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Studies on the Bryophyte Flora of Vanuatu. 10. Additions to the Hypnaceae (Musci)*

Masanobu Higuchi[1] and Naoki Nishimura[2]

[1] Department of Botany, National Science Museum,
Amakubo 4–1–1, Tsukuba 305–0005, Japan
E-mail: higuchi@kahaku.go.jp
[2] Botanical Garden, Okayama University of Science,
Ridai-cho 1–1, Okayama 700–0005, Japan
E-mail: nishimur@rins.ous.ac.jp

Abstract Thirteen species in six genera in the family Hypnaceae are reported based on the collections made in Vanuatu by Sugimura in 2000 and Higuchi in 2001. *Ctenidium elegantulum*, *C. pubescens* and *Ectropothecium moritzii* are new records for the moss flora of Vanuatu. A key and figures of the species of *Ctenidium* in Vanuatu are provided.
Key words : Hypnaceae, mosses, Vanuatu.

The family Hypnaceae of Vanuatu in this series was reported by Higuchi and Nishimura (2002) based on the collections in 1996 and 1997. This paper deals with the Hypnaceae occurring in Vanuatu, based on the collections made by Mr. K. Sugimura in 2000 and M. Higuchi in 2001 (cf. Higuchi 2005). The specimens examined are kept in the herbarium of the Department of Botany, National Science Museum (TNS), and the duplicates in the herbarium of the Department of Forestry, Republic of Vanuatu (PVNH).

Hypnaceae

The Hypnaceae recorded for Vanuatu presently includes 28 species in nine genera (Higuchi & Nishimura 2002). By the examination of the above collections, thirteen species in six genera were recognized. *Ctenidium elegantulum*, *C. pubescens* and *Ectropothecium moritzii* are new records for the moss flora of Vanuatu. Key to the genera of Hypnaceae in Vanuatu is shown in Higuchi and Nishimura (2002).

Key to the species of *Ctenidium* in Vanuatu (revised from Nishimura 1985)

1. Marginal serration of stem leaves strongest at basal corners: setae papillose throughout .....3. *C. polychaetum*
1. Marginal serration of stem leaves equally weak throughout or stronger at upper part: setae papillose throughout or almost smooth 2
2. Stem and branch leaves complanate; median laminal cells of stem leaves usually 20–30 μm long; laminal cells prorate almost throughout the leaf .....2. *C. elegantulum*
2. Stem and branch leaves not or weakly complanate; median laminal cells of stem leaves usually more than 40 μm long; laminal cells weakly prorate at upper half of the leaf ....1. *C. pubescens*

1. Ctenidium pubescens (Hook.f. & Wils.) Broth. in Engler & Prantl, Nat. Pfl. 1(3): 1048 (1908). (Figs. 1–3)

Specimen examined. Espiritu Santo Isl., Mt. Tabwemasana, 1450 m, Oct. 23, 2001 (*Higuchi 39844*).

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Distribution. Australia, Lord Howe Island and New Zealand (cf. Nishimura 1985). New to Vanuatu.

Notes. This species is closely related to *Ctenidium stellulatum* known from Hawaii Islands and Society Island. They share several features such as irregular ramification with branches of different length, weakly falcate, ovate-lanceolate stem leaves (Fig. 1), thin-walled laminal cells with low prorations (Fig. 3), weak marginal serration and thin-walled alar cells. But *Ctenidium pubescens* differs from *C. stellulatum* in wider bases of stem leaves, shorter acumens of stem leaves, less prorate laminal cells and larger alar parts with shorter alar cells (Fig. 2). Althoug the plants (Higuchi 39844) has distinctly rugose leaf acumens, this tendency has been seen sometimes in the species of *Ctenidium*.

2. Ctenidium elegantulum Broth., Bishop Mus. Bull. 40: 34 (1927). (Figs. 4–7)

Specimen examined. Espiritu Santo Isl., Mt. Tabwemasana, 1450 m, Oct. 23, 2001 (*Higuchi 39831*).

Distribution. Endemic to the Hawaiian Islands (cf. Nishimura 1985). New to Vanuatu.

Notes. This species is similar to *C. plumicaule* M.Fleisch. known from Sumatra and Java in epiphytic, small-sized plants, cordate basal part of stem leaves (Fig. 4), weakly serrulate margins of stem leaves and thick-walled alar cells (Figs. 5, 6). *Ctenidium elegantulum*, however, is distinguished from *C. plumicaule* by having the shorter acumen of stem leaves and the clear proration of laminal cells.

3. Ctenidium polychaetum (Bosch & Sande Lac.) Broth. in Engler & Prantl, Nat. Pfl. 1(3): 1048 (1908). (Figs. 8–11)

Specimen examined. Espiritu Santo Isl., Base Camp – 1st Camp of Mt. Tabwemasana, 1000–1300 m, Oct. 25, 2001 (*Higuchi 39914*).

Distribution. Java, Borneo, Ceram, Philippines and Vanuatu.

Notes. The plants in Vanuatu have stem leaves with narrower basal half as compared with those in other areas (Fig. 8).

4. Ectropothecium moritzii A.Jaeger, Ber. S. Gall. Naturw. Ges. 1877–78: 262 (1880).

Specimens examined. Anatom Isl., Anelghowhat – Mt. Ukapaerek, 170 m, Nov. 5, 2001 (*Higuchi 40060*, *40061*); Anelghowhat – Mt. Nidwon Nelcai, 90 m, Nov. 6, 2001 (*Higuchi 40218*, *40220*).

Distribution. Tropical and subtropical East Asia. New to Vanuatu.

Notes. Among the *Ectropothecium* species with medium to large sized plants, *E. moritzii* is characterized by narrowly triangular-lanceolate stem leaves with gradually narrowed, flattened acumen, 3–4 seriate and hyaline cells at the basal corner, autoicous sexuality and shorter (about 2 cm long) setae. The apperance of *Ectropothecium moritzii* is similar with *E. pacificum*, one of the *Ectropothecium* from Vanuatu, but the latter has ovate-lanceolate stem leaves with channeled acumen.

5. Ectropothecium pacificum Mitt., J. Linn. Soc. Bot. 10: 180 (1868).

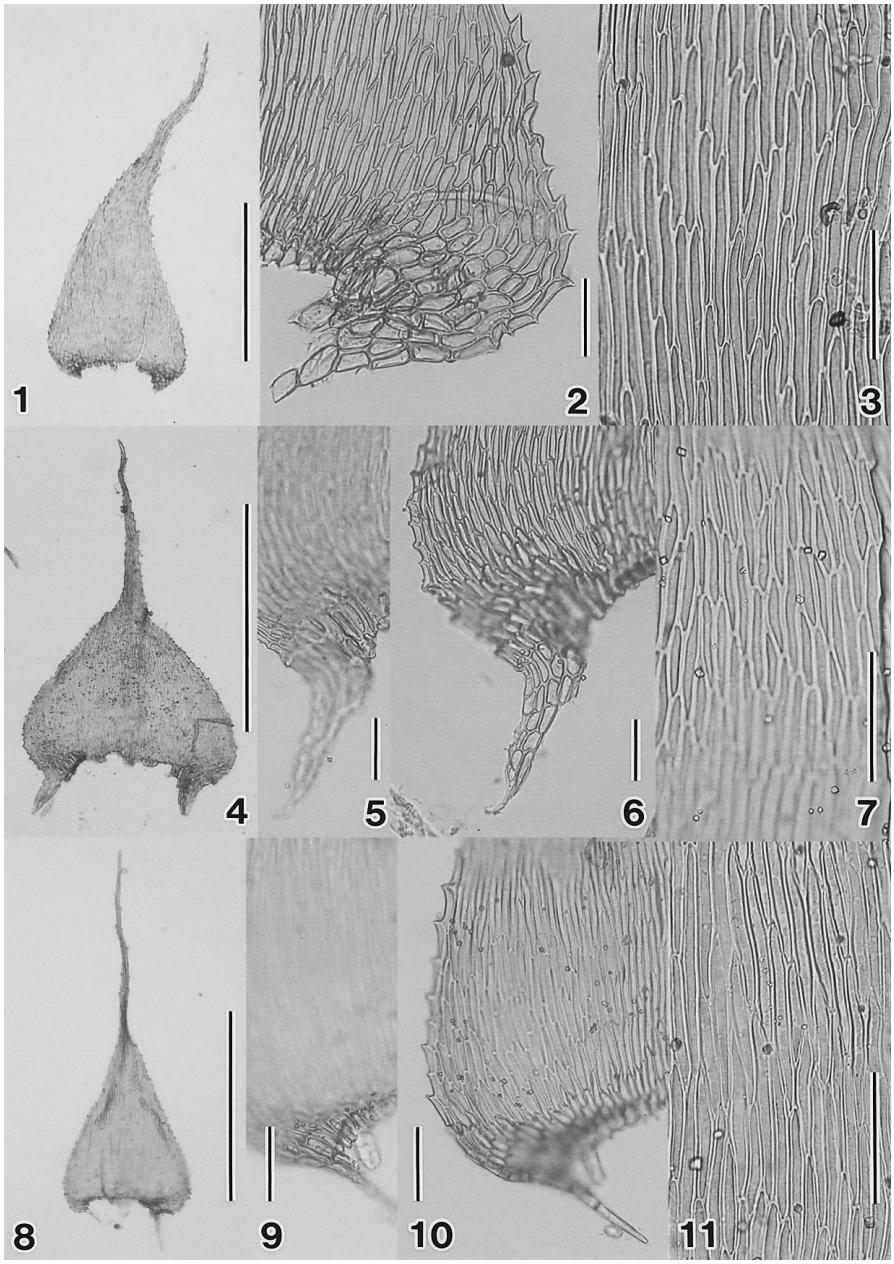
Specimen examined. Espiritu Santo Isl., Base Camp of Mt. Tabwemasana, 1050 m, Oct. 24, 2001 (*Higuchi 39886*).

Distribution. New Caledonia, Vanuatu and Samoa.

6. Ectropothecium sodale (Sull.) Mitt., J. Linn. Soc. Bot. 10: 180 (1868).

Specimens examined. Espiritu Santo Isl., Kerepua – 1st Camp of Mt. Tabwemasana, 250 m, Oct. 19, 2001 (*Higuchi 39693*); western slope of Mt. Tabwemasana, 440 m, Oct. 30, 2000 (*Sugimura 3483*); 1st Camp – Base Camp of Mt. Tabwemasana, 1000–1300 m, Oct. 25, 2001 (*Higuchi 39900*); Base Camp of Mt. Tabwemasana, 1050 m, Oct. 22, 2001 (*Higuchi 39708*, *39712*); Mt. Tabwemasana, 1400 m, Oct. 23, 2001 (*Higuchi 39817*), 1450 m (*Higuchi 39828*, *39830*, *39843*); Butmas, 250 m, Oct. 28, 2001 (*Higuchi 39944*).

Distribution. New Guinea, New Caledonia, Vanuatu, Fiji, Samoa, Society Islands and Mar-



Figs. 1–11. 1–3. *Ctenidium pubescens* (Higuchi 39844). 4–7. *C. elegantulum* (Higuchi 39831). 8–11. *C. polychaetum* (Higuchi 39914). 1, 4, 5. Stem leaves. Scale=5 mm. 2, 5, 6, 9, 10. Basal angles of stem leaves. Scale=50 μm. 3, 7, 11. Median cells of stem leaves. Scale=50 μm.

quesas Islands.

7. Ectropothecium zollingeri (Müll.Hal.) A.Jaeger, Ber. S. Gall. Naturw. Ges. 1877–78: 272 (1880).

Specimens examined. Espiritu Santo Isl., western slope of Mt. Tabwemasana, 730 m, Nov. 2, 2000 (*Sugimura 3595*, *3596*), 770 m (*Sugimura 3588*); 1st Camp – Base Camp of Mt. Tabwemasana, 1000–1300 m, Oct. 25, 2001 (*Higuchi 39921*); Base Camp of Mt. Tabwemasana, 1050 m, Oct. 22, 2001 (*Higuchi 39733*, *39743*); Butmas, 520 m, Oct. 24, 2000 (*Sugimura 3448*); Matantas, 30 m, Oct. 29, 2001 (*Higuchi 40005*), 50 m, Nov. 6, 2000 (*Sugimura 3604*). Efate Isl., Mele, 20 m, Oct. 20, 2000 (*Sugimura 3398*); Cascades Waterfall, 50 m, Nov. 11, 2000 (*Sugimura 3639*, *3642*, *3643*). Tanna Isl., Loanialu Pass, 540 m, Nov. 8, 2001 (*Higuchi 40242*, *40243*). Anatom Isl., Anelghowhat – Mt. Nidwon Nelcai, 120 m, Nov. 6, 2001 (*Higuchi 40177*).

Distribution. Tropical Asia (north to Japan), New Caledonia and Vanuatu.

8. Isopterygium albescens (Hook.) A.Jaeger, Ber. S. Gall. Naturw. Ges. 1876–77: 433 (1878).

Specimens examined. Espiritu Santo Isl., 1st Camp – Base Camp of Mt. Tabwemasana, 1000–1300 m, Oct. 25, 2001 (*Higuchi 39897*); Mt. Tabwemasana, 1430 m, Oct. 23, 2001 (*Higuchi 39808*), 1500 m (*Higuchi 39859*); northern ridge of Mt. Tabwemasana, 1510 m, Nov. 1, 2000 (*Sugimura 3559*). Tanna Isl., Loanialu Pass, 540 m, Nov. 8, 2001 (*Higuchi 40246*).

Distribution. Tropical and subtropical East Asia, Vanuatu and Hawaii.

9. Isopterygium minutirameum (Müll.Hal.) A.Jaeger, Ber. S. Gall. Naturw. Ges. 1876–77: 434 (1878).

Specimens examined. Tanna Isl., Loanialu Pass, 540 m, Nov. 8, 2001 (*Higuchi 40229*, *40237*).

Distribution. Tropical and subtropical Asia, Vanuatu and Australia.

10. Pseudotaxiphyllum pohliaecarpum (Sull. & Lesq.) Z.Iwats., J. Hattori Bot. Lab. 63: 449 (1987).

Specimen examined. Espiritu Santo Isl., Mt. Tabwemasana, 1430 m, Oct. 23, 2001 (*Higuchi 39811*).

Distribution. Tropical and subtropical Asia.

11. Taxiphyllum taxirameum (Mitt.) M. Fleisch., Musci Fl. Buitenzorg 4: 1435 (1923).

Specimens examined. Espiritu Santo Isl., Kerepua, 70 m, Oct. 28, 2000 (*Sugimura 3475*). Efate Isl., Klems Hill, 150 m, Oct. 20, 2000 (*Sugimura 3399*). Anatom Isl., Anelghowhat – Mt. Ukapaerek, 240 m, Nov. 5, 2001 (*Higuchi 40097*).

Distribution. Asia, eastern North America, Central and South America.

12. Vesicularia inflectens (Brid.) Müll.Hal., Bot. Jahrb. 23: 330 (1896).

Specimens examined. Espiritu Santo Isl., Base Camp of Mt. Tabwemasana, 1050 m, Oct. 22, 2001 (*Higuchi 39776*); Butmas, 580 m, Oct. 28, 2001 (*Higuchi 39958*, *39992*); Rotal, 140 m, Oct. 30, 2001 (*Higuchi 40030*, *40034*).

Distribution. China, Caroline Islands, New Guinea, Solomon Islands, Australia, New Caledonia, Vanuatu, Fiji, Samoa, Admiralty Islands, Society Islands, Tubuai, Rapa, Rotuma (cf. Whittier 1976).

13. Vesicularia pinnatula Müll.Hal. ex Broth., Oefv. Finsk. Vet. Soc. Foerh. 51A (17): 28 (1909).

Specimens examined. Espiritu Santo Isl., Butmas, 580 m, Oct. 28, 2001 (*Higuchi 39960*, *39985*). Anatom Isl., Anelghowhat – Mt. Ukapaerek, 240 m, Nov. 5, 2001 (*Higuchi 40095*); Anelghowhat – Mt. Nidwon Nelcai, 210 m, Nov. 6, 2001 (*Higuchi 40184*, *40190*).

Distribution. Australia, New Caledonia and Vanuatu.

Notes. The name of this species is not listed on Index Muscorum (Wijk et al. 1969).

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