Additions to the moss floras of Solomon Islands and several countries of tropical Asia

Johannes Enroth

Department of Botany, P.O. Box 7, University of Helsinki, Finland

Abstract. The following new records are presented: Solomon Islands: *Plagiotheciopsis oblonga* (Broth.) Broth.; Malaysia: *Neckera warburgii* Broth. (*Himantocladium warburgii* (Broth.) Fleisch.); Vietnam: *Taiwanobryum speciosum* Nog.; Laos: *Himantocladium formosicum* Broth. & Yas.; India: *Thamnobryum alleghaniense* (C. Müll.) Nieuwl.; Nepal: *Himantocladium cyclophyllum* (C. Müll.) Fleisch. and *Homaliadelphus targionianus* (Mitt.) Dix. & P. Varde; Bhutan: *Neckera muratae* Nog., *N. polyclada* C. Müll., *Neckeropsis exserta* (Hook.) Broth., *Himantocladium cyclophyllum*, *Pinnatella alopecuroides* (Hook.) Fleisch., *P. calcutensis* Fleisch., *Porotrichum fruticosum* (Brid.) Jaeg. and *Handeliobryum sikkimense* (Par.) Ochyra. *Hypnum schmidii* C. Müll. (*Thamnobryum schmidii* (C. Müll.) Chopra) is lectotypified and synonymized with *Thamnobryum alleghaniense*. Discovery of the sporophyte of *Himantocladium warburgii* indicates that the species belongs to *Neckera* Hedw.

This paper is largely an extract of the information accumulated in the course of my taxonomic studies on neckeraceous and other pleurocarpous mosses. The new record for Vietnam is based on previously misidentified specimens, while most of the new records for other countries are based on hitherto unpublished material, a major part of which was sent to me by Dr. D. G. Long (E). He also kindly checked the new records for Nepal and Bhutan and particu-

larly emphasized (pers. comm.) that many old records labelled "Bhotan" are actually from Kalimpong area of West Bengal State, India.

SOLOMON ISLANDS

Hypnaceae

Plagiotheciopsis oblonga (Broth.) Broth. in Dix.,

J. Linn. Soc. Bot. 45: 492. 28 f. 11. 1922.

This species has recently been treated by Tan (1987) and Enroth (1991). The previously known distribution included Philippines and Papua New Guinea. In my paper cited above *Plagiotheciopsis oblonga* was placed in the Entodontaceae for convenience rather than taxonomic reasons. A placement in the Hypnaceae, suggested by Buck (1980), seems more plausible.

Specimen examined: North Solomons Province, Buka Island, Lonahan Village, 5°18'S 154°41'E, 5 m, regrowth, on a rotting log in a slow flowing stream, 6. XI. 1985, Kolema 89 (H).

MALAYSIA

Neckeraceae

Neckera warburgii Broth., *Monsunia* 1: 49. 1899; *Himantocladium warburgii* (Broth.) Fleisch., *Musci Fl. Buitenzorg* 3: 892. 1908.

Tan & Noguchi (1984) and Enroth (1989, 1992b) treated this species as *Himantocladium warburgii*, based on the gametophyte features, because the sporophyte was not known. Shortly after the publication of my paper on the taxonomy of *Himantocladium* (Enroth 1992b), I received a sporophyte-bearing specimen (van Zanten 8001) on loan from GRO. Only fragments of the capsule are present, but the characters of the intact seta suffice to indicate that the species belong to *Neckera* Hedw. rather than *Himantocladium*. In the latter genus, the seta is straw-yellow, up to 2.0 (- 2.5) mm long, and smooth, or has only slightly bulging cells in the distal part. The seta of *Neckera warburgii* is also straw-yellow, but it is 1.1 mm long, and the median and distal parts are distinctly mamillate. An identical seta is possessed by *N. crenulata* Harv. I have elsewhere (Enroth 1992a) emphasized the close relationship between *N. crenulata* and *N. undulatifolia* (Tix.) Enroth. The setal characters, as well as the elongate, strongly incrassate and strongly porose laminal cells, of *N. warburgii* point out that it belongs to

this grouping. The habitual resemblance between *N. undulatifolia*, *N. warburgii*, and *N. crenulata* is also remarkable. The plants are stout, distinctly stipitate, and frondose, and the leaves are strongly undulate.

Neckera warburgii has been regarded as an endemic of the Philippines (Tan & Noguchi 1984, Enroth 1992b). Dr. A. Touw of Leiden kindly informed me that a Bornean specimen identified as *Himantocladium warburgii* was deposited in L.

Specimen examined: Borneo, Sabah, Mt. Kinabalu, Paka-paka Cave, 9 840 ft, on rocky wooded banks of stream, 14. VI. 1957, Sinclair, Kadim bin Tassim & Kapis bin Sisiron 9184 (L).

VIETNAM

The two Vietnamese specimens cited below were reported as *Porotrichum petelotii* Tix. by Pócs et al. (1967), but that name has not been validly published (cf. Crosby et al. 1992). The specimens were collected in the vicinity of Cha Pa, which is located in northern Vietnam.

Prionodontaceae

Taiwanobryum speciosum Nog., *Trans. Nat. Hist. Soc. Formosa* 26: 143. 1, f. 2. 1936.

This species has previously been known from Japan and Taiwan (Lai & Koponen 1981, Noguchi 1989). The latter of the specimens cited here is a mixture of *Taiwanobryum speciosum* and *Palamocladium nilgheriense* (Mont.) C. Müll.

Specimens examined: Cha Pa, sur des rochers calcaires et sur l'écorce de *Betula* près de Sapa, 1650-1780 m, IX. 1963, Pócs 2573/u, 2575/j (both EGR).

LAOS

Neckeraceae

Himantocladium formosicum Broth. & Yas. in

Broth., Rev. Bryol. 53: 2. 1926.

This species has been known only from Taiwan (Enroth 1992b). The specimen from Laos was found in a "Neckeraceae indet." folder in H. The very strongly widened leaf bases serve to distinguish *Himantocladium formosicum* from the closely related *H. cyclophyllum* (cf. fig. 49 in Noguchi 1950).

Specimen examined: Attopeu, 1. III. 1904, Micholitz s. n. (H "Rel. Broth. R2003").

INDIA

Neckeraceae

Thamnobryum alleghaniense (C. Müll.) Nieuwl., American Midland Natural. 5: 50. 1917.
Hypnum schmidii C. Müll., Bot. Zeit. 12: 574. 1854, syn. nov.; *Thamnium schmidii* (C. Müll.) Jaeg., Ber. Thatigk. St. Gallischen Naturwiss. Ges. 1875-1876: 311. 1877 (Adumbratio 2: 215); *Thamnobryum schmidii* (C. Müll.) Chopra, Bryologist 80: 544. 1977. - Lectotype (selected here): India. "Mont. Neelgherrenses", Schmid s. n. (JE!, isoelectotype S!).
Thamnium biondii C. Müll., Nuovo Giorn. Bot. Italiano n. ser. 5: 195. 1898. - Isotype: China. "China interior, prov. Shen-si sept., in monte Tui-kio-san", 20. X. 1896, Giraldis s. n. (H-BR!). - Synonymized by Levier (1906).

Thamnobryum alleghaniense was mentioned in Iwatsuki's (1958a) treatment of the mosses common to the eastern North America and eastern Asia. Its distribution in North America was outlined by Crum & Anderson (1981). Levier (1906) and Dixon (1928) reported *Thamnobryum alleghaniense* from Shaanxi ("Shen-si") in northern China. It was not included in the catalog of Chinese mosses by Redfearn & Wu (1986), but it is added to a recent list by Redfearn (1993). The synonymization of the name *Hypnum schmidii*, based on a collection from the Nilgiri Mountains, implies the first record for India. The specimen here selected as the lectotype of *H. schmidii* consists of several fronds. The sexual condition of the speci-

men is synoicous, although Müller (1854) originally described it as dioicous. Crum & Anderson (1981) described the sexual condition of *Thamnobryum alleghaniense* as polygamous, meaning that it can be autoicous or synoicous.

NEPAL

Neckeraceae

Himantocladium cyclophyllum (C. Müll.) Fleisch., Musci Fl. Buitenzorg 3: 887. 1908.

The genus *Himantocladium* has previously not been recorded for Nepal, but *H. cyclophyllum* occurs in the adjacent Sikkim State of India. The total distribution of the essentially tropical *H. cyclophyllum* is wide, ranging from Seychelles in the Indian Ocean to Society Islands in the Pacific (Enroth 1992b).

Specimen examined: Tamur River near Chirwa, 27°29'N 87°46'E, ca. 1350 m, open woodland on riverbank, on shaded rock, 3. IX. 1989, Long 16584 (E).

Homaliadelphus targionianus (Mitt.) Dix. & P. Varde, Rev. Bryol. n. ser. 4: 142. 1932.

This species has a fairly wide range in southern and and southeastern Asia, including the Himalayan region (Iwatsuki 1958b, Gangulee 1976, Noguchi 1989), but there are no literature records from Nepal.

Specimen examined: Tamur River between Chirwa and Hellok, 27°29'N 87°46'E, ca. 1450 m, Schima - dominated woodland, on rock face, 4. IX. 1989, Long 16595 (E).

BHUTAN

Recently Long (1992) added 33 species to the still fairly poorly known bryophyte flora of Bhutan. Eight species of the Neckeraceae are reported here, including the first reports of the genera *Himantocladium*, *Porotrichum* (Brid.) Hampe and *Handeliobryum* Broth.

Neckeraceae

Neckera muratae Nog., J. Sci. Hiroshima Univ. ser. B, div. 2, 3: 17. 4 f. 5-9. 1936.

Neckera muratae was regarded as a Japanese endemic by Noguchi (1989). A careful comparison of the two specimens cited below with the Japanese material of *N. muratae* in H revealed that they represent that species. According to Noguchi (1989), the capsules are ca. 1.2 mm long and the inner perichaetial leaves up to 3.8 mm long. The capsules of the Bhutanese specimens are 0.9 - 1.0 mm long and the perichaetial leaves up to 3.2 mm long, but such quantitative differences are certainly insignificant, as the Japanese and Bhutanese specimens are identical in other features. The specimen Long 8818 is accompanied by *Homaliadelphus targionianus*.

Specimens examined: Thimphu District, 27°18'N 89°33'E, Tham Chu, S of Confluence, Thimphu Chu Valley, ca. 2150 m, dry oak forest, on *Quercus*, 26. VII. 1979, Long 8818 (E); 5 km N of Chapcha, 27°12'N 89°32'E, ca. 2150 m, mixed broad-leaved forest, on *Quercus*, 26. VII. 1979, Long 8820 (E).

Neckera polyclada C. Müll., Nuovo Giorn. Bot. Italiano n. ser. 3: 114. 1896.

This apparently rare Asian species was previously known from Japan and China (Noguchi 1989).

Specimen examined: Tongsa District, tributary of Longte Chu at Charikhachor Chorten near Chendebe, W of Tongsa, 27°27'N 90°21'E, ca. 2450 m, deeply shaded ravine in forest, on log by stream, 22. V. 1979, Long 8072 (E).

Neckeropsis exserta (Hook.) Broth., Nat. Pfl. ed. 2, 11: 188. 1925.

The Bhutanese specimens represent *Neckeropsis exserta* var. *exserta*, which has been recorded from several Himalayan localities, as well as from southern and eastern India, and Thailand (Touw 1962, 1972).

Specimens examined: Samchi District, Tamangdhanra forest near Samchi, 26°54'N 89°06'E, ca. 600 m, wooded valley in subtropical forest, on tree trunk, 28. II. 1982, Long 10511 (E); Kalapani SE of Samchi, 26°50'N 89°07'E, ca. 360 m, secondary subtropical forest, on tree trunk, 2. III. 1982, Long 10543 (E); Gaylegphug District, Lodrai Khola near Gaylegphug, 26°54'N 90°31'E, ca. 350 m, steep valley in thinned subtropical forest, on tree trunk, 21. III. 1982, Long 10647 (E); Gaylegphug, Sarbhang road, 26°52'N 90°30'E, ca. 300 m, forestry plantation, on Duabanga trunk, 29. V. 1979, Long 8175 (E); Phuntsholing District, tributary of Torsa River 2 km N of Phuntsholing, 26°53'N 89°23'E, ca. 200 m, on boulder in shaded jungle, 2. V. 1979, Long 7722 (E); Hillside on N side of Phuntsholing, 26°52'N 89°23'E, ca. 230 m, on Duabanga trunk in secondary subtropical forest, 13. II. 1982, Long 10343 (E); Sarbhang District, 10 km E of Sarbhang, 26°53'N 90°21'E, ca. 410 m, deciduous terai forest, on tree trunk, 7. III. 1982, Long 10551 (E); Phipsoo, 26°45'N 90°07'E, ca. 300 m, on *Ficus religiosa* in garden, 15. III. 1982, Long 10612 (E); Sankosh District, 2 km W of Pinkhua, 26°44'N 90°02'E, ca. 330 m, ravine in subtropical forest, on tree trunk, 16. III. 1982, Long 10622 (E); Tongsa District, between Pertimi and Tintibi Bridge, Mangde Chu, 27°12'N 90°40'E, ca. 1090 m, ravine in warm broad-leaved forest, on tree trunk, Long 10792 (E).

Himantocladium cyclophyllum (C. Müll.) Fleisch.

Specimens examined: Between Shamgong and Mangde Chu, 1985, Broad B55(261) (E); Samchi District, Tamangdhanra forest near Samchi, 26°54'N 89°06'E, ca. 600 m, wooded valley in subtropical forest, on boulder, 28. II. 1982, Long 10512 (E); Sarbhang District, 10 km E of Sarbhang, 26°53'N 90°21'E, ca. 410 m, deciduous terai forest, on tree trunk, 7. III. 1982, Long 10550 (E); Singi Khola 15 km W of Sarbhang, 26°50'N 90°12'E, ca. 390 m, subtropical terai forest on river bank, on tree trunk, 9. III. 1982, Long 10555 (E).

Pinnatella alopecuroides (Hook.) Fleisch., Hedwigia 45: 84. 1906.

The distribution area of *Pinnatella alopecuroides* ranges from Sri Lanka and India to Australia (Queensland) and New Caledonia. It has also been known from Nepal and northern India (Sikkim, West Bengal).

Specimen examined: Tongsa District, near Pertimi S of Shamgong, ca. 1310 m, warm broad-leaved forest, on tree trunk, 5. IV. 1982, Long 10785 (E).

Pinnatella calcutensis Fleisch., Hedwigia 45: 84. 1906.

This distinct and very peculiar species has often been confused with *Pinnatella alopecuroides*; the differences will be discussed in a forthcoming monograph of *Pinnatella* Fleisch., already completed by the present author. The total distribution of *P. calcutensis* is fairly narrow. In addition to Bhutan, it occurs in Sri Lanka, India, Burma, and Thailand.

Specimens examined: Phuntsholing District, tributary of Torsa River 2 km N of Phuntsholing, 26°53'N 89°23'E, ca. 200 m, on boulder in shaded jungle, 2. V. 1979, Long 7723 (E); hillside on N side of Phuntsholing, 26°52'N 89°23'E, ca. 230 m, on Duabanga trunk in secondary subtropical forest, 13. II. 1982, Long 10340 (E); Sankosh District, 2 km W of Pinkhua, 26°44'N 90°02'E, ravine in subtropical forest, on tree trunk, ca. 330 m, 16. III. 1982, Long 10621 (E).

Porotrichum fruticosum (Brid.) Jaeg., Ber. Thatigk. St. Gallischen Naturwiss. Ges. 1875-1876: 306. 1877 (Adumbratio 2: 210).

The apparently discontinuous range of *Porotrichum fruticosum* ranges from Sri Lanka and Himalayas to Taiwan (Gangulee 1976, as *Thamnobryum fruticosum* (Brid.) Gang.). In the Himalayan region it was previously known from Nepal and India (Sikkim, Darjeeling, Arunachal Pradesh).

Specimen examined: Mongar District, 27°20'N 91°02'E, near large waterfall above Namning, SE of Sengor, ca. 2730 m, shady ravine in wet mixed broad-leaved forest, on mossy tree trunk,

6. VII. 1979, Long 8649 (E).

Handeliobryum sikkimense (Par.) Ochyra, J. Hattori Bot Lab. 61: 71. 1986.

The unispecific genus *Handeliobryum* was treated in detail by Ochyra (1986). It was previously known from Nepal, northern India, and China (Xizang, Sichuan).

Specimen examined: Tongsa District, western slopes below Yuto La, E of Tongsa, 27°31'N 90°34'E, ca. 3120 m, moist *Tsuga/Rhododendron* forest, on wet rocks by waterfall, 8. VI. 1979, Long 8255 (E).

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