



Book Review

The Antarctic mosses, with special reference to the South Shetland Islands. J. PUTZKE and A.B. PEREIRA. 2001. 196 pp., 36 line drawings, 7 plates with 14 colour photographs. Soft cover, size, 16.2 × 23.1 cm. ULBRA (Universidade Luterana do Brasil), Canoas/RS. Price: not given. ISBN 85–7528–008–2.

In the introduction to the present book the authors write (p. 7 and the back cover): “*The Antarctic mosses* aims at presenting a list, as complete as possible, of the specific known epithets, presenting a discussion on the taxonomic position of each species, descriptions, illustrations and ecological discussions to contribute to the Bryophyte knowledge of Antarctica”. Thus, they clearly declare that a potential user of it should obtain a typical moss flora of the seventh continent, with special emphasis on the South Shetland Islands, one of several peri-Antarctic archipelagoes situated north-west of the western coast of the Antarctic Peninsula. The special reference to this area is not unexpected because the authors personally carried out fieldwork in this region. Therefore, both bryologists and naturalists may anticipate that at least this most remote part of the globe, large, not easily accessible and of great phytogeographical importance, will have received a comprehensive treatment of mosses, a plant group which, apart from lichens, is a major component of the impoverished tundra vegetation in this biome.

Upon initial contact with this book, the reader may be surprised and wonder how such a great amount of taxonomic, ecological and phytogeographical information could be contained in a book of relatively modest size, especially as some problematical taxa have never been thoroughly examined taxonomically in this region and require a rather broad discussion. Additionally, the moss flora of Antarctica is not as poor as one could imagine, judging from the popular conviction that the Antarctic is a very inhospitable continent for plants. Although the continent is heavily glaciated and only about 0.3% of its surface is ice-free in summer, during about 175 years of botanical exploration approximately 200 moss taxa have been recorded, about 50 of which have been described from the Antarctic material. But all is possible in life and science.

Apart from opening acknowledgements, a short, one-page preface and a table of contents, the book consists of nine major sections. The first, “Historical background: scientific and commercial discovery of Antarctica”, provides an outline of the history of the discovery of the icy continent. This wide-ranging and exciting story is here presented very selectively. A lot of space is devoted to the oldest attempts to discover the Antarctic, whereas very little is dedicated to the exploration of various parts of the continent after its discovery. The most important exploratory expeditions in the 19th and 20th centuries are presented in tabular form, although in many cases the data in the relevant columns are incomplete. For example, a reader cannot find out who discovered the South Sandwich Islands or what were the main achievements of the expeditions of E. Shackleton (1907–1909), W. Filchner (1911–1912) and D. Mawson (1911–1914). In Table 4, in the column entitled “Feat/Discovery”, the authors provide ... just the names of expedition vessels. Additionally, there are various misleading or missing data in the tables. For instance, the Argentine relief expedition which rescued the Swedish South Polar Expedition took place in

1903, not in 1904 as given in the present book, and it was commanded by Julfan Irizar whose name is not mentioned in the appropriate column. Likewise, Luis Alberto Pardo Villalon is not mentioned as captain of the Chilean ship *Yelcho* which rescued men of E. Shackleton's famous expedition on the ship *Endurance* from Elephant Island. In Table 2 it is stated that G. Powell discovered the South Orkney Islands, but neither date (1821) nor his nationality (British) is provided. When checking Table 4 one might assume that no important Antarctic voyage was organized after 1931, although the British expeditions of J. R. Rymill on the ship *Penola* in 1934–1937 and the *Operation Tabarin* in 1943–1945 yielded a lot of scientifically important discoveries. The first section ends in an enumeration of the scientific stations in the South Shetland Islands, especially on King George Island, while mentions of other scientific stations is reduced to a single sentence. Of the continental stations only the ephemeral Greenpeace station on Ross Island is recorded and a number of truly scientifically important stations neglected.

In contrast to the first section, the second one, "History of the Antarctic botany", is very poor as regards subject matter. The authors cite only the first botanical paper by J. Torrey describing a new *Usnea* and then in a single sentence they mention the activity of J. D. Hooker, who was the first professional botanist to work in the Antarctic. It is worth noting that neither the first bryological paper on Antarctic mosses, the famous *Musci antarctici* by J. D. Hooker and W. Wilson of 1844, nor another account of the mosses by these authors of 1847 in *Flora antarctica* are cited in "References". On the other hand, more is written about the German South Polar Expedition of 1882–1883 to South Georgia which is irrelevant in the context of Antarctic bryology. Here it is worth noting that a reader may look in vain in this work for a definition of the Antarctic as currently accepted. This is of great importance because the boundaries of this biome had been the subject of major controversy until it was arbitrarily accepted that for botanical purposes Antarctica is defined as all land south of latitude 60°S, together with the South Sandwich Islands archipelago and the strongly isolated, solitary island of Bouvetøya which lie somewhat to the north of the 60th parallel but climatically and botanically fit well into the polar region.

Of the whole rich bryological output devoted to Antarctic mosses, the authors mention only the two papers by J. Cardot of 1901 and 1908 which presented the bryological results of, respectively, the Belgian (1897–1899) and Swedish (1901–1903) expeditions, and a checklist compiled in 1961 by W.C. Steere and supplemented in 1968 by S.W. Greene. For users not well versed on the subject, such a presentation may give the impression that the present work is the first and only comprehensive treatment devoted to the Antarctic mosses.

In the second part of this section the major groups of Antarctic terrestrial organisms are presented. Unfortunately, the data regarding the number of species are either incorrect (hepatics and mosses) or none (lichens). The authors state that 22 species of liverworts are known to occur in the Antarctic and the most recent complete treatment of this group is that by Ochyra and Váňa of 2000. This information is entirely incorrect since 27 species of hepatic are currently known to occur in the Antarctic and they are treated in detail in *The Liverwort Flora of Antarctica* by H. Bednarek-Ochyra, J. Váňa, R. Ochyra and R.I. Lewis Smith which was published in 2000.

According to the authors the only complete treatment of Antarctic mosses with identification keys, descriptions and illustrations is their own paper of 1990 for King George Island. They admittedly state that in 1998 Ochyra published the moss flora of this island but it is not quoted in "References". They completely disregard the fact that the latter Flora provided over one third more moss species for the island (61 versus 40) as well as a great number of taxonomic, nomenclatural and phytogeographical novelties for the whole of the Antarctic. In addition, no mention is made of the first fascicle of the Antarctic Moss Flora by Greene and collaborators which was published in 1970, nor is included any reference to the survey of the Antarctic mosses by Robinson of 1972 or the account of continental Antarctic mosses by Kanda of 1987.

The third chapter of the book “List of Antarctic Bryophyta” presents moss species reported from the Antarctic. Actually, three separate lists of mosses are presented. The first one (pp. 27–32) is probably intended to be a complete list of Antarctic mosses but lacks any comment to this effect. The second (pp. 33–40) is entitled “Geographic distribution of mosses in the South Shetland Islands and Antarctica and relation to other fitossociological (sic!) areas in the World” and comprises a list of moss species with an indication of their phytogeographical status. Alas, for some species (e.g., *Bryum pseudotriquetrum*, *Hypnum revolutum* and *Muelleriella crassifolia*) no information on their distribution is available and for others (e.g., *Bryum dichotomum*, *Ditrichum gemmiferum* and *Encalypta procera*) only information on local distribution is given. In some cases the geographical status is designated quite enigmatically, for instance *Ceratodon antarcticus* and *C. grossiretis* are given to be “widespread”. Finally, on pp. 41–42 there is a third list which indicates the distribution of each species on particular islands in “the South Shetland Islands and Antarctic Continent”. The major problem is that each of these lists presents a different number of species in the study area, namely the first 78, the second 77 and the third 83. None of these figures is correct since the real number of moss species in the Antarctic is much higher. In 1998 a critical list of 104 moss species occurring in the Antarctic was published by Ochyra, Bednarek-Ochyra and Lewis Smith (the paper is quoted in “References” but not in the text), but currently this number has increased to 111 (unpublished data). Excluding some officially unpublished records in the 1998 list (although they are available in the database on the British Antarctic Survey web site), for example *Aloina brevirostris*, *Distichium inclinatum*, *Syntrichia anderssonii* and *Willia austroleucophaea*, the authors for unknown reasons do not list a number of species which are firmly rooted in the Antarctic literature, for example *Campylopus introflexus*, *C. spiralis*, *Conostomum pentastichum*, *Isopterygiopsis pulchella*, *Leptobryum pyriforme*, *Pterygoneurum ovatum* and *Schizymenium pusillum* (reported as *Mielichhoferia austrogeorgica*).

“Key to genera of Bryophyta found in Antarctica”, presented in the fourth chapter of the book, is certainly incomplete. It lacks a number of genera, for example *Funaria*, *Leptobryum*, *Orthotrichum*, *Plagiothecium*, *Pterygoneurum* and *Sarconeurum*, but some genera which are not formally dealt with in the book, namely *Notoligotrichum* and *Stegonia*, are included in the key. Although *Polytrichastrum* is not recognised here as a separate genus, it appears in the key. It is interesting how users will determine *Polytrichum alpinum* if this genus is keyed by “leaf margin entire”.

The fifth chapter “Genera and species description of mosses reported from the South Shetland Islands” is the largest one in the book and presents the taxonomic treatment of the moss taxa reported from this archipelago. Unfortunately, not all species known to occur in this island group are considered, and such species as *Bryoerythrophyllum recurvirostrum*, *Dicranella hookeri*, *Encalypta procera*, *Funaria hygrometrica*, *Grimmia plagiopodia*, *Isopterygiopsis pulchella*, *Leptobryum pyriforme*, *Notoligotrichum trichodon*, *Philonotis gourdonii*, *Sarconeurum glaciale* and *Schizymenium pusillum*, which are known to occur on various islands in the South Shetlands, are not discussed or even mentioned at all.

The taxonomic treatment provides descriptions of genera and species, although for several genera (e.g., *Ditrichum*, *Hypnum*, *Muelleriella*, *Sanionia* and *Warnstorfia*) the descriptions are missing and only taxonomic discussion is available. The descriptions of some species (e.g., *Holodontium strictum*, *Hypnum revolutum*, *Meesia uliginosa*, *Orthotheciella varia*, *Platydictya jungermannioides* and *Racomitrium sudeticum*) are copied verbatim from Ochyra’s (1998) *The Moss Flora of King George Island, Antarctica* and the descriptions of additional numerous species (e.g., *Anisothecium cardotii*, *Didymodon gelidus*, *Ditrichum hyalinum*, *D. lewis-smithii*, *Grimmia reflexidens*, *Muelleriella crassifolia*, *Schistidium antarctici*, *S. cupulare*, *S. falcatum*, *S. halinae*, *S. rivulare*, *S. steerei* and *S. urnulaceum*) are only slightly modified in wording, usu-

ally by the simple change of some terms (e.g., “plants” for “shoots”), the deletion of some parts of the descriptions, usually some “weasel words” like “mostly”, “rather”, and/or making the measurements even. It can be easily proved that in a similar way the authors accommodated descriptions of *Polytrichum* species from Greene’s (1973) and *Racomitrium pachydietyon* from Bell’s (1973) treatments of these taxa for *A Synoptic Flora of South Georgian Mosses*. This is an unprecedented example of plagiarism in the bryological literature. In total, 30 genera belonging to 15 families and 67 species and two varieties are recognised. Two species, *Andreaea acuminata* and *Racomitrium pachydietyon*, are reported as new to the Antarctic. The former is reported from King George Island on the basis of the material collected in 1989 and it is odd why this distinct and easily distinguished species had not been considered by the authors in their work on the island’s moss flora of 1990, since most collections cited there were made in 1989.

The only taxonomic and nomenclatural novelty is the reduction of *Sanionia georgicoun-cinata* to a variety of *S. uncinata*. However, the resulting new combination is invalidly published because the basionym is not cited in full, but, even so, it would be illegitimate because the correct name for this taxon at the varietal level is var. *polare*. It is also worth noting the unique suggestion of transferring *Campylopus* to the Ditrichaceae (p. 82). *Ceratodon antarcticus* and *C. grossiretis* are recognised as distinct species, while *C. purpureus* has not been recorded by the authors at all, despite its description being given. Likewise, *Bryum urbanskyi* is here treated as a species in its own right, although the type material from Îles Kerguelen is actually *Bryum dichotomum* and the Antarctic plants so named represent *B. pseudotriquetrum*.

Ecological data are given only for selected species and they are lacking for species of *Brachythecium*, *Syntrichia*, *Bartramia patens*, *Bryum amblyodon*, *B. argenteum*, *B. pseudotriquetrum*, *Muelleriella crassifolia* and *Racomitrium sudeticum*. Only about 150 examined specimens are cited and nowhere is it stated that these could be selected ones. Thus, it is not a particularly impressive basis for a flora of such a large area as Antarctica or even the South Shetland Islands themselves.

Comparison of the distributional data in the systematic part based on the specimens studied with those presented in the list on pp. 33–40 and in Table 8 on pp. 41–42 exhibits great discrepancies with regard to the distribution of the species concerned on particular islands in the South Shetlands and this brings their reliability into question. It is sufficient here to provide some examples. *Platydictya jungermannioides*, *Racomitrium sudeticum*, *Schistidium halinae*, *S. occultum* and *S. steerei* are recorded **only** from King George Island in Table 8, whereas in the systematic part they are all cited **only** from Rip Point on Nelson Island. *Schistidium cupulare* is cited as occurring only on King George Island on p. 37, then it is recorded from King George Island and Livingston Island in Table 8, but on p. 98 only the specimen from Nelson Island is quoted. *Bryum dichotomum* is recorded from Deception Island in the lists on pp. 28 and 34, from Elephant Island, King George Island and Deception Island in Table 8, whereas in the taxonomic treatment on p. 72 only two specimens from King George Island are cited. *Orthotrichum rupestre* is indicated to occur only on the Antarctic Continent (Antarctic Peninsula) on pp. 40 and 105, whereas in Table 8 it is recorded from Eadie Island and Aspland Island in the South Shetlands. *Ditrichum hyalinum* is recorded from King George Island in Table 8 and only from Deception Island in the text on p. 90. *Dicranoweisia crispula* is recorded from Nelson Island on p. 119 but according to Table 8 it also occurs on King George Island, Livingston Island and Deception Island. The most enigmatic inconsistency is the report of *Racomitrium pachydietyon*, which is cited from Nelson Island on p. 94 but is absent from the list of species on pp. 36–37 and from Table 8. Interestingly, in this table *R. ptychophyllum* is recorded from King George Island, but then this species is nowhere mentioned in the text. It is hard to imagine it could be a simple misprint!

From checking the specimens examined by the authors it has become evident that Rip Point on the north coast of Nelson Island, opposite the Fildes Peninsula on King George Island, has an

exceptional concentration of the Antarctic moss rarities. The authors report from this small area no fewer than a dozen of the rarest Antarctic moss species including *Bryum orbiculatifolium*, *Conostomum magellanicum*, *Orthotheciella varia*, *Racomitrium pachydictyon*, *R. sudeticum*, *Schistidium amblyophyllum*, *S. cupulare*, *S. halinae*, *S. occultum* and *S. steerei*. This area was explored bryologically by D.C. Lindsay, a good English lichenologist and effective collector, who found there only about a dozen quite ubiquitous moss species.

Some 60 species are illustrated with line drawings assembled in 36 plates. They are without exception very crude and certainly not useful for determination. The illustrations of some details appear to be inaccurate and incorrect. For example, cross-sections of the costa of *Ceratodon grossiretis* and *C. antarcticus* indicate a large central stereid band and large epidermal cells on both the ventral and dorsal sides of the costa. This costa structure is rather typical for *Bryum*, not *Ceratodon* in which there is a distinct median row of large guide cells separating dorsal and ventral stereid bands, the latter being sometimes greatly reduced to lacking. The habit of some species is also illustrated with colour photographs but these are mostly not of good quality. One of them presents *Polytrichum piliferum* in fine fruiting condition which is curious because on p. 108 the authors state that this species was “not found fertile by us”. The species is indeed almost always sterile in the Antarctic and so far, of 90 specimens studied in various world herbaria, only a single population from Cierva Point on the Danco Coast has a few, mostly aborted, capsules. Those presented in the picture in this book appear to be well-developed. Alas, the authors do not indicate where they took this photograph.

In the last three sections of the book a short glossary of the most important terms used in the text, an index of species names and references are presented. The set of references is quite curious as well because it consists of about 225 items, about 90 of which (40%) are not cited in the text. On the other hand, there are a dozen or so publications quoted in the text which are absent from “References”. Some of them are very important, for example the treatment of the Musci by W. Wilson and J. D. Hooker (junior) of 1847 in *Flora antarctica*. Another famous paper of these authors of 1844 entitled *Musci antarctici*, which is the first account of Antarctic mosses, is not cited at all. It was probably mistaken by the authors for a paper by W. J. Hooker (senior) and W. Wilson which had also been published in 1844 but dealt with ... Brazilian mosses. The authors have copied verbatim from the aforementioned *The Moss Flora of King George Island, Antarctica*, all publications by Ochyra, including those in various co-authorships, from 1984b to 1999b, and retained the same literal designations for different works published in the same year despite the fact that many of them had not been quoted in the text. Nor have bibliographic data been supplemented for papers which are indicated to be “in press” in the book and which were published early in 1999. One paper on *Bryum dichotomum* in the Antarctic is cited twice; first, it is ascribed to H. Ochi alone and indicated as published in 1985 and, next, it is ascribed to H. Ochi and R. Ochyra and shown to have been published in 1986. Some items are cited in very curious ways, for instance “DRYG, 1906. Dutsch. **Südpolar Exped.** 8: 98”. This certainly refers to the paper by V. F. Brotherus of 1906 in which he presented the bryological results of the German South Polar Expedition of 1901–1903 under the command of Erich D. von Drygalski.

All the aforementioned errors, shortcomings and failures of the book are only illustrative but they should suffice to show the low scientific standard of this publication. It is a very obscure treatment which not only does not provide any new and/or original information on Antarctic mosses, but fails to consider or simply distorts many data existing in the literature. It is an exceptional example of a lack of scientific solidity and competence which is very misleading and confusing for any would-be users who are not closely familiar with austral polar mosses. In fact publications of this sort may well do more harm than good.

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