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Studies on some Australian pottiaceous mosses

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Abstract. *Chionoloma bombayense* (Müll. Hal.) P. Sollm. [syn. *Pseudosymblepharis bombayensis* (Müll. Hal.) P. Sollm.] and *Syntrichia serrata* (Dixon) R.H. Zander are reported new for Australia. *Barbula hampeana* Paris is identical with *Barbula hornschuchiana* Schultz. *Pottia tasmanica* Broth. and *Pottia brevicaulis* (Taylor) Müll. Hal. are considered new synonyms of *Microbryum starkeanum* (Hedw.) R.H. Zander. Comments on a nomen nudum, *Tortula brachytheca* Burchard, are given.

Over the last few years the author identified many Australian Pottiales, mainly from herbarium Canberra (CANB) with a set of duplicates in Leiden. In this regard, various type materials were also studied.

(1) *Chionoloma bombayense* (Müll. Hal.) P. Sollm. [syn. *Pseudosymblepharis bombayensis* (Müll. Hal.) P. Sollm.]

Till now, only 5 collections of this taxon were studied from Australia. All material seen was rather short leaved and non-fruiting. For a discussion of the observed morphological variation within *Chionoloma (Pseudosymblepharis)* in Asia, see Sollman (2000, 2001).

The following collections were studied from Australia:

New South Wales, Weeping Rocks, New England National Park, 72 km E of Armidale, *Nothofagus-Elaeocarpus* dominated forest at base of escarpment, on wet shaded rock face, 30°30'S, 152°24' E, alt 1400 m, 17 Aug. 1993, *H. Streimann 52013*, det. Ph. Sollman, 1994, dupl. L (in hb as *Tortella cirrhata* Broth.).

New South Wales, Williams River, Barrington Tops National Park, 35 km NW Dungog, disturbed wet sclerophyll forest with *Casuarina* in steep valley, on semi-exposed rock, 32°09'S, 151°31' E, alt 320 m, 16 April 1998, *H. Streimann 60427*, det. Ph. Sollman, Oct. 2000, dupl. L.

Queensland, Atherton, Great Dividing Range, summit east of Atherton, on exposed bark of tall tree in (low) rainforest, alt c. 1250 m, 31 July 1968, *B.O. van Zanten 68.1284* and *68.1289-B*, det. Ph. Sollman, 1991 and 1992, hb. GRO.

(2) *Barbula subcalycina* Müll. Hal.

Australian collections belonging to

Barbula subcalycina have sometimes been misidentified as *Chionoloma*, especially the more elongated forms. In fact, the first reported record for Australia (Streimann & Touw 1981: 261 as *Pseudosymblepharis subduriuscula*), based on *H. Streimann 3197*, belongs to *Barbula subcalycina*. I agree with Stone (1991: 266) that this material belongs to an elongated form of *Barbula subcalycina.*

The best gametophytic characters for separating *Barbula subcalycina* from species of *Chionoloma* are:

1. The back of the costa is essentially smooth in *Chionoloma*, but papillose in *Barbula subcalycina*, especially on the upper leaves.
2. In *Chionoloma* a central strand is commonly lacking (sometimes very weakly present) in the stem cross-section, especially in the older parts of the stem. In *Barbula subcalycina* a central strand is generally clearly present. See also Stone (1991: 265).
3. Dry plants are loosely crisped in *Chionoloma*, especially in larger plants. In *Barbula subcalycina* the leaves are contorted and wound around the stem in a cork-screw way.
4. The general leaf outline between the two taxa is usually different. In *Barbula subcalycina* the leaf apex is commonly quite obtuse and rounded. In *Chionoloma* the apex region is commonly more gradually tapering to mostly a small acute apex.
5. The papillae of medial leaf cells in *Barbula subcalycina* are many, dense, pronounced, rather massive and obscuring the lumen, while the leaf cell papillae in *Chionoloma* are many, but fine and tiny, and far less pronounced.
6. The leaf base of *Barbula subcalycina* has thin walled, whitish cells, sometimes with some faint (more or less yellowish) tinge. The transition from the basal smooth leaf cells to the papillose and greenish upper laminal cells is rather abrupt. In *Chionoloma* the yellowish and transitional basal leaf cells are often present, especially in larger plants. They are rather thick walled, elongated, often more or less sinuose in outline. The leaf base is commonly sheathing or, at least expanded, and more gradually tapering towards leaf apex. A weakly demarcated border that ascends obliquely towards the leaf margins is often present, especially in larger plants. In smaller plants of *Chionoloma* the border is weakly expressed to absent. In *Barbula subcalycina* there is no trace of any bordering along the lower leaf margins.
7. The habitats of the two tend to differ. *Chionoloma* mostly grows in more natural habitats in (sub) tropical areas, such as rainforests, especially on rocks, boulders, wood, but can also grow terrestrially. *Barbula subcalycina* usually grows in more rural, open, sandy to clayish, loamy (muddy) habitats.

Smaller plants of *Calymperastrum latifolium* (Hampe) I.G. Stone can resemble *Chionoloma* superficially. However, they are likely not closely related. This former species is well described, discussed and illustrated by Stone (1985) and Zander (1993).

(3) *Syntrichia serrata* (Dixon) R.H. Zander

This taxon is reported new to Australia based on the following specimen:

Tasmania, Croceus Cave State Reserve, 21 km WSW of Chudleigh, wet sclerophyll forest at base of limestone cliff, on semi-exposed boulders, forming large colonies, non-fruiting, 41°33'S, 146°14'E, alt 320 m, 12 May 1997, *H. Streimann 59750*, det. Ph. Sollman, Oct. 2000, conf. R.H. Zander, 2001, hb. CANB; L, BUF (in herb. as *Barbula calycina* Schwägr.).

Lightowlers (1985: 373) considered *Syntrichia serrata* (as *Tortula serrata* Dixon) different from *Tortula serrulata* Hook. & Grev. He examined type material for both taxa. Sainsbury (1955: 191), however, considered both taxa as identical. It is not clear to me whether Sainsbury (l.c.) studied and compared the original material of both taxa. I follow here the taxonomic decision of Lightowlers (1985). Since Lightowlers (1985: 374) considered *Tortula serrata* as endemic for New Zealand, the report here is therefore new to Australia. Interestingly, Fife (1995: 323 as *Hennediella;* see also p. 329 (*ibid*) *Syntrichia* and p. 330 (*ibid*) *Tortula)* did not indicate *Syntrichia serrata* as a NZ endemic.

Syntrichia serrata is well illustrated in Zander (1993: 268, plate III, fig. 13-16). I also studied this taxon in the field in New Zealand. This species commonly has fragile leaves (Beever *et al.* 1992: 74; Sainsbury 1955: 191).

Misidentification of *Syntrichia serrata*

is possible, especially with *Tortula robusta* Hook. & Grev. and also with *Tortula rubra* Mitt. in Hook. f. Australian collections called *Tortula robusta* and/or *Tortula serrulata* (see especially Streimann & Curnow 1989: 376, 377) should be checked under the names of *Syntrichia serrata* or *S. rubra* (Mitt.) R.H. Zander. Scott and Stone (1976: 192) did not see any Australian material labelled *Tortula robusta* or *Tortula serrulata.*

Selected New Zealand collections studied:

South Island, Mitchells Track Port Hills, Banks Peninsula, alt 420 m, on moist volcanic rock ledges, in dense remnant bush, non-fruiting, 17 April 1980, *J.A. Elix 80-39*, det. Ph. Sollman, 1988-1997, hb. CANB, NICH, H, NY, FH, L.

North Island, Lake Waikaremoana, Hopuruahine Landing, on tree stems in native forest, shade, alt c. 600 m, 28 Aug. 1968, *B.O. van Zanten 68.1880* (non-fruiting), *68.1883-A*, (fruiting), hb. GRO.

North Island, Hawke's Bay, Tangoio Reserve, on trees in native forest, alt c. 100 m, 21 Oct. 1959, *B.O. van Zanten 1215* (non-fruiting), hb. GRO.

(3) *Barbula hornschuchiana* Schultz

Barbula hampeana Paris, Index Bryol. 76. 1894, *syn. nov.* = *Barbula brachyphylla* Hampe, Linnaea 30: 625, 626, 1860, *hom. illeg.*; *Tortula brachyphylla* Mitt., Trans. & Proc. Royal Soc. Victoria 19: 60. 1882 [1883], fide Wijk *et al.* (1959-1969).

1. The protologue for *Barbula brachyphylla* Hampe (Hampe 1860: 625-626) cited no collection(s). However, it described fruiting plants. The new taxon was compared with *Barbula convoluta* Hedw. and *Barbula torquata* Taylor. Watts & Whitelegge (1902: 70) gave two collections, as follows: "Vic., Gippsland: FvM (= F. von Mueller) '55 [year 1855]; Tas.: teste FvM, Fragm. Phyt. XI, Suppl. (*B. brachyphylla*)". The introduction of the protologue (Hampe 1860) gave no additional clues either. However, in this paper several new taxa were described from Gippsland based on collections dated 1855, often also with a number.

2. Herbarium Melbourne has a specimen sheet (MEL 100.547.9, hb. F. von Mueller!) that contains four small packets. In two of these packets are the original material of *Desmatodon adustus* Mitt.; they are with the number 78 and the year 1855. The four packets contain identical plants, all fruiting, and belong to *Barbula hornschuchiana* Schultz. All packets are from Gippsland. This material was also studied by J.H. Willis (see below). Judging from the notes present on the packets and also the exclamation marks, *Barbula brachyphylla* Hampe and *Desmatodon adustus* Mitt. are considered as identical.

3. This collection numbered 78 in herb. F. von Mueller and also dated 1855 was apparently used to describe several new taxa. Compare here especially the text in Catcheside's flora (1980: 178-180).

4. Another Melbourne collection (MEL 101.583.8!) is also of some relevance to the present case. The specimen has also the information - "J.H. Willis Australian Reference Set". This collection, among other things, contains one packet with the same data as above: no. 78, year 1855, Gippsland, F. von Mueller. The data was written in the characteristic and nice handwriting of J.H. Willis. The packet contains also fruiting plants. Willis had considered *Desmatodon adustus* Mitt. identical with *Barbula brachyphylla* Hampe, *Barbula subspiralis* Hampe and *Barbula hampeana* Paris.

5. In conclusion, I consider the material present in F. von Mueller's herbarium (MEL 100.547.9!) as probably the duplicate of the original material of *Barbula brachyphylla* Hampe. The plants are identical with *Barbula hornschuchiana* Schultz.

(4) *Gymnostomum brevicaule* Taylor = *Microbryum starkeanum* (Hedw.) R.H. Zander

Gymnostomum brevicaule Taylor, London J. Bot. 5: 42. 1846; *Pottia brevicaulis* (Taylor) Müll. Hal., Syn. 1: 556. 1849; *Microbryum brevicaule* (Taylor) R.H. Zander, Genera of the Pottiaceae: Mosses of Harsh Environment 240. 1993, *syn. nov.* Types: (W. Australia), Swan River, 1843, *J. Drummond* (*11*), herb. Hooker, BM 55.60.60!, 55.60.61!

Several collections of this taxon from the type locality were carefully studied. All the materials are identical. There are, however, larger

and smaller plants present among the materials. Scott and Stone (1976: 172) suggested that perhaps a mixture was involved. They referred to personal communications with D. Chamberlain (U.K.).

However, after studying the type collection of *Gymnostomum brevicaule*, I agree with Willis (1954) and also with the notes by Hooker ('conf. *Pottia minutula* var. o*blonga')* that the plants belong to the *Pottia davalliana/ starkeana* group. The costa is consistently not broader above mid leaf. Following the treatment of Ros *et al.* (1996), I consider the type material as belonging to *Pottia starkeana* (Hedw.) Müll. Hal., recently treated as a *Microbryum* species by Zander (1993).

I also realized that the figures, text and key characters of *Pottia tasmanica* in Catcheside's flora (1980: 128, fig. 53) are different from that in Zander (1993: 238, figs. 12-15, as *Microbryum*). In my opinion, it is well possible that Catcheside's interpretation of this taxon (in his flora) represents extreme material belonging to *Desmatodon convolutus* (Brid.) Grout. Very likely, Catcheside (l.c.) had not examined the original material. Moreover, the variation present in *Desmatodon convolutus* can be considerable. Compare here especially the works of Flowers (1973: 194) and Magill (1981: 210). Husnot (1884-1894: 96) gave, in addition, a variety *edentula* Schimp.

(5) *Pottia tasmanica* Broth. = *Microbryum starkeanum* (Hedw.) R.H. Zander

Pottia tasmanica Broth., Oefv. Finsk. Vet. Soc. Foerh. 36: 159. 1895, *syn. nov.* Type: (Australia), Tasmania, River Jordan, prope Brighton, ad terram, fruiting, 15 June 1892, *W.A. Weymouth no. 1129*, det. Brotherus, ex hb. Hobart, hb. FH, hb. M. Fleischer!, holotype.

Only one collection was available for study. The peristome of this material consists of only short stumps. Spores from ripe (brown) capsules were studied. They have a knobby outline. The plants fit rather easily the concept of *Pottia starkeana* (Hedw.) Müll. Hal., especially as discussed by Ros *et al.* (1996).

Although Warnstorf (1916: 147-148) stated that the costa of *Pottia tasmanica* becomes broader towards apex, I have not observed this feature in the type material.

(5) *Tortula brachytheca* Burchard = *Tortula antarctica* (Hampe) Wilson in Hook. f.

Tortula brachytheca Burchard, Pap. & Proc. Royal Soc. Tasmania 87: 86. 1953, *nom. nud.*

According to the authors of Index Muscorum (Wijk *et al.* 1959-1969: 75) this name is a *nom. nud.* However, this was not indicated as such in Streimann and Curnow (1989: 371). I studied only one collection gathered from the original locality, as follows:

Australia, Tasmania, Tasman Peninsula, East Coast, on sandy bank of the Creek on beach, Eagle Hawk Neck, fruiting, 43°01'S, 147°55'E, 29 Oct. 1889, *W.A. Weymouth 2877*, ex Tasmanian Herbarium Hobart, det. H.N. Dixon as *Tortula princeps*, MEL 205. 472.0!

This collection agrees rather well with the data presented for this taxon in Sainsbury (1953: 86). I consider this material to belong to *Tortula antarctica* (Hampe) Wilson in Hook.f. It is of interest that the type material of *Barbula brachytricha* Müll. Hal. was collected from the same locality, on the same day, also by W.A. Weymouth and was considered by Kramer (1988: 92) as *Tortula antarctica.*

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