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ADDITIONS TO THE VASCULAR FLORA OF
TIERRA DEL FUEGO

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Since 1690, the date of the first recorded collection of plants from Tierra del Fuego (Middleton, 1909), some 55 people are known to have made collections of vascular plants in the area south of the Straits of Magellan (Moore, unpub.) and there is an extensive literature on its flora. As the region is in the highest latitudes attained by any appreciable part of the southern South America it is of considerable phytogeographical interest. For example, Tierra del Fuego is clearly essential to any consideration of the amphi-Antarctic distributions of many species and genera, while its separation from the mainland by the Straits of Magellan, and its division into a multitude of large and small islands, make it an important area for studying many factors affecting the processes of plant distribution. Furthermore, from the south and west to the north and east of Fuegia there is a microcosm of the topographical and climatic gradients shown on the mainland between latitude 40°S. and the Straits of Magellan. Despite its importance, there is no up-to-date account of the vascular flora of Tierra del Fuego although there is a number of published lists and partial accounts dealing with many of the species, of which it is estimated there are approximately 450 native to the region and a further 100-150 introduced by man (Moore, unpub.).

Whilst preparing a modern treatment of the vascular flora of Tierra del Fuego I have taken several opportunities to carry out field work in the region and this paper records several interesting species, not previously known from the area, which were collected by me dur-

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ing the period December, 1967 - March, 1968. Most of these discoveries were made in company with Mrs. R. N. Goodall, of Estancia Harberton, Tierra del Fuego, and I also take this opportunity to publish new records based on material collected by her prior to and after my visit.

TETRACHONDRA PATAGONICA Skottsberg

The amphi-Antarctic genus *Tetrachondra* is currently considered to contain two species, viz - *T. hamiltonii* Petrie ex D. Oliver, occurring between lat. 45°30'S. and 46°30'S. and again at lat. c. 40°S. in New Zealand (Allan, 1961), and *T. patagonica*, which was described by Skottsberg (1912) from the N.W. shore of Lago San Martín (48°53'S.) in prov. Santa Cruz, Argentina. The Patagonian species was distinguished from *T. hamiltonii* by its more robust habit, somewhat shorter internodes, longer, narrower, more ciliate leaves, wider corolla-lobes, non-setulose nutlets, and non-thickened style-apex.

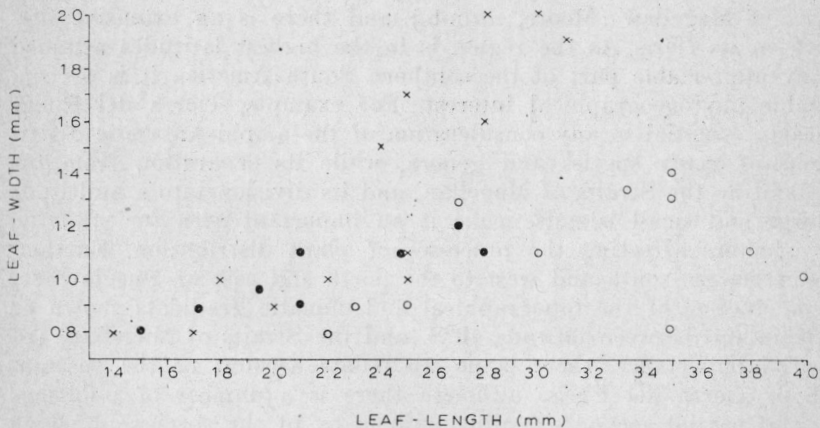


Fig. 1. Length and width of leaves in *Tetrachondra hamiltonii* (●), *T. patagonica* ssp. *patagonica* (○) and *T. patagonica* ssp. *fuegiana* (x).

So far as I am aware, there has been only one, unpublished, record of *T. patagonica* subsequent to that of Skottsberg: Argentina: Santa Cruz; Guer Aike, c. 20 km south of Puerto Coyle on road to Río Gallegos, alt. 20 m., in sandy blue mud by road, 2.i.1939. *Eyerdam, Beetle & Grondofna 24067* (S.). This collection is clearly referable to the same taxon as Skottsberg's material, although there are generally fewer long cilia on the petiole and leaf-base, the margin of the leaf is entire or occasionally serrulate distally, and the style

is thickened at the apex a result of the well-developed stigmatic papillae. In the type collection the stigmatic papillae are usually short and erect, so that the style appears not or scarcely thickened at the apex, although in some flowers the papillae are somewhat patent and better developed. It seems, therefore, that the thickening of the style-

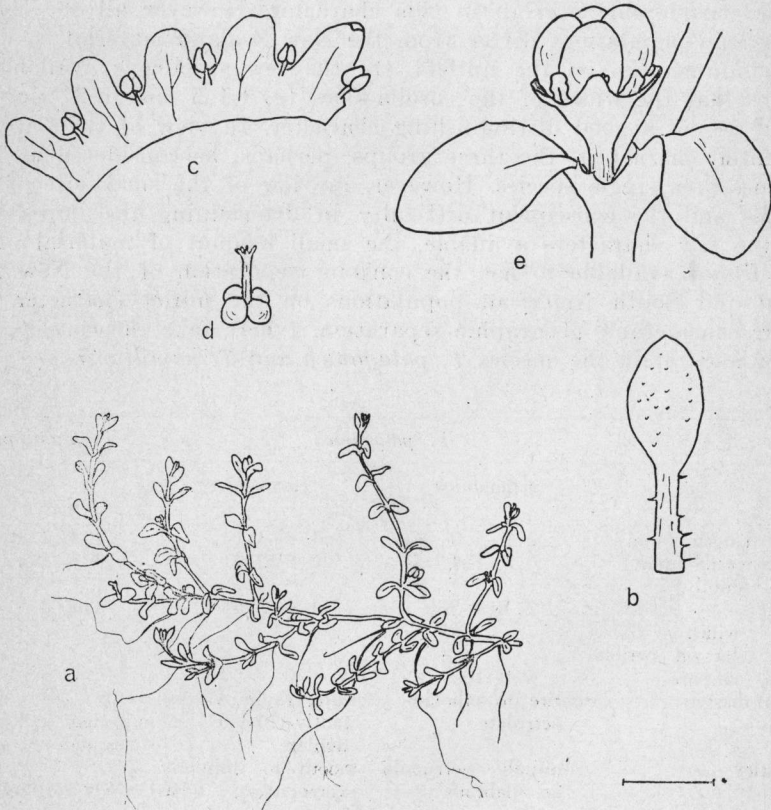


Fig. 2. *Tetrachondra patagonica* Skottsberg ssp. *fuegiana* D. M. Moore. (a) Habit; (b) Leaf; (c) Corolla opened to show insertion of stamens; (d) Gynoecium; (e) Mature nutlets. Scale = 10 mm for a, 1.5 mm for b, 1 mm for c, d, e.

apex is not a good character for differentiating the Patagonian and New Zealand species, apparently being a developmental character of low taxonomic value.

In 1967 Mrs. R. N. Goodall sent me a collection from Estancia Harberton which proved to be a *Tetrachondra*, and in 1968 identical material was collected by Mrs. Goodall and myself at or somewhat

above treeline in several localities along the north shore of the Canal Beagle. The Fuegian plant is of a delicate, creeping habit, differing in this respect from typical *T. patagonica* and resembling the New Zealand species. It is clear from Table 1 and Fig. 1 that the Patagonian and Fuegian populations can be readily distinguished on leaf-shape, but that the Fuegian and New Zealand populations show considerable overlap in this character. However all the South American populations differ from the New Zealand material in lacking indumentum on the nutlets. On the few specimens available it seems that the width of the corolla-lobes (*c.* 1-1.5 mm in *T. patagonica*) is not a good distinguishing character. In view of the few differential characters, the three groups, perhaps, be considered as subspecies of a single species. However, in view of the small size of the genus and the consequent difficulty in determining the importance of the few characters available, the small amount of material of *T. hamiltonii* available to me, the constant separation of the New Zealand and South American populations on the nutlet character and their considerable geographic separation, I here take the conservative view and retain the species *T. patagonica* and *T. hamiltonii*.

	<i>T. patagonica</i>		<i>T. hamiltonii</i>
	<i>patagonica</i>	<i>fuegiana</i>	
Leaf-length (mm)	2.2-5.0	1.4-3.1	1.5-2.8
Leaf-width (mm)	0.8-1.4	0.8-2.0	0.8-1.2
Leaf length width	2.1-4.5	1.4-2.5	1.8-2.5
Nº cilia on petiole and leaf-base	0-4(-10)	0-4	0-3
Leaf-margin	entire to ciliate- serrulate	entire, rarely v. dis- tantly ciliate den- tulate	minutely ciliate- serrulate
Nutlet	minutely verruculo- se, glabrous	smooth to minutely verruculose, gla- brous	densely setulose

Table 1. Comparison of characters distinguishing *Tetrachondra hamiltonii* and the two subspecies of *T. patagonica*.

In South America the two groups of populations are geographically separated, although further collecting may reduce the distance of their separation, and they generally differ in habit and leaf-shape. In view of this the Patagonian and Fuegian populations may satisfactorily be recognized at the subspecific level. A new subspecies therefore has to be described to accommodate the southernmost entity.

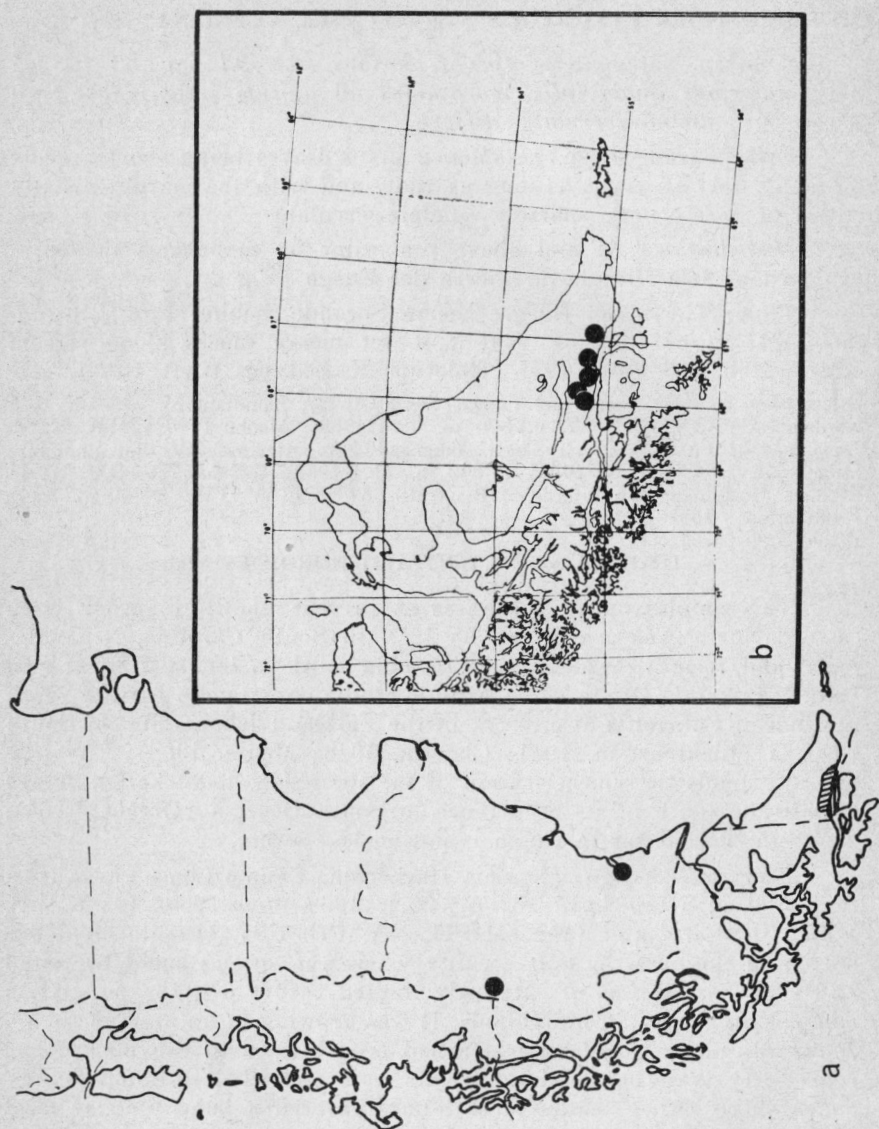


Fig. 3. Distributions of *Tetrachondra patagonica* Skottsberg. (a) localities for ssp. *patagonica* (o) in southern Patagonia and general range of ssp. *fuegiana* D. M. Moore (||||) in southern Tierra del Fuego. (b) localities for ssp. *fuegiana* in Tierra del Fuego.

TETRACHONDRA PATAGONICA Skottsberg subsp. **FUEGIANA** subsp. nov.

A subsp. patagonica foliis brevioribus (0.8-3.1 mm) et 1.4-2.5 plo longioribus quam latis, marginibus ad apicem integris vel raro parcissime ciliolato-serrulatis differt.

Differs from subsp. *patagonica* in its leaves being shorter (0.8-3.1 mm), 1.4-2.5 times as long as wide, and with the margin distally entire or rarely very sparsely ciliate-serrulate.

Distribution: At and above timberline on mountains in southern part of Isla Grande de Tierra del Fuego (Fig. 3).

Type: Tierra del Fuego: Sierra Sorondo, behind Punta Segunda. 54°47'S., 67°58'W. c. 600 m. "wet mossy places along stream edge". 20.ii.1968. *Moore* 1975 (Holotype K, isotypes BAB, LP, LTR).

Other material: Tierra del Fuego: Sierra Alvear; mountain W. side of Paso Garibaldi, 54°33'S., 67°51'W. c. 800 m. 19.i.1968. *Moore* 1590 (LTR, UPS) *Goodall* 1301 (MICH, NA); Sierra Almanza; Cerro Almanza, W. side of Lashifashaj valley, 54°50'S., 67°29'W, c. 850 m. 11.i.1968. *Goodall* 730 (LP, LTR) Estancia Moat; mountain at head of Río Chico, 54°53'S., 66°53'W. c. 700 m. 26.i.1968. *Moore* 1632 (LTR).

OPHIOGLOSSUM CROTALOPHOROIDES Walter

This amphitropical species is at present known to occur from eastern North America at lat. 35°12'N in South Carolina, to Guatemala, and from Venezuela and Colombia south to lat. c. 47°S at San Rafael, Istmo de Ofqui, Chile, with sporadic occurrences further south in Andean Patagonia at c. 49°S, in the Falkland Islands and in South Georgia (Lichtenstein, 1944; Clausen, 1948; Moore, 1968). The new record extends the southern limit of the species by about half a degree of latitude south of its occurrence in South Georgia (Greene, 1964), although the habitat in Fugia is mucho less severe.

Tierra del Fuego: Estancia Harberton; Campo Loma Larga Norte, c. 300 m, 54°50'S., 67°16.5'W. 22.i.1968. *Moore* 1607 (C, K, LP, LTR, UPS), *Goodall* 1302 (MICH, NA, UC, US). Despite assiduous searching this was the only locality where the species could be found and even here it was of extremely limited occurrence, the population comprising about 100 individuals. It was growing in an area of *Nothofagus antarctica* woodland which had been burned to provide grazing some forty years ago, and the plants were restricted to damp depressions where rather shallow acid humus covered a band of grey clay.

As indicated by Clausen (1938), this species tends to be more robust in localities south from lat. 45°S. Although the Fuegian plants do not reach the size of the very large specimens from West Falkland on which Clausen (l.c.) based his ssp. *robustum*, they generally accord with this subspecies in the length of leaf-lamina (35-40 mm.), length of fertile spike (16-20 mm.) and length of sporangia (2-2.5 mm.),

but not in the diameter of the fertile stalk (1-1.5 mm.) or width of leaf-lamina (20-26 mm.), which fall within the range of the more northerly populations referable to ssp. *crotalophoroides*.

POLYGALA SALASIANA Gay

In the northern part of its range this species occurs on the west flank of the Andes (lat. *c.* 30-40° S.), while further south it crosses the cordillera and is found in Patagonia from lat. 38°30'S. in prov. Neuquén to lat. 50°20'S. in prov. Santa Cruz (Grondona, 1948). In view of the strong affinities between the flora of southern Patagonia and the steppe in the northern part of Tierra del Fuego, it is not surprising that the first Fuegian locality for *Polygala salasiana* should be along the Atlantic coast of the Isla Grande.

Two collections are known: Estancia Viamonte, lat. 53°58'S., 67°30'W., upper beach by sea, 10.xi.1967, *Goodall 1023* (LTR); Estancia San Pablo, S.E. side of Cabo San Pablo by sea, 6.iv.1968, *Goodall 1687* (LTR, MICH, NA, UC, US). In both localities the plants occurred in open sand.

NASTANTHUS SPATHULATUS (Phil.) Miers

Although the Calyceraceae is a temperate South American family, the only member previously known from Tierra del Fuego is *Boopis australis* Decaisne. *Nastanthus spathulatus* occurs along the Andes of C. Chile, in the northwest of prov. Mendoza, and in provs. Neuquén and Santa Cruz (Pontiroli, 1963) south to Río Pelque (lat 50°50'S.), while the closely related *N. chubutensis* Speg. occurs in the Andes of provs. Neuquén and Chubut.

The three Fuegian populations were collected on open tallus slopes towards the upper limit of vascular plant growth at latitudes of 800 - *c.* 1000 m. on the mountains along the north shore of the Canal Beagle viz. Sierra Alvear; mountain on W. side of Paso Garibaldi, 54°33'S., 67°51'W., *c.* 800 m., 19.i.1968, *Moore 1597* (BAB, K, LTR, UPS), *Goodall 1293* (MICH, NA, UC, US); Sierra Sorondo; behind Punta Segunda, 54°47'S., 67°58'W., *c.* 1000 m., 20.ii.1968, *Moore 1966a* (BAB, K, LP, LTR), *Goodall 1468* (MICH, NA, US); Sierra Almanza; Cerro Almanza, W. side of Lashifashaj valley, 54°50'S., 67°29'W., *c.* 1000 m., 11.i.1968, *Moore 1433* (K,LTR).

The material appears most closely referable to *N. spathulatus*, having spathulate leaves, few or no receptacular scales and prominent, fleshy glands at the base of the filaments. However, in several characters the Fuegian plants are much closer to the description of *N. chubutensis* given by Pontiroli (1963). Thus, corolla —and anther—

length, and the shape of the receptacular scales, when present, are much closer to *N. chubutensis*:

	<i>spathulatus</i>	Fuegian populations	<i>chubutensis</i>
Corolla-length (mm)	7-8	c. 6.0	c. 6.0
Anther-length (mm)	2.5	c. 1.0	c. 1.0
Receptacular scales			
- shape	spathulate	linear	linear
- length (mm)	c. 5	c. 5	c. 3

This clearly indicates that the descriptions of the two species given by Pontiroli (1963) require some modification and may suggest that further material, particularly from the area between lat. 50°50'S. and 54°30'S., may necessitate further investigation of their delimitation.

The three Fuegian populations show interesting variation in the length of the calyx-lobes, which average respectively c. 0.8 mm (*Moore 1597*), c. 1.0 mm (*Moore 1433*) and 1-2 mm (*Moore 1966a*), but no correlation is possible between this and other characters or distribution.

GAMOCHAETA NIVALIS Cabrera

Hitherto known from the Andes of Chile (provs. Talca, Nuble, Valdivia) at lat. 35° - c. 39°S. and Argentina (provs. Mendoza, Neuquén), the southern most specimen cited by Cabrera 1961 occurred at lat. 40°30'S. Its discovery in Tierra del Fuego, therefore, constitutes a southward extension of some 14 degrees of latitude, the collecting details being as follows: Lago Fagnano, N. side: Aserradero Vidal; Cerro Atukoyak, 800-900 m., 54°28'S., 67°37'W., loose soil, 17.i.1968. *Moore 1567* (LP, LTR). This species occurred above tree-line on one of the drier mountains north of Lago Fagnano, and it is perhaps relevant to its ecological requirements to note that it was not encountered in the alpine areas of any of the mountains investigated in the area of higher precipitation further south.

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SUMMARY

Ophioglossum crotalophoroides Walter, *Polygala salasiana* Gay, *Nastanthus spathulatus* (Phil.) Miers, *Gamochaeta nivalis* Cabrera and the newly described *Tetrachondra patagonica* Skottsberg subsp. *fuegiana* D. M. Moore are recorded as new for the native vascular flora of Tierra del Fuego. Information on the known distribution of these species is summarized and, in some instances, the characteristics of the Fuegian populations are discussed in relation to previous description of the species.

SUMARIO

Se describen las siguientes novedades para la flora vascular indígena de Tierra del Fuego: *Ophioglossum crotalophoroides* Walter, *Polygala salasiana* Gay, *Nastanthus spathulatus* (Phil.) Miers, *Gamochaeta nivalis* Cabrera y la nuevamente descrita *Tetrachondra patagonica* Skottsberg subsp. *fuegiana* D. M. Moore. También se incluyen datos referentes a la distribución hasta ahora conocida de estas especies y en algunos casos una consideración de las características de las poblaciones fueguinas refiriéndose en particular a las descripciones anteriormente publicadas.