

## On the occurrence of *Ceratodon purpureus* (Hedw.) Brid. (Ditrichaceae) on Subantarctic Marion Island

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**Abstract** – *Ceratodon purpureus* (Hedw.) Brid. is generally considered to be a weedy, ubiquitous and cosmopolitan moss species. It is very rare on Subantarctic islands in the Kerguelen Province and hitherto it was only occasionally collected on Îles Kerguelen and it is absent from Îles Crozet. The former report of this species from Marion Island in the Prince Edward Islands archipelago proved to be based on misidentifications and the voucher collections represented *Dicranella gremmenii* Ochyra. *C. purpureus* is here reported for the first time from four stations on Marion Island and the local plants are briefly characterized and illustrated.

**Bryophyta / Musci / Ditrichaceae / *Ceratodon* / Marion Island / Kerguelen Province / Subantarctica / distribution**

### INTRODUCTION

*Ceratodon purpureus* (Hedw.) Brid. is generally considered to be a cosmopolitan weedy moss but this view needs some qualification. The species is indeed a very common weed that thrives on a wide range of substrates, including sterile and disturbed soil, rocks, stone walls, wood, and roofs, even in urban areas with strong atmospheric pollution. It is very widespread in the temperate and polar regions of both hemispheres but in the tropics it is mainly confined to montane regions above 2000 m and is absent from the vast lowland regions of Amazonia (Churchill, 1998) and Africa (Kis, 1985). Hence, it cannot strictly be considered as having a truly cosmopolitan distribution.

*Ceratodon purpureus* is an exceptionally protean species that shows a continuum of overlapping polymorphs across its ecological and geographical ranges. As pointed out by Burley and Pritchard (1990) in their taxonomic revision of the genus, recognition of regional populations as distinct species or infraspecific taxa is precarious, especially if the distinctions rely mainly on sporophyte characters. *C. purpureus* is notoriously sterile and in some regions fertile plants have never been found. For example, indigenous populations in the Antarctic do not

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produce sporophytes; the only record of sporophytes is from Deception Island in the South Shetland Islands (*Lewis Smith 3644b*, AAS, KRAM), where this population is most likely a recent introduction on the island which is still volcanically active.

In the Southern Hemisphere *Ceratodon purpureus* is very common at temperate latitudes in South America (Greene, 1986), southern Africa (Magill, 1981), Australia (Scott *et al.*, 1976) and New Zealand (Beever *et al.*, 1992). It is one of the commonest mosses in continental and maritime Antarctica (Kanda, 1987; Ochyra, 1998 and unpublished). It has an interesting and strange distribution in the Subantarctic, a region comprising several isolated islands and small archipelagoes in the vast Southern Ocean. On South Georgia, a solitary island in the South American Province of the Subantarctic, *C. purpureus* appears to be relatively frequent (Ochyra, unpublished). It is also found on Macquarie Island in the Australasian Province (Selkirk *et al.*, 1990) where it is a frequent species in fell-field (Bergstrom & Selkirk, 1999). Prior to this report *Ceratodon purpureus* had been found on two islands or island groups in the Kerguelen Province (the Indian Ocean sector of the Southern Ocean), namely at Heard Island (Mitten, 1876a; Burley & Pritchard, 1990) and Îles Kerguelen (James, 1875, 1876; Mitten, 1876a, b; Brotherus, 1906; Cardot, 1916; Ochyra, 1999a). In both localities it is very rare.

### MARION ISLAND REPRESENTATION

*Ceratodon purpureus* was also previously reported from Marion Island (the larger of the Prince Edward Islands, which is a two-island archipelago in the Kerguelen Province) by Van Zanten (1971). However, that author was reserved about the identification, remarking that some characters (short and blunt leaves and entire leaf margins that are weakly, or not at all, recurved) of the Marion Island specimens deviate from the usual forms of the species. Examination (by RO) of the voucher collections deposited at GRO revealed that Zanten's reservation was justified; all represent *Dicranella gremmenii* Ochyra, a species described only recently from Marion Island (Ochyra, 1999b) and collected even more recently from Îles Kerguelen (Ochyra & Poulsen, 2003). Though sterile, this species is very distinct and immediately distinguished from *C. purpureus* by its leaf areolation, anatomy of the costa, plane or inflexed leaf margins and pseudopapillose laminal cells.

However, *Ceratodon purpureus* is not excluded from the bryoflora of Marion Island since during field work there in 1999 we discovered it at three localities on the southern coast of the island. It is rare; extensive fieldwork in 1999 and again in 2001 and 2003 yielded the species only at a single additional location on the island and, so far, *C. purpureus* has not been recorded on nearby Prince Edward Island (which we surveyed intensely in 2001 and 2003).

**SUBANTARCTICA. PRINCE EDWARD ISLANDS. *Marion Island*:** (1) NE slope of the ridge between Johnny's Hill and Karookop, lat. 46°57'30"S, long. 37°48'30"E, alt. 200 m, on pocket of soil in crevices of grey lava, 13 Apr. 2003, *Ochyra 1116/03* (KRAM); (2) Green Hill overlooking Kildalkey Bay, lat. 46°58'07"S, long. 37°50'50"E, alt. 100-130 m, in crevices of steep red volcanic rock face, 21 Apr. 1999, *Ochyra & V.R. Smith 12863/99 & 1278/99* (KRAM); (3) Crawford Bay, on the east side of the outlet of Water Tunnel Stream, lat.

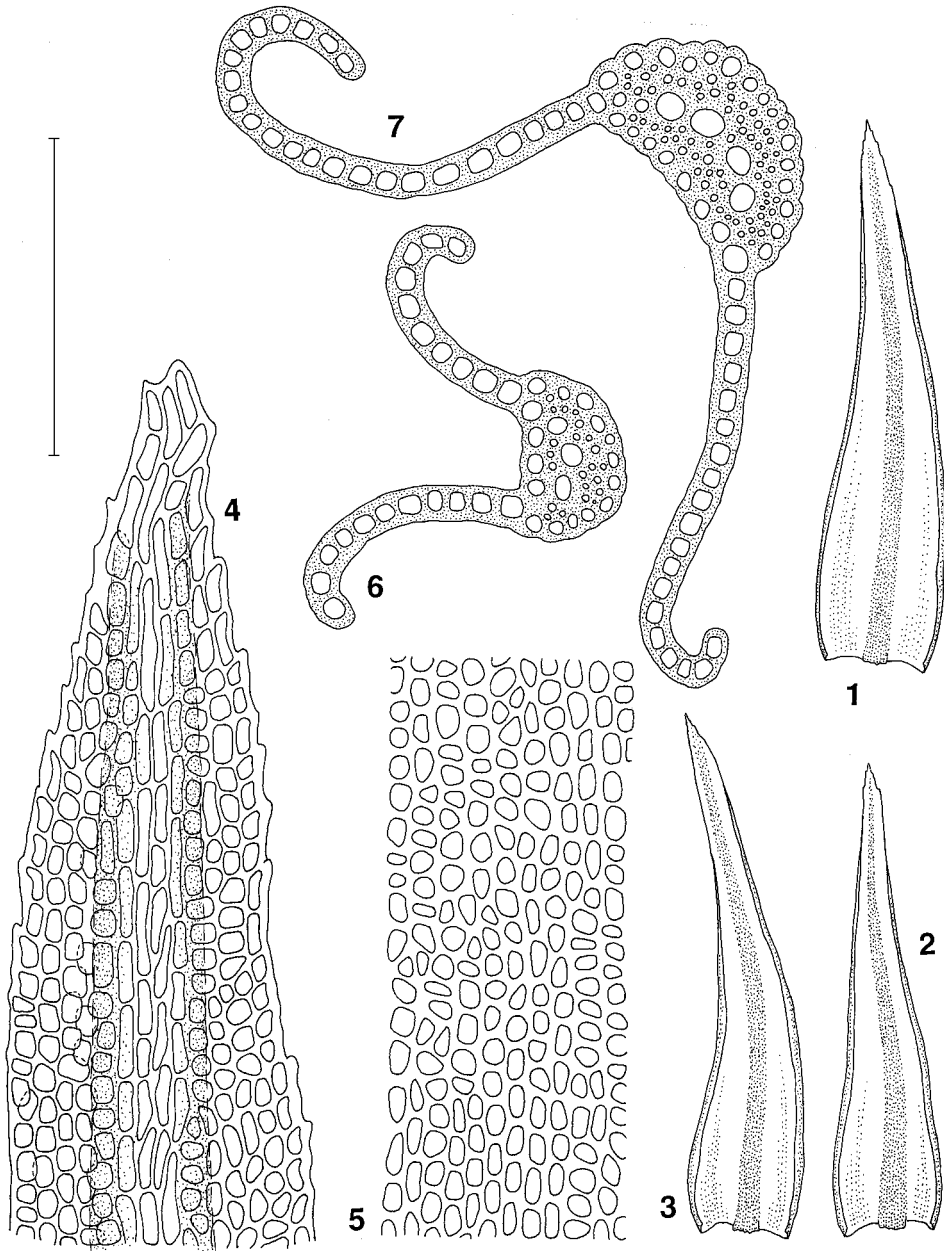


Fig. 1. *Ceratodon purpureus* (Hedw.) Brid. – 1-3. Leaves. 4. Leaf apex. 5. Mid-leaf cells. 6-7. Transverse sections of leaf in upper and median parts. [All from *Ochyra & V.R. Smith 2046/99*, KRAM]. Scale bar: 1 mm (1-3) and 100  $\mu$ m (4-7).

46°57'25''S, long. 37°45'20''E, alt. 140 m; in crevices of coastal black lava rocks; 27 Apr. 1999, *Ochyra & V.R. Smith 2308/99* (KRAM); (4) between Crawford Bay and south-east part of Santa Rosa Valley, 300 m inland from the seashore, lat. 46°57'55''S, long. 37°44'15''E, alt. 25 m; in fissures of black lava rocks on raised marine platform, in dry and sheltered sites, associated with *Syntrichia anderssonii* and *Racomitrium membranaceum*; 26 Apr. 1999, *Ochyra & V.R. Smith 2013/99 & 2046/99* (KRAM).

All Marion Island *Ceratodon purpureus* specimens are sterile, but are typical expressions of the species (Fig. 1). Plants grow in compact, reddish- to drab-green tufts, up to 4 cm tall. The form and morphology of the Marion Island plants is very similar to plants from Îles Kerguelen. Nerves are very strong and percurrent to short excurrent as a stout cuspidate point. Leaf margins are broadly recurved to revolute and are distinctly serrulate at the apex. Laminal cells are quadrate, rounded quadrate to short-rectangular and 8-11 µm in width. Laminal cell size is definitely in the lower part of the range found for Antarctic *C. purpureus*. In Antarctic plants cell width is mostly 8 to 18 µm, with some cells being larger (up to 22 µm), whereas the Marion Island plants examined so far have cells 8-11 µm wide. However, there is no clear hiatus in cell width between the Marion Island and the Antarctic plants, or between different populations in the Antarctic; at any particular locality, even within one patch, almost the whole range of cell widths can be found. Recognition of Antarctic plants as a separate species *C. antarcticus* Cardot (as suggested by Burley and Pritchard, 1990) therefore seems to be unjustified.

All populations of *Ceratodon purpureus* discovered on Marion Island are not particularly rich and at any station the species is not a prominent constituent of local vegetation. It occurs at low elevations, from near sea level to about 200 m, and grows on soil or humus in crevices and fissures of grey or black lava rocks, mostly in dry and sheltered situations. It forms pure compact tufts and as the most frequent associated growing with it are *Syntrichia anderssonii*, *Racomitrium membranaceum*, *Kiaeria pumila*, *Schizymenium campylocarpum* and *Catagonium nitens*.

This present report markedly extends the range of *Ceratodon purpureus* to Marion Island in the Kerguelen Province of the Subantarctic and confirms previous observations that the species is rare on all the islands on which it occurs in that province. It has not been reported on any of the islands in the Îles Crozet archipelago but this might well be due to the fact that the bryoflora of that archipelago is very undercollected.

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