NOTES ON ANTARCTIC BRYOPHYTES: XI. *MIELICHHOFERIA AUSTRO-GEORGICA* AND *MUELLERIELLA GRASSIFOLIA*

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Abstract. Details of the distribution of *Mielichhoferia austro-georgica* C. Muell. and *Muelleriella crassifolia* (Hook. f. et Wils.) Dus. in the Antarctic botanical zone are provided, together with notes on identification and sporophyte production.

Mielichhoferia austro-georgica C. Muell.

According to Müller (1890), Cardot (1908) and Clarke (1973), *M. austro-georgica* endemic to the sub-Antarctic island of South Georgia. Smith and Corner (1973) however, recorded the species in their survey of the vegetation of an area of the Graham and Danco coast regions of the Antarctic Peninsula. This extension to its geographical range is particularly significant since it is within the Antarctic botanical zone as defined by Greene (1964).

Smith and Corner's (1973) field observations were supported by a voucher specimen (R. I. L. Smith No. 938, see Table 1) determined by B. G. Bell in 1970. Further specimens have been collected or have come to light during a recent re-examination of all Antarctic material determined as *Pohlia nutans* (Hedw.) Lindb. in the British Antarctic Survey Herbarium (AAS) currently located at the Institute of Terrestrial Ecology, Bush Estate, Penicuik, Midlothian. A list of all known Antarctic specimens of *M. austro-georgica* is given in Table I.

The majority of the specimens have sporophytes, some in profusion, suggesting that the species may be capable of completing its life cycle even at these high latitudes. Its Antarctic distribution appears to be limited to the Graham and Danco coast areas of the Antarctic Peninsula where it is rare but abundant in a few localities such as Rasmussen Island where a single stand is known to cover 2 m^2 (R. I. L. Smith, personal communication). As on South Georgia, it typically forms short turves in rock crevices and on sheltered rock faces near the sea. Surprisingly, it has not been recorded from the more northerly South Shetland or South Orkney islands.

The Antarctic specimens of *M. austro-georgica* agree well with South Georgian material, the fertile plants falling well within the range of stem, leaf and cell measurements given by Clarke (1973). One of the sterile specimens is somewhat smaller, but the key provided by Clarke (1973) identifies this and all other specimens without difficulty. In view of the confusion with *Pohlia nutans*, the major differences between the two species are summarized in Table II.

In conclusion, *M. austro-georgica* is a relatively little-known and local constituent of the Antarctic coastal moss flora. It is possible that specimens exist, in other collections, which have been mis-identified as *P. nutans*.

Muelleriella crassifolia (Hook. f. et Wils.) Dus.

M. crassifolia (as *Orthotrichum crassifolium*) was first noted from the Antarctic botanical zone by Gimingham and Smith (1970), with more precise locations cited by

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Table I. All known specimens of *Mielichhoferia austro-georgica* C. Muell. from the Antarctic botanical zone.

Locality	*Lat. and long.*	*Collection/No.*	*With sporophytes*	*Distribution to herbaria*
*Galindez Island, Argentine Islands, Graham Coast	65°15′S 64°16′W	B. G. L. E. 1114a	√	AAS, BM
*Galindez Island, Argentine Islands, Graham Coast	65°15′S 64°16′W	R. W. M. Corner 451	√	AAS, BM, (CHR, IAA, LE, MEL, NY, PC, PRE, SGO, S–PA, TNS)†
*Galindez Island, Argentine Islands, Graham Coast	65°15′S 64°16′W	R. W. M. Corner 561	–	AAS
*Galindez Island, Argentine Islands, Graham Coast	65°15′S 64°16′W	R. I. L. Smith 938	√	BM, BA
*Galindez Island, Argentine Island Graham Coast	65°15′S 64°16′W	R. I. L. Smith 3283	√	AAS, PRE.
Rasmussen Island, Graham Coast	65°15′S 64°06′W	R. I. L. Smith 1924	√	AAS, ALTA, CHR, LE, MEL, NY, PC
Andrée Island, Charlotte Bay, Danco Coast	64°31′S 61°30′W	R. I. L. Smith 4003	√	BM, BA
Andrée Island, Charlotte Bay, Danco Coast	64°31′S 61°30′W	R. I. L. Smith 4017	–	AAS, NY
Andrée Island, Charlotte Bay, Danco Coast	64°31′S 61°30′W	R. I. L. Smith 4019	√	BM, S, TNS
Andrée Island, Charlotte Bay, Danco Coast	64°31′S 61°30′W	R. I. L. Smith 4020	√	BM, ALTA
Andrée Island, Charlotte Bay, Danco Coast	64°31′S 61°30′W	R. I. L. Smith 4036	–	BM

*Specimens previously determined and published by Greene and others (1970) as *Pohlia nutans* (Hedw.) Lindb.

†Duplicate specimens (in brackets) were distributed after their original publication (Greene and others, 1970) and have not been examined by the authors.

Table II. A summary of the differences between *Mielichhoferia austro-georgica* C. Muell. and *Pohlia nutans* (Hedw.) Lindb.

Character	*Mielichhoferia austro-georgica*	*Pohlia nutans*
Outer peristome	Absent	Very conspicuous
Position of inflorescence	On short lateral branches	Terminal on main stems
Perichaetial leaves	Similar to other leaves	Markedly elongate
Leaf shape	Often asymmetric	Rarely asymmetric
Leaf cells	Small hexagonal rectangular with thin walls; the ends of the cells normally pointed	Elongate-rectangular with thick walls (*c.* 3 μm thick); the end walls usually flat or oblique

Smith (1972) (South Orkney Islands), Smith and Corner (1973) (Argentine Islands) and Allison and Smith (1973) (South Shetland Islands). Vitt (1976) unfortunately did not include Antarctic material in his monograph of the genus and therefore the full geographical range of this species is likely to be overlooked. Details of all known material from the Antarctic that has been determined as *M. crassifolia* subsp. *crassifolia* are given in Table III. Cardot (1900, 1908), however, reported two *Orthotrichum* specimens, *O. antarcticum* Card. and *O. rupicolum* C. Muell. from Cape Anna, Danco Coast. Neither specimen has been traced in the present study but they should be considered in any future revision of either *Orthotrichum* or *Muelleriella* for the Antarctic botanical zone.

Table III. All known specimens of *Muelleriella crassifolia* (Hook. f. et Wils.) Dus. from the Antarctic botanical zone. All specimens belong to the subsp. *crassifolia*.

Locality	*Lat. and long.*	*Collection/No.*	*With sporophytes*	*Distribution to herbaria*
Coronation Island, South Orkney Islands	60°38′S 45°35′W	R. I. L. Smith 37	√	AAS
Coronation Island, South Orkney Islands	60°38′S 45°35′W	R. I. L. Smith 451	√	AAS
Lynch Island, South Orkney Islands	60°39′S 45°36′W	R. I. L. Smith 506	√	AAS, ALTA
Matthews Island, South Orkney Islands	60°45′S 45°09′W	R. I. L. Smith 192	–	ALTA, BM, MEL, S, TNS
Powell Island, South Orkney Islands	60°41′S 45°03′W	R. I. L. Smith 255	–	AAS, ALTA, CHR
Powell Island, South Orkney Islands	60°41′S 45°03′W	R. I. L. Smith 281	–	BM
Signy Island, South Orkney Islands	60°43′S 45°38′W	R. E. Longton 1083	–	AAS, PC
Signy Island, South Orkney Islands	60°43′S 45°38′W	R. I. L. Smith 10	–	BM, PRE
Signy Island, South Orkney Islands	60°43′S 45°38′W	R. I. L. Smith 350	–	AAS
Signy Island, South Orkney Islands	60°43′S 45°38′W	R. I. L. Smith 404	–	AAS, BA, BM, LE, NY
Signy Island, South Orkney Islands	60°43′S 45°38′W	R. Webb 87	–	AAS
Aspland Island, South Shetland Islands	61°28′S 55°55′W	J. P. Baylis 75	–	BM
Eadie Island, South Shetland Islands	61°29′S 55°57′W	J. S. Allison 231	–	AAS
Andrée Island, Charlotte Bay, Danco Coast	64°31′S 61°30′W	R. I. L. Smith 4000	–	BM, PC, S
Uruguay Island, Argentine Islands Graham Coast	65°14′S 64°14′W	R. W. M. Corner 596a	–	AAS, BA, CHR, LE, MEL
Berthelot Islands Graham Coast	65°20′S 64°10′W	R. W. M. Corner 618	–	AAS
Cape Tuxen, Graham Coast	65°16′S 64°08′W	R. W. M. Corner 670	–	BM, NY
Between Irizar and Uruguay Islands, Argentine Islands, Graham Coast	65°13′S 64°13′W	R. W. M. Corner 708	–	BM

M. crassifolia is at present known from the South Orkney and South Shetland Islands and the Danco and Graham coast regions of the Antarctic Peninsula. It typically forms loose to dense cushions on coastal rocks often within the spray zone dominated by hygrohaline crustose lichens. Three specimens from the South Orkney Islands have sporophytes and Smith (1972) remarked that the species is often abundantly fertile on sheltered sites in this region. However, Webb (1973) failed to find any fertile plants during his study of bryophyte reproduction on Signy Island. No sporophytes have been seen on specimens collected from more southerly localities, and Smith and Corner (1973) noted that the species is less abundant in the Argentine Islands region of the Graham Coast than on the South Orkney Islands. Thus present information suggests that the species is capable of producing capsules in favourable habitats on the South Orkney Islands (60°S) but is sterile and less abundant in the Graham Coast region of the Antarctic Peninsula (65°S) where it appears to reach the limit of its range.

M. crassifolia is perhaps most likely to be confused with species of *Schistidium*. It can be distinguished by its leaf shape which is generally ligulate from an ovate base, compared with the typical ovate-lanceolate leaf shape of *Schistidium*. The leaf areolation is also different, the longitudinal cell walls of *Schistidium* are characteristically sinuose, if sometimes weakly so, and the leaf margin or patches of the upper lamina are bistratose. In *M. crassifolia*, the cell walls are not sinuose while the lamina is bistratose in the entire upper part and along the margins below, thus giving a much thicker appearance to the leaf. Capsules, when present, differ considerably from those of *Schistidium* in being shortly exserted rather than immersed and bear a much larger calyptra covered in short hairs.

A full description and illustrations of *M. crassifolia* are given by Vitt (1976). *M. crassifolia* is the most widespread of the four species which he considers constitute the genus, being circum-sub-Antarctic in distribution. He divides it into two subspecies; subsp. *acuta* (C. Muell.) Vitt, found on the Îles Crozet and Îles Kerguelen and subsp. *crassifolia* which occurs on most other sub-Antarctic islands (including Auckland, Campbell, Macquarie and Marion islands and South Georgia) and in Tierra del Fuego. It is to the latter subspecies that the Antarctic plants belong. Vitt (personal communication) has confirmed the identifications of three of the Antarctic specimens (Corner No. 670, R. I. L. Smith No. 37, 192) and remarks that they are most similar to Fuegian populations in their small size and rather slender leaves.

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