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Studies on *Barbula tenuirostris* Brid. [replaces *Barbula consanguinea* (Thwaites & Mitt.) A. Jaeger sensu A. Eddy]

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Abstract. Twelve taxa are proposed as new synonyms of *Barbula tenuirostris* Brid. Two nomina nuda also belong here. *Barbula tenuirostris* is compared with the most closely related taxa in Asia. *Barbula anceps* Cardot is *Barbula arcuata* Griff. A lectotype is selected for *Barbula scleromitra* Besch.

Introduction

This is the second and last paper on (mainly Asian) taxa that belong to the species that often (following Eddy, 1990) has been called *Barbula consanguinea*. In my first paper (Sollman, 2000), I still used that name. Saito (1975: 495) has studied the holotype of *B. consanguinea* (Thwaites & Mitt.) A. Jaeger and concluded it to belong to *Barbula javanica* Dozy & Molk., and after my study of the holotype, I agree with him. Thus *B. consanguinea* should not any more be used for the species under consideration, sensu Eddy. It appears that *B. tenuirostris* Brid. is the oldest name for this species.

Seen in this context, I also studied various, mainly Asian, taxa in the *Barbula* Hedw. sect. *Hydrogonium* (Müll. Hal.) K. Saito. I find the character differences among and between the taxa cited below, too small and too variably

expressed, to treat them as distinct at the species level.

All author citations in botanical names follow Brummitt and Powell (1992).

The oldest name available is:

***Barbula tenuirostris* Brid.**, Bryol. Univ. 1: 826. 1827.

Tortula angustifolia Hook. & Grev., Edinb. J. Sc. 1: 298. 1824.

Barbula angustifolia (Hook. & Grev.) Müll. Hal., Syn. 1: 603. 1849, hom. illeg. non. Brid. 1826.

Type: Nepal, Wallich, fruiting, hb. Hooker, BM! Notes.

1. Wilson annotated the above collection „closely allied to *T. (Tortula) flavicans* (capsule not seen)“.

2. All materials from hb. BM named *Barbula*

(*Tortula*) *angustifolia* that I studied are identical. Axillary gemmae are constantly present.

New Synonyms of *Barbula tenuirostris* Brid.

The following names are proposed as new synonyms of *Barbula tenuirostris* Brid. They are listed in chronological order of the publications.

***Barbula sordida* Besch.**, Bull. Soc. Bot. France 41: 80. 1894. *syn. nov.*

Hydrogonium sordidum (Besch.) P.C. Chen, Hedwigia 80: 239. 1941.

Type: (Vietnam), Annam, Prov. de Hanoi, Vo-xa, in mont. Chua Hac, fruiting, with gemmae, 25 Jan 1888, H. Bon 3615, hb. Bescherelle, PC (holo!).

Note.

1. According to Chen (1941: 239 this taxon is very near *Barbula consanguinea* (Thwaites & Mitt.) A. Jaeger.

***Barbula scleromitra* Besch.**, Bull. Soc. Bot. France: 81, 1894. *syn. nov.*

Type: Vietnam (Nord), Prov. de la Ha Noi, Kien Khê, fruiting, with gemmae, 14 Sep 1887, R.P. 3315, H. Bon, det. Bescherelle, PC (lecto!, selected here).

Notes.

1. The protologue mentions two collections without indicating a holotype.

2. In the above material, very interesting capsule shape variation is present, varying from about cylindrical to more or less cupiform.

***Barbula majuscula* Müll. Hal.**, Nuov. Giorn. Bot. Ital. n. ser. 5: 182. 1898. *syn. nov.*

Hydrogonium majusculum (Müll. Hal.) P.C. Chen, Hedwigia 80: 242. 1941.

Type: China interior, Prov. Schen-si-mer, prope Shan-gen-ze, in alveo fluminis Lao-y-huo, non fruiting, with gemmae, 15 Mar 1897, J. Giraldi, det. Müll. Hal. no. 1825, Bryotheca E. Levier, BM (iso!).

***Barbula subcomosa* Broth.**, Hedwigia 38: 211. 1899. *syn. nov.*

Hydrogonium subcomosum (Broth.) P.C. Chen, Hedwigia 80: 236. 1941.

Type: Japan, Kiushiu, Kanagawa, ad rupes, fruiting, with gemmae, 7 Oct 1860, Wichura 1400, BM (iso!).

Notes.

1. The holotype in hb. H-BR. was not available for study.

2. Although Chen (l.c. p. 237) gave Wichura 1400-a as type, the protologue stated only Wichura 1400.

3. Wichura 1400-a at hb. S-G. Roth was studied. This collection also belongs here.

4. Wichura 1400-b (hb. H-BR.) was also examined. This material is also *Barbula tenuirostris*.

5. Some capsules in the type material are somewhat asymmetrical.

***Barbula louisiadum* Broth.**, Öfv. Finska Vet. Soc. Förh. 42: 97-98. 1899 (1900).

Hydrogonium louisiadum (Broth.) W. Schultze Motel, Willdenowia 7: 55. 1973.

Type: (Louisiane Arch.), Louisiades, Russel Island, ad terram, non fruiting, with gemmae, Apr 1898, W. Micholitz s.n., hb. Brotherus, H (no. 027.60.02, holo!).

Notes.

1. This collection was annotated by D.H. Norris (May 1986) as *Barbula subcomosa* Broth. See also Norris & Koponen (1989: 119).

2. Eddy (1990: 178) placed this taxon into the synonymy of *Barbula consanguinea*.

***Barbula obtusissima* Broth. & Paris**, Oefv. Finsk. Vet. Soc. Foerh. 48: 11. 1906. hom. illeg. non Müll. Hal. 1849. *syn. nov.*

Didymodon obtusissimus Broth., Nat. Pfl. ed. 2, 11: 528. 1925, hom. illeg. non Broth. 1921.

Type: Nova Caledonia, ad amnem Dumbea, ad terram, non fruiting, with gemmae, 10. 1904, Leg. Le Rat (25), hb. H-BR (no. 12. 92. 003, holo!).

***Barbula yunnanensis* Copp.**, Bull. Séanc. Soc. Sci. Nancy 3, 12 (4): 15. 1911. *syn. nov.*

Type: (China), Yunnan, fruiting, with gemmae, 1910, leg. R.P. Maire s.n., comm. G. Bonati, hb. A. Coppey, in hb. J. Cardot, PC (iso!).

Note.

1. I consider the collection above as the isotype material. No fruiting plants were present. According to the protologue, at least some fruiting material should be present. For the rest, the material agrees well with the protologue.

***Barbula lobayensis* R.S. Williams**, Bull. Torrey Bot. Club 42: 573. 1915. *syn. nov.*

Type: Philippines, Luzon, Tayabas Prov., Lobayat, on earth, fruiting, with gemmae, May 1909, J.B. Leiberger 1258, NY (holo!).

Notes.

1. The citation of the type collection in Norris and Koponen (1989: 119) is not quite correct. These authors placed this taxon into synonymy of *Barbula subcomosa* Broth. and I agree with them.

2. The type material (above) contains a note – likely in the hand writing of R.S. Williams – ‘near *B. (Barbula) consanguinea*, but leaves more pointed’.

***Barbula dharvarensis* Dixon**, J. Indian Bot. 2: 182–183. 1921. *syn. nov.*

Type: (India), Nigadi, 7 miles W. of Dharwa (W. Ghats), non fruiting, with gemmae, earth bank, in compound of resthouse, 1919, L.J. Sedgwick, hb. Dixon, ref. no. 5703, BM (holo!).

Notes.

1. The plants in the type packet are in a bad condition.

2. A few non-type collections bearing the same name were studied; they proved to belong to other taxa, e.g. *Barbula javanica* Dozy & Molke and *Trichostomum* sp.

3. In the protologue the species epithet was written as „dharwanensis“.

***Trichostomum birmense* Broth. in Brühl.**, Rec. Bot. Surv. India 13 (1): 128. 1931. *nom. nud.*

Material studied: (Burma), Birmania sup., Maymyo, Wetvin Hill, (near Mandalay), on rock, with gemmae, 2775 ft, 13 Dec 1923, R. Sarup s.n., det. Brotherus, no. 5667, BM!

Note.

1. This collection is here referred to *Barbula tenuirostris*.

***Barbula subdenticulata* Dixon**, J. Siam Soc. Nat. Hist. Suppl. 9 (1): 17–18. 1932. *syn. nov.*

Type: (Thailand), Siam, Udawn, Loi Wang, Supung, on rocks in deciduous forest, by stream, fruiting, with gemmae, alt. c. 300 m., Mar 1924, A.F.G. Kerr (78), hb. Dixon, BM!

***Barbula obscuriretis* Dixon**, J. Siam Soc. Nat. Hist. Suppl. 9: 18. 1932.

Type: (Thailand), Siam, Payap, Doi Sutep, old plaster wall, fruiting, c. 600 m., 13 Nov 1922, A.F.G. Kerr (34), hb. Dixon, BM.

Note.

1. This taxon was placed into synonymy of *Barbula consanguinea* by Eddy (1990: 178). I have studied only the non type materials named *Barbula obscuriretis*. *Barbula obscuriretis* is here treated as *Barbula tenuirostris* Brid.

***Hydrogonium hygrophilum* Hilp.**, Beih. Bot. Centralbl. 50 (2): 629–630. 1933. *nom. nud.*

Material: (Sri Lanka), Ceylon, Perandeniya, im bot. Garten an Wasserrinnen, non fruiting, with gemmae, 800 m., 8 Feb 1898, M. Fleischer, Musci Frond. Archipelagi Indici et Polynesiaci: Serie X (no. 451–500), 1908, no. 461, L!

Note.

1. This collection is here referred to *Barbula tenuirostris*.

***Barbula incerta* Dixon**, Proc. Royal Soc. Queensland 53 (2): 29–30. 1942. *hom. illeg. non Schumacher 1803, nec (Mitt.) Paris 1900. syn. nov.*

Type: (Australia, Queensland), Atherton, Prior Creek, non fruiting, with gemmae, 17 Dec 1938, coll. H. Flecker 5423, hb. Dixon, BM, holo!

Note.

1. Only two collections bearing this name were available for study.

***Trichostomum philippinense* Z. Iwats. & B.C. Tan**, Kalikasan, Philipp. J. Bot. 8 (2): 195. 1979. *syn. nov.*

Trichostomum brevifolium E.B. Bartram, Philipp. J. Sci. 87: 277–278. 1859. *hom. illeg. non Sendtn. ex Müll. Hal. 1849.*

Trichostomum bartramii Z. Iwats. & B.C. Tan, Misc. Bryol. Lichénol. 7: 7. 1977. *hom. illeg. non H.A. Mill. 1967.*

Type: Philippines, Luzon, Ilocos Sur Prov., Tirad Pass, Mt. Tirad, Sitio Sisim, Barrio Mabatana, Conception, through secondary forest, on rock, non fruiting, with gemmae, s. alt., 7 May 1953, J.V. Santos 5701, det. E.B. Bartram, FH (holo!).

Note.

1. There is an annotation made by B.C. Tan in 1984, „this is better placed in *Barbula* close to

B. obscuriretis Dix.“. I agree with him.

***Barbula flavicans* D.G. Long**, J. of Bryology 18: 356. 1994. *syn. nov.*

Tortula flavescens Hook. & Grev., Edinb. J. Sc. 1: 297. 1824. hom. illeg. nec *Tortula flavescens* (With.) P. Beauv. 1805, non *Tortula flavescens* Brid. 1806; *Barbula flavescens* (Hook. & Grev.) Brid., Bryol. Univ. 1: 831. 1826. hom. illeg. non Roehling 1813; *Tortula fuscescens* Hook. & Grev. in Wallich, Num. List Herb. E. Ind. Comp. no. 7567, 1832, *nom. nud.* (orthographical error for *T. flavescens* Hook. & Grev.); *Barbula fuscescens* Müll. Hal. Syn. Musc. 1: 831. 1849, *nom. inval.* (art. 34. 1.).

Type: ‘Nepal, Wallich, BM!’.

Notes.

1. For relevant literature, see especially Townsend (1993: 672) and Long (1994: 356–357).
- 2., All the *Barbula (Tortula) flavescens* and *Barbula (Tortula) fuscescens* collections at hb. BM, that I studied – in total 13 numbers – including material from the hb. Hooker, are identical. They all bear axillary gemmae. All these collections are referred here to *Barbula tenuirostris* Brid.

Taxa not available for study

***Semibarbula ranuii* Gangulee**, Nova Hedwigia 8: 148. 1964.

Type: India, Ranchi Distr., prope cataractus near Hudru Falls, in regio Chotanagpur, Presidency College, fruiting, Oct 1956, Gangulee 2400, CAL (holo).

Notes.

1. The type collection in hb. CAL was not available for study. Apparently no duplicates of this taxon were distributed.
2. Judging from the protologue (including plates), this taxon is very likely identical with *Barbula tenuirostris* Brid.

Other related taxa

***Barbula seramensis* H. Akiyama**

Recently, Akiyama (1996) described, illustrated and discussed a new species, *Barbula seramensis* H. Akiyama, which is related to the rather variable *Barbula tenuirostris* Brid. Seen

in this context, I have checked the types of taxa cited above and none of these match the new species of Akiyama. I conclude that *Barbula seramensis* is a rather clear cut taxon next to *Barbula tenuirostris* Brid.

While working with unnamed or partially named Pottiales material made on loan from the herbarium at New York Botanical Garden, I came across three collections which I had annotated in October 2003 as belonging to *Barbula seramensis*. These plants fit well the text, figure and key characters presented in Akiyama (1996). No axillary gemmae were found in these materials.

The data for these additional materials of *Barbula seramensis* are as follows:

- (1) Indonesia, Java, Buitenzorg, fruiting, s. date, Kurz 919. 916, mixed with *Hyophila involuta* and *Bryum* (hb. NY);
- (2) Indonesia, Java Occid., Prov. Preanger, Tjipeum, Bandung, Halioven waterfall, fruiting, c. 500 m., Sm. Harsar s.n., 27 Feb. 1913 (hb. NY);
- (3) Indonesia, Java, Pasangrahan, Kamodjan, c. 200 m., fruiting, M. Fleischer (54), 6 June 1913, with *Weissia*, *Philonotis* and others (hb. NY).

***Barbula sumatrana* Baumgartner & Dixon**

This taxon seems to be known only from the type locality. For this paper, the type material of *Barbula sumatrana* Baumgartner and Dixon was also studied. The data for the type collection are as follows: (Indonesia), Sumatra, prope Padang, fontes calcarei, ad lacum media Singkarak, non fruiting, c. 400 m., 6 Mar 1929, coll. C.F. Rutner 4A, comm. J. Baumgartner, hb. Dixon, BM!

Furthermore, I came across in the loan material from hb. NY a Griffith's collection which was badly labelled: „Tortuloides ubiquo on banks“, s. date, Griffith no. 125. 147, in hb. W. Mitten, NY. This material was compared with the type of *Barbula sumatrana*. They match well. Mixed in this collection are several plants of *Barbula arcuata* Griff., fruiting and with gemmae. Very likely the plants of this collection come from the Indian Himalayas, near Simla. The nearest Griffith number I found is no. 129, which was collected near Simla (India). As such, *Barbula sumatrana* looks to be more widespread than was thought.

Table 1.**Gametophytic character differences between *Barbula tenuirostris*, *Barbula seramensis* and *Barbula sumatrana*.**

<i>B. tenuirostris</i>	<i>B. seramensis</i>	<i>B. sumatrana</i>
Upper part of the lamina commonly <i>flat</i> to weakly, widely incurvate	Upper part of the lamina commonly rather <i>hollow</i> , to about tubulose (in some leaves)	Upper part of the lamina <i>hollow</i>
Leaf margins <i>plane</i> in upper part of the leaves	Leaf margins often <i>involute</i> in the upper part of the leaves	Leaf margins <i>recurved</i> from above base to $\frac{3}{4}$ or $\frac{4}{5}$ of the leaf length
Axillary gemmae constantly <i>present</i> , although sometimes scarce	Axillary gemmae not known	Axillary gemmae not known
When moist, leaf apex region <i>straight</i> or nearly so	When moist, leaf apex often curved to <i>hooked</i> (hamate)	When moist, leaf apex often <i>somewhat curved</i>
When moist, many leaves circa <i>plane</i>	When moist, many leaves keeled	When moist, many leaves <i>keeled</i>

I strongly oppose the suggestion of Eddy (1990, p. 176, below) that the cell ornamentation in *Barbula sumatrana* should approach that of *Barbula pseudoehrenbergii* Fleisch. and its most related taxa. *Barbula tenuirostris*, *B. seramensis* and *B. sumatrana* are obviously (closely) related. They share especially the rather dense, pluripapillose lamina cells, which obscure the cell lumen. To see the differences in the cell wall ornamentation, one needs to examine the lamina papillae, if possible, in the growing shoots. The differences of the three taxa are shown in Table 1.

For the differences of these taxa with *Barbula indica* (Hook.) Spreng., see Sollman (2000).

A new synonym for *Barbula arcuata* Griff.,
Calcutta J. nat. Hist. 2: 491. 1842.

***Barbula* (?) *anceps* Cardot**, Beih. Bot. Centralbl. 19 (2): 102. 1905. *syn. nov.*

Hydrogonium anceps (Cardot) Herzog & Nog., J. Hattori Bot. Lab. 14: 60. 1955.

Type: Formosa, Kushaku, non fruiting, leg. Faurie no. 130, 6 Jun 1903, hb. J. Cardot, PC (holo!).

This collection fits *Barbula arcuata* Griff. rather easily, as described, illustrated and discussed especially by Saito (1975). The lamina cells in the type material are smooth to slightly mammillate, with 1 or 2 tiny, low conical papillae on a cell, but not obscuring the lumen. The leaf shape is often triangular, tapering from a broader, cordate/hastate base, to a small, acuminate apex. The leaf margins are commonly recurved, from above base to near apex. The leaf apex is often slightly denticulate. In some leaves the apex is somewhat small and blunt. I found no gemmae in this collection. A few rhizoidal tubers are, however, present, as described and illustrated by Whitehouse (1976) for *Barbula arcuata*.

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