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Lectotypification of *Acroporium hyalinum* (Reinw. ex Schwägr.) Mitt. (Hypnales: Sematophyllaceae).

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Abstract

Acroporium hyalinum (Reinw. ex Schwägr.) Mitt., an older name for *Acroporium stramineum* (Reinw. & Hornsch.) M.Fleisch., is applied here in accordance with the principle of nomenclatural priority. *Acroporium hyalinum* is broadly circumscribed by its erect-spreading, ovate-lanceolate leaves with short acuminate tips. Its infra-specific delimitation, however, has not been clearly resolved. Based on careful examination of nearly 200 specimens, including 35 types associated with *A. hyalinum* and its synonyms, all the three varieties proposed by Tan (1994) are accepted here as *Acroporium hyalinum* (Reinw. ex Schwägr.) Mitt. var. *hyalinum*, *A. hyalinum* var. *hamulatum* (M.Fleisch.) M.S.Chua & B.C.Ho, and *A. hyalinum* var. *turgidum* (M.Fleisch.) M.S.Chua & B.C.Ho, the latter two names being new combinations. Descriptions and an identification key of these three varieties are provided, along with taxonomic notes and illustrations. Lectotypification of *Hypnum hyalinum* Reinw. & Hornsch. is proposed.

Keywords: *Acroporium hyalinum*, moss taxonomy, Sematophyllaceae, lectotypification

Introduction

Acroporium Mitt. currently comprises of 68 accepted taxa worldwide (TROPICOS 2018). A major distinguishing feature of the genus *Acroporium* is the presence of a single conspicuous basal row of large and often thin-walled alar cells with the outermost curved inwards like a bean (Ramsay *et al.* 2004; Tan 1994; Tan *et al.* 2007). The appearance of alar cells is one of the main characters used in the identification of members of the family Sematophyllaceae. *Acroporium* has been included in several recent regional floras, taxonomic revisions, and checklists, including for India (Daniels 2010), mainland China and Taiwan (Jia *et al.* 2005; Chiang *et al.* 2011; Shevock *et al.* 2014), Japan (Suzuki 2016), the Philippines (Tan 1994; Tan 2000; Linis 2014), Indochina

(Tan and Iwatsuki 1993; He 1996; He and Nguyen 2012; Ho *et al.* 2015), Peninsular Malaysia and Singapore (Yong *et al.* 2013), Borneo (Tan 1994; Tan *et al.* 1997; Tan and Mohamed 2013), Sulawesi, Java, and Sumatra (Tan 1994; Gradstein *et al.* 2005, Ho *et al.* 2006, Ariyanti *et al.* 2009), Australia (Tan *et al.* 1996, 1998; Ramsay *et al.* 2004), Papua New Guinea (Tan *et al.* 2007), the Neotropics (Camara *et al.* 2015), Hawaii (Staples *et al.* 2004), and Africa (O'Shea 2006). Despite the floristic boundary of Malesia being one of the centres of diversity of this genus, a comprehensive taxonomic treatment of Malesian *Acroporium* is still lacking.

There are some species that have not been treated satisfactorily due to the lack of available specimens. However, the increase in sampling efforts since Tan's (1994) work has facilitated the investigation of these taxa. *Acroporium stramineum* (Reinw. & Hornsch.) M.Fleisch. represents one such taxon requiring further study.

Based on thorough critical examination of nearly 200 specimens, including 35 types, loaned from various herbaria (B, BO, BORH, E, F, FH, H-BR, JE, KLU, L, NY, PC, SING, UBC), the three infra-specific taxa that were proposed by Tan (1994), *Acroporium stramineum* (Reinw. & Hornsch.) M.Fleisch. var. *stramineum, A. stramineum* var. *hamulatum* (M.Fleisch.) B.C.Tan, and *A. stramineum* var. *turgidum* (Mitt.) B.C.Tan are here accepted under *Acroporium hyalinum*. They share similarities in size and superficial leaf form, i.e. the broadly lanceolate to ovate-lanceolate lamina with a short acuminate tip, making them difficult to distinguish from one another. *Acroporium hyalinum* is distributed mainly in tropical Asia, Australasia and the Pacific regions. The specimens examined for each taxon are listed in Appendix.

Taxonomic treatment

Acroporium hyalinum (Reinw. ex Schwägr.) Mitt. *J. Linn. Soc. Bot.* 10: 183 (1868)

Basionym: *Hypnum hyalinum* Reinw. ex Schwägr. in Schwägr., *Sp. Musc. Frond. Suppl. Tertium* (1)(2): 227b (1828)

Sematophyllum hyalinum (Reinw. ex Schwägr.) A. Jaeger, *Ber. Thätigk. St. Gallischen Naturwiss. Ges*. 1876–1877: 383 (1878)

Type citation: In monte Gedé insulae Javae, et magis compactum in monte Klabad insulae Celebes legit et misit Prof. Reinwardt.

Type: Indonesia. Java, Mt. Gede, *Reinwardt s.n.* (lectotype, here designated: G 00113954!; isolectotype: G 00116253!); residual syntypes: Sulawesi ("Celebes"), Mt. Klabat ("Mt. Klabad"), *Reinwardt s.n.* (G 00048702!, L 0473469!, L 0473470!).

=*Acroporium stramineum* (Reinw. & Hornsch.) M.Fleisch., *Musc. Buitenzorg* 4: 1301 (1923)

Basionym: *Leskea straminea* Reinw. & Hornsch., *Nova Acta Phys.-Med. Acad. Caes. Leop.-Carol. Nat. Cur*. 14: 717 (1829)

Type citation: Hab. In monte Klabat in regno Medano Celebes insulae, et in monte Gedé Javae insulae.

Type: Indonesia. Sulawesi ("Celebes"), Mt. Klabat, *Hornschuch s.n.* (syntypes: E 00756906!, E 00756909!, G 00048700!, G 00048704!, G 00048705!).

=*Hypnum gedeanum* Müll. Hal., *Syn. Musc. Frond*. 2: 390 (1851) *syn. nov.*

Type citation: Patria. Java, monte Gedé: Reinwardt; ex Hb. Gottscheano habemus.

Type: n.v. but see notes under typification below.

=*Hypnum monoicum* Sande Lac. in Dozy & Molk., *Bryol. Jav*. 2: 207 (1869)

Acroporium monoicum (Sande Lac.) M.Fleisch., *Musc. Buitenzorg* 4: 1287 (1923)

Type citation: Habitat insulam Javae, KORTHALS; in m. Salak, ZOLLINGER coll. Sub no. 1816; in sylvis obscuris m. Pangerango altit. 5000', JUNGHUHN. Sumatra, KORTHALS.

Type: Indonesia. Java, Mt. Pangerango, *Junghuhn s.n.* (lectotype, designated by Tan (1994: 283): L 0057119!), isolectotype: BM, FH 01142423!); residual syntypes: Mt. Salak, *Zollinger 1816* (BM, L 0057117!); Sumatra, *Korthals s.n.* (L 0057118!).

=*Sematophyllum batanense* Broth., *Philipp. J. Sci., C.* 8: 96 (1913)

Type citation: BATANES ISLANDS, Bur. Sci. 3856 Fénix.

Type: Philippines. Batanes Is., *Fenix* (*Bur. Sci. 3856*) (holotype: H 3300051!; isotypes: E 00049203!, FH 01142556!).

=*Sematophyllum lepinei* Besch., *Ann. Sci. Nat. Bot.* ser. 7, 20: 48 (1894)

Acroporium lepinei (Besch.) M.Fleisch., *Musc. Buitenzorg* 4: 1303 (1923)

Type citation: Montagnes de Taiarapu, commence à paraître vers 600 m. d'altitude LÉPINE, 1847, no 15; VESCO; NADEAUD, no 87; RIBOURT, 1850.

Type: Tahiti. Taiarapu, *Lepine 15* (lectotype designated by Tan (1994: 283): BM; isolectotypes: PC 0703307!, PC 0703308!, PC 0703309!); residual syntypes: Taiarapu, *Vesco s.n.* (BM, PC 0703311!); Taiarapu, *Ribourt s.n.* (BM); Taiarapu, *Nadeaud 87* (BM, PC 0703310!).

=*Sematophyllum ramosissimum* Broth. in K. Schum. and Lauterb., *Fl. Schutzgeb. Südsee* 101 (1901)

Acroporium ramosissimum (Broth.) M.Fleisch., *Musc. Buitenzorg* 4: 1288 (1923)

Type citation: Kaiser Wilholmsland: Sattelberg, Nuselang-station, auf gefälltem Holze bei 900 m ü. M. (Kaerabach n. 41, am 8. Dezember 1893).

Type: Papua New Guinea. Morobe, Sattelberg, Nuselang Station, *L. Kaernbach 41* (holo: H 3300068!).

Plants large, caespitose. *Stems* decumbent, forming wefts, mats or cushions, irregularly branched; *branches* long or short. *Leaf* arrangements from erect-patent, complanate to imbricate throughout, 1.5–3.0 mm long and 0.6–1.1 mm wide, broadly lanceolate to ovate-lanceolate, weakly or strongly concave, apices short acuminate or hamate, ecostate, margins entire, inflexed but not tubulose, slightly serrulate or dentate near apex. *Laminal cells* narrowly elongate to sublinear, 34–100 μm long, smooth, with incrassate walls, pitted; alar cells enlarged, yellowish to brown, thin-walled, 3–8 cells in a single row.

Pleurocarpous. Autoicous, dioicous or pseudoautoicous. *Perichaetial leaves* up to 2 mm long, slightly constricted into a short to long acuminate and denticulate acumen. *Setae* 0.7–3.0 cm, scabrous above. *Capsules* oblong, urn 1–3 mm long, 0.4–0.8 mm wide, suberect. *Peristome* well developed, exostome teeth striate below, papillose above. *Spores* large, 20–35 μm, greenish.

Key to the varieties of *Acroporium hyalinum*

1. Plants complanate, main branches mostly long with few lateral short branches, leaf apices always hamate ..... *Acroporium hyalinum* var. *hamulatum*
1. Plants not complanate, main branches irregular, leaf apices mostly straight 2
2. Leaves mostly imbricate, reaching 3 mm long ..... *Acroporium hyalinum* var. *turgidum*
2. Leaves mostly erecto-patent to falcate, less than 2.5 mm long..... *Acroporium hyalinum* var. *hyalinum*

Description. *Plants* large, caespitose, densely tufted, yellowish-green. *Stems* decumbent, forming wefts or tufts, up to 8.5 cm long, irregularly branched; *branches* imbricate-cuspidate at apex, sometimes falcate. *Leaf* arrangement mostly erect-patent, at times imbricate throughout or at least at lower stem and erect-patent on upper stem, 1.5–2.5 mm long and 0.6–1.1 mm wide, ovate-lanceolate to broadly oblong-lanceolate, concave, apices short acuminate, margins entire, inflexed but not tubulose, slightly serrulate near apex. *Laminal cells* narrowly elongate to sublinear, (35–)40–75(–100) μm long, pitted; alar cells enlarged, yellowish, thin-walled, 5–6(–7) cells in a single row.

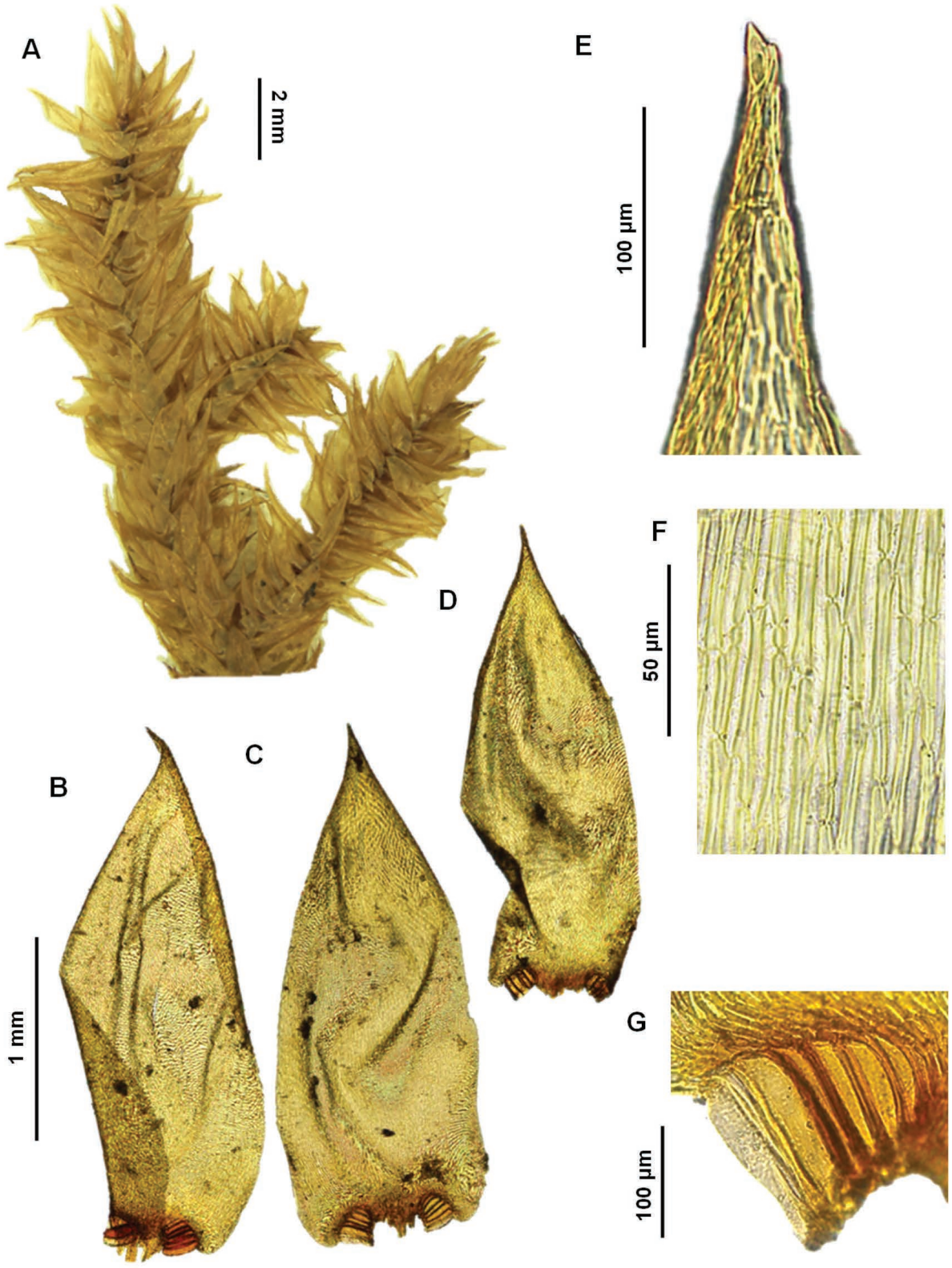

Fig. 1. *Acroporium hyalinum* var. *hyalinum.* A: Habit. B–D: Leaves. E: Apical leaf cells. F: Median laminal cells. G: Alar region. [Based on *Reinwardt s.n.* (L0473470), syntype of *Hypnum hyalinum*]

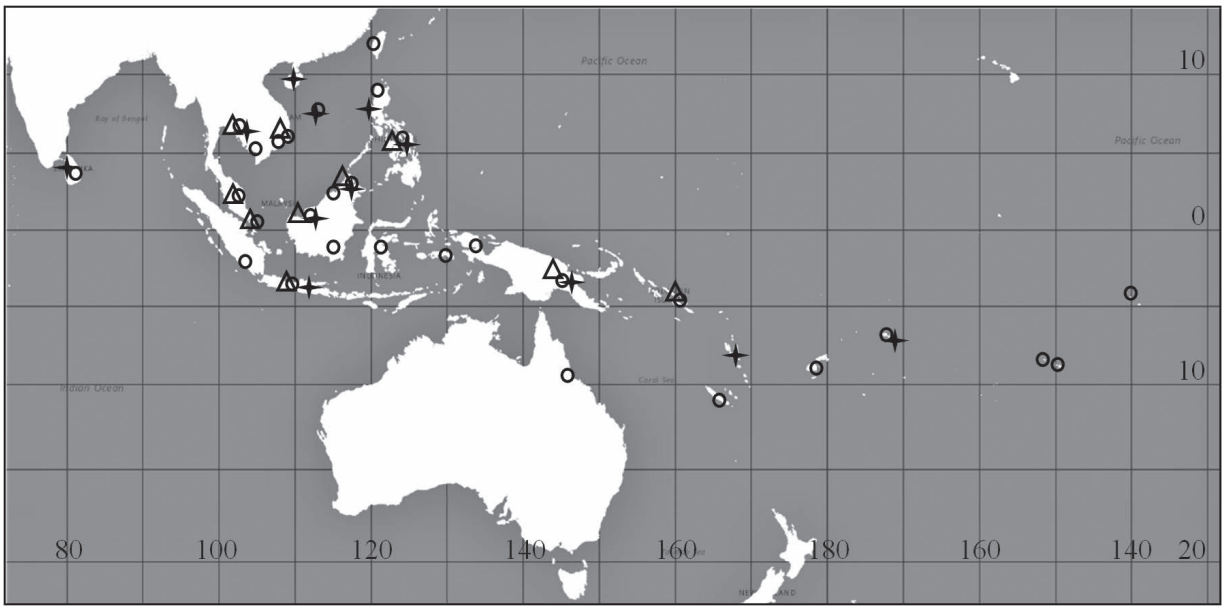

Fig. 2. Distribution map of *Acroporium hyalinum* var. *hyalinum* (○), *A. hyalinum* var. *hamulatum* (△) and *A. hyalinum* var. *turgidum* (+).

Autoicous, dioicous or pseudoautoicous. *Perichaetial leaves* up to 2 mm long, slightly constricted into a short to long acuminate and denticulate acumen. *Setae* (0.7–)1.0–2.5(3.0) cm, scabrous above. *Capsules* oblong, urn 1–2 mm long, 0.4–0.8 mm wide, suberect, operculum about 0.8 mm long. **Fig. 1**.

Illustrations: Reinw. ex Schwägr. (1828) Fig. 227b as *H. hyalinum*; Reinwardt and Hornschuch (1829) Fig. a as *Leskea straminea*, tab 40; Dozy and Molkenboer (1869) tab 304 as *Hypnum hyalinum*, tab 306 as *H. monoicum*, tab 307 as *H. gedeanum*; Bartram (1939) Fig. 431, plate 25; Whittier (1976) Fig. 90 as *Acroporium lepinei*, p. 324; Tan (1994) Figs. 69-71, p. 282; Ramsay et al. (2004) Fig. 1, p. 5.

Distribution and habitat: Indian subcontinent: Sri Lanka. Eastern Asia: mainland China (Guangdong), Hainan, Taiwan. Indo-China: Cambodia, Thailand, Vietnam. Malesia: Borneo (Brunei, East Kalimantan, Sabah, Sarawak), Java, Malaya (Peninsular Malaysia, Singapore), Maluku (Ambon), Philippines, Sulawesi, Sumatra. Papuasia: New Guinea (Irian Jaya, Papua New Guinea), Solomons. Australia: Queensland. Southwestern Pacific: Fiji, Samoa. South-Central Pacific: Society Is. (Tahiti, Raiatea), Marquesas (**Fig. 2).** Epiphytic on tree trunks and branches in upland forests, or on rotten logs or humus. Elevation 700–2,470 m.

Notes. As noted in previous works (Bartram 1939, Tan 1994, Tan *et al.*, 2007), the most diagnostic and stable characters of this species are the consistent erect-patent, broadly lanceolate leaves with short acuminate tips. The leaf outline of *A. hyalinum* var. *hyalinum* varies from ovate-lanceolate to oblong-lanceolate. Compared to the other two varieties, the nominate var. *hyalinum* can be distinguished by its consistently denser growth form, and plants that tend to have predominantly erect-patent leaves with frequent irregular branching and non-recurved leaf tips. For differences with the other varieties see under notes of each one separately.

A few specimens of this variety from Australia and the Philippines have imbricate leaves on the lower stems with erecto-patent leaves on the upper stems. Most of the specimens seen have predominately erecto-patent leaves, although some specimens have imbricate leaves throughout a stem axis. These *A. hyalinum* var. *turgidum* growth forms occur probably because of the similar humid habitat in which var. *turgidum* is found (Tan 1994). This has been demonstrated in other studies, where adaptive traits of bryophyte life form arise convergently but independently even in quite unrelated taxa when they evolve under similar habitat condition (Mägdefrau 1982; Bates 1998; Kürschner 2003). In this study, the differentiation of var. *hyalinum* and var. *turgidum* may be accounted for by environmental variation, but future molecular studies could clarify the relationship between the two varieties.

Nomenclature. In the protologue of *Hypnum hyalinum* Reinw. ex Schwägr. (Schwägrichen 1828), *Hypnum hyalinum* Reinwardt MS is mentioned in the diagnosis, and is accompanied by the following information: "In monte Gedé insulae Javae, et magis compactum in monte Klabad insulae Celebes legit et misit Prof. Reinwardt." This indicates that Reinwardt had both collected the material and sent it to Schwägrichen. Within the protologue of *Leskea straminea* Reinw. & Hornsch. (Reinwardt & Hornschuch 1829) the following locality information is given: "Hab. in monte Klabat in regno Menado Celebes insulae, et in monte Gedé Javae insulae." Wijk *et al.* (1964) indicate the synonymy of this latter taxon with *Acroporium hyalinum*, something that was

previously done by Fleischer (1923), who also stated that the two were identical, although he gave priority to *L. straminea* at that time as he believed this name to have been published in 1826 (Margadant 1968). Given that these two names are ascribed to one entity, and that the collector and type localities given for each are the same, it is reasonable to assume that both names are based in part on the same material that was collected by Reinwardt from two separate localities, and then described independently by Schwägrichen (1828) and Reinwardt and Hornschuch (1829). This would also explain why, among extant material, there appears to be no material from Mt. Gede for *L. straminea*.

There are two specimens in G that attest to this. The lectotype of *Hypnum hyalinum* (G 00113954) has the following label information, written by Schwägrichen, "*Hypnum hyalinum* Suppl. 2 227. *Leskea straminea* Reinw. & H. Musc. Javan act Leopold 14. Mons Gedé Java, Klabat Celebes". The designated isolectotype material (G 00116253) is labelled, "*Hypnum hyalinum* Reinw. e monte Gede Javae, *Leskea straminea*". For the syntypes: G specimen (G 00048702) labelled "e Monte Klabad, insula Celebes *H. hyalinum* acc (illegible word) a Javaeico (and in Schwägrichen's hand) *Hy hyalinum* Reinwardt e monte Klabat ins Celebes adunt". Syntype specimens in L labelled as "Herb. Reinwardt. Van de Gide by Pondok tong et m. Klabat Celebes *Hypnum hyalinum*", and another L specimen labelled "*Hypnum hyalinum* R. e montis Klabat Celebium".

Several other specimens in G and E that may also represent duplicates from the original material of *Leskea straminea* are labelled as follows: "*Leskea straminea* R et Hornsch. *Hypnum hyalinum* Schwaegr. f. 227 (nom R et Hornsch). Java" (G 00048705); "*Hypnum hyalinum* Reinw. Java" (G 00048704); "*Leskea straminea* art Leopold 14. p. 717. R et Horsch. *Hypnum hyalinum* Schw. Java" (G 00048700); "Ins. Celebes Hornschuch. *Leskea straminea* Hornsch" (E 00756906); *Leskea straminea* Insula Celebes R. Hornschuch" (E 00756909).

As effective publication can only be considered when it was circulated in print (Turland *et al.* 2018: Art. 31.1), Schwägrichen (1828) independently published *Hypnum hyalinum* a year earlier than Reinwardt and Hornschuch (1829). Hence, *H. hyalinum* is the earliest available name for this taxon. Below we propose new varietal combinations under this species.

On the other hand, several original specimens need clarification. The type specimen of *Acroporium hyalinoblastum* M.Fleisch. [PC 0567953], which was once listed as synonym of *A. stramineum* (Tan 1994), was annotated by Tan in 1992 on the label as *Acroporium strepsiphyllum* (Mont.) B.C.Tan and not included in his later article on *Acroporium* (Tan *et al.* 2007). Here, we follow Tan's annotation and remove *A. hyalinoblastum* from synonymy of *A. hyalinum*.

Leskea straminea was cited under *Hypnum gedeanum* Müll. Hal by Müller (1851), the type of *H. gedeanum*, a specimen collected by Reinwardt from Mt. Gede in herb. Gottsche, is probably also a syntype or isosyntype of both *Hypnum hyalinum* and *Leskea straminea*.

Sematophyllum pinnatum M.Fleisch. was erroneously listed as synonym of *A. stramineum* var. *stramineum* in Tan (1994) but was later moved under the synonymy of *A. warburgii* (Broth.) M.Fleisch. (Tan *et al.* 2007), which is followed here.

***Representatives Specimens examined*: AUSTRALIA.** Queensland: *D.H.Vitt 27982* (UBC). **INDONESIA.** Java: Mt. Salak, *Zollinger 1816* [Barcode: L 0057117, residual syntype of *Hypnum monoicum* (=*A. hyalinum*)-L]; Sulawesi: Mt. Klabat, *Reinwardt s.n.* [Barcodes: G 00048702, L 0473469, L 0473470, residual syntypes of *Hypnum hyalinum* (=*A. hyalinum*)-G, L]; Sumatra: *Korthals s.n.* (Barcode: L 0057118, residual syntype of *H. monoicum*); Kerinci Seblat National Park, *B.C.Tan 05103*, *05180* (SING); Mt. Pangerango, *Junghuhn s.n.* [Lectotype of *Hypnum monoicum* (=*A. hyalinum*)-L]; **FIJI.** *A.C.Smith 5193*, *5704* (det. as *A. lepinei*-UBC). **FRENCH POLYNESIA.** Taiarapu, *Lepine 15* [Barcode: PC0703307, PC0703308, PC0703309, Isolectotype of *Sematophyllum Lepine* (=*A. hyalinum*)-PC]. **MALAYSIA.** Kedah: Kedah Peak, *R.E.Holttum 15111* (UBC); Sarawak: Gunung Mulu National Park, *A.Touw 19902* (KLU). **NEW CALEDONIA.** *Franc s.n.* (det. as *A. monoicum*-JE); Mt. Dzumac, *Le Rat s.n.* (PC); ibid., *Le Rat s.n.*(JE). **PAPUA NEW GUINEA.** Morobe Province: Sattelberg, Nuselang Station, *L.Kaernbach 41* [Lectoype of *S. ramosissimum* (=*A. hyalinum*)-H-BR]; Port Moresby: Owen Stanley Range, *C.E.Carrl 13869* (F). **PHILIPPINES.** Cagayan Valley: Batanes Islands, *Fenix* (*Bur. Sci. 3856*) [Holotype of *S. batanense* (=*A. hyalinum*)-H-BR]; ibid., *Fenix* (*Bur. Sci. 3856*) (Isotype of *S. batanense*-E). **SRI LANKA.** Central province: Kandy, Hunnasgiriya, ibid., Fleischer's *Musci Frond. Archip. Ind. Exsicc. 324* (PC); Southern province: Galle, Hiniduma, *M.Onraedt 76.L.3468* (JE). **TAHITI.** Taiarapu, *Vesco s.n.* [Barcode: PC 0703311, residual syntype of *Sematophyllum lepinei* (=*A. hyalinum*)-PC]; Taiarapu, *Nadeaud 87* (Barcode: PC 0703310, residual syntype of *S. lepinei*). **TAIWAN.** Taipei, Wulai, *T.Y.Chiang 25714* (UBC). **VIETNAM.** Da Lat: Prenn Pass, *Tixier 2212* (PC).

Acroporium hyalinum* var. *hamulatum (M.Fleisch.) M.S.Chua & B.C.Ho, ***comb. nov.***

Basionym: *Sematophyllum hamulatum* M.Fleisch., *Hedwigia* 44: 316 (1905), *fide* Tan (1994)

=*Acroporium stramineum* var. *hamulatum* (M.Fleisch.) B.C.Tan, *Willdenowia* 24: 285 (1994)

=*Acroporium hamulatum* (M.Fleisch.) M.Fleisch., *Musc. Buitenzorg* 4: 1294 (1923)

Type citation: WEST-JAVA: An Baumästen im Sprühregen der Wasserfälle von Tjiburrum am Gedehgebirge! 1700, (F.); bei Lebak Saït oberhalb Tjiburrum! 2000 m (F.) forma: An steilen Andesitfelsen im Sprühregen der Wasserfälle von Tjiburrum! (F.).

Type: Indonesia. Java, Mt. Gede, Tjiburrum, Fleischer's *Musci Frond. Archip. Ind. Exsicc. 325* (lectotype, designated by Tan (1994: 285): FH; residual syntypes: H-BR 35023, B 300222659!, E 00007256!, JE 04004441!, JE 04004442!, JE 04008323!, PC 0147660!, PC 0657923!, PC 0657924!, PC 0657925!, PC 0657928!, PC 0720742!).

Description: *Plants* forming lax mats, sparsely branched. *Stems and primary branches* long, 7–8 cm in length, may reach up to 12 cm, more or less complanate. Leaf morphology identical to that of var. *hyalinum*. *Leaves* erect to patent, 1.9–2.3 mm long, 0.7–0.9 mm wide, broadly ovate-lanceolate, concave, short acuminate, apices hamate, dentate at recurved tip. *Laminal cells* as in var. *hyalinum*, (34–)40–70 μm long; alar cells enlarged, yellowish to tinted orange, (5–)6–8 cells.

Dioicous. *Setae* up to 2 cm long. *Perichaetial leaves and sporophytes* similar to var. *hyalinum*. **Fig. 3**.

Illustrations: Fleischer (1923): Fig. 207 as *A. hamulatum*, p. 1295; Bartram (1939): Fig. 430 as *Acroporium hamulatum*, plate 25; Tan (1994) Figs. 66-68, p. 282.

Habitat: On bark of trees, on twigs. Elevation 120–2,200 m.

Notes. Although the hamate leaf tips can also be found in some leaves of other *Acroporium* taxa (Tan *et al.* 2007), with various degrees of expression (Tan 1994), they never appear like the leaf apices of var. *hamulatum*, which are distinctly bent almost 180° backwards, like hooks. Furthermore, this character frequently develops in the majority of leaves within a population. The hamate tips, however, are fragile and are often broken off on some of the leaves of old specimens. Although the overall leaf morphology of var. *hyalinum* and var. *hamulatum* resemble each other, the distinct hooked apices, often lax habit and the relatively low tufted plants in var. *hamulatum* separate this variety from var. *hyalinum*. These discernible varieties occur over similar geographical range (Indo-China, Malesia and Pacific) and ecology (common epiphytes on stems and branches from lowland to upper montane forest, usually in moist environment).

***Representatives Specimens examined*: CHINA.** Hainan: *H.Y.Liang 35529b* (UBC). **INDONESIA.** West Java: Tjiburrum, Fleischer's *Musci Frond. Archip. Ind. Exsicc. 325* [Barcodes: B 300222659, E 00007256, JE 04004441, JE 04004442, JE 04008323, PC 0147660, PC 0657923, PC 0657924, PC 0657925, PC 0657928, PC 0720742, residual syntypes of *Sematophyllum hamulatum* (=*A. hyalinum* var. *hamulatum*)-B, E, JE, PC]; Tjipanas Natural Reserve, *Noerta 50/405B* (BO). **MALAYSIA**. Pahang: Cameron Highlands, *G.Gunaseelan & Ponniah 317* (KLU); Sabah: Imbak Canyon Conservation Area, *M.S.Chua 77* (BORH); **PHILIPPINES.** Luzon: Mount Santo Tomas, *H.H. Bartlett 13284a* (FH).

Acroporium hyalinum var. turgidum (Mitt.) M.S.Chua & B.C.Ho, ***comb. nov.***

Basionym: *Acroporium turgidum* Mitt., *J. Linn. Soc. Bot*. 10: 183 (1868)

Replaced synonym: *Hypnum turgidum* Dozy & Molk., *Ann. Sci. Nat. Bot*. sér. 3, 2: 309 (1844) *nom. illeg., non H. turgidum* (Hartm.) Hartm. (1843)

Acroporium stramineum var. *turgidum* (Mitt.) B.C.Tan, *Willdenowia* 24: 286 (1994)

Type citation: Borneo, Sumatra, Java.

Type: Indonesia. Java, Sederatoe, *Korthals s.n.* (lectotype designated by Tan (1994: 286): L 0057120!; isolectotype: L 0623788!); residual syntypes: Borneo, *leg. ign.* (L 0057128!); Sumatra, *Korthals s.n.* (L 0057121!, PC 0703327!).

Description: Morphologically similar to the type variety. *Plants* large, forming thick cushions. *Stems and primary branches* long, to 5 cm in length, tumid and turgid. *Leaves* (1.5–)2.0–2.8(–3.0) mm long, 1.0–1.1 mm wide, mostly imbricate, at times with slight erect-spreading leaves on lateral side of the branches, broadly ovate-lanceolate to lanceolate, strongly concave, wrinkled to undulate, apices short acuminate. *Laminal cells* (40–)50–80(–100) um long; alar cells enlarged, yellowish to dark brown, (3–)4–6 cells in a single row.

Setae 1.5–2(–2.2) cm long, urn 1.3–3.0 mm long, 0.8–1.5 mm wide. *Perichaetial leaves and sporophyte* similar to the typical variety. **Fig. 4**.

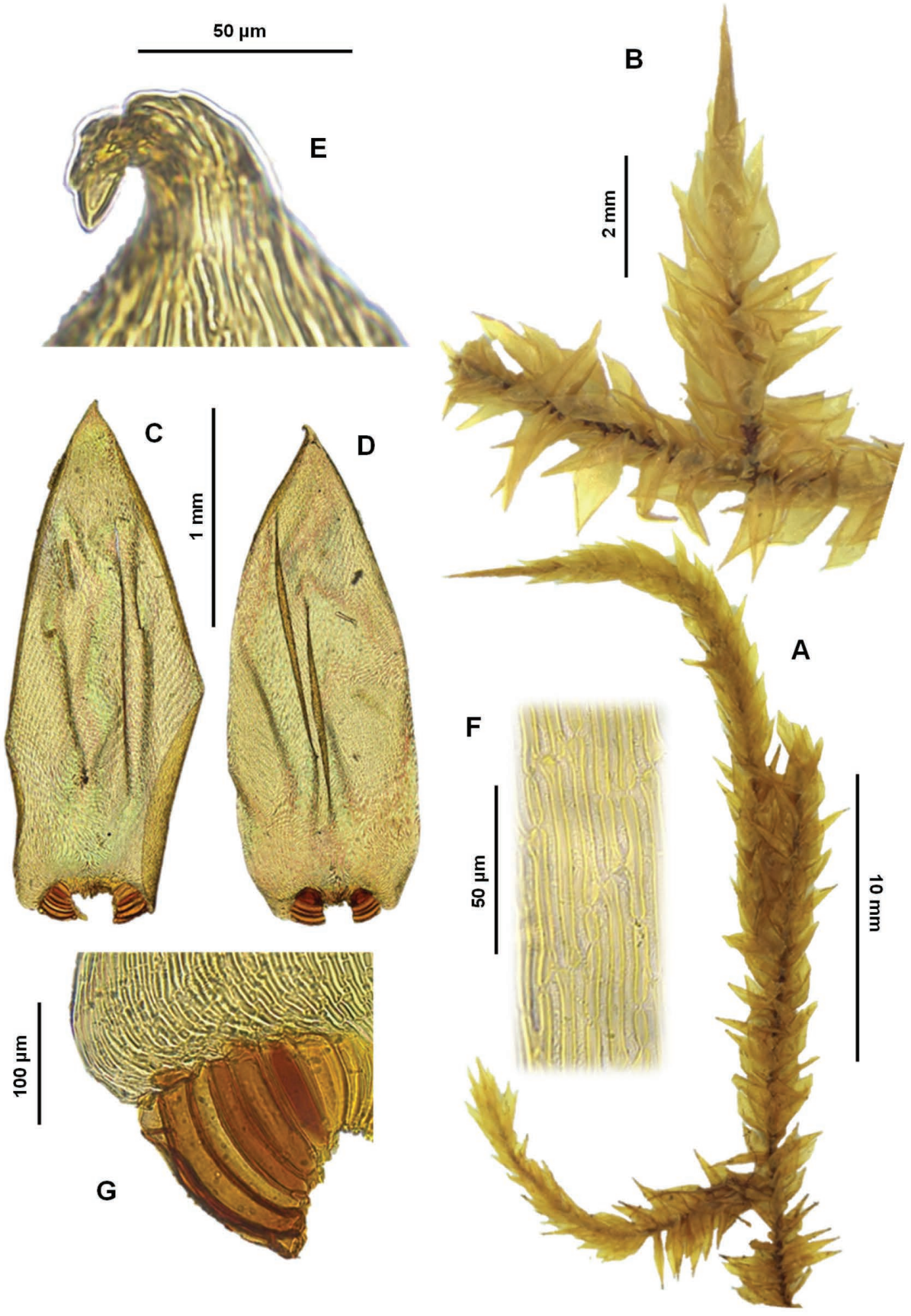

Fig. 3. *Acroporium hyalinum* var. *hamulatum*. A: Habit of stem. B: Habit of branch. C–D: Leaves. E: Apical leaf cells. F: Median laminal cells. G: Alar region. [Based on Fleischer's *Musci Frond. Archip. Ind. Exsicc. 325* (B300222659), syntype of *Sematophyllum hamulatum*]

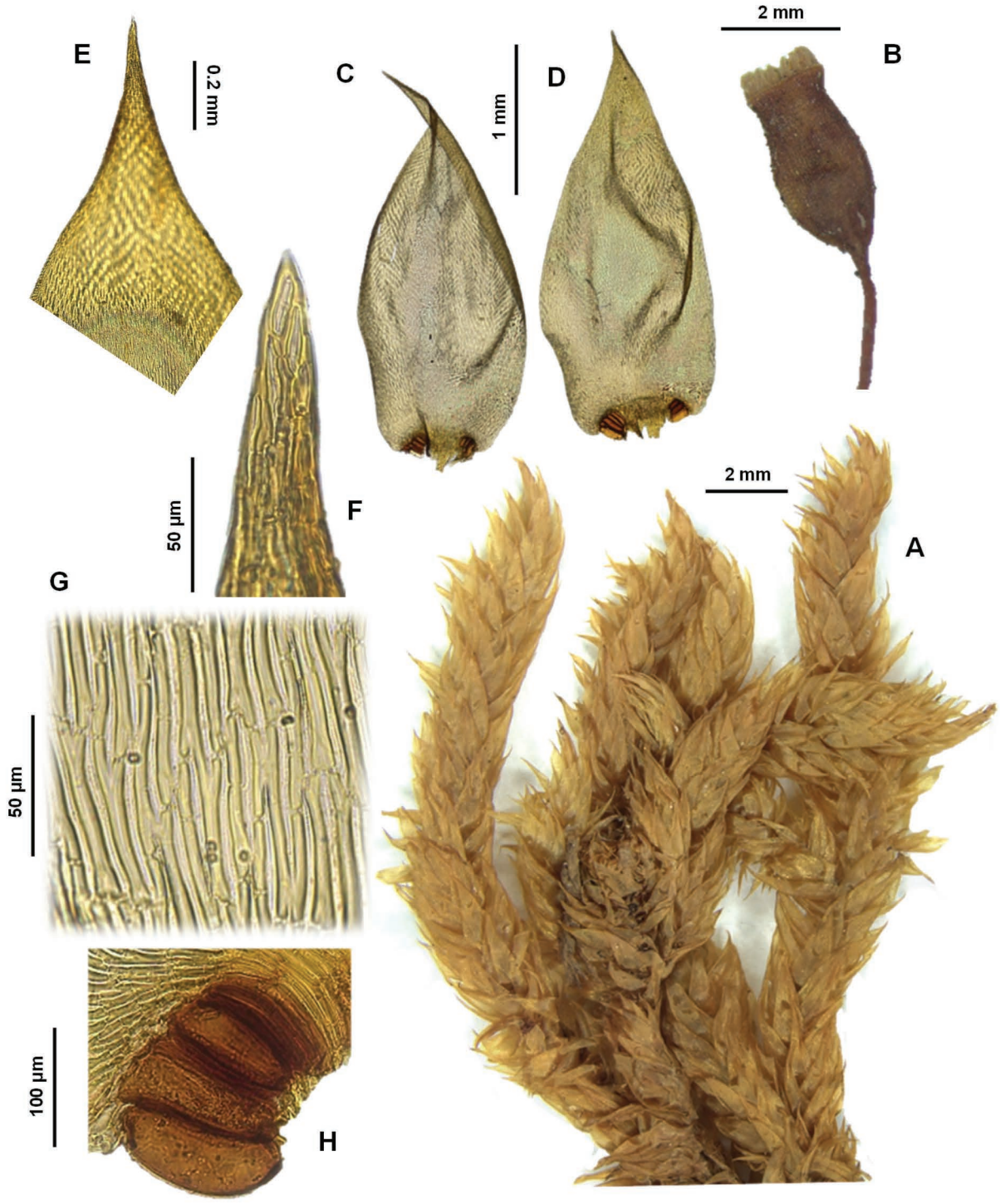

Fig. 4. *Acroporium hyalinum* var. *turgidum*. A: Habit of stem. B: Sporophyte. C–D: Leaves. E: Leaf apex. F: Apical leaf cells. G: Median laminal cells. H: Alar region. [Based on *Korthals s.n.* (L0623788), isolectotype of *Acroporium turgidum*]

Illustrations: Dozy and Molkenboer (1869) tab 303 as *Hypnum turgidum*; Fleischer (1923) Fig. 209 as *Acroporium turgidum*, p. 1300; Tan (1994) Figs. 72-77, p. 282.

Distribution and habitat: Indian Subcontinent: Sri Lanka. Eastern Asia: Hainan, Taiwan. Indo-China: Cambodia. Malesia: Borneo (Sabah, Sarawak), Java, Philippines. Papuasia: New Guinea (Papua New Guinea). Southwestern Pacific: Samoa, Vanuatu. Growing on tree trunks, branches and humid ground inside forests at elevations between 730 and 1,910 m.

Notes. The consistent imbricate leaf-arrangement is diagnostic for var. *turgidum*. The plant is rather rigid and form relatively tight cushions. Leaves of var. *turgidum* are also more concave, with mature leaves consistently longer (above 2 mm) and wider (above 1 mm wide) than in the other two varieties.

Typification: The name *Hypnum turgidum* Dozy & Molk. (1844) is an illegitimate homonym of *H. turgidum* (Hartm.) Hartm. (1843) (Art. 53.1 of Turland *et al.* 2018), and *Acroporium turgidum* Mitt. was proposed as a replacement name (Turland *et al.* 2018: Art. 58.1). Because the replacement name is typified by the type of the replaced synonym (Turland *et al.* 2018: Art. 7.4), the species was typified by Tan (1994) when he designated a lectotype for *Hypnum turgidum* Dozy & Molk.

There are several specimens located in herbarium L. The first specimen packet bearing barcode L 0057120 contains two sheets. The sheet from Sederatoe, Java has four stems glued on and were annotated on sheet by both Tan in 1992 and Touw in 2003 and 2005 as the lectotype. This sheet is here confirmed as the lectotype. The other sheet contains a short piece of stem glued on, with handwritten protologue information added and confirmed by Touw as being that of Molkenboer. However, the specimen on this sheet was probably collected from Sumatra (annotated by Touw in 2003), while the larger part of the same collection has very likely been moved to second packet with barcode L 0057121. The last specimen is labelled from Sederatoe [barcode: L 0623788], probably from the same gathering as the lectotype and is treated here as an isolectotype.

***Representatives Specimens examined*: BORNEO.** *leg. ign.* (Barcode: L 0057128, residual syntype of *A. turgidum*-L). **INDONESIA.** East Kalimantan: East Kutai, Balikpapan, *W.Meijer B.1640* (BO); Lesser Sunda Islands: Manggarai district, *A.Touw & M.Snoek 23139A* (BO) ; Sumatra, *Korthals s.n.* (Barcode: L 0057121, PC 0703327, residual syntypes of *A. turgidum*-L). **MALAYSIA.** Sabah: Imbak Canyon Conservation Area, *M.Suleiman 4527* (BORH); ibid., *M.S.Chua 72* (BORH). **SAMOA.** *Powell s.n.* (Barcode: 1178872, det. as *A. turgidum*). **VANUATU.** *W.Gunn B3311* (E); ibid., *W.Gunn B3302* (UBC).

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