Hisatsugu Ando*: Some little known species of the Asiatic Hypnum

Of the species of Hypnum described from Asia, some have been insufficiently known or erroneously understood. The five Hypnum treated here are the examples. Their original descriptions, all without a figure, are short or sometimes even misleading. Doignon (1953), in his treatise of Hypnum of the world, gave short diagnoses of these species excepting H. submolluscum Besch., but his observations were rather rough and in some respects unacceptable. In this paper I make detailed descriptions and illustrations of the species based on their type specimens, and offer remarks on distinction, with which I hope to contribute to Asiatic bryology.

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1. Hypnum sikkimensense Ando, nom. nov. Fig. 1.


Plants robust. Stems prostrate, up to 7 cm in length, regularly pinnate; in cross-section cortical cells with thickened walls, 4-5-seriate, colored with brownish-yellow, somewhat enlarged in the outermost layer, central strand slightly differentiated; branches 0.4-1 cm long. Stem leaves falcate-secund, gradually narrowed to the insertion, 2-2.2 mm long and 0.6-0.8 mm wide, not plicate; margins plane, subentire; costa double, short or indistinct; basal cells colored with reddish-yellow; alar cells enlarged and hyaline, sometimes forming distinct excavations, above these small subquadrate cells 3-5 along the margin. Branch leaves smaller, 1.3-1.5 mm

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long and 0.4–0.6 mm wide; margins plane, almost entire or finely serrulate above; costa indistinct; median cells 40–60×±3 μ in lumen, with rather thin walls; alar hyaline cells much fewer. Monoicous. Inner perichaetial leaves wide-lanceolate, smooth or only slightly plicate below; margins subentire; costa indistinct. Seta purplish-red, 3–3.5 cm long; capsule (young) inclined, long-cylindric, with a small conic operculum.

Type specim. exam. Sikkim: Lachen, 9000 ped. (J. D. Hooker no. 976)—holotype in NY.

Distribution. Only known from the type locality.

Remarks. The well-differentiated, sometimes strongly excavated, alar hyaline regions of stem leaves and the subentire leaf-margins are remarkable. The slender cylindric capsule with a small operculum is seemingly characteristic, but such a feature of the capsule may be attributed to its young age and is accordingly unessential. From Hypnum plumaeforme Wils. this is different in having scarcely cordate leaves with wider acumen and almost smooth, subentire perichaetial leaves (in H. plumaeforme perichaetial leaves are strongly plicate and serrate).

As the name Hypnum perspicuum (Mitt.) Jaeg. is illegitimate because it is a later homonym of Hypnum perspicuum Hampe [Linnaea 31: 529 (1862)=Mittenothamnium diminutivum (Hampe) Britt.], the species is hereby renamed as above.

The other specimen named "Stereodon perspicuus" from Bhutan (Griffith no. 552) attached on the same sheet with the holotype is not H. perspicuum. It is rather referable to H. flaccens that will be treated later.


Plants comparatively robust, somewhat glossy. Stems up to 8 cm in length, regularly and laxly pinnate, rarely bipinnate; in cross-section cortical cells thick-walled, 3-seriate, colored with brownish-yellow, medullary cells larger and with comparatively thick, pitted walls, central strand developed; branches irregularly patent, to 1.7 cm in length, attenuate. Stem leaves falcate-secund, subcircinate, broadly ovate-lanceolate, gradually or a little abruptly narrowed to an acumen, subcordate at base, 1.7–2 mm long and 0.6–0.9 mm wide, usually plicate; margins plane, rarely recurved below, subentire to serrulate; costa double, indistinct but sometimes considerably stout; basal cells colored with brownish-yellow; alar parts very weakly differentiated, with only a single or a few enlarged hyaline cells, above
Fig. 2. *Hypnum macrogynum* Besch. (drawn from Delavay no. 4135-syntype). A, B. Stem leaves, \( \times 28 \). C. Basal angle of stem leaf, \( \times 270 \). E, F. Branch leaves, \( \times 28 \). G. Basal angle of branch leaf, \( \times 270 \). H. Apical part of branch leaf, \( \times 270 \). I. Median cells of branch leaf, \( \times 270 \). J. Capsule, \( \times 14 \). K. A part of the cross-section of stem, \( \times 270 \). L. Inner perichaetial leaf, \( \times 28 \).
these small subquadrate cells 2-3 along the margin. Branch leaves smaller, 1-1.5 mm long and 0.4-0.6 mm wide; margins usually recurved below; median cells 40-60x2.5-3 μ in lumen; alar parts scarcely differentiated. Dioicous. Inner perichaetial leaves lanceolate with a long slender acumen, slightly plicate, subentire to serrulate, ecostate. Seta up to 4.7 cm in length, reddish-yellow; capsule yellowish-brown, inclined, very large, obovate-cylindric, 4 mm long excl. operculum and 1.3 mm thick, slightly arcuate when dry, operculum conic-obtuse; annulus 2-3-seriate.

Type specim. exam. China: Yun-nan, bois de Kiaoche-tong, versant oriental de Hee-chan-men, 11 oct. 1887 (Delavay s. no.); Yun-nan, bois de Ma-eul-chan, 9 sept. 1889 (Delavay no. 4135)—syntypes in PC.

Distribution. China [Yun-nan (Bescherelle 1892, Brotherus 1929), Szechwan (Brotherus 1929)].

Remarks. The Delavay's no. 4135 specimen has good fruits whose characters conform well to the original description and is selected as lectotype.

Bescherelle compared this species with Hypnum callichroum Brid., H. crista-castrensis Hedw. and H. imponens Hedw., and emphasized its "entire leaves without costa" as a distinctive character, but such a feature of leaves in this species is not constant. The leaf-margins are sometimes serrulate and the costa is occasionally strong. The most important character of this species is the large capsule attaining 4 mm in length. From the preceding H. sikkimense, this is different primarily in its less differentiated alar parts of stem leaves. In Wijk & al.'s Index Muscorum 3: (1964), H. macrogynum is cited as a synonym of Hypnum plumaeforme Wils. following Doignon (1953). Indeed this species bears a close resemblance to H. plumaeforme, from which, however, it can be separated by the less differentiated alar cells of stem leaves, usually recurved margins of branch leaves (plane in H. plumaeforme) and by the larger capsule.


Plants robust, somewhat glossy. Stems prostrate, regularly and rather loosely pinnate, 8 cm long or more; in cross-section cortical cells 3-5-seriate, with thickened,
brownish walls, medullary cells suddenly enlarged and thinner-walled, central strand weakly developed; branches 0.3-1.2 cm long. Stem leaves falcate-secund, broadly ovate-lanceolate, with a rather short acumen, subcordate at base, 1.6-2 mm long and 0.9-1 mm wide, slightly plicate; margins plane, sometimes recurved below, serrulate above; costa double, distinct, reaching to or above 1/3 the leaf-length; basal cells colored with brownish-yellow; alar cells enlarged and thin-walled, forming conspicuous hyaline regions, above these small subquadrate cells 2-3 along the margin. Branch leaves smaller, 1.3-1.5 mm long and 0.5-0.7 mm wide, more strongly plicate; margins usually recurved below; median cells 50-70×±3 μ in lumen, sometimes provided with papilae at upper angles on both dorsal and ventral sides; alar hyaline cells fewer. Inner perichaetial leaves lanceolate with a long slender acumen, plicate, subentire to faintly serrulate; costa obsolete.

Type specim. exam. China: Yun-nan, bois de Ma-eul-chan, à 2800 m d’altitude, 9 juil. 1889 (Delavay s. no.)—holotype in PC.

The above description was made on the basis of holotype specimen lacking fruits. Sporophytes were observed in other specimens (Mitten Herb. in NY) named Hypnum monticola Mitt. from Khigumpa (Assam ?, Griffith s. no. 152) and Bhutan (Griffith s. no.) which are undoubtedly referable to H. flaccens.

Additional description. Seta up to 4.5 cm in length, reddish-brown; capsule reddish-brown, inclined, obovate-cylindric, 2-3 mm long excl. operculum and 0.8-1 mm thick, slightly arcuate when dry; operculum conic-apiculate.

Distribution. H. flaccens has been known only from the type locality, but it seems to be widely distributed in the region ranging from Yun-nan to the eastern Himalayas. ‘Hypnum plumaeforme’ sensu Horikawa (1955; cited in Ando 1958) and Hypnum nakaoanum Ando (Noguchi 1964) reported from Nepal are apparently identical with H. flaccens. I saw other specimens from Sikkim, Bhutan and Assam (?)..

Remarks. This species is similar to the preceding H. macrogynum, from which it can be distinguished by the somewhat larger leaves with stouter costae, better-differentiated alar regions and a little longer lamina cells. Hypnum plumaeforme is also akin to this, but it is different in the leaves being less plicate, more slender in acumen, plane at the margins (usually recurved below in H. flaccens), and with weaker costae.

Fig. 4. A–F. *Hyphnum flaccens* Besch. (drawn from Griffith no. 152, named *Hyphnum monto-
Plants robust. Stems prostrate, up to 12 cm in length, yellowish-brown, regularly and rather loosely pinnate; branches 0.3-1 cm long. Stem leaves falcate-secund, broadly ovate at base and gradually lanceolate to a rather short acumen, narrowed to a subcordate base at insertion, 2-2.7 mm long and ±1 mm wide, more or less plicate; margins plane, serrulate above; costa double, very strong, reaching to or above 1/3 the leaf-length; alar cells enlarged, thin-walled and hyaline, forming well-delimited regions, above these small subquadrate cells 2-3 along the margin. Branch leaves smaller, 1.3-1.6 mm long and 0.4-0.6 mm wide; margins more conspicuously serrulate, sometimes recurved below, costa shorter; median cells long, 60-80×±3 μ in lumen, sometimes provided with papillae at upper angles; alar cells far reduced in differentiation. Sporophyte unknown.

Type specim. exam. Burma (com. Monguilloy)—syntype in PC.

Distribution. China, Burma, Sikkim (other two syntype specimens from Sikkim and Yun-nan were simultaneously cited by Renauld & Cardot).

Remarks. As compared with H. flaccens, this species has longer lamina cells, but in other characters, it exhibits no difference sufficient to warrant a specific separation from H. flaccens. I think this species may possibly be included in the variation range of H. flaccens. A definite conclusion is, however, reserved for further study based on a larger collection. Cardot (1915) has reduced H. zickendrahtii to a synonym of Hypnum aduncoides (Brid.) C. Muell. known from Africa (Bourbon, Madagascar). As I have not studied the specimen of H. aduncoides, I cannot at present offer any comment on such treatment by Cardot.


Plants medium in size. Stems prostrate, up to 5 cm in length, regularly pinnate, rarely bipinnate; in cross-section cortical cells ±4-seriate, yellowish, medullary cells rather thick-walled, central strand differentiated; branches 0.4-1 cm long; leaves strongly falcate-secund and homomallous. Stem leaves ovate-lanceolate, gradually narrowed to a subcircinate acumen, subcordate at base, 1.5-1.7 mm long and 0.4-0.5 mm wide, sometimes plicate, rarely rugose above; margins plane, rarely

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excl. operculum and ±0.7 mm thick; cilia 1-2.

Type specim. exam. China: Yun-nan, bois de Ma-eul-chan, 10 sept. 1889 (Delavay no. 3892)—syntype in PC.

Distribution. China [Yun-nan (Bescherelle 1892), Szechwan (Brotherus 1929)].

Remarks. This species, as the specific epithet indicates, resembles Ctenidium molluscum (Hedw.) Mitt. in appearance, but leaf-characters are quite different. The most closely related species is Hypnum fertile Sendt., from which it is distinguished by the shorter acumen and usually plane leaf-margins (usually recurved below in H. fertile).

These species, except for H. submolluscum, treated in this paper show a strong resemblance to H. plumaeforme Wils., a species common in East Asia, and also to H. sakuraii (Sak.) Ando, which is known at present only from Japan, in both general appearance and leaf-features. So they are apt to be confused with each other. For the more practical identification of these species, a key is presented as follows:

Key to Hypnum plumaeforme and its allied species

1. Alar parts of stem leaves poorly differentiated, with a single or a few enlarged hyaline cells; capsule very large, attaining 4 mm in length (excl. operculum); known from southwestern China.....................H. macrogynum Besch.

1. Alar parts of stem leaves well-differentiated, with more numerous enlarged hyaline cells; capsule smaller, 3–3.5 mm at longest (excl. operculum)........2

2. Leaves more or less plicate; margins of branch leaves usually recurved below...3

2. Leaves not or only slightly plicate; margins of branch leaves usually plane ....4

3. Lamina cells 50-70 μ long at the median part of branch leaves; ranging from southwestern China to eastern Himalayas......................H. flaccens Besch.

3. Lamina cells longer, 60-80 μ at the median part of branch leaves; known from southwestern China, Burma and Sikkim ......H. zickendrahtii Ren. et Gard.

4. Leaves cordate or subcordate at base; acumen slender, 7–11° in angle; distributed widely in East Asia..............................H. plumaeforme Wils.\(^1\)

4. Leaves not or less cordate at base; acumen wider, 10–15° in angle.............5

5. Costa usually distinct; lamina cells 60-90 μ long at the median part of branch leaves known from

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leaves; endemic to Japan .........................H. sakuraii (Sak.) Ando

5. Costa indistinct; lamina cells shorter, 50-70 μ long at the median part of branch leaves; only known from Sikkim .........................H. sikkimense Ando

**Literature**


kawa (1955) により "Hypnum plumaeforme" として、また同じくネパールからNoguchi (1964) により Hypnum nakaoanum Ando として報告されたものはいずれもH. flaccens に相当する。ビルマ、シキム、中国（雲南省）から同時に発表されたHypnum zickendrahtii Ren. et Card. は、ビルマ産のsyntype 標本によると、葉の細胞が長い（50〜70 μ に対し 60〜80 μ）ことを除いては、H. flaccens と類著な差異がなく、恐らく同種と思われるが、さらに多数の標本にもとづいて検討する必要があり、本報では synonym におとすことを保留した。Cardot (1915) は本種をアフリカ産（ブルボン、マダガスカル）の Hypnum aduncoides (Brid.) G. Muel. と同じものと考えた。筆者はまだ H. aduncoides の標本を見ていないので、Cardot の取扱いについて何も意見を述べることができない。Hypnum submolluscum Besch. は中国西南部（雲南、四川）に分布する種であるが、系統的には Hypnum fertile Sendt. に近いようである。以上5種のうち、H. submolluscum を除いた4種は、外観や葉の形態が H. plumaeforme や日本特産の Hypnum sakuraii (Sak.) Ando に酷似していて、間違われやすい。そこでこれらの種を識別するための検索表を作成、提示した。


本書は、ドイツのゲッチンゲン大学の基礎造林学研究所長のハルトマンと、同じ研究所のヤーンの共著になる。これは Ökologie der Wälder und Landschaften の第1 巻で、以下第2、第3 巻もつづいて刊行されることになっている。本書はハルトマンの1931年らいの群落分類学的、植物地理学的、群落生態学的研究の集大成ともいうべきもので、前著の Waldgesellschaften der deutschen Mittelgebirge und des Hügellandes (1959) とか Grandlagen der Forstwirtschaft (1959) その他の業績のもとになった資料をふくむ。内容は対象とした地域、方法、群落・気候・土壌の略記法、群落分類法、群組成表の解説（46〜275頁）、各組成表に対応する土壌の特性表（276〜360頁）、常在度表の解説（361〜570頁）、文献、群集名索引などからなる。ここで森林群落については、現在同じ大学の生態学者であるエレンベルクの全層群落（草本層、コケ層までふくむ）の考え方をしたがい、ブロン・ブランケの立場で群落分類を行なっている。組成表の各地点ごとに解説がついているので、単に概括的でなく立ちえって具体的な資料にあたりたい場合にはきわめて便利である。ルブナーの森林生態地理学 (Rubner, K.: Die pflanzen-geographischen Grundlagen des Waldbaues, Neumann Verlag, Radebeul, Berlin, 1960) のようなものと併読すると、ヨーロッパの森林植生の理解に資するところが大きいであろう。理学畑でなく林学畑の人がこうした一見遥回りのような天然林の群落と立地の資料をつみあげることに敬服させられた。