Jeinimeni and high Río Cisnes sectors on 3 and 4 December (Birks undated, M. and A. Sheader *in litt.*). They too found and compiled data for *V. auricolor* in Chile, as well as for other related taxa encountered in immediately adjacent Argentina.

The following contents also incorporate further information about the southern rosulate *Viola* flora, in particular of Chile, resulting from prolonged study of section *Andinium* by one of ourselves (Watson), which

assimilated products of the Patagonian exploration by Carl Skottsberg in 1908 (Skottsberg 1916). This has led to the establishment of *V. columnaris* as an element of the Chilean flora.

MATERIALS AND METHODS

A combination of recorded field results, communication from reliable third parties, herbarium research and a comprehensive review of the literature yielded the information and cited collections that follow. Where essential for confirmation or identification, annotated dried material was taken and also augmented by in situ photography. Informed members of the Alpine Garden Society of England provided supporting oral or written reports and observations. The fundamental contribution of Carl Skottsberg (1916) formed the basis for study of published data. Swedish colleagues examined his available type material at first hand and reported their findings. The geopolitical situation at the time Skottsberg made his *Viola* gatherings has been studied and established (Poza Ruiz 2005).

RESULTS

Viola auricolor Skottsberg. in *Kongl. Svenska Vetenskapsskapad. Handl.* 56(5): 265; tab. 20, figs 1-2; tab 22, fig. 27 a-d. 1916.

Dwarf, perennial, acaulescent herb usually forming cushions up to 25 cm or more across by 2-5 cm high from stout pivotal lignose, usually simple taproot giving rise to aerial crown of one to numerous branched caudices at ground-level, each terminating in a regularly imbricated evergreen rosette of 1.5-4 cm diameter. Rosette pale glaucous-green to green tinged bronze. Leaf broadly spatulate to suborbicular on extended pseudopetiole of 6-12 mm, entire, fleshy-leathery with cartilaginous margin, obtuse, mucronulate. Peduncle equal in length to foliage. Flowers borne in ring on outer face of rosette, to 1.5 cm, deep yellow to orange-yellow with black guide-lines. Up-



FIGURA 1. *Viola auricolor*. Parque Nacional Perito Moreno, Santa Cruz, Argentina. Photo - John Watson

per and lateral petals elliptical to narrowly spatulate, the lateral petals bearded with claviform hairs; lower petal obcordate, glabrous or with sparse hairs at base. Spur 1.5-3 mm, thick, obtuse. Style crest as two prominent lateral triangular downcurved lobes.

Material examined and cited: Chile, Región de Aisén, Prov. de General Carrera, Comuna de Chile Chico, Sector Estadio, 46°83'56''S, 71°97'31''W, 780-850 m, 12/XII/2004, Rojas and Saldivia (SGO 153259) Región de Aisén, Prov. de General Carrera, Comuna de Chile Chico, Sector Estadio, 46°83'56''S, 71°97'31''W, 780-850 m, 12/XII/2004, Rojas and Saldivia (SGO 153236) Región de Aisén, Prov. de General Carrera, Reserva Nacional Lago Jeinimeni, Comuna de Chile Chico, Sector el Colmillo, over 1200 m, XII-2004, Rojas, Saldivia and Molina 20041212-34

Note: At present we have been able to trace one Skottsberg syntype at Uppsala University (UPS). It may be the only remaining extant type collection of this taxon.

Observations: All sect. *Andinium* violas are more or less yellow in the throat, which is considered to be

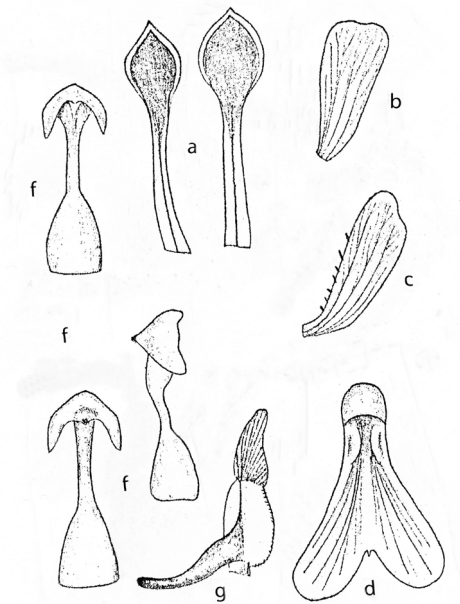


FIGURA 2. *Viola auricolor*. Between Quebrada Honda and Pico Sur, Jeinimeni, Chile. Photo collection Martin and Anna Sheader.

FIGURA 3. *Viola auricolor*. (a) leaves. (b) superior, (c) lateral, (d) inferior petals. (f) style. (g) anther. Fig. 27 of Skottsberg.

a diagnostic feature of earlier-evolved violas (H. E. Ballard, T. Marcussen pers. comms). However, as a rule the characteristic is not evident in all-yellow-flowered taxa such as *V. auricolor*. J.M.W.

This species was encountered in the Lago Jeinimeni National Nature Reserve as two distinct populations on typical Patagonian steppe formations. One colony of limited extent was found at no more than 850 m. The other population from the uppermost ridges at over 1100 m, which lie between the Las Vacas stream valley and Cerro las Cuarcas, had a considerable spread. These plants from higher elevations were seen to be better developed. G.R. and P.S.

Following Skottsberg, further collections of *V. auricolor* were made by the pioneer Argentinian botanical explorer Spegazzini and later by Ruiz Leal (Rossow 1988). However, the species remained relatively unknown until the early 1980s when encountered by modern Argentinian botanists including the late R.A. Rossow (pers. comm.). While exploring Santa Cruz province in connection with the *Flora Patagonica* project, Rossow (1988) was preparing *Viola* for *Flora Patagonica*. His treatment included *V. auricolor* as photographed by M. Sánchez and depicted on the dust cover of Part 5.

Viola auricolor in Argentina subsequently became one of the principal objectives of a series of botanical tours to Patagonia organised by the Alpine Garden Society of England and led by one of ourselves (Watson). It was observed twice in Santa Cruz province during 1999, initially as a small colony on the heights above Lagos del Furioso, and later as a considerably more numerous population in the Parque Nacional Perito Moreno (Erskine 2001).

As outlined in the introduction, a small party of eight enthusiasts known as the Grupo Erskine visited the area in 2006. The group consisted of informed Alpine Garden Society of Great Britain members with considerable previous experience of the region, and included academic botanists. A detailed and scientifically informative 31 page account of their project was posted on the Internet at Birks (undated). It contains well-defined images of *V. auricolor* and *V. sacculus*. The group had been advised of the discovery of *V. auricolor* in Chile the previous year and were provided with details. Birks (undated) identified floral communities of the region and reported that "*Viola auricolor* was seen in small quantities at 930 m." at Jeinimeni. On 4 December, they explored further within Chile at Cerro Pico Sur. Birks (undated) wrote, "We parked the vehicles at 750 m and then walked up through dry Southern Patagonian steppe and open Altoandina vegetation and even alpine desert to 1180 m. The area was very rich with 167 species being recorded. Many of the species seen on previous days were seen on this day, including many fine colonies of *Viola auricolor*, *Oxalis adenophylla*, *O. loricata*, *O. laciniata*, and *Anarthrophyllum desideratum*." Two members of Grupo Erskine provided a detailed and unpublished report of the three violas treated here (M. and A. Sheader *in litt.*). Based on observation and GPS readings, they have cited the following data for *V. auricolor* in

Chile: “Jeinimeni: mountains north of Chile Chico. Cuevas de los Manos: 46°43.577'S, 71° 45.678'W, at 987 m, scarce. Quebrado Honda to Pico Sur: 46°40.2435'S, 71° 43.936'W at 932 m; from 880-1180 m, abundant. Most plants multi-stemmed, largest with about 100 rosettes.” Their data also included maps of the full distribution of this and the two following species.

More detailed observations on the overall distribution, morphology, systematic relationships and ecology of *V. auricolor* are under preparation (J.M. Watson unpubl.). J.M.W.

Viola sacculus Skotts. in *Kongl. Svenska Vetenskapskapad. Handl.* 56(5): 266; tab. 20, fig. 5; tab 23, fig. 2 a-g. 1916.

Synonyms: *V. patagonica* W. Becker, *Repert. Spec. Nov. Regni Veg.* 21: 356. 1925. *V. auritella* W. Becker, *op. cit.*: 356-357. 1925. *V. squamosa* W. Becker, *Kew Bull.*: 138. 1928.

Dwarf, perennial, acaulescent herb, often cushion-forming, usually 2-6 cm high from simple or branched taproot giving rise to crown of one to many caudices, these at times long and dispersed when buried below ground-level, each terminating in a tight to somewhat loosely imbricated evergreen rosette of 1.5-3 cm diameter. Rosette dark-coloured. Leaf rather narrow, sublanceolate, ovate to spatulate on extended pseudopetiole of 3-10 mm, entire or minutely denticulate, fleshy, obtuse, margin dull, dark red. Peduncle equal in length to blade. Flowers borne upfacing in ring around outer face of rosette, to over 1cm across, white, lavender blue, rarely to darker blue or yellow, including intermediate phases between these colours, without guide-lines, glabrous, or with a tuft of clavate hairs at the centre of the lateral petals, scented. Upper and lateral petal blades larger than lower petal, more or less broadly obovate; lower petal obovate, entire to indistinctly emarginate, strongly naviculate medially and basally back to deep, rounded spur of 1-2 mm. Style crest somewhat variable, as subentire to two ovate lateral lobes, these sometimes also bilobed.

Material examined and cited: Chile, Región de Aisén, Prov. de General Carrera, Reserva Nacional Lago Jeinimeni, Comuna de Chile Chico, en cerro las Cuarcas, 1300 m, II.2005, Molina, Rojas and Saldivia 2005218 (SGO 154824).

Material cited: “Meseta n. vom Valle Frias (= Río Cisnes), c. 1000 m, 17.XI.1908”, Skottsberg s.n., (syntype: S, Skottsberg 585). Despite this flowering (Bl.) collection being labelled from Chubut by Skottsberg, it is more likely to have been collected within Chilean territory.

Note: Another Skottsberg syntype exists at UPS, but we have not yet established further details.

Observations: This species was found among the stony rock debris at the summit of a mountain in an exposed, windy situation. Each rosette was measured as no more than 2 cm in diameter, and the population as seen was minimal in numbers, consisting of no more than ten plants. G.R.

Viola sacculus has no close allies in the section. It shares with *V. auricolor* a distinctiveness in flower that is impossible to confuse with any other in the section. The lowermost petal looks clearly smaller than the other



FIGURA 5-. *Viola sacculus*. Lago Vintter, Chubut, Argentina. Photo collection - Martin and Anna Sheader.

four, is strongly navicular-keeled, and extends back as a deep, sack-like spur. This is well portrayed in fig. 148c of Rossow (1988). It is equally unmistakable in the sterile phase, the compact rosettes being composed of rather narrow, fleshy, entire leaves with an obtuse tip lacking mucronulation. They are a dark, somewhat lustrous green and margined darkish red.

Becker (1925a, 1928) authored three species on minor characters, *V. patagonica*, *V. auritella* and *V. squamata*, all of them since synonymised with *V. sacculus* (Rossow 1988). Becker justified *V. patagonica* by the yellow flower colour, rosette form and style and spur differences, *V. auritella* by its auriculate style head, and *V. squamata* by uncritical foliar and rosette features. Although unmistakable, this species is now recognised as more heterogeneous than was historically appreciated. Foliage varies somewhat throughout the range. Particularly extended, narrow leaf-blades are found in some populations of Santa Cruz, Argentina (M. and A. Sheader in litt.). Floral parts represent the most noticeable disparity, above all in petal colour. Although predominantly white to the north of its range, considerable variation has been recorded at the other geographical extreme, including yellow and very dark blue (D. Haselgrove pers. comm., M. and A. Sheader in litt.).

Its principal distribution is Argentinian Patagonia, where it has been recorded from the provinces of Santa Cruz to Neuquén at elevations between 1500-2500 m (Xifreda and Sanso 1999). The latter authors noted its existence in Chile – as also confirmed by Watson (1994). This latter indication was based on a single specimen examined at Kew which had been collected in the upper Río Palena valley near Palena in 1936 (J.M. Watson, pers. obs.).

One of Skottsberg's four unnumbered *V. sacculus* syntypes is probably the first collection of the species made in Chile, despite being cited for Chubut. Unfortunately it cannot be assigned to either country as the locality note is ambiguous and coordinates are not provided.

The recent discovery of this species in the Jeinimeni region, as cited and described above, is a southern extension of its known occurrence in Chile. Of particular interest is the flower colour. As with populations found in adjacent Argentina by the Alpine Garden Society party, its blue is a notably darker hue than any similar tones found in populations of northern Chubut and Río Negro. J.M.W.

In addition to the above two very distinctive taxa, whose presence has been evidenced indisputably in Aisén by recent field investigators, *V. columnaris* has also without doubt been collected historically from somewhat to the north in the same province and so should also be included in flora of Chile lists.

Viola columnaris Skotts. in *Kongl. Svenska Vetenskapskapad. Handl.* 56(5): 261; tab. 20, figs 3-4; tab 22, fig. 28 a-e. 1916.

Dwarf, perennial, acaulescent herb, often cushion-forming, from stout pivotal, usually simple lignose taproot giving rise to crown of one to several branched caudices at ground-level, each terminating in a regularly and densely imbricated, often columnar, evergreen rosette of 2.5-5 cm diameter and 2-9 cm height. Leaf broadly spatulate to suborbicular, often broader than long with base abruptly truncate to extended pseudopetiole of up to 7 mm or more, obtuse, mucronulate, fleshy-leathery with cartilaginous, scarious, margin, this minutely denticulate towards base. Peduncle equal in length to blade. Flowers borne more or less outwards-facing around circumference of rosette, to 1 cm, white, (sometimes pale blue-violet), with violet guide-lines. Upper and lateral petals linear-obovate, truncate; lateral petals narrowly spatulate, obtuse; lower petal ligulate-spatulate shortly emarginate, lined basally along the margins by sparse hairs. Spur 2 mm, thick, obtuse. Style crest obscurely trilobed with two distinct lateral patent lobes and a third, scarcely evident, central sublobe.

Note: Except for the parenthesised colour addition, details of the above description are derived from Skottsberg's protologue rather than the amplified proscription by Rossow (1988), which included variable and questionable northern material (see below).

Material cited: Chile, Aisén (Region), upper Río Cisnes, “Valle Frias, Abhang des (slope of) Cerro Cáceres, trockene Meseta, Bl. (= in flower) ca 800 m., 19.XI.08”, Skottsberg s.n., syntype. At present there is no known material of this collection and it may be well be entirely lost (see below).

The collection “n. vom Valle Frias (= Río Cisnes), trockene Meseta, Bl., c. 1000 m, 17.XI.2008”, Skottsberg s.n. (syntype: S, Skottsberg 584) was probably also made within Chile, but is too close to the international boundary to be certain.

Observations: The existence of *V. columnaris* in Chile is based on original Skottsberg syntypes, two of which were collected by Skottsberg himself in 1908, a third syntype having been gathered by J. Högberg (Skottsberg *op. cit.*). The Skottsberg specimens were both noted from Valle Frias, but at different localities, one a meseta, where he also discovered the *V. sacculus* material referred to above, the other Cerro Cáceres. The Högberg example was collected at 44°24'S - 71°22'W in Chubut province, Argentina. Xifreda and Sanso (loc. cit.) defined the Argentinian status of *V. columnaris* as native rather than endemic, but without stating a neighbouring country of occurrence. However, there seems no doubt that they must implicitly have regarded it as extant in Chile as well.

It is quite remarkable that *V. columnaris* has remained unrecorded as an element of the recognised Chilean flora for almost 100 years. There are several probable contributory reasons. Skottsberg did not provide a wider geographical context beyond the immediate type locality for his own collections. Perhaps he was unsure of



FIGURA 4. *Viola sacculus*, typical colour form, specially to the north of the species's range. Cerro Catedral, río Negro, Argentina. Photo – Ana Flores.

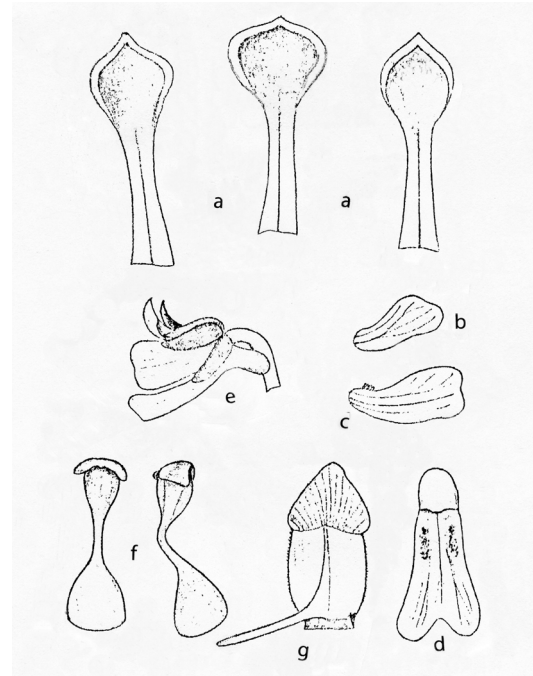


FIGURA 8. *Viola columnaris*. (a) leaves. (b) superior, (c) lateral, (d) inferior petals. (e) flower. (f) style. (g) anther. Fig. 28 of Skottsberg.

its exact political placement at a time when the international limits of these unpopulated wildernesses were even less evident than they are today – when precise accuracy can be assured by GPS devices. It should be remembered as well that the neutral commission arbitrating the boundary between Chile and Argentina had only settled the line of demarcation five years previously, and that this has continued as an issue under dispute at certain points up to the present. Skottsberg would certainly have been aware of these geopolitical sensitivities. His note for the gathering from the meseta lacks provincial or national data. However, the origin of the *V. sacculus*, which was collected at the same site at the same time, is in fact given as Chubut. Skottsberg located both type sites as within the north side of Valle Frias. Pozo Ruiz (2005) informs that in 1897 and 1898 the pioneer geographer of Chilean Patagonia, Hans Steffen, identified Valle (Felix) Frias as the Argentinian name for the Río Cisnes valley. Pozo Ruiz adds that Steffen also associated that valley and the sources of the Río Cisnes on the Chilean side with Cerro Cáceres and a certain Cerro Mesa (which may well be Skottsberg's "Meseta"). Modern Chilean and Argentinian maps show Cerro Cáceres well within Chilean territory. There is not the slightest doubt that *V. columnaris* collected there belongs in the Chilean flora. *V. columnaris* and *V. sacculus* were noted by Skottsberg at 1000 m on his dry meseta. That elevation is the very lowest point that divides Chile and Argentina along the northern watershed of the Cisnes valley. So whether Skottsberg actually collected the 'meseta' violas across the border in Chubut, Argentina, the far less probable alternative, or in Aisén, Chile is never likely to be proven unless his original populations are rediscovered.

The recent Alpine Garden Society field exploration of parts of Aisén province, as mentioned above, also searched for *V. columnaris*. Although unsuccessful on terrain overlooking the valley of the Río Cisnes on the Chilean side, they did encounter a small population shortly across the border in Argentina (M. and A. Sheader in litt.). Flowering was estimated as a month or more past. Nevertheless, this could only have been *V. columnaris*. Floral details and careful field observations are critical for the *V. columnaris* group and the area should be revisited and explored thoroughly at an earlier time of the season, October to mid-November, with this in view.

The presence of *V. columnaris* has not been confirmed in Chile subsequent to the type gatherings, but Skottsberg is universally regarded as a punctilious collector and recorder. His one unambiguous example for the country may therefore be taken as reliable. The species is currently accepted as having a lengthy, interrupted Andean distribution of approximately 1000 km, which is almost unparalleled in the section. It ranges between the type localities in the south to Volcán Copahue in Neuquén province to the north. The latter population has been observed at the limit of vegetation very close to the international border (J.M. Watson and A.R. Flores pers. obs.). Its occurrence high on the Chilean flanks of that same volcano seems very probable. It should be looked for there as well as at the southern type sites.

DISCUSSION

Taxonomic uncertainties: The close-knit complex of morphologically similar taxa that includes *V. columnaris* poses difficult systematic problems, some of which remain unresolved at the time of writing and may even require ribosomal DNA analysis. Until Skottsberg's syntypes have been examined, or material from the region of the type sites has been re-collected, or both, there can be no clear certainty that southern and northern material represent the same taxon. Nor in a wider context can the exact taxonomic boundaries of the complex yet be considered as accurately defined. Current nomenclature may require modification in due course. Populations studied at various points on the Argentinian side between the Copahue and Bariloche districts, including some which have been assigned to *V. columnaris* (Rossow 1988), display a degree of apparent continuous polymorphic variation which is extreme for any perennial species of section *Andinium* (M. Ferreyra *et al.* 2006, M. and A. Sheader in litt., P.J. Erskine pers. comm., J.M. Watson, A.R. Flores and C. Blaxland pers. obs.). If indeed continuous, these must evidently represent some form of geographically widespread evolutionary development, perhaps active, where reticulate hybridisation may be suspected (Allaby 1999). Rossow (1988) placed *V. petraea* W. Becker as a synonym of *V. columnaris*. Given the taxonomical uncertainty of the complex as a whole in situ, in the literature and in herbaria, it would seem prudent to avoid such inflexible conclusions in the absence of fully comprehensive studies and more decisive evidence.

Lectotypification: As indicated, except for one gathering of *V. columnaris* by Högberg, all three of these taxa were published by Skottsberg from syntypes collected by himself (*V. auricolor* 3 syntypes: *V. sacculus* 4 syntypes: *V. columnaris* 3 syntypes) (Skottsberg 1916). Rossow (1988) cites a Högberg isosyntype of *V. columnaris* in BAF. As part of a comprehensive study of *Viola* sect. *Andinium* by himself and A.R. Flores, one of the authors, Watson, has been attempting to trace these syntypes collected by Skottsberg. The inquiry was based on indications that they appear to have been exclusively limited to herbaria of his native Sweden, primarily S and UPS (Del Vitto *et al.* 1998), where he is known to have deposited his principal material. We have certainly not traced records or found any evidence of these gatherings by him from herbaria he supplied outside Sweden as noted in Del Vitto *et al.* (1998). Thanks to efficient and valued co-operation from Swedish colleagues we learned that no Skottsberg material of the three violas is found in GB (C. Persson in litt.), while one each of *V. sacculus* and *V. columnaris* exist at S (A. Anderberg in litt.), and *V. auricolor* and *V. sacculus* are also represented by one specimen each at UPS. The folder there for *V. columnaris* is empty. In fact 95 *Viola* specimens loaned out from UPS have never been returned (M. Hjertson in litt.).

Following wider investigation, it is strongly suspected that this Skottsberg type material may have been permanently lost along with critical *Viola* collections from Chilean herbaria. As a result of this uncertainty it has not been possible to select and cite lectotypes here, as would be desirable. Our intention now is to declare the missing material as definitively lost, and when the opportunity arises to examine the remaining syntypes, selecting and citing lectotypes from those. J.M.W.

CONCLUSION

The species registered here raise the number of sect. *Andinium* as published and present in Chile to 51-52. Including these three, species from other sections, adventives, and further taxa awaiting publication, the latest revisional total count for the genus *Viola* in the Chilean flora stands provisionally at 77-78 species. 74-75 of them are native and endemic, the other three introduced (J.M. Watson and A.R. Flores unpubl.).

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