

CHAPTER IV

RESULTS



The 40 species recorded are:-

1. Acanthocladium deflexifolium. Rent & Card.
2. Acanthocladium longipilum Broth.
3. Acanthocladium penicillatum (Mitt.) Broth.
4. Acanthocladium piliferum (Broth.) P.Tx.
5. Acanthocladium surculare (Mitt.) Broth.
6. Acanthorrhynchium papillatum (Harv.) Fleisch.
7. Acroporium aciphyllum Dix.
8. Acroporium diminutum (Brid.) Fleisch.
9. Acroporium hamulatum (Fleisch) Fleisch.
10. Acroporium hermaphroditum (C.Muell) Fleisch.
11. Acroporium lamprophyllum Mitt.
12. Acroporium laosianum (Broth & Par.) Broth.
13. Acroporium punctuliferum (Theu. & Mitt.) Fleisch.
14. Acroporium secundum (Reu. & Hsch.) Fleisch.
15. Acroporium sigmatodontium (C.M.) Fleisch.
16. Aerobryidium filamentosum (Hook.) Fleisch.
17. Aerobryopsis longissima (Dr. & Mb.) Fleisch.
18. Brotherella amblystegia (Mitt.) Broth.
19. Chionostomum rostratum C.M.

20. Clastobryum serrulatum R.et.C.
21. Foreauella orthothecia (Schew.) Dix & Vard.
22. Gammiella pterogonoides (Harv.) Broth.
23. Mastopoma perundulatum (Dix.) Horih & Ands.
24. Meiothecium microcarpum (Hook.) Mitt.
25. Sematophyllum caespitosum Bruch.
26. Sematophyllum microcladiellum Fleisch.
27. Sematophyllum phaenicum (C.M.) Fleisch.
28. Sematophyllum subhumile (C.M.) Fleisch.
29. Sematophyllum tristiculum (Mitt.) Fleisch.
30. Stereophyllum anceps (Bosch. & Lac.) Broth.
31. Taxiphyllum taxirameum (Mitt.) Jaeg.
32. Taxithelium alare (Broth.)
33. Taxithelium arnottii Thér
34. Taxithelium nepalense (Schw.) Broth.
35. Taxithelium vernieri (Dub.) Besch.
36. Trichosteleum boschii (D.et.M.) Jaeg.
37. Trichosteleum chaetomitriopsis Dix.
38. Trichosteleum hamatum (D.Et.M.) Jaeg.
39. Trismegistia lancifolia (Harv.) Broth.
40. Trismegistia rigida (Mitt.) Broth.

Descriptions of all taxonomic categories concerned are provided in details below.

Family Sematophyllaceae

Plants in various sizes, pale, robust, slender, in dense mats or tufts. Stems creeping or ascending, often pinnate or irregularly branched, without amphigastria. Paraphyllia absent.

Leaves ovate, lanceolate, mostly acuminate. Costa absent or slightly short or double. Leaf cells linear or elongate - rhombic, smooth or papillate over the lumen. Alar cells few, thickened or coloured.

Pleurocarpous mosses; seta elongate, smooth or rough above; capsules rather small, ovoid or cylindrical, nodding or horizontal, rarely erect; lid long and slenderly beaked; peristome teeth double, thin, transversely barred.

Key to the genera of Sematophyllaceae

1. Costa present.
 2. Plant large, leaf margin dentate, rib longer than $\frac{3}{4}$ the length of the leaf.
 3. Leaves gradually narrowed, leaf cells rhombic
.....1 Aerobryopsis.
 3. Leaves lanceolate, abruptly narrowed into a long narrow point, leaf cells elongate...2 Aerobryidium.
 2. Plant small, leaf margin entire, rib longer than $\frac{1}{4}$ the length of the leaf, leaves oblong, obtuse or shortly pointed3 Stereophyllum.
1. Costa absent.
 4. Alar cells forming a smaller group sometime nearly absent.
 5. Leaf margin entire, primary stem creeping, densely pinnate4 Foreauella.
 5. Leaf margin dentate.
 6. Leaves ovate or lanceolate, leaf cells papillate.5 Taxithelium.
 6. Leaves oblong - lanceolate, leaf cells smooth or papillate at the upper end..6 Taxiphyllum.
 4. Alar cells forming a group of equally developed larger or smaller in several horizontal rows.

7. Leaf margin entire, seldom finely dentate near apex
8. Alar cells forming a group in several horizontal rows, yellow or brown. Leaf oblong - lanceolate, short acuminate, leaf cells smooth, elongate7 Gamiella.
8. Alar cells large, hyaline or color in one horizontal row, seldom with a few small cells in a second row above.
9. Leaf falcate, homotropous. Branch leaves elliptic gradually attenuated into a narrowly subulate point, alar cells sometime with transverse walls
.....8 Brotherella.
9. Leaf spreading, erect or squarrose.
10. Leaves of branches radially arranged. Alar cells thin - walled.
11. Leaves oval, short - pointed, spreading, secondary stems irregularly branched.
.....9 Meiothecium.
11. Leaves longly elliptic, erect - spreading, secondary stems regularly pinnate.....
.....10 Chionostomum.
10. Leaves of branches in several ranked. Alar cells few but large, inflated and colored,
12. Leaves lanceolate, acuminate, leaf cells usually incrassate smooth or somewhat scabrous
.....11 Acroporium.

12. Leaves oblong - elliptic, leaf apex blunt or with a short or subulate point.12 Sematóphyllum.
7. Leaf margin distinctly dentate, at least near apex.
13. Leaf cells uni-papillate or seriate over the lumen, elongate or rhombic.
14. Leaves subcomplanate, leaf cells rhombic. Alar cells hyaline13 Acanthorrhynchium.
14. Leaves usually falcate, leaf cells elongate. Alar cells hyaline or pale yellow.....14 Trichosteleum.
13. Leaf cells smooth, elongate.
15. Alar cells forming a group in several horizontal rows, yellow or brown.
16. Leaves more or less distinctly bordered, upwards widely and sharply dentate.....
.....15 Trismegistia.
16. Leaves not bordered, subhomotropous to falcate.....16 Mastopoma.
15. Alar cells few, very large, hyaline or yellow
17. Secondary stems densely pinnate. Alar cells in one horizontal row, incrassate or with a few small cells in a second row above.....
.....17 Clastobryum.
17. Secondary stems bipinnate, irregularly branched or regularly pinnate. Basal margin above the alar cells with a few hyaline cells
.....18 Acanthocladium.

1. Aerobryopsis. Fleisch.

Aerobryopsis Fleisch, Hedwigia 44 (1905) 304

Plants large, robust, lustrous, in densely mats or tufts, feathery masses. Secondary stems long, usually pendulous, irregularly branched, branches densely foliation more or less flattened. Leaves spreading, ovate, acuminate, smooth or undulate; costa present, ending about halfway or more; leaf cells oval - rhomboidal or linear, distinctly unipapillate; alar cell absent, cell at basal angle subquadrate.

Seta slender, elongate, more or less scabrous; capsule erect or curved, ovoid - cylindric; peristome teeth papillose.

Species one; an exsiccata of B.K.F.

Aerobryopsis longissima (Doz. and Molk.) Fleisch.

Aerobryopsis longissima (Doz & Molk.) Fleisch;

Hedwigia 44 (1905) 305. Synonyms:-

Neckera longissima Doz & Molk., Musc. Frond.

n. sp. Archip. Ind. (1844) 18.

Meteorium lanosum Mitt., Journ. Linn. Soc. Suppl 1

(Musc. Ind. or.) (1859) 90.

Plants large, dioicous, normally robust, glossy, pale or yellowish green. Secondary stems erect or pendulous, irregularly pinnately branched, short, widely spreading, complanate. Leaves

in several - ranked, lanceolate, gradually narrowed, acuminate, broad at the base, about 1.0 - 1.5 mm. wide and 2.0 - 2.5 mm. long ; leaf margin denticulate, undulate above; costa present, divided the leaf lamina into two nearly equal parts, longer than 1/2 the length of the leaf; leaf cells linear - rhomboidal, distinctly unipapillate over center of lumen, about 4 - 5 μ wide and 20 - 35 μ long; alar cell absent, cells at basal angle subquadrate.

Seta slender, more or less scabrous, about 1.5 - 2.0 cm. long; capsule erect or curved, ovoid - cylindric, small, about 0.5 mm. wide and 1.5 mm. long; peristome teeth papillose, with transversely striate, about 0.65 mm. long.

Habitat : Forest rich in bamboo along streamlet, on trees.

Illustrations : Figure I, 1.1 - 1.6

Specimens examined : Loei, Phu (Mt.) Krading; Alt: 1150 - 1200 m; A Touw No. 10945, No. 10948 (B.K.F.) Chiangmai, Doi (Mt.) Suthep; Alt: 1600 - 1650 m : O. Manop No. 104, No. 125, No. 127. (Dept. of Botany, Chulalongkorn University.)

Figure I

Aerobryopsis longissima (Doz. and Moek.) Fl.

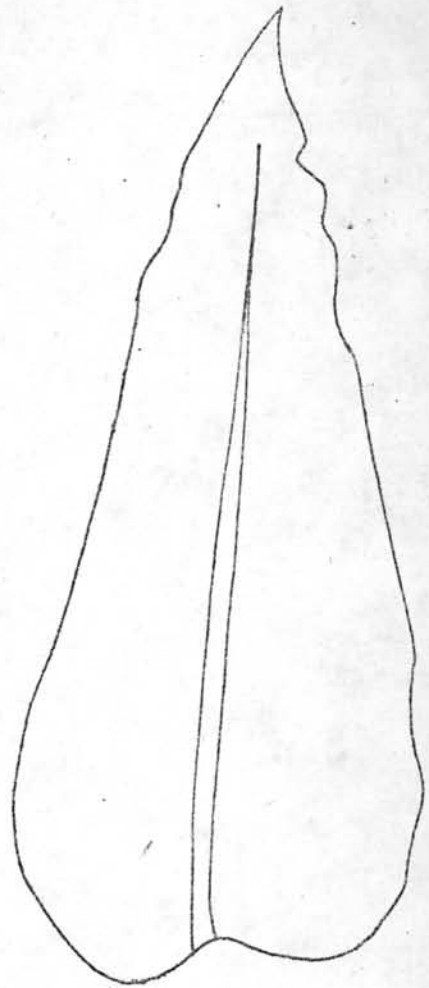
- 1.1 Plant X 1
- 1.2 Leaf arrangement X 10
- 1.3 Leaf X 45
- 1.4 Dry capsule X 15
- 1.5 Peristome teeth X 100
- 1.6 Leaf cells showing unipapillate
and basal leaf cells X 240



1.1



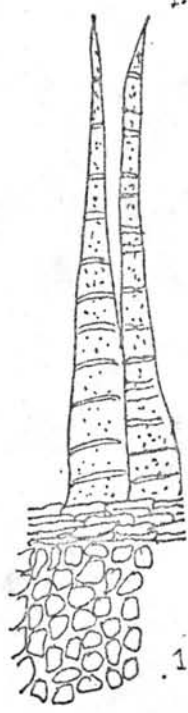
1.2



1.3



1.4



1.5

006541



1.5

2. Aerobryidium Fleisch:

Aerobryidium Fleisch; in Engl. Nat. Pflzi 1 c.p. 820 (1906)

Plant large, in glossy mats. Secondary stems more or less pinnately branched, erect or pendulose. Leaves crowded, oblong - lanceolate, abruptly narrowed into a long narrow point; costa present, single or double, longer than $1/3$ the length of the leaf, exceeding the middle of the leaf lamina; alar cell absent; cells at basal angle subquadrate; leaf cells elongate - rhombic.

Seta elongate; capsule horizontal or suberect; lid rostrate; peristome teeth yellow, densely transversely striate.

Species one; an exsiccata of B.K.F.

Aerobryidium filamentosum (Hook.) Fleisch.

Aerobryidium filamentosum (Hook.) Fleisch

in Engl. Nat. Pflzj 1. c.p. 821 (1906). Synonyms:-

Neckera filamentosa Hook. Musc. exot. p 14, t. 158 (1818)

Steud. Nom. Cryptog. p. 294. (1824); griff. Not. p. 462 (1849)

Polytrichum filamentosum Brid. Bryol.

Univ. II, 264 (1827); C. Muell Syn II, p. 153 (1851)

Meteorium filamentosum (Hook.) Mitt. Musc.

Ind. or p. 91, in Journ linn. Soc. Suppl. 1859; Bryol. Jav. II, p. 228 (1870)

Plants large, dioicous, in rather rigid, glossy, in dense mats, when dry colour become dark - brown at the base and yellowish at the tip. Secondary stems more or less pinnately branched,

erect or pendulous. Leaves in several - ranked, oblong - lanceolate, long acuminate, narrow at the tip, broad at the base, about 1.0 - 1.5 mm. wide and 3.0 - 4.0 mm. long; leaf margin entire, undulate above; costa present, longer than $\frac{3}{4}$ the length of the leaf, exceeding the middle of the leaf lamina; leaf cells rhomboidal elongate, nearly smooth, about $4 - 5 \mu$ wide and $20 - 35 \mu$ long; alar cell absent; basal cells subquadrate, hyaline.

Seta elongate, papillose at the apex, about 1.0 - 1.5 cm. long; capsule cylindrical, horizontal or suberect, about 1.0 - 1.5 mm. wide and 2.0 - 2.5 mm. long; lid rostrate; peristome teeth yellow, densely transversely striate, about 0.5 mm. long.

Habitat : Low brushwood with stunted trees on exposed ridge; on tree trunks and branches. Humid hill evergreen forest along streamlet.

Illustration : Figure II, 2.1 - 2.6

Specimens examined : Chiangmai, Doi (Mt.) Chiengdao; Alt: 1900 - 2100 m. A. Touw No. 8923, No. 9306, No. 9546 (B.K.F.) Udonthani, Phu (Mt.) Luang; Alt: 1300 - 1400 m. A. Touw No. 10614 (B.K.F.)

Figure II

Aerobryidium filamentosum (Hook.) Fl.

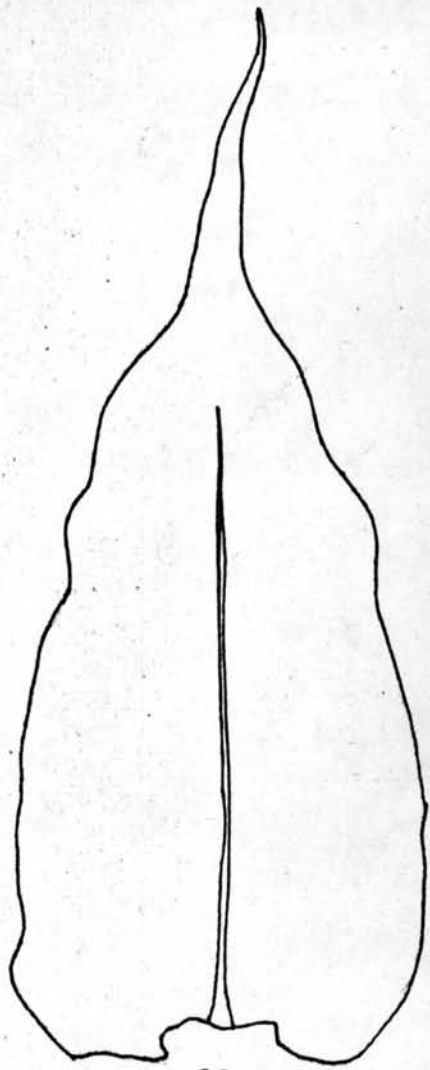
- 2. 1. Plant X 1
- 2. 2. Leaf arrangement X 10
- 2. 3. Leaf X 45
- 2. 4. Dry capsule X 15
- 2. 5. Peristome teeth X 70
- 2. 6. Leaf cells showing unipapillate
and basal leaf cells X 240



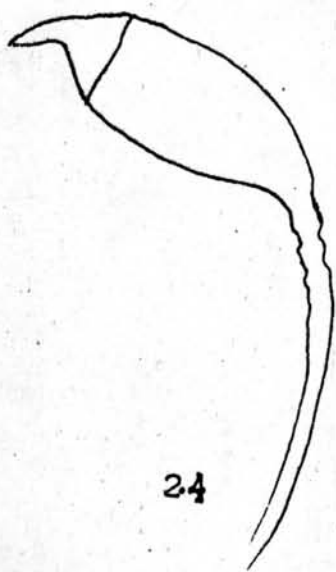
2.1



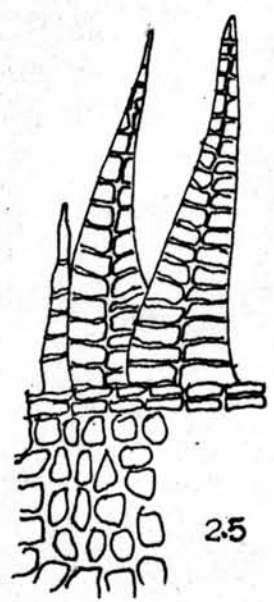
2.2



2.3



2.4



2.5



2.6

3. Stereophyllum Mitt.

Stereophyllum Mitt. Journ. Linn. Soc. Bot. Suppl. 1 (Musc. Ind. or.) (1859) 117

Plants slender, in densely mats; irregularly branched. Leaves less crowded, oblong-lanceolate, obtuse, entire or more tooth at the apex; costa present, to $1/4$ or more of the length of the lamina; leaf cells smooth, thin - walled; alar cells absent or nearly absent, cells at basal angles subquadrate in numerous rows.

Seta elongate; capsule small, ovoid, mostly inclined to horizontal; lid acute or shortly rostrate; peristome teeth double.

Species one; an exsiccata of B.K.F.

Stereophyllum anceps (Bosch. & Lac.) Broth.

Stereophyllum anceps (Bosch & Lac.) Broth; E. & P.

Pflanzenfam. ed. 1 Musci (1907) 898. Synonyms :-

Stereophyllum philippinense Broth., Philip. Journ. Sc. 31. (1926). 294

Hypnum anceps Bosch. Jav. 2(1860) 161, pl. 260.

Plants dioicous, in thin mats; irregularly branched. Leaves not crowded, ovate - lanceolate, obtuse or shortly pointed, lateral row slightly large and asymmetrical, about 0.4 - 0.5 mm. wide and 1.5 - 2.3 mm. long; leaf margin entire at the base,

more or less toothed near the apex; costa present, single, well - developed, divided lamina into two unequal part, to 1/2 or more of the length of the lamina, broad at the base, tapering upward; leaf cells linear, smooth, thin - walled, about 5 - 7 μ wide and 50 - 80 μ long, rhomboidal - elongate near the apex; alar cell absent, basal cells subquadrate, many horizontal rows, hyaline, thick - walled, different in shape to the laminal cells.

Seta slender, elongate, smooth, 1.0 - 2.0 cm. long; capsule small, narrowly ovoid - cylindric, mostly inclined to horizontal, about 0.6 mm. wide and 1.6 mm. long; lid conical or conic - rostrate, usually short and oblique; peristome teeth not seen.

Habitat : Hill evergreen forest, on tree trunks and on rocks.

Illustrations : Figure III, 3.1 - 3.5

Specimens examined : Chiangmai, Doi (Mt.) Chiengdao; Alt: 1400 m. A. Touw and T. Smitinand No. 6998 (B.K.F.) Kakhon Nayok, Nang Rawnng Water Fall; Alt: 100 m. A. Touw. No. 8976. (B.K.F.) Nakhon Sawan, La:gsang National Park West of Tak near 3rd water fall; Alt: 340 m. A. Touw No. 8047 (B.K.F.) Udonthani, near Ban Na Luang; Alt: 370 m. A. Touw No. 10369 (B.K.F.)

Figure . III

Stereophyllum anceps (Bosch & Lac.) Broth.

- 3.1 Plant X 1
- 3.2 Dry capsule X 15
- 3.3 Leaf X 45
- 3.4 Leaf cells and basal leaf
cells X 240
- 3.5. Leaf arrangement X 10



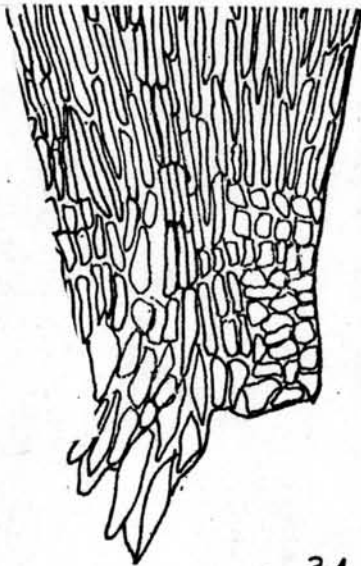
3.1



3.2



3.3



3.4



3.5

4. Foreauella Dix. et. Vard.Foreauella Dixon & Varde, Archi. Bot.

Bull. Mens (8,9) 1 (1927) 175.

Plants in densely mats or tufts, glossy. Stems elongate, closely pinnate, branches short, tumid, strongly curved when dry. Leaves complanate or subcomplanate, oblong - ovate, lanceolate; leaf margin entire, seldom tooth near the apex; costa absent; leaf cells elongate, smooth, thin - walled; alar cells forming a smaller group sometime nearly absent.

Seta elongate, smooth; capsule oblong - ovoid, wide - mouthed, horizontal to inclined.

Species one; an exsiccate of B.K.F.

Foreauella orthothecia (Schew.) Dix & Vard

Foreauella orthothecia (Schwaegr.) Dixon & Vard, Journ. Bot. (1937) 129. Synonyms: -

Hypnum orthothecium Schwaegr., Suppl. pt. 1 3 fasc. 1 (1927) pl. 220 b

Leskea secunda Hook., Ic. Pl. Rar. (1841) pl. 23, fig. 1

Foreauella indica Dixon & Varde, Archiv. Bot. Bull. Mens. (8,9) 1 (1927) 175.

Plants autoicous, golden - green glossy plants in dense intricate mats. Branches ascending, densely pinnate, 0.1 to 1.0 cm. long. Leaves usually somewhat complanate, being less crowded, when dry the leaves are usually somewhat rugose, erect-spreading when moist, oblong - ovate, acuminate, about 0.3 - 0.5 mm. wide and 0.7 - 1.0 mm. long; leaf margin entire, minutely denticulate toward the apex; costa absent; leaf cells elongate, smooth, thin - walled, 3 - 5 μ wide and 25 - 40 μ long; alar cell absent; basal cells subquadrate in a small group, hyaline.

Seta elongate, smooth, 2.0 - 3.0 cm. long; capsule oblong - ovoid, large, 1.0 - 1.5 mm. wide and 2.0 - 2.5 mm. long, horizontal to inclined, oblong - ovate, wide - mouthed; spore round, rough, about 16 μ to 33 μ ; peristome teeth not seen.

Habitat: Open hill evergreen forest: on tree trunks and branches.

Illustrations : Figure IV, 4.1 - 4.5

Specimens examined : Chiangmai, Doi (Mt.) Chiengdao; Alt: 1250 - 1350 m. A. Touw No. 8158, No. 8854, No. 8876, No. 8909 (B.K.F.), Doi (Mt.) Suthep; Alt: 1000 - 1650 m. A Touw No. 8412, No. 8429, No. 8586, (B.K.F.) O. Manop No. 65 (Dept. of Botany Chulalongkorn University.) Nakhon Sawan, Doi Musae, Agricultural Experiment Station; Alt: 780 - 800 m. A. Touw No. 8158 (B.K.F.) Udonthani, Phu (Mt.) Luang; Alt: 900-950 m. A. Touw No. 10389, No. 10812 (B.K.F.)

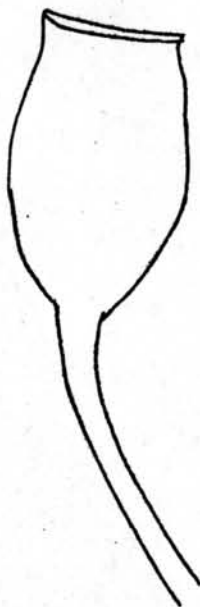
Figure IV

Foreauella orthothecia (Schew.) Dix. & Vard.

- 4. 1. Plant X 1
- 4. 2. Dry capsule X 15
- 4. 3. Leaf X 45
- 4. 4. Leaf cells X 240
- 4. 5. Leaf arrangement X 10



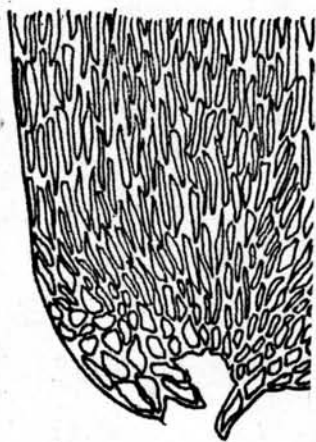
4.1



4.2



4.3



4.3



4.5

5. Taxithelium SpruceTaxithelium Spruce, Catal (1867)

Plants slender, usually in thin mats or tufts. Stem more or less regularly pinnate, branches complanate-foliate. Leaves ovate or ovate - lanceolate, short or long acuminate, usually toothed near apex; costa absent; cells linear, serriate-papillose over lumens, rarely smooth, usually differentiated at basal angles.

Seta elongate, smooth; capsule ovoid, inclined or horizontal; lid conical, short.

Species four; the exsiccats of B.K.F. and B.K.

Key to the species of Taxithelium

1. Leaf cells strongly pluripapillate2
1. Leaf cells minutely unipapillate3
2. Leaves ovate - lanceolate, obtuse or bluntly acute; setae 1 - 2 cm. long 1 T. nepalense.
2. Leaves narrowly lanceolate, short acuminate; setae 2.0 - 2.5 cm. long 2 T. arnottii
3. Leaf cells elongate - rhombic, about 5 - 8 μ wide and 50 - 70 μ long; setae 1 cm. long 3 T. vernieri.
3. Leaf cells narrowly linear, 3-4 μ wide and 60 - 80 μ long; setae 2 - 3 cm. long 4 T. alare.

1. Taxithelium nepalense (Schwaegr) Broth.

Taxithelium nepalense (Schwaegr) Broth; *Monsonia* 1. (1900) 51

Synonym :-

Hypnum nepalense Schwaegr, suppl. pt. 1, 3 fase 2 (1830) pl. 226.

Plants autoicous, in dense flat mats. Stem elongate, rather regularly pinnate, branches widely spreading, less than 1 cm. long. Leaves ovate - Lanceolate, obtuse or bluntly acute, about 0.3 - 0.5 mm. wide and 0.8 - 0.9 mm. long; leaf margin serrulate, minutely crenulate above; costa absent; leaf cells narrowly rhomboidal, thin-walled, 4 - 5 μ wide and 50 - 70 μ long, strongly pluripapillate; alar cells small, oval, not inflated; supra - alar cells irregularly subquadrate, numerous, extending obliquely up margins.

Seta smooth, 1 - 2 cm. long; capsule oval, inclined, about 0.9 mm. wide and 1.0 mm. long; lid conical, short; peristome teeth not seen.

Habitat: Evergreen secondary forest, at base of tree trunks.

Illustration : Figure V, 5.1 - 5.5

Specimens examined : Bangkok; A.F.G. Kerr No. 53 , No. 54, No. 238, No. 239. Phuket Island, near thalang, Khao Klung; Alt: 80 - 200 m. A. Touw No. 8546, No. 10304, No. 11141, No. 11179 (B.K.F.). P.Tx. No. 3551 (B.K.F.) Surattani, Khao Nawng; Alt: 300 m. A.F.G. Kerr No. 208, No. 231, No. 458, No. 468.

2. Taxithelium arnottii Thér

Plants autoicous, slender, in thin mats. Branches regularly pinnate, less than 1 cm. long. Leaves not crowded, lanceolate, short acuminate, about 0.3 - 0.5 mm. wide and 1 - 1.5 mm. long; leaf margin entire, dentate near the apex; costa absent; leaf cells pluripapillate over the lumen, elongate - rhombic, about 3 - 5 μ wide and 40 - 60 μ long; alar cells nearly absent; hyaline or pale yellow, supra - alar cells few, subquadrate.

Seta elongate, smooth, 2.0 - 2.5 cm. long; capsule ovoid, small, about 0.7 mm. wide and 1.0 mm. long; inclined or horizontal; lid conical short; peristome teeth not seen.

Habitat : On shaded trunk.

Illustrations: Figure VI, 6.1 - 6.5

Specimens examined: Chiangmai, Doi (Mt.) Suthep; Alt. 1600 - 1650 m. P. Tx. No. 4252 (B.K.F.), O. Manop No. 73, No. 88 (Dept. of Botany Chulalongkorn University) Huay Koon; Alt: 300 m. P. Tx. No. 3588 (B.K.F.)

3. Taxithelium vernieri (Dub.) Besch.

Plants autoicous, rather small, in dense mats or tufts. Branches regularly pinnate, less than 1 cm. long. Leaves crowded, small, ovate - lanceolate, gradually filiform-acuminate, about

0.3 - 0.4 mm. wide and 0.8 - 1.0 mm. long; leaf margin dentate; costa absent; leaf cells elongate rhombic, about 5 - 8 μ wide and 50 - 70 μ long minutely papillose; alar cells absent or nearly so; cells at basal angle rectangular, hyaline.

Seta elongate, smooth below, rough near the apex, about 1 cm. long; capsule small, ovoid, about 0.6 mm. wide and 1.0 mm. long, inclined to horizontal, lid conical, short; peristome teeth not seen.

Habitat: Evergreen forest; on tree trunks.

Illustrations : Figure VII, 7.1 - 7.5

Specimens examined : Nakhonsithamarat, Khao (Mt.) Luang; Alt: 1000 m. A. Touw No. 11587, No. 11589 (B.K.F.)

4. Taxithelium alare Broth.

Taxithelium alare Broth; Philip. Journ. Sci. Soc. C. 3. (1908) 28.

Plants autoicous, slender, yellowish - green, glossy, in dense tufts. Branches closely pinnate, about 1 cm. long. Leaves crowded, erect - spreading, narrowly ovate - lanceolate, gradually acuminate, about 0.3 - 0.5 mm. wide and 1.5 - 2.0 mm. long; leaf margin erect, minutely serrulate above; costa absent; leaf cells narrowly linear, 3 - 4 μ wide and 60 - 80 μ long, unipapillate; alar cell absent or nearly so, basal cells irregular, in a small group.

Seta slender, reddish, smooth, 2 to 3 cm. long; capsule small, slightly inclined, about 0.5 mm. wide and 1.0 - 1.2 mm. long; lid conical, 0.5 mm. long; peristome teeth not seen.

Habitat : Summit region; stunted mossy forest; on trees and on leaves.

Illustrations : Figure VIII, 8.1 - 8.5

Specimens examined : Chiangmai, Doi (Mt.) Suthep; Alt. 1600 - 1650. A. Touw No. 11800 (B.K.F.) Manop No. 77, No. 79 (Dept. of Botany Chulalongkorn University) Nakhonsithamarat, Khao (Mt.) Luang; Alt: 1740 m. A. Touw No. 11680 (B.K.F.) Pattani, Khao (Mt.) (B.K.) Kala Kire; Alt. 900 m. A.F.G. Kerr No. 283.

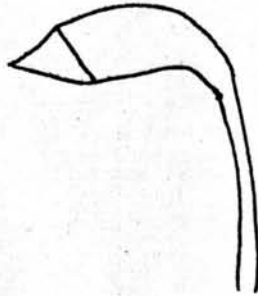
Figure . V

Taxithelium nepalense (Schw.) Broth.

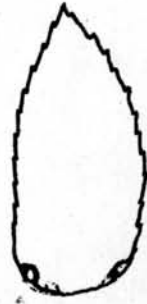
- 5.1 Plant X 1
- 5.2 Dry capsule X 15
- 5.3 Leaf X 15
- 5.4 Leaf arrangement X 10
- 5.5 Leaf cells showing pluripapillate and
basal leaf cells X 240



5.1



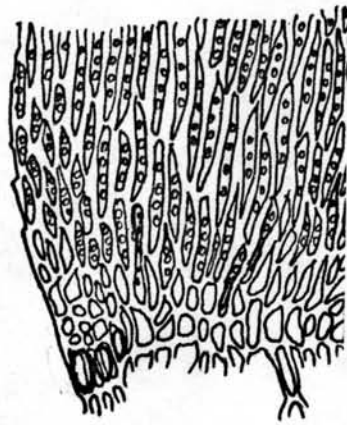
5.2



5.3



5.4



5.5

Figure.. VI

Taxithelium arnottii [!] ther

- 6.1 Plant X 1
- 6.2 Dry capsule X 15
- 6.3 Leaf X 45
- 6.4 Leaf arrangement X 10
- 6.5 Leaf cells showing pluripapillate
and basal leaf cells X 240



6.1



6.2



6.3



6.4



6.5

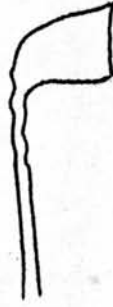
Figure VII

Taxithelium vernieri (Dub.) Basch.

- 7.1 Plant X 1
- 7.2 Dry capsule X 15
- 7.3 Leaf X 45
- 7.4 Leaf arrangement X 10
- 7.5 Leaf cells showing unipapillate
and basal leaf cells X 240



7.1



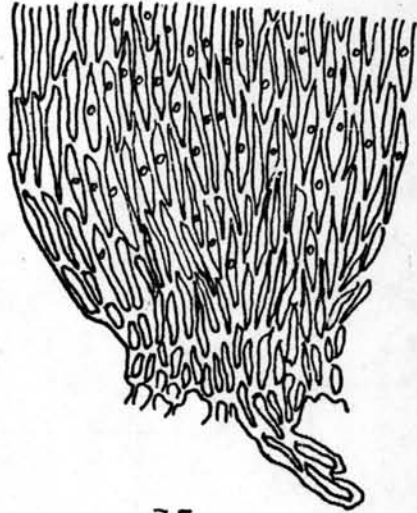
7.2



7.3



7.4

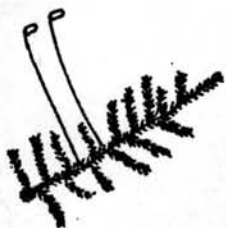


7.5

Figure: VIII

Taxithelium alare Broth.

- 8.1 Plant X 1
- 8.2 Dry capsule X 15
- 8.3 Leaf X 45
- 8.4 Leaf arrangement X 10
- 8.5 Leaf cells showing unipapillate
and basal leaf cells X 240



8.1



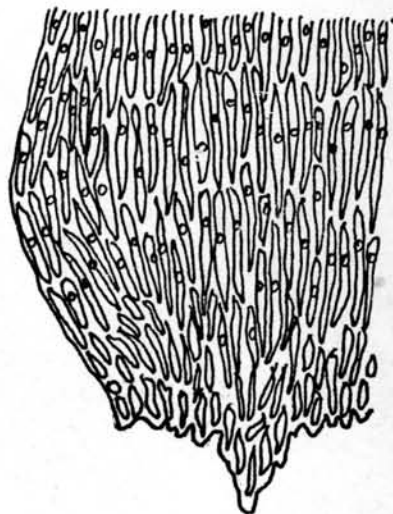
8.2



8.3



8.4



8.5

6. Taxiphyllum Fleisch.

Taxiphyllum Fleisch; Laubmfl. Java 4 (1922) 1434

Plants slender, in thin mats. Stems elongate, irregularly branched. Leaves ovate - lanceolate, oblong - lanceolate, shortly or longly acuminate, spreading; leaf margin dentate; costa absent; leaf cells elongate, thin - walled, papillate at the upper end; alar cell none; cells at basal quadrate, thick - walled, inner cells elongate.

Species one; an exsiccata of B.K.F. and B.K.

Taxiphyllum taxirameum (Mitt.) Fleisch.

Taxiphyllum taxirameum (Mitt.) Fleisch; Laubmfl. Java. 4 (1922)

1435. Synonym :-

Stereodon taxirameus Mitt., Journ. Linn. Soc. Suppl. 1 (Musc. Ind. Or.) (1859) 105.

Plants dioicous, slender, delicate, in thin mats; branches irregularly bipinnate, complanate - foliate. Leaves rather crowded, oblong - lanceolate, ovate - lanceolate, usually short acuminate, erect - spreading; about 0.4 - 0.6 mm. wide and 1.0 - 1.6 mm. long; leaf margin sharply serrulate above and usually denticulate nearly to the base; leaf cells elongate, thin - walled, smooth, papillate at the upper end, about 5 - 6 μ wide and 60 - 80 μ long; alar cell none; basal cells quadrate, thin - walled, different to the lamina^l cells.

Habitat : Evergreen forest, along stream; on rocks and in soil in secondary forest.

Illustrations: Figure IX, 9.1 - 9.5.

Specimens examined : Chiangmai, Faang; Alt. 600 m. P. Tx. No. 3552 (B.K.F.), Doi (Mt.) Suthep; Alt: 1600 - 1650 m. A. Touw. No. 9449. (B.K.F.), O. Manop No. 122 (Dept. of Botany, Chulalongkorn University) Prachuapkhirikhan, Hui Yang. A.F.G. Kerr No. 13 (B.K.).

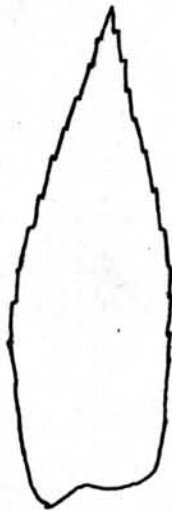
Figure IX

Taxiphyllum taxirameum (Mitt.) Jaeg.

- 9.1 Plant X 1
- 9.2 Leaf X 45
- 9.3 Leaf arrangement X 10
- 9.4 Upper leaf cells and margin X 240
- 9.5 Leaf cells X 240



9.1



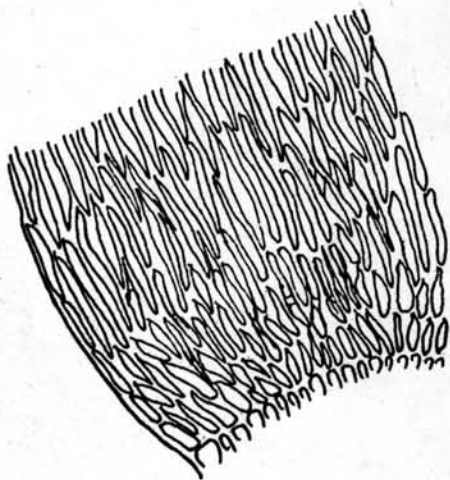
9.2



9.3



9.4



9.5

7. Gammiella Broth.

Gammiella Broth in E.P. 1, 3 p. 1067 (1908) Synonyms :-

Pleuropi sp. Griff. Not. p. 470 (1849)

Stereodontis sp. Mitt Musc. Ind. or. p. 93 (1859)

Hypni sp. Jaeg. Adumbr. II p. 610 (1877/78)

Plants in dense mats. Stems elongate, irregularly branched. Leaves ovate - lanceolate, short acuminate, broad at the base, gradually narrow in the upper part; leaf margin entire; costa absent; leaf cells elongate, smooth, thin - walled; alar group large, subquadrate, yellow or brown, thick - walled.

Seta elongate; capsule cylinder, suberect or horizontal; lid conical.

Species one; an exsiccate of B.K.F.

Gammiella pterogonoides (Harv.) Broth.

Plants autoicous, glossy, in densely mats. Stem elongate, irregularly branched. Leaves in several - ranked, ovate - lanceolate, short acuminate, about 0.4 - 0.5 mm. wide and 1.2 - 1.5 mm. long; leaf margin entire; costa absent; leaf cells elongate, smooth, thin - walled, about 4 - 5 μ wide and 40 - 60 μ long; alar cells forming a group in several horizontal rows, subquadrate, in deep yellow or brown, thick - walled.

Seta elongate, smooth, about 1.5 - 2.0 cm. long; capsule suberect, cylinder, about 0.5 - 0.7 mm. wide and 2 mm. long; lid conical; peristome teeth double, acute, with transversely striate, about 0.4 mm. long.

Habitat : On branches in evergreen forest.

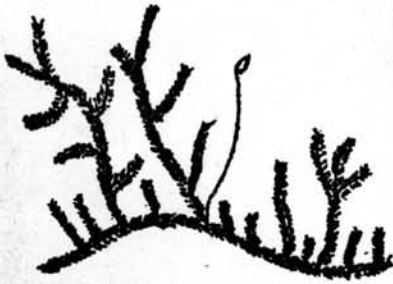
Illustrations: Figure X, 10.1 - 10.6

Specimens examined : Prachinburi khao (Mt.) Khieo;
Alt: 1300 m. P. Tx. No. 3579, No. 3588 (B.K.F.), O. Manop No. 66,
No. 71 (Dept. of Botany Chulalongkorn University).

Figure . . X

Gammiella pterogonoides (Harv.) Broth.

- 10.1 Plant X 1
- 10.2 Dry capsule X 15
- 10.3 Leaf X 45
- 10.4 Leaf arrangement X 10
- 10.5 Leaf cells and basal leaf
cells X 240
- 10.6. Peristome teeth X 100



10.1



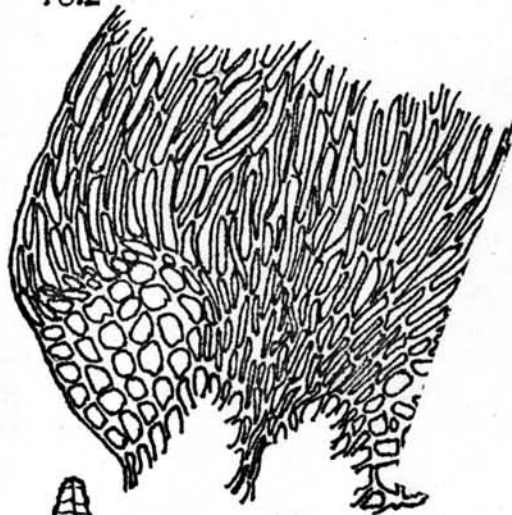
10.2



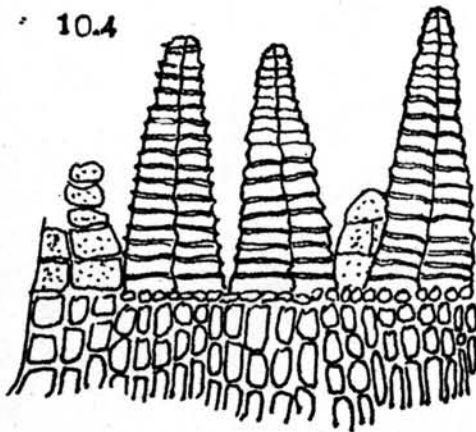
10.3



10.4



10.5



10.6

8. Brotherella Loeske, Stud. 175. 1910

Plants rather slender, glossy, in dense tufts. Stems elongate, pinnately branched. Leaves in several - ranked, falcate - secund, oblong - ovate, acuminate; costa absent; cells narrowly linear, smooth; alar cells large and inflated.

Seta long and slender; capsule horizontal, exothecial cells rectangular; lid obliquely conic - rostrate.

Species one; an exsiccate of B.K.F.

Brotherella amblystegia (Mitt.) Broth.

Plants dioicous, rather large, slender, glossy, in densely tufts; irregularly branched. Leaves falcate - secund, oblong - lanceolate, long acuminate, to 0.4 - 0.7 mm. wide and 2.0 - 2.5 mm. long; leaf margin entire, more toothed near the apex; costa absent; leaf cells linear, smooth, thin - walled, about 4 - 6 μ wide and 40 - 50 μ long; alar cells in several horizontal rows, different in size and shape with the inner cells, dark - brown.

Seta elongate, slender, smooth, 3.5 cm. long; capsule large, to 1.0 - 1.5 mm. wide and 2.0 - 2.5 mm. long, ovoid, horizontal or suberect; lid conical; peristome teeth not seen.

Habitat / Summit region, small Sphagnum bog; on tree trunks and branches.

Illustrations: Figure XI, 11.1 - 11.5

Specimens examined: Chiangmai, Doi (Mt.) Inthanon;
Alt: 2530m. A. Touw No. 9807, No. 9812 (B.K.F.), O. Manop
No. 201 (Dept. of Botany, Chulalongkorn University.)

Figure XI

Brotherella amblystegia (Mitt.) Broth.

- 11.1 Plant X 1
- 11.2 Dry capsule X 15
- 11.3 Leaf X 45
- 11.4 Leaf cells and basal leaf cells
X 240
- 11.5 Leaf arrangement X 10



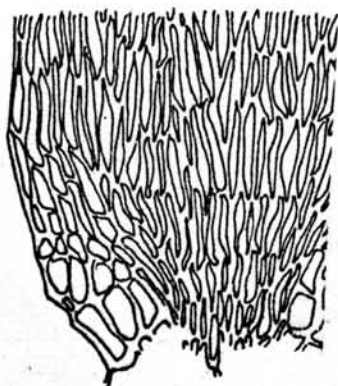
11.1



11.2



11.3



11.4



11.5

9. Meiothecium Mitt.

Meiothecium Mitt., Journ. Linn. Soc. Bot. (1868) 185.

Plants slender, in dense tufts or mats, yellowish - green, glossy. Stems elongate, ascending, irregularly branched. Leaves ovate, concave, short - pointed, spreading; costa absent; leaf cells oval - rhomboidal, longer below; alar cells usually large and inflated.

Seta short, often curved, nearly smooth; capsule erect or inclined; peristome teeth single usually papillose; lid small, conic rostrate.

Species one; an exsiccata of B.K.F.

Meiothecium microcarpum (Harv.) Mitt.

Meiothecium microcarpum (Harv.) Mitt., Linn. Soc. Journ. Bot.
(1869) 185. Synonym : +

Pterogonium microcarpum Harv. Lond. Journ. Bot. (1840) 12.

Plants autoicous, in flat mats, slightly glossy. Secondary stems irregularly pinnate, branches ascending. Leaves in several-ranked, appressed when dry, often slightly secund when moist, ovate, short acuminate, about 0.3 - 0.5 mm. wide and 0.7 - 1.0 mm. long; leaf margin entire; costa absent; leaf cells elongate - rhombic, 5 to 6 μ wide and 20 - 35 μ long, thin - walled, cells at the apex oval - rhomboidal; alar cells few but large, hyaline or plae yellow, in one horizontal row with rectangular cells above.

Seta 4 to 6 mm. long, nearly smooth; capsule inclined, oval - cylindric, about 1.5 mm. long and 1.0 mm. wide; lid slenderly conic - rostrate; peristome teeth not seen.

Habitat : On trees and shrubs in streambed of temporarily dry rivulet. Moist evergreen forest along streamlet, on tree trunks.

Illustrations: Figure XII, 12.1 - 12.5

Specimens examined : Nakhon Səwan, Doi Musae

Agricultural Experiment Station; Alt: 725 - 800 m. P. Tx.

No. 0526, No. 0715 (B.K.F.) Udonthani, Phu (Mt.) Luang;

Alt: 1250 m. A. Touw 10514 (B.K.F.)

Figure XII

Meiothecium microcarpum (Harv.) Mitt.

- 12.1 Plant X 1
- 12.2 Dry capsule X 15
- 12.3 Leaf X 45
- 12.4 Leaf arrangement X 10
- 12.5 Leaf cells and basal leaf cells
X 240



12.1



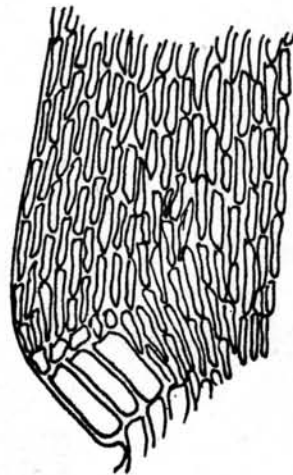
12.2



12.3



12.4



12.5

10. Chionostomum C.M.

Chionostomum O.M., Linnaeus 36 (1870 - 1871) 21.

Plants glossy, in dense mats or tufts. Stems creeping, irregularly pinnate. Leaves ovate - lanceolate, deeply concave, short - acuminate; costa absent; leaf cells oval - rhomboidal, longer below; alar cells large and inflated.

Seta long, smooth; capsule large, erect or inclined, cylindrical; peristome teeth double, lid long and slenderly beak.

Species one, an exsiccata of B.K.F.

Chionostomum rostratum (Griff.) C.M.

Chionostomum rostratum (Griff.) C.M., Linnaeus 36 (1870 - 1871)

21. Synonym :-

Neckera rostrata Griff. Not. 456; Ic. Pl. Asiat. 2 (1849)

Plants autoicous, rather robust. Stem elongate; branches irregularly pinnate; leaves laxly erect when dry, spreading when moist, oblong - lanceolate, short acuminate, about 0.4 - 0.8 mm. wide and 1.5 - 2.5 mm. long; leaf margin entire; costa absent;

leaf cells elongate - rhombic, smooth, thin - walled, 5 to 8 μ wide and 45 - 60 μ long, gradually longer and narrower below; alar cells 3 - 4, large and inflated, pale yellow or hyaline.

Seta 1.5 - 2.5 cm. long, slender, red, smooth; capsule cylindric, erect or slightly inclined, 0.5 - 1.0 mm. wide, 2.5 - 3.0 mm. long; lid rostrate, about 1.5 mm. long; peristome teeth double, with transversely striate, pale yellow, about 3 mm. long; spores smooth, 12 to 14 μ in diameter.

Habitat : On twigs in evergreen forest.

Illustrations : Figure XIII, 13.1 - 13.6

Specimens examined : Prachinburi, Khao (Mt.) Khieo
Alt: 1300 m. P. Tx. No. 2586, No. 3886 (B.K.F.) , O. Manop No.69,
No. 73, No. 74 (Dept. of Botany Chulalongkorn University.)

Figure XIII

Chimnostomum rostratum C.M.

- 13.1 Plant X 11
- 13.2 Dry capsule X 15
- 13.3 Leaf X 45
- 13.4 Leaf arrangement X 10
- 13.5 Leaf cells and basal leaf
cells X 240
- 13.6. Peristometeeth X 200



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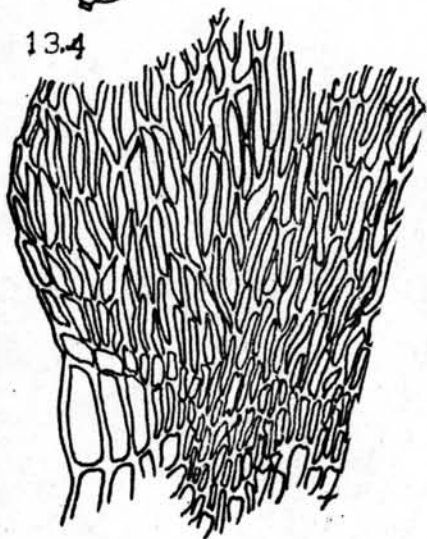
132



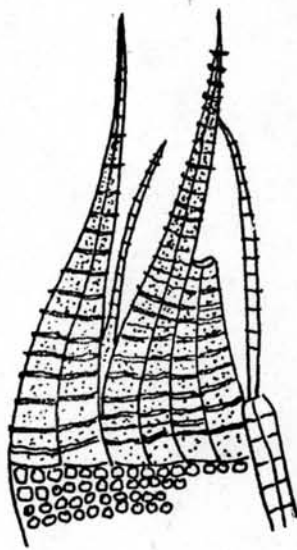
133



13.4



13.5



13.6

11. Acroporium

Acroporium Mitt., Journ. Linn. Soc. 1868 : 182. 1868

Plants slender to robust, glossy, in dense deep tufts or mats. Branches numerous, suberect, rather stiff, densely foliate, frequently cuspidate at tips. Leaves erect - spreading, ovate - lanceolate, linear, acuminate, subentire; costa absent; leaf cells elongate, smooth or somewhat scabrous; alar cells few but large, inflated and coloured, different in size and in shape to the laminal cell.

Seta slender; capsule small, suberect; peristome teeth transversely striate, with a narrow median furrow; lid with a fine, needle - like beak.

Species nine; the exsiccats of B.K.F.

Key to the species of Acroporium

1. Plant large, leaves over 0.5 mm. wide 2
1. Plant small, leaves under 0.5 mm. wide 5
2. Leaf apex minutely recurved at extreme point
..... 1 A. hamulatum
2. Leaf apex erect..... 3
3. Leaf cells elongate, incrassate, about 4 -5 μ wide and 30 -
50 μ long 2 A. laosianum
3. Leaf cells linear, about 4 μ wide and 40 - 60 μ long
..... 4
4. Leaf cells smooth, seta elongate about 1.5 cm. long, smooth,
..... 3 A. aciphyllum
4. Leaf cells incrassate. Seta 2 cm. long, smooth below,
pustulose above 4 A. hermaphroditum.
5. Leaf cells smooth or coarsely serriate - papillose on back
..... 5 A. lamprophyllum
5. Leaf cells smooth 6
6. Leaf cells linear, about 5 - 7 μ wide and 40 - 70 μ long,
seta smooth below, pustulose above 6 A. sigmatodontium

6. Leaf cells linear, about 4 μ wide and 30 - 50 μ long,
seta typically smooth 7 A. Secundum
7. Leaf margin entire, weakly toothed near the apex
.....8
8. Leaves under 0.3 mm. wide, rigidly erect - spreading,
acuminate. 8 A. diminutum
8. Leaves over 0.3 mm. wide, leaf long acuminate.
..... 9 A. punctuliferum

1. Acroporium hamulatum Fleisch.

Acroporium hamulatum Fleisch, Laubmfl. Java 4 (1918) 1294

Plants dioicous, large, robust, glossy in dense tufts. Branches numerous, irregularly, about 2 cm. long, Leaves less crowded, widely spreading, usually minutely recurved at the extreme apex, oblong - ovate, cordate - auriculate, short acuminate, about 1.0 - 1.5 mm. wide and 2.0-2.5 mm. long; leaf margin entire; costa absent; leaf cells elongate, incrassate, about 6 - 8 μ wide and 40 - 60 μ long; alar cells 3 or 4 large, oblong, conspicuous, in deep brown, one horizontal row.

Seta 1.6 mm. long, slightly pustulose above; capsule inclined, about 0.5 mm. wide and 1.0 mm. long; peristome teeth not seen.

Habitat : Evergreen mossy forest, on rocks and on trees.

Illustrations : Figure XIV, 14.1 - 14.5

Specimens examined : Nakhonsithamarat, Khao (Mt.) Luang; Alt: 1650 - 1740 m. A. Touw No. 11737, No. 11790, No. 11794 (B.K.F.)

2. Acroporium laosianum (Broth. & Par.) Broth.

Plants robust, glossy in dense tufts. Branches ascending, irregularly pinnate, about 1.0 cm. long. Leaves crowded, erect-spreading, oblong - lanceolate, short acuminate, about 0.5 - 0.7 mm. wide and 1.7 - 2.0 mm. long; leaf margin entire; costa absent; leaf cells elongate - rhombic, incrassate, about 4 - 5 μ wide and 30 - 50 μ long; alar cells 3 or 4, oblong, large, in colored.

Seta elongate, smooth, nearly papillose above, 1.0 - 1.5 cm. long; capsule small, suberect or inclined, 0.5 mm. wide and 0.9 mm. long; peristome teeth not seen.

Habitat : Evergreen forest along rivulet; on trees and on exposed sandstone rocks.

Illustrations : Figure XV, 15.1 - 15.5

Specimens examined : Phitsanulok, thung Salaeng Luang Park; Alt: 600 m. P. Tx. No. 3582 (B.K.F.) Prachinburi, Khao (Mt.) Yai National Park; Alt: 700 m. A. Touw No. 19525, No. 10559, No. 10677, No. 10960, No. 10963 (B.K.F.), O. Manop No. 121 (Dept. of Botany, Chulalongkorn University.) Udonthani, Phu (Mt.) Luang; Alt: 1250 - 1300 m. A. Touw No. 11795, 12047, 12094 (B.K.F.) Loei, Phu (Mt.) Krading; Alt: 1150 - 1200 m. A. Touw 12115 (B.K.F.)

3. Acroporium aciphyllum Dix.

Plants dioicous, robust, glossy in deep tufts. Branches irregular ascending. Leaves crowded, oblong - ovate, cordate - auriculate, acuminate, about 0.7 - 0.8 mm. wide and 1.5 - 2.0 mm. long; leaf margin entire; costa absent; leaf cells linear, smooth, about 4 μ wide and 40 - 60 μ long; alar cells 3 or 4, large, hyaline or yellow.

Seta elongate, about 1.5 cm. long, smooth; capsule small, ovoid, inclined or suberect, about 0.5 mm. wide and 0.86 mm. long; peristome teeth not seen.

Habitat : Evergreen forest along stream; on tree trunks.

Illustrations : Figure XVI, 16.1 - 16.5

Specimens examined : Nakhonsithamarat, Khao (Mt.)

Luang; Alt: 700 - 800 m. A. Touw No. 11977, P. Tx. No. 2598
(B.K.F.)

4. Acroporium hermaphroditum (C.M.) Fleisch.

Acroporium hermaphroditum (C.M.) Fleisch; Laubmfl. Java 4 (1919)

1292. Synonym : -

Hypnum hermaphroditum C.M., Syn. 2 (1851) 388, 689

Plants synoicous, rather large, robust, goldengreen in deep tufts; irregularly branched, erect, cuspidate at the tips. Leaves horizontally spreading, crowded, oblong - ovate from a broad cordate - auriculate base, short acuminate, about 0.8 - 1.0 mm. wide and 2.0 mm. long; leaf margin entire or inflexed; costa absent; leaf cells linear, incrassate, about 4 μ wide and 40 - 60 μ long; alar cells 3 or 4, large, in deep brown.

Seta 2 cm. long, pustulose above, smooth at the base; capsule inclined or suberect, about 0.7 mm. wide and 1.2 mm. long; peristome teeth not seen.

Habitat : Evergreen forest along ridge; on tree trunks.

Illustrations: Figure XVII, 17.1 - 17.5

Specimens examined: Nakhonsithamarat, Khao (Mt.) Luang; Alt: 1450 - 1650 m. A. Touw No. 11639, No. 11645, No. 11698, No. 11832 (B.K.F.)

5. Acroporium lamprophyllum Mitt.

Acroporium lamprophyllum Mitt; Linn. Soc. Journ. Bot. (1869) 183.

Synonym :-

Hypnum scabrellum Bryol. Jav., Bryol. Jav. 2 (1869) 214

Plants dioicous rather delicate, slender slightly glossy plants, in dense mats. Branches irregularly pinnate, suberect, cuspidate. Leaves not crowded, narrowly lanceolate, concave, gradually narrowed to a long acuminate, about 0.2 - 0.3 mm. wide and 1.4 - 1.5 mm. long; leaf margin entire; costa absent; leaf cells linear - rhombic, 3 - 5 μ wide and 30 - 50 μ long, smooth or coarsely serrate - papillose on back; alar cells large and hyaline.

Seta about 1 cm. long, coarsely papillose above, smooth below; capsule small, ovoid, inclined, about 0.4 mm. wide and 0.5 mm. long; peristome teeth double, with striolate, about 3 - 4 mm. long.

Habitat : Moist evergreen forest along streamlet, on tree trunks.

Illustrations : Figure XVIII, 18.1 - 18.6

Specimens examined: Nakhon Sawan, Doi Musae
Agricultural Experiment Station Alt: 780 - 800 m. A. Fouw
No. 8130, No. 11226, No. 12291 (B.K.F.)

6. Acroporium sigmatodontium (C.M.) Fleisch. Acroporium sigmatodontium (C.M.) Fleisch; laubmfl. Java. 4 (1918) 1281.

Synonym:-

Hypnum sigmatodontium C.M.; Syn. 2 (1851) 687.

Plants synoicous, rather slender, in dense tufts or mats, glossy; branches suberect. Leaves crowded, slightly secund, oblong - lanceolate, slenderly and sharply acuminate, concave; about 0.3 - 0.5 mm. wide and 1.5 - 2.0 mm. long; leaf margin entire, slightly tubulose toward the apex; costa absent; leaf cells linear, smooth, about 5 - 7 μ wide and 40 - 70 μ long; alar cells typical, 3 or 4 cells, large.

Seta slender, smooth below, papillose above, 0.6 - 1.5 mm. long; capsule small, ovoid, horizontal or inclined, scarcely 0.5 mm. wide and 1.0 mm. long; lid slenderly beak, about 1 mm. long; peristome teeth not seen.

Habitat : Summit region; stunted mossy forest; on trees.

Illustrations : Figure XIX, 19.1 - 19.5

Specimens examined : Nakhonsithamarat, Khao (Mt.)

Luang; Alt: 1740 m. A. Touw No. 11833, P.Tx. No. 2652 (B.K.F.)

7. Acroporium secundum (Reinw and Hornsch.) Fleish.'

Acroporium secundum (Reinw. & Hornsch.) Fleisch, E & P.

Pflanzen. fam. ed. 1. Musci (1909) 1122. Synonyms :-

Leskea secunda Reinw & Hornsch; Nov. Act. Caes Leop. Carol. 14
Suppl. 2 (1828) 717.

Sematophyllum tubulosum Broth; Philip. Journ. Sci.
Sec. C. 8 (1913) 94.

Plants dioicous, rather small, robust, glossy, yellowish-green or brown plants in deep tufts. Leavesless crowded, oblong-lanceolate, short acuminate, about 0.3 - 0.4 mm. wide and 1.5 mm. long; leaf margin entire or minutely denticulate at the apex; costa absent; leaf cells linear, smooth, about 4 μ wide and 30 - 50 μ long; alar cells 3 or 4, large, hyaline or pale yellow.

Seta 2.5 - 3.0 cm. long, typically smooth; capsule small, inclined; peristome teeth not seen.

Habitat: Mossy forest; on tree trunks

Illustrations : Figure XX, 20.1 - 20.5

Specimens examined : Nakhonsithamarat, Khao (Mt.)Luang;
Alt: 1740 m. A. Touw No. 11795, No. 12597 (B.K.F.) Prachinburi,
Khao (Mt.) Yai National Park; Alt: 700 m. P. Tx. No. 2678 (B.K.F.),
O. Manop. No. 120 (Dept. of Botany Chulalongkorn University.)

8. Acroporium diminutum (Brid.) Fleisch.

Acroporium diminutum (Brid.) Fleisch; Laumfl. Java
4(1918) 1274. Synonyms :-

Dicranum diminutum Brid., Bryol. Univ. 2 (1826) 814

Hypnum subulatum Hampe, Ic. Musc. 1 (1844). pl. 9

Plants dioicous, usually delicate, in thin mats; branches nearly regularly pinnate. Leaves rigidly erect - spreading, convolute when dry, not crowded, narrowly lanceolate, acuminate, about 0.2 - 0.3 mm. wide and 1.0 - 1.5 mm. long; leaf margin entire, weakly toothed near the apex; costa absent; leaf cells linear, smooth, thin-walled, about 4 μ wide and 30 - 50 μ long; alar cells typical, large, hyaline or pale yellow, 3 - 4 cells, oblong.

Seta 1.0 - 1.8 cm. long; slender, smooth; capsule small, horizontal or subpendulous; peristome teeth not seen.

Habitat : Evergreen forest on decaying logs.

Illustrations : Figure XXI, 21.1 - 21.5

Specimens examined : Nakhonsithamarat, Khao (Mt.)Luang;
Alt: 600 - 650 m. A. Touw No. 11526, No. 12651, P.Tx. No. 0590
(B.K.F.)

9. Acroporium punctuliferum (Thew. & Mitt.) Fleisch.

Plants dioicous, rather delicate, glossy robust, in deep tufts. Leaves not crowded, linear - lanceolate, long acuminate, about 0.3 - 0.5 mm. wide and 1.7 - 2.0 mm. long; leaf margin entire, weakly toothed near the apex; costa absent; leaf cells elongate, smooth, about 4 μ wide and 40 - 55 μ long; alar cells 3 or 4, sharply defined, large, in deep yellow.

Seta elongate, 0.5 - 1.0 cm. long; smooth; capsule small, horizontal or inclined, 0.4 mm. wide and 0.7 mm. long; peristome teeth not seen.

Habitat : Evergreen forest along streamlet, epiphytic.

Illustrations : Figure XXII, 22.1 - 22.5

Specimens examined : Prachinburi, khao (Mt.) Yai National Park; Alt: 700 m. A. Touw No. 12332, No. 13322. P. Tx. No. 2110 (B.K.F.) O. Manop No. 115, No. 126 (Dept. of Botany, Chulalongkorn University.)

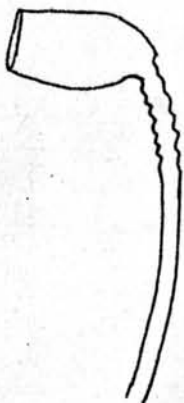
Figure XIV

Acroporium hamulatum (Fleisch.) Fleisch.

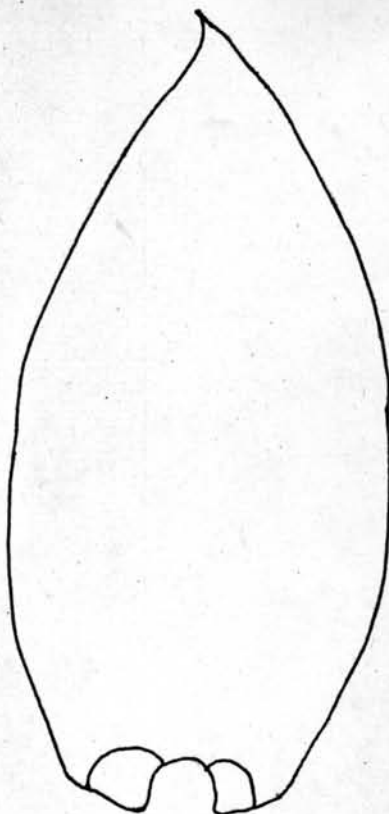
- 14.1 Plant X 1
- 14.2 Dry capsule X 15
- 14.3 Leaf X 45
- 14.4 Leaf arrangement X 10
- 14.5 Leaf cells and basal
leaf cells X 240



14.1



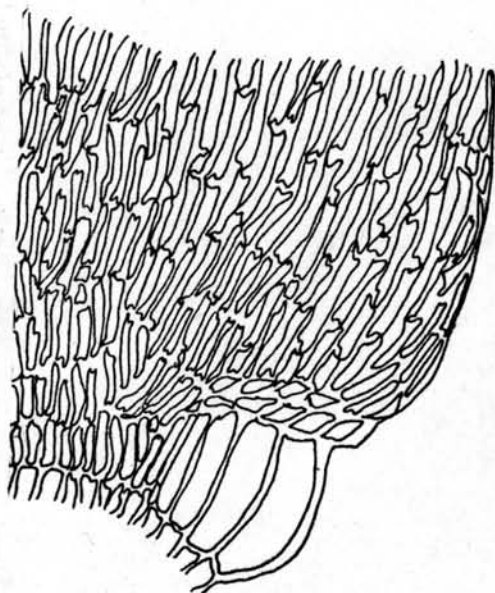
14.2



14.3



14.4



14.5

Figure. XV

Acroporium laosianum Broth. & Par.) Broth.

- 15.1. Plant X 1
- 15.2 Dry capsule X 15
- 15.3. Leaf X 45
- 15.4 Leaf arrangement X 10
- 15.5 Leaf cells and basal leaf cells
X 240



15.1



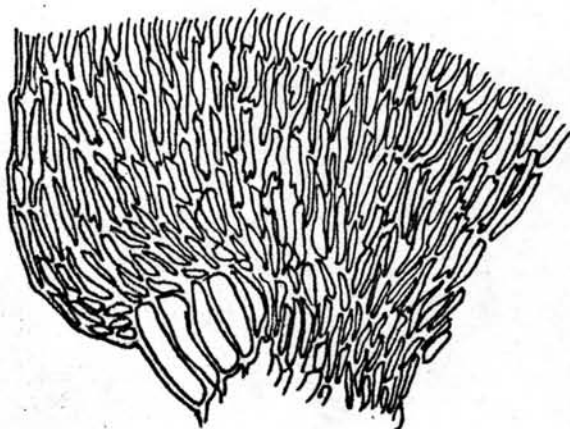
15.2



15.3



15.4



15.5

Figure XVI

Acroporium aciphyllum Dix.

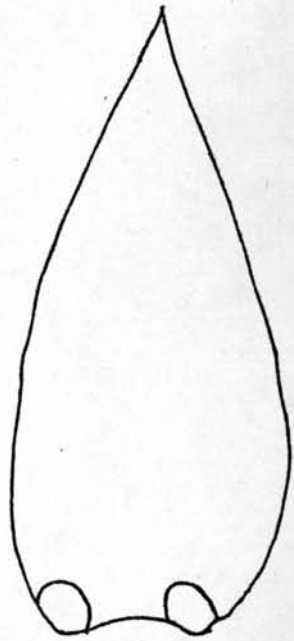
- 16.1. Plant X 1
- 16.2 Dry capsule X 15
- 16.3 Leaf X 45
- 16.4 Leaf arrangement X 10
- 16.5 Leaf cells and basal
leaf cells X 240



16.1



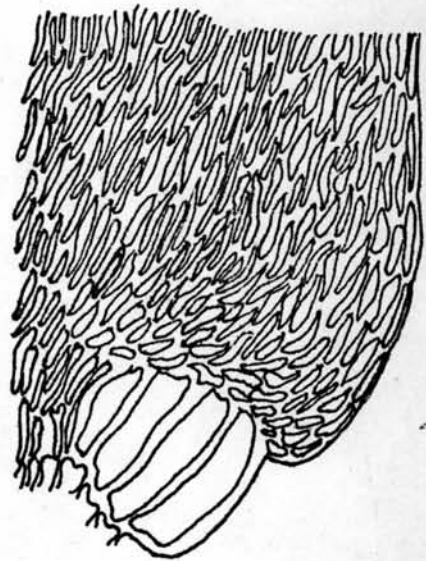
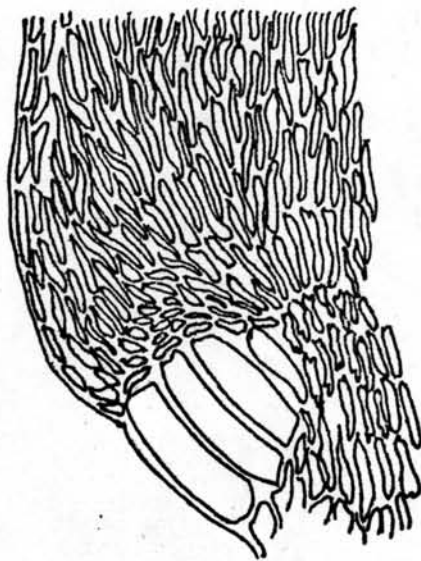
16.2



16.3



16.4



16.5

Figure XVII

Acroporium hermaphroditum (C.M.) Fleisch.

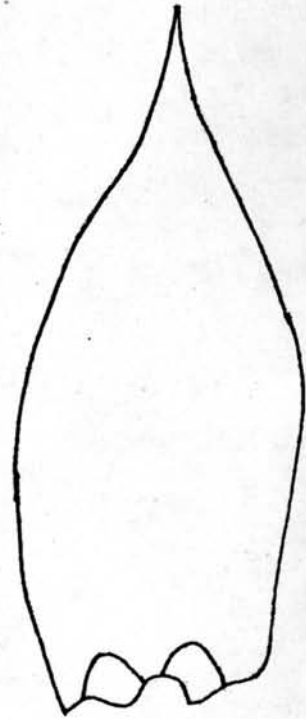
- 17.1 Plant X 1
- 17.2 Dry capsule X 15
- 17.3 Leaf X 45
- 17.4 Leaf arrangement X 10
- 17.5 Leaf cells and basal leaf
cells X 240



17.1



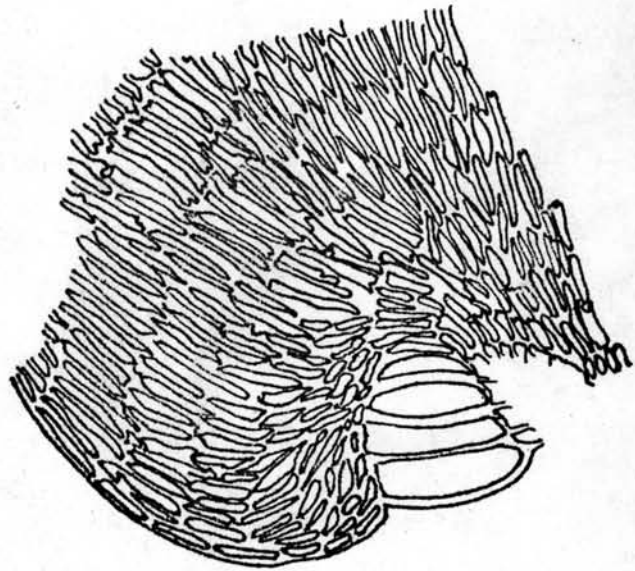
17.2



17.3



17.4



17.5

Figure XVIII

Acroporium lamprophyllum Mitt.

- 18.1 Plant X 1
- 18.2 Dry capsule X 15
- 18.3 Leaf X 45
- 18.4 Leaf arrangement X 10
- 18.5 Leaf cells showing unipapillate
and basal leaf cells X 240
- 18.6 Peristome teeth X 200



18.1



18.2



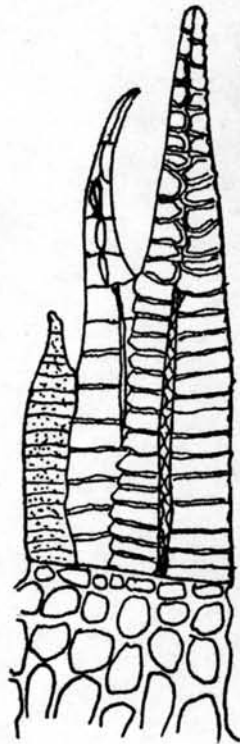
18.3



18.4



18.5



18.6

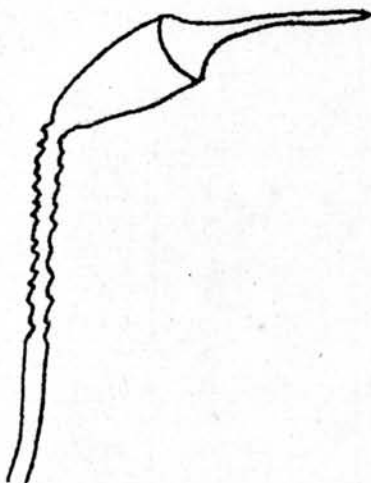
Figure XIX

Acroporium sigmatodontium (C.M.) Fleisch.

- 19.1 Plant X 1
- 19.2. Dry capsule X 15
- 19.3. Leaf X 145
- 19.4. Leaf arrangement X 10
- 19.5. Leaf cells and basal leaf
cells X 240



19.1



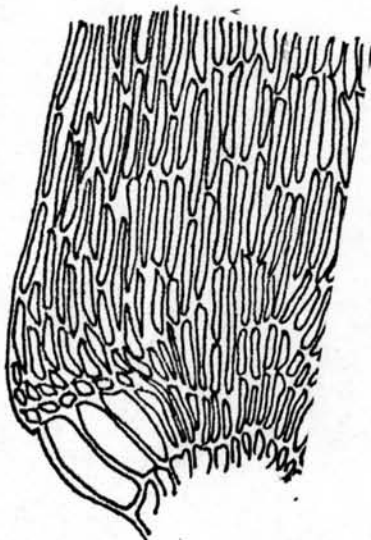
19.2



19.3



19.4



19.5

Figure XX

Acroporium secundum (Reinw. and Hornch.) Fleisch.

- 20.1. Plant X 1
- 20.2. Dry capsule X 15
- 20.3. Leaf X 45
- 20.4. Leaf arrangement X 10
- 20.5. Leaf cells and basal leaf
cells X 240



20.1



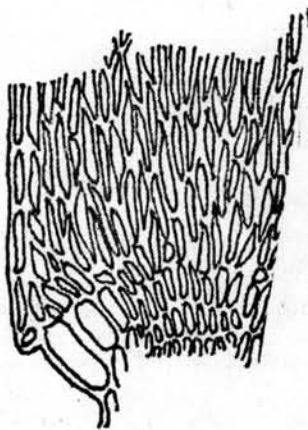
20.2



20.3



20.4



20.5

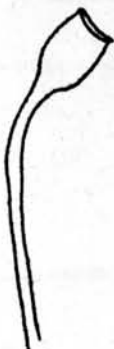
Figure XXI

Acroporium diminutum (Brid.) Fleisch.

- 21.1 Plant X 1
- 21.2 Dry capsule X 15
- 21.3 Leaf X 45
- 21.4 Leaf arrangement X 10
- 21.5 Leaf cells and basal leaf
cells X 240



21.1



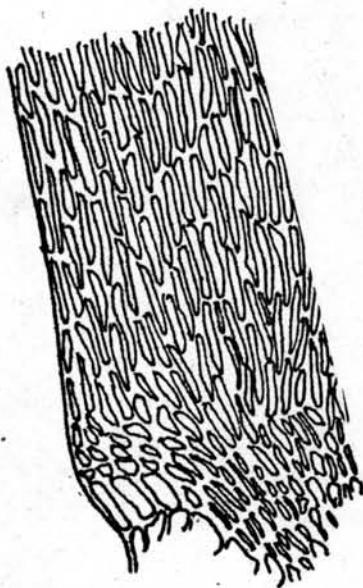
21.2



21.3



21.4



21.5

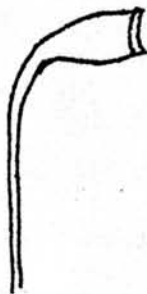
Figure XXII

Acroporium punctuliferum (Thew. & Mitt.)

- 22.1 Plant X 1
- 22.2 Dry capsule X 15
- 22.3 Leaf X 45
- 22.4 Leaf arrangement X 10
- 22.5 Leaf cells and basal leaf
cells X 240



22.1



22.2



22.3



22.4



22.5

12. Sematophyllum Mitt.

Sematophyllum Mitt., Journ. Linn. Soc, 8:5. 1865

Plants rather slender, often glossy, in dense mats or tufts. Stems irregularly branched, crowded and ascending, with dense foliage. Leaves varried secund or subcomplanate, erect-spreading or falcate, ovate - lanceolate, oblong - elliptic, leaf apex blunt or with a short or subulate point; leaf margin entire or weakly toothed near the apex; costa absent; leaf cells elongate or rhomboidal, smooth; alar cells large and inflated.

Seta usually smooth; capsule small, oblong, erect to horizontal.

Species five; the exsiccats of B.K.F. and B.K.

Key to the species of Sematophyllum

1. Stems regularly pinnate branched2
1. Stems irregularly branched3
2. Branches about 3 cm. long; leaves lanceolate, acuminate..
.....1 S. subhumile
2. Branches less than 1 cm. long; leaves oblong - elliptic,
blunt or shortly point2 S. phaenicum
3. Leaf cells short, rhomboidal - elongate, about 4 - 5 μ wide
and 35 - 50 μ long3 S. caespitosum

3. Leaf cells linear - elongate, about 5 - 7 μ wide and
50 - 70 μ long 4
4. Leaves broad, abruptly acuminate..... 4 S. tristiculum
4. Leaves narrower, gradually subulate acuminate.....
..... 5 S. microcladiellum

1. Sematophyllum subhumile (C.M.) Fleisch.

Sematophyllum subhumile (C. Muell.) Fleisch; Musci Fl. Buit. 4:
1264 (1923). Seki in Journ. Sci. Hiorshima Univ., ser. B. Div.
2, 12: 42 (1968).

Plants in densely mats or tufts, glossy. Branches in
regularly pinnate, to 3 cm. long; usually widely spreading.
Leaves crowded, erect - spreading, lanceolate, acuminate, about
0.2 - 0.5 mm. wide and 1.3 - 1.5 mm. long; leaf margin entire;
costa absent; leaf cells elongate, thin - walled, smooth, about
4 - 5 μ wide and 30 - 40 μ long; alar cells 3 or 5, large, in-
flated, hyaline or pale yellow, oblong; supra - alar cells sub-
quadrate.

Sporophyte not seen

Habitat : On twigs in evergreen forest.

Illustrations : Figure XXIII, 23.1 - 23.5

Specimens examined : Chiangmai, Doi (Mt.) Suthep;

Alt: 1600 - 1650 m. O. Manop No. 116, No. 124 (Dept. of Botany,
Chulalongkorn University.) Prachinburi, Khao(Mt.) khieo

Alt : 1300 m. P. Tx. No. 3589, No. 4122 (B.K.F.)

2. Sematophyllum phaenicum (C.M.) Fleisch.

Plants rather rigid, in mats or tufts. Branches crowded, ascending regularly pinnate, short, less than 1 cm. long. Leaves in several - ranked, oblong elliptic, blunt or shortly point, about 0.4 - 0.5 mm. wide and 1.0 - 1.3 mm. long; leaf margin entire; costa absent; leaf cells elongate - rhombic, about 4 - 5 μ wide and 30 - 50 μ long; alar cells 3 - 4 large, inflated, yellow, supra - alar cells few, subquadrate, different in shape and size to the inner cells.

Sporophyte not seen.

Habitat : On decayed wood.

Illustrations : Figure XXIV, 24.1 - 24.5

Specimens examined : Surattani, Thanom troa;

Alt: 40 m. P. Tx. No. 3583. No. 4222 (B.K.F.)

3. Sematophyllum caespitosum (Hedw.) Mitt.

Sematophyllum caespitosum (Hedw.) Mitt., Journ. Linn.

Soc. 12 : 479. 1869. Synonyms:-

Leskea caespitosa Hedw., Sp. Musc. 233. 1801.

Hypnum loxense Hook., Keenth Pl. Aequin. 1 : 62. 1822 - 28.

Hypnum galipense C.M., Bot. Zeit. 1848. 780. 1848.

Plants autoicous, yellowish - green, laxly tufted; irregularly branched. Leaves crowded, ovate - lanceolate, acute or short acuminate, slightly concave, about 0.3 - 0.5 mm. wide and 1.2 - 1.5 mm. long; leaf margin entire; costa absent; leaf cells rhomboidal - elongate, about 4 - 5 μ wide and 35 - 50 μ long, shorter at the apex and more or less elongated below, alar cells 3 - 4, oblong, scarcely inflated, supra - alar cells subquadrate, rather numerous.

Seta 0.5 - 1.5 cm. long, red; capsule inclined, ovoid, often asymmetrical, about 0.5 mm. wide and 1.0 - 1.5 mm. long; peristome teeth not seen.

Habitat : Near the stream, on tree hrunks.

Illustrations : Figure XXV, 25.1 - 25.6

Specimens examined : Prachinburi, khao (mt.) Yai National Park; Alt: 700 m. P. Tx. No. 3579, No. 3580. (B.K.F.) O. Manop. No. 106, No. 128 (Dept. of Botany, Chulalongkorn University.)

4. Sematophyllum tristiculum (Mitt.) Fleisch.

Sematophyllum tristiculum (Mitt.) Fleisch. Laubmfl. Java

4 (1918) 1262. Synonym :-

Stereodon tristiculus Mitt., Journ. Linn. Soc. Suppl. 1

(Musc. Ind. or.) (1859) 102.

Plants autoicous, slender, glossy, in dense mats; branches widely spreading. Leaves ovate - lanceolate, abruptly acuminate, 0.4 - 0.5 mm. wide and 1.0 - 1.3 mm. long; leaf margin entire; costa absent; leaf cells linear - elongate, smooth, 5 - 6 μ wide and 60 - 70 μ long; shorter in acumen and colored across insertion; alar cells 3 - 4 oval, slightly inflated, pale yellow, supra - alar cells few, subquadrate, thick - walled.

Seta 0.7 - 1.0 cm. long; capsule suberect or inclined, oblong - ovoid, about 0.7 mm. wide and 1.0 - 1.4 mm. long; peristome teeth not seen.

Habitat : Hill evergreen forest; on trees in streambed of temporarily dry forest rivulet.

Illustrations: Figure XXVI, 26.1 - 26.6

Specimens examined : Nakhon Sawan, Doi Musae Agricultural Experiment Station; Alt: 750 - 800 m. A. Touw. 8007 (B.K.F.), Prachinburi, Khao (Mt.) Yai National Park; Alt: 700 m. A. Touw No. 10854 (B.K.F.), O. Manop. No. 111, No. 129. (Dept. of Botany, Chulalongkorn University), Khao (Mt.) Khieo; Alt: 1100 m. A.F.G. Kerr No. 8 (B.K.) Udonthani, Phu (Mt.) Luang; Alt: 850-900m. A. Touw No. 12372 (B.K.F.).

5. Sematophyllum microcladiellum Fleisch.

Plants glossy, in densely mats or tufts; branches crowded, irregularly pinnate. Leaves in several - ranked, erect - spreading ovate - lanceolate, acuminate, about 0.3 - 0.4 mm. wide and 1.0 - 1.5 mm. long; leaf margin entire; costa absent; leaf cells linear - elongate, smooth, thin - walled, about 6 - 7 μ wide and 50 - 60 μ long, cell at the apex narrower; alar cells 2 or 3, large, inflated; supra alar cells subquadrate.

Sporophyte not seen.

Habitat : Evergreen forest along rivulet near Forest Station; epiphytic.

Illustration: Figure XXVII, 27.1 - 27.5

Specimens examined : Prachinburi, Khao (Mt.) Yai National Park; Alt: 700 m. A. Touw No. 12241, P. Tx. No. 2236 (B.K.F.), O. Manop No. 101 (Dept. of Botany, Chulalongkorn University.)

Figure XXIII

Sematophyllum subhumile (C.M.) Fleisch.

- 23.1 Plant X 1
- 23.2 Leaf X 45
- 23.3 Leaf arrangement X 10
- 23.4 Upper leaf cells X 240
- 23.5 Leaf cells and basal leaf
cells X 240



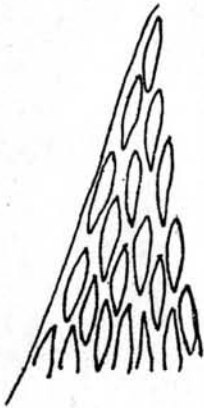
23.1



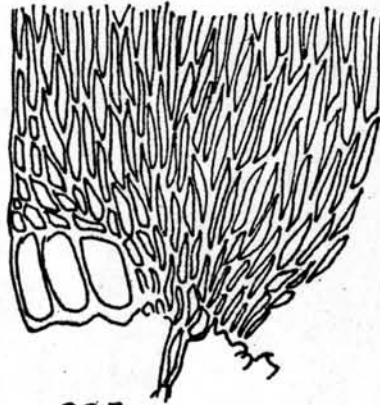
23.2



23.3



23.4

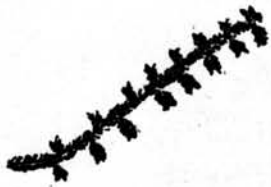


23.5

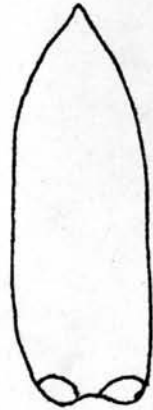
Figure XXIV

Sematophyllum phaenicum (C.M.) Fl.

- 24. 1. Plant X 1
- 24. 2. Leaf X 45
- 24. 3. Leaf arrangement X 10
- 24. 4. Upper leaf cells X 240
- 24. 5. Leaf cells and basal leaf
cells X 240



24.1



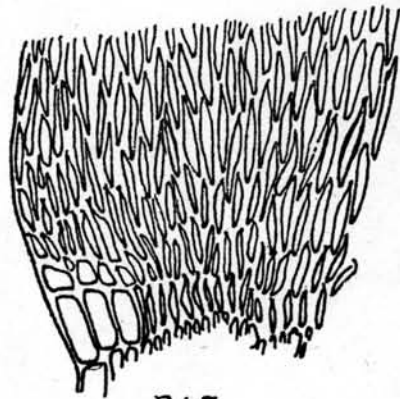
24.2



24.3



24.4



24.5

Figure XXV

Sematophyllum caespitosum Bruch

- 25.1 Plant X 1
- 25.2 Dry capsule X 15
- 25.3 Leaf X 45
- 25.4 Upper leaf cells X 240
- 25.5. Leaf cells and basal leaf
cells X 240
- 25.6 Leaf arrangement X 10



25.1



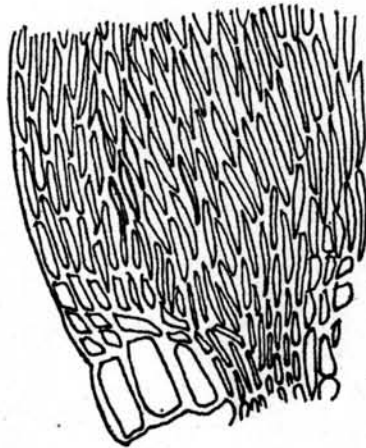
25.2



25.3



25.4



25.5



25.6

Figure XXVI

Sematophyllum tristiculum (Mitt.) Fl.

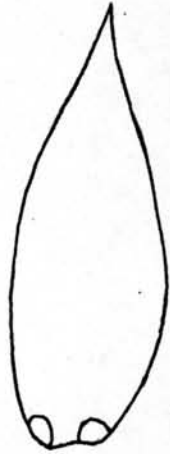
- 26.1. Plant X 1
- 26.2 Dry capsule X 15
- 26.3 Leaf X 45
- 26.4 Upper leaf cells X 240
- 26.5 Leaf arrangement X 10
- 26.6. Leaf cells and basal leaf
cells X 240



26.1



26.2



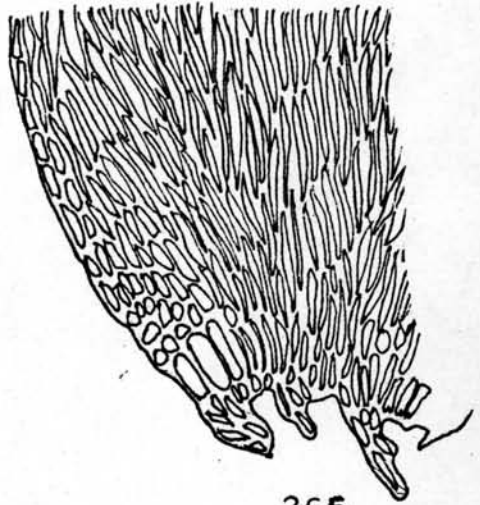
26.3



26.5



26.4



26.6

Figure XXVII

Sematophyllum microcladiellum Fleisch.

- 27.1 Plant X 1
- 27.2 Leaf X 45
- 27.3 Leaf arrangement X 10
- 27.4 Upper leaf cells X 240
- 27.5 Leaf cells and basal leaf
cells X 240



27.1



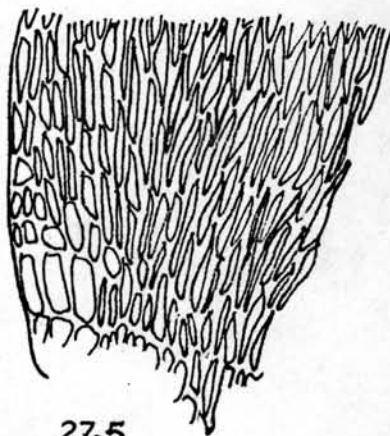
27.2



27.3



27.4



27.5

13. Acanthorrhynchium Fleisch.

Acanthorrhynchium Fleisch., Laubmfl. Java 4 (1919) 1331.

Plants slender, in flat mats. Branches subcomplanate, closely pinnate, foliate. Leaves ovate, long filiform - acuminate, serrulate all around; costa absent; leaf cells oval - rhomboidal, unipapillate; alar cells large, inflated.

Seta long, smooth; capsule inclined or horizontal; lid short, conical; peristome teeth double.

Species one ; an exsiccata of B.K.F. and B.K.

Acanthorrhynchium papillatum (Harv.) Fleisch.

Acanthorrhynchium papillatum (Harv.) Fleisch., Laubmfl.

Java 4 (1919) 1331. Synonym :-

Hypnum papillatum Harv., Hook. Ic. Pl. Par. 1(1937) pl. 23, fig 8; Lond. Journ. Bot. (1840) 18.

Plants autoicous, delicate, forming dense mats. Stems elongate, usually closely pinnate or twice pinnate; branches short and ascending, complanate - foliate. Leaves ovate, rather abruptly narrowed to a long filiform point, concave, about 0.2 - 0.5 mm. wide and 0.8 - 1.2 mm. long; leaf margin serrate; costa absent; leaf cells oval - rhomboidal, 6 - 7 μ wide and 15 - 30 μ long, unipapillate over lumen, thick - walled; alar cells 3 or 4, inflated, pale yellow or hyaline.

Seta elongate, smooth, about 2.0 cm. long; capsule inclined or horizontal, 0.5 mm. wide and 1.2 mm. long, cylindrical with apophysis; peristome teeth not seen.

Habitat : In evergreen secondary forest, along rivulet; on tree trunks and on decayed wood.

Illustrations : Figure XXVIII, 28.1 - 28.6

Specimens examined : Phitsanulok, Tung salang Luang; Alt: 500 m. A. Touw No. 12225 (B.K.F.) Phuket Island, near Thalang; Alt: 100 - 37 m. A. Touw No. 11277 (B.K.F.) Prachinburi, Khao (Mt.) Yai National Park; Alt: 700 m. P. Tx. No. 3584, A. Noguchi No. 11588 (E.K.F.) Surattani, Yanyao; Alt: 500 m. A.F.G. kur No. 467 (B.K.)

Figure XXVIII

Acanthorrhynchium papillatum (Harv.) Fleisch.

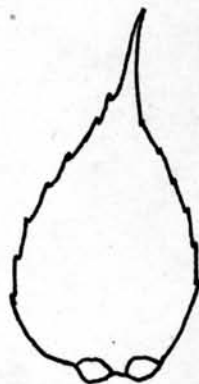
- 28.1 Plant X 1
- 28.2 Dry capsule X 15
- 28.3 Leaf X 45
- 28.4 Upper leaf cells X 240
- 28.5 Leaf arrangement X 10
- 28.6 Basal leaf cells and
basal leaf cells X 240



28.1



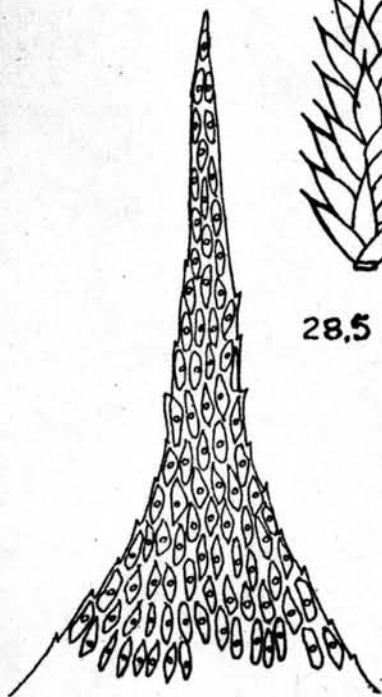
28.2



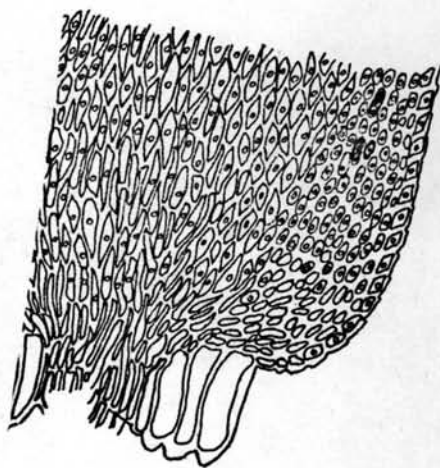
28.3



28.5



28.4



28.5

14. Trichosteleum (Mitt.) Jaeg.

Trichosteleum (Mitt.) Jaeg. Adumbr. 2 (1875 - 1877) 477.

Synonyms :-

Sematophyllum sec. Trichosteleum Mitt., Lourn. Linn. Soc.

12 : 476 - 1869.

Plants in densely mats or tufts. Stem creeping, irregularly branched. Leaves in several - ranked, ovate - lanceolate, oblong - lanceolate, usually falcate, acuminate, toothed near the apex; costa absent; leaf cells uni - or pluri or seriate papillose over the lumen, linear or elongate rhombic, thin - walled; alar cells few and large, hyaline or colour, in one horizontal row with or without smaller cells above.

Seta slender, smooth or papillose above; capsule pendulous, minute; lid with a long, needle - like beak.

Species three; the exsiccats of B.K.F.

Key to the species of *Trichostelium*

1. Leaf cells pluripapillate, leaves falcate - secund, long acuminate 1 T. hamatum.
1. Leaf cells unipapillate
 2. Leaf oblong - lanceolate, short acuminate, more toothed at the apex 2 T. chaetomitriopsis
 2. Leaf ovate - lanceolate, long acuminate, weakly toothed at the apex 3 T. boschii.

Trichosteleum hamatum (D.et.M.) Jaeg.

Trichosteleum hamatum (Doz. & Molk.) Jaeg;

Adumbr. 2 (1876 - 1877) 486. Synonyms :-

Hypnum hamatum Doz & Molk; Ann. Sci. Nat. (1877) 307;

Musc. Frond. Archip. Ind. (1844) 11.

Hypnum palanense. Hampe, Linnaeus 38 (1874) 567.

Plants autoicous, in densely mats or tufts, pale or lurid green, slightly glossy. Branches decumbent or ascendent, usually hooked at tip. Branch leaves crowded, more or less falcate - secund, ovate or oblong - ovate, concave, base gradually narrowed to lanceolate, long acuminate, about 0.5 - 0.6 mm. wide and 2.0 - 2.3 mm. long, often smaller; leaf margin erect, minutely denticulate, sharply serrate toward the apex; costa absent; upper leaf cells shortly linear or narrowly elliptic, with slightly sinuose or pitted, incrassate walls, papillate, basal cells longer, more pitted and usually smooth; about 5 μ wide and 25 - 50 μ long; alar cells 2 or 3, very large, oval - oblong, inflated, hyaline or pale yellow.

Seta slender, 1.0 - 1.5 cm. long, papillose above and smooth below; capsule small, ovoid, about 0.5 mm. wide and 0.4 mm. long; horizontal or pendulous; peristome teeth not seen.

Habitat : On wood in secondary forest. Moist evergreen forest, on decay wood.

Illustrations : Figure XXIX, 29.1 - 29.6

Specimens examined : Chiangmai, Doi (Mt.) Inthanon; Alt: 2000 m. O. Manop No. 8, No. 19, No. 22 (Dept. of Botany, Chulalongkorn University.), Nakhonratchasima, Pak Tong Chai, Alt: 300 m. P. Tx. No. 3550, No. 4100 (B.K.F.).

2. Trichosteleum chaetomitriopsis Dix.

Plants autoicous, in densely tufts. Stems elongate, irregularly pinnate; branches ascending. Leaves oblong - lanceolate, slightly concave, cuspidate, about 0.4 - 0.7 mm. wide and 1.5 - 2.0 mm. long; leaf margin entire below and serrulate in the upper half; costa absent; cells at the apex rectangular, upper leaf cells shortly linear, unipapillate, basal leaf cells longer, usually smooth, about 4 - 6 μ wide and 40 - 50 μ long; alar cells few, large, oblong, inflated, yellow or brown.

Seta slender, 1.4 - 2.0 cm. long, papillose above and smooth below; capsule small, ovoid, 0.5 - 0.6 mm. wide and 0.7 - 1.2 mm. long, horizontal or pendulous; lid slenderly beaked; peristome teeth not seen.

Habitat: In hill evergreen forest on ridge, on tree trunks, on bark and rock, rarely on decaying wood.

Illustrations : Figure XXX, 30.1 - 30.6

Specimens examined : Chanburi, Pong Nam Rawn, Khao (Mt.) Soidao; Alt: 1700 m. E.B. Bartram No. 3968 (B.K.F.) O. Manop No. 15 (Dept. of Botany, Chulalongkorn University.)
Frachinburi, Khao (Mt.) Yai National Park; Alt: 1200 m. A. Touw No. 12091, P.Tx. No. 3581 (B.K.F.).

3. Trichosteleum boschii (Doz. and Molk) Jaeg.

Trichosteleum boschii (Doz. & Molk) Jaeg., Adumbr. 2(1876-1877)

487. Synonyms:-

Hypnum boschii (Doz & Molk) , Ann. Sci. Nat.4 (1844)306

Trichosteleum basilanense Broth; Philip, Journ Sci sec.C. 13

(1918) 220

Plants autoicous, slender, in dense low tufts, yellowish green, slightly glossy. Branches laxly ascending, irregularly pinnate. Leaves ovate - lanceolate, slightly concave, long acuminate, about 0.3 - 0.4 mm. wide and 1.5 - 2.0 mm. long; leaf margin undulate above, serrulate in upper half; costa absent ; leaf cells linear, thin - walled, 4 - 5 μ wide and 40 - 60 μ long, with a single papilla over lumen or dorsal side, smooth below; alar cells large, inflated, yellow or brown.

Seta 0.8 - 1.5 cm. long, curved and papillose at the tips, smooth below; capsule small, about 0.3 mm. wide and 0.6 mm. long, horizontal or pendulous; peristome teeth not seen.

Habitat : On tree trunks.

Illustrations : Figure XXXI, 31.1 - 31.6

Specimens examined : Prachinburi, Khao (Mt.) Khieo; Alt: 1700 m. P.Tx. No. 3578, No. 411 (B.K.F.), O. Manop No. 20 (Dept. of Botany, Chulalongkorn University.)

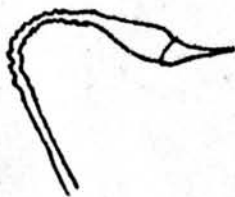
Figure XXIX

Trichosteleum hamatum (D.et. M.) Jaeg

- 29.1. Plant X 1
- 29.2 Dry capsule X 15
- 29.3 Leaf X 45
- 29.4 Upper leaf cells and margin X 240
- 29.5 Leaf arrangement X 10
- 29.6 Leaf cells showing pluripapillate
and basal leaf cells X 240



29.1



29.2



29.3



29.4



29.5



29.6

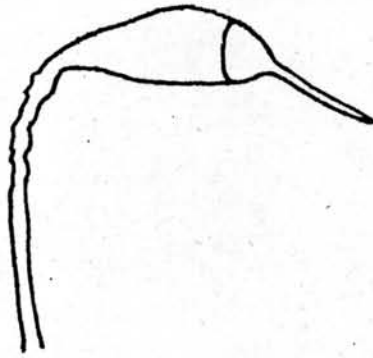
Figure XXX

Trichosteleum chaetomitriopsis Dix.

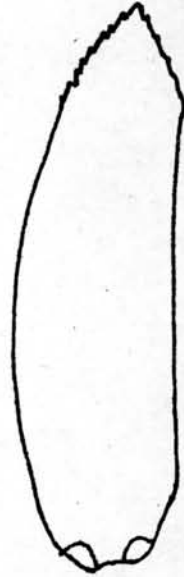
- 30.1 Plant X 1
- 30.2 Dry capsule X 15
- 30.3 Leaf X 45
- 30.4 Upper leaf cells X 240
- 30.5 Leaf arrangement X 10
- 30.6 Leaf cells showing unipapillate
and basal leaf cells X 240



30.1



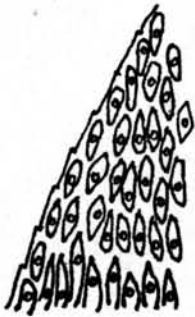
30.2



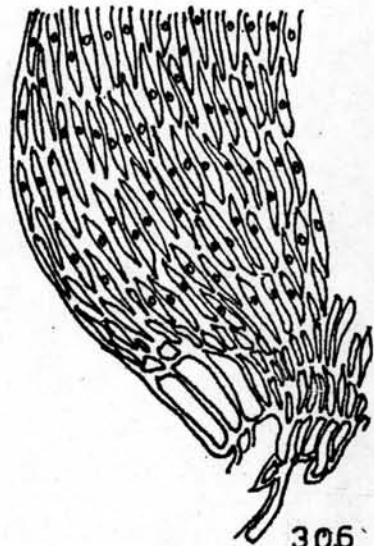
30.3



30.5



30.4



30.6

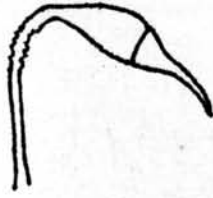
Figure XXXI

Trichosteleum boschii (D.et.M.) Jaeg

- 31.1 Plant X 1
- 31.2 Dry capsule X 15
- 31.3 Leaf X 45
- 31.4 Upper leaf cells X 240
- 31.5 Leaf arrangement X 10
- 31.6 Leaf cells showing unipapillate
and basal leaf cells X 240



31.1



31.2



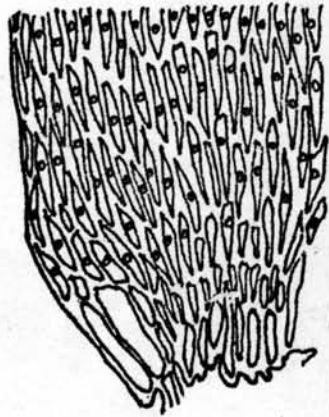
31.3



31.4



31.5



31.6

15. Trismegistia (C.M.) Broth.

Trismegistia (C.M.) Broth; E. & p. Pflanzenfam. ed. 1

Musci (1908) 1077. Synonym :-

Hypnum sec. Trismegistia C.M. Journ. Mus. Godeffr. 6 (1874) 89.

Plants large, attractive glossy plants in intricate deep tufts. Primary stems arched or ascending; secondary stems erect, much branches above, branches densely foliate. Leaves crowded, lanceolate or broadly at base, acuminate; costa absent; leaf cells elongate or rhomboidal elongate, smooth; alar cells forming a group in several horizontal rows, inflated and colored.

Seta very long, red; capsule large, horizontal; lid conic - rostrate.

Key to the species of Trismegistia

Plants large, stems erect, branches densely foliate, cuspidate at tip1 T. rigida

Plants smaller, stems erect, often dendroid, branches slightly complanate2 T. lancifolia

1. Trismegistia rigida (Hornsch. & Reinw.) Broth.

Trismegistia rigida (Hornsch. & Reinw.) Broth; E. & P.

Pflanzen. fam. ed. 1 Musci (1908) 1078. Synonyms :-

Hypnum rigidum Hornsch. & Reinw., Nov. Act. Acad. Caes.

Leop. 14 Suppl. 2 (1828) 731.

Trismegistia densiretis Broth; Philip. Journ. Sci. 31 (1926) 295.

Plants dioicous, large, in deep lax tufts. Secondary stems erect, rigid, bipinnately branched above, simple below, branches densely foliate, cuspidate, at the tips. Leaves of secondary stems erect - spreading, ovate - lanceolate, long acuminate, about 1.0 - 1.5 mm. wide and 3.0 - 3.5 mm. long; branch leaves smaller, coarsely toothed, gradually acuminate, about 0.5 - 1.0 mm. wide and 2.5 - 3.0 mm. long; leaf margin sharply serrate toward the apex; costa absent; leaf cells smooth, about 5 μ wide and 30 - 40 μ long; alar group large, golden-brown, cells inflated and transversely divided.

Seta 5 - 7 cm. long or longer, red; capsule horizontal, gibbous; lid conic - rostrate, short; peristome teeth not seen.

Habitat : Hill evergreen forest; on rocks in shady forest stream, stunted mossy forest; on trees. Evergreen forest along ridge; on tree trunks.

Illustrations: Figure XXXII, 32.1 - 32.5

Specimens examined : Nakhonsithamarat, Khao (Mt.) Luang; Alt: 1740 m. a. Touw No. 10643, No. 10688, No. 11674, No. 11788, No. 11844 (B.K.F.), A.F.G. Kerr No. 298 (B.K.)

2. Trismegistia lancifolia (Harv.) Broth.

Trismegistia lancifolia (Harv.) Broth; E. & P. Pflanzenfam.
ed. 1 Musci (1908) 1078. Synonyms :-

Neckera lancifolia Harv., Lond. Journ. Bot. (1840) 14.

Acanthocladium merrillii Broth; Philip. Journ. Sci. Sec.

C. 3 (1908) 29.

Plants dioicous, smaller than T. rigida, in deep tufts. Primary stem often stoloniferous; secondary stem erect, often dendroid, branches slightly complanate, blunt at the tips. Stem leaves ovate - lanceolate, more toothed at apex, long acuminate, about 0.8 - 1.5 mm. wide and 2.0 - 2.5 mm. long, branch leaves narrowly ovate - lanceolate, concave, slightly narrowed to a lingulate point, acuminate, about 0.5 - 1.0 mm. wide and 1.5 - 2.0 mm. long; leaf margin sharply serrate above; costa absent; leaf cells linear - rhomboidal, shorter and broader near the apex, about 5 μ wide and 35 - 50 μ long, smooth; thickened wall; alar group large, colored, cells inflated.

Beta to 6 cm. long; capsule horizontal; lid long and slenderly beaked; peristome teeth not seen.

Habitat : Evergreen forest along streamlet; on rock in stream. Evergreen forest along ridge, on tree trunks.

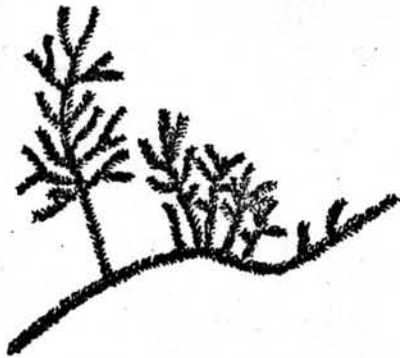
Illustrations : Figure XXXIII, 33.1 - 33.6

Specimens examined : Nakhonsithamarat, Khao (Mt.) Luang;
Alt: 700 - 1650 m. A. Touw No. 11695, No. 11978 (B.K.F.)
Pattani, Ba chaw; Alt: 400 m. A.F.G. Kerr No. 55 (B.K.)
Prachinburi, Khao (Mt.) Yai National Park; Alt: 700 m. O. Manop
No. 49, No. 55 (Dept. of Botany, Chulalongkorn University.)

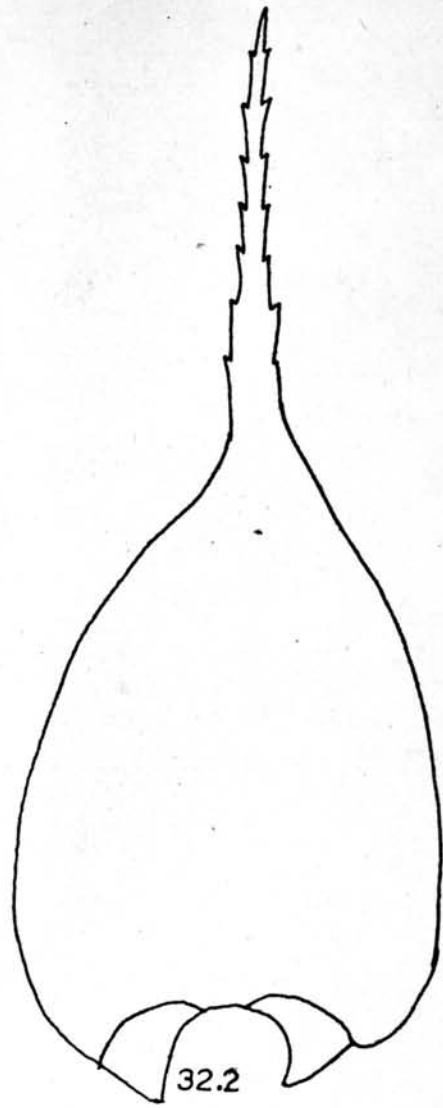
Figure XXXII

Trismegistia rigida (Mitt.) Broth.

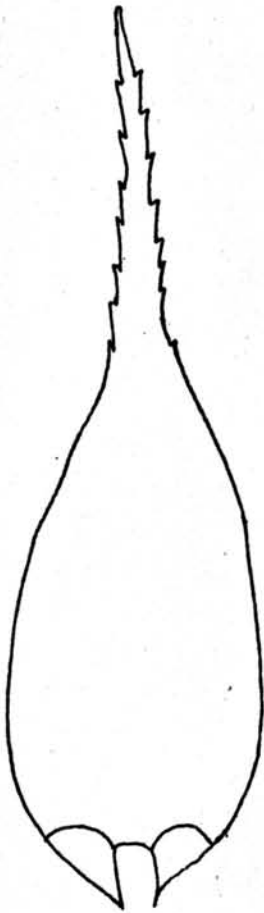
- 32.1 Plant X 1
- 32.2 Stem leaf X 45
- 32.3 Branch leaf X 45
- 32.4 Leaf ~~cells~~ and basal
leaf cells X 240
- 32.5 Leaf arrangement X 10



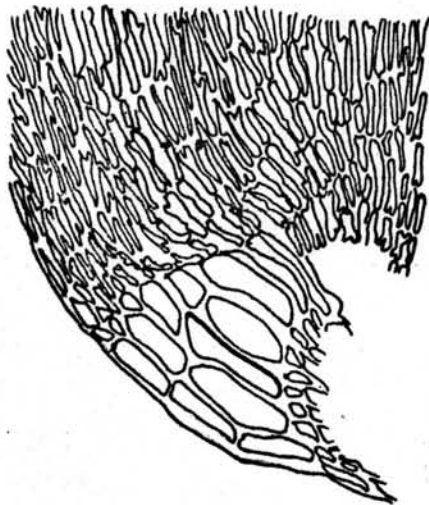
32.1



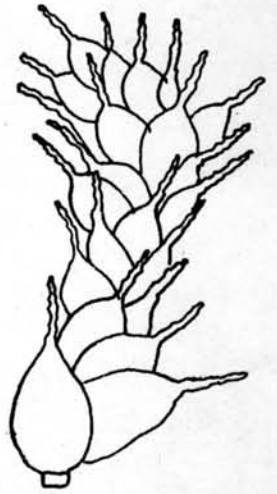
32.2



32.3



32.4



32.5

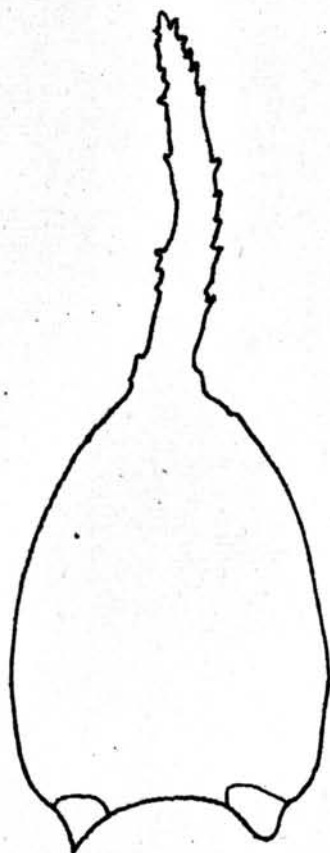
Figure XXXIII

Trismegistia lancifolia (Harv.) Broth.

- 33.1 Plant X 1
- 33.2 Stem leaf X 45
- 33.3 Branch leaf X 45
- 33.4 Upper leaf cells X 240
- 33.5 Leaf cells and basal
leaf cells X 240
- 33.6 Leaf arrangement X 10



33.1



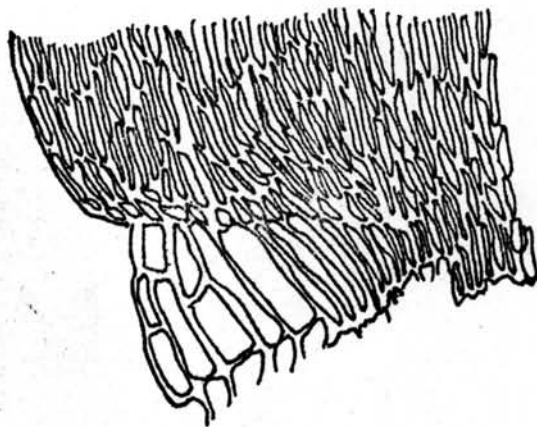
33.2



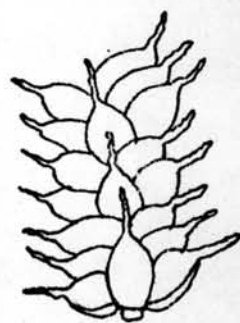
33.3



33.4 .



33.5



33.6

16. Mastopoma Card.

Mastopoma Card; Rev. Bryol. (1901) 116

Plants large, usually robust, glossy plants in lax or dense mats; irregularly or pinnately branched. Leaves crowded, erect spreading or secund, ovate - lanceolate, oblong - lanceolate, concave; leaf margin spinose - serrate in upper half; costa absent; leaf cells linear, smooth; alar group inflated and colored.

Seta very long, curved at the tip; capsule large, horizontal, ovoid; lid short, conical.

Species one ; an exsiccate of B.K.F.

Mastopoma perundulatum (Dix.) Horih & Ando.

Mastopoma perundulatum (Dix.) Horih' Ando, comb. nov. Synonym:-

Trismegistia perundulata Dix. in Ann. Bryol. 9 : 69 (1936)

Plants autoicous, large, robust in densely mats or tufts. Branches irregularly bipinnate. Leaves crowded, subhomotropous to falcate, lanceolate, long acuminate, stem leaves 0.5 - 1.0 mm. wide and 3.5 - 4.0 mm. long, branch leaves smaller, about 0.5 - 1.0 mm. wide and 2.5 - 3.5 mm. long; leaf margin spinose serrate in the upper half; costa absent; leaf cells linear, smooth, thick - walled, about 5 - 7 μ wide and 50 - 70 μ long; alar cells in group, yellow.

Seta elongate, 4.5 - 6.0 cm. long; smooth or upward
herrucose; capsule rough, large, ovoid, horizontal or suberect,
about 1.0 - 2.0 mm. wide and 2.5 - 3.0 mm. long; lid short,
conical apiculate, not beaked; peristome teeth not seen.

Habitat : Hill evergreen forest; on tree trunks and
branches.

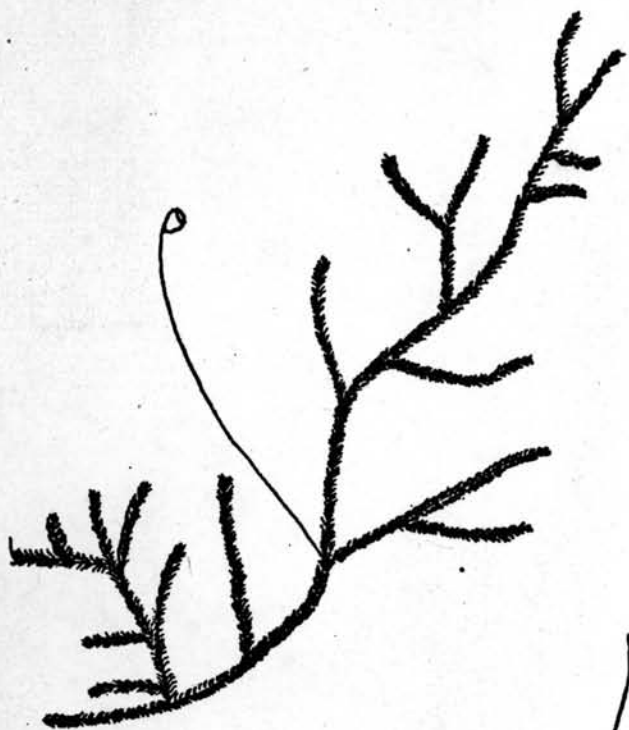
Illustrations: Figure XXXIV, 34.1 - 34.7

Specimens examined : Chiangmai, Doi (Mt.) Inthanon;
Alt: 2300 m. A. Touw No. 9815 (B.K.F.), O. Manop No. 10, No. 56,
No. 60 (Dept. of Botany, Chulalongkorn University.)

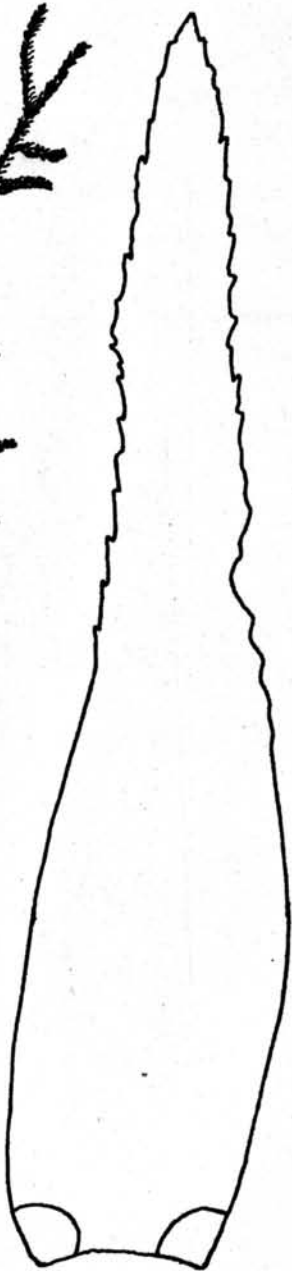
Figure XXXIV

Mastopoma perundulatum (Dix.) Horih & Ands.

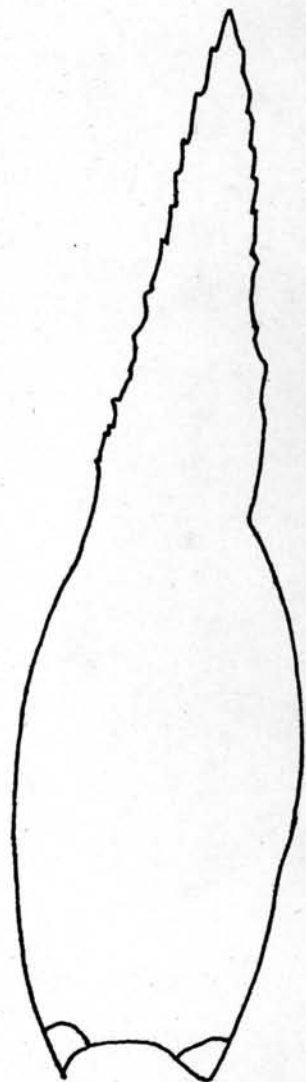
- 34.1 Plant X 1
- 34.2 Stem leaf X 45
- 34.3 Branch leaf X 45
- 34.4 Upper leaf cells X 240
- 34.5. Dry capsule X 15
- 34.6 Leaf arrangement X 10
- 34.7 Leaf cells and basal
leaf cells X 240



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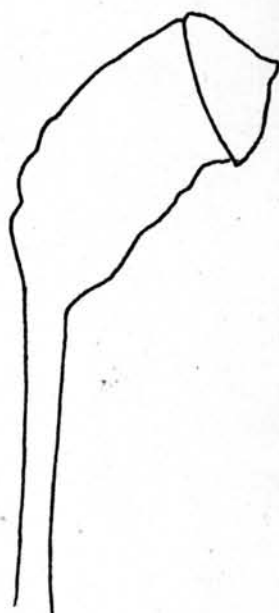
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343



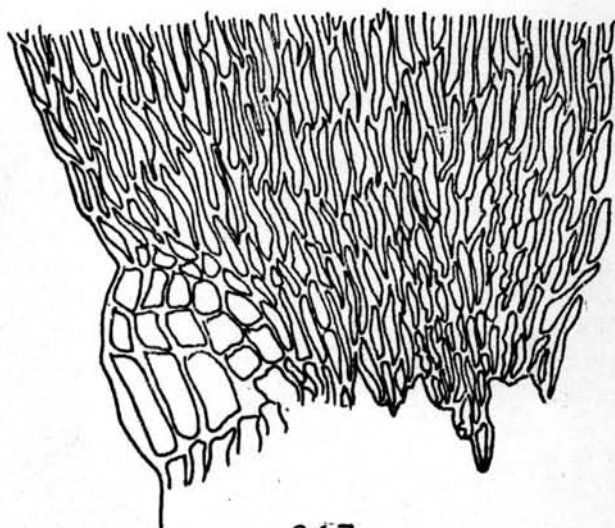
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17. Clastobryum Doz. et. Molk.

Clastobryum Doz. et Molk. Musc. frond. ined. Archip. ind. p.43
(1845). Synonyms:-

Astrodontium Doz. et Molk. in Ann. sc. Nat. 1844, II. p. 299

Neckerae C. Muell. Syn. II. p. 91 (1850)

Plants in densely mats, delicate; branches regularly pinnate. Leaves not crowded, oblong - lanceolate, acuminate; leaf margin entire; costa absent; leaf cells elongate, smooth; cells at the apex rhomboidal - elongate; alar cells few, hyaline or pale yellow.

Species one : an exsiccata of B.K.F.

Clastobryum serrulatum (R.et.C.) Broth.

Plants dioicous, delicate, in densely mats; branches regularly pinnate, about 0.5 cm. long. Leaves oblong - lanceolate, acuminate, about 0.3 - 0.5 mm. wide and 1.0 - 1.5 mm. long; leaf margin entire; costa absent; leaf cells elongate, smooth, thin - walled, about 4 - 6 μ wide and 40 - 70 μ long; cells at the apex rhomboidal - elongate, about 7 μ wide and 15 - 30 μ long; alar cells few, in one horizontal row, oblong, hyaline or pale yellow.

Sporophyte not seen.

Habitat : In evergreen forest, on tree trunks.

Illustrations : Figure XXXV, 35.1 - 35.5

Specimens examined : Phitsanulok, Phu (Mt.) Mieng;

Alt: 1300 m. P. Tx. No. 3585, No. 3888 (B.K.F.)

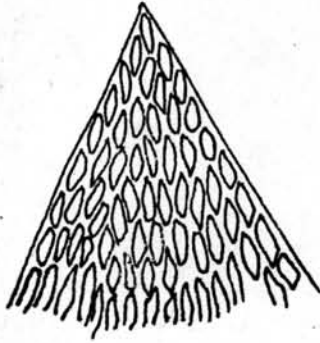
Figure XXXV

Clastobryum serrulatum (R.et. C.)Br.

- 35.1 Plant X 1
- 35.2 Upper leaf cells X 240
- 35.3 Leaf X 45
- 35.4 Leaf arrangement X 10
- 35.5 Leaf cells and basal
leaf cells X 240



35.1



35.2



35.3



35.4



35.5

18. Acanthocladium Mitt.

Acanthocladium Mitt., Trans. & Proc. Roy. Soc, Victoria 19:85.
1883.

Plants pale, forming dense mats or tufts. Stem often creeping, elongate, pinnate, bipinnate or irregularly branched. Leaves in several - ranked, lanceolate, ovate, erect - spreading; leaf margin entire or weakly toothed; costa absent; leaf cells thin - walled, linear, smooth, somewhat rarely uni - or pluripapillate; alar cells large, usually hyaline, different in shape or in size to the laminal cells, inner basal leaf cells not sharply differentiated from the laminal cells.

Seta elongate, smooth or rough near the apex; capsule horizontal, noded or erect; peristome teeth double; lid conic - rostrate.

Species five; the exsiccats of B.K.F. and B.K.

Key to the species of Acanthocladium

1. Leaf cells smooth2
1. Leaf cells uni - or pluripapillate4
2. Leaf oblong - lanceolate, short acuminate3
2. Leaf ovate, filiform - acuminate; leaf cells elongate,
about 5 - 8 μ wide and 60 - 80 μ long.....1 A. penicillatum
3. Leaf cells rhomboidal - elongate, about 4 - 5 μ wide and
25 - 30 μ long2 A. piliferum
3. Leaf cells linear, about 5 - 6 μ wide and 40 - 60 μ long
.....3 A. deflexifolium
4. Leaf cells unipapillate, seta smooth, about 2 inches long
.....4 A. longipilum
4. Leaf cells pluripapillate, seta rough near apex, about
1.0 cm. long5 A. surculare.

1. Acanthocladium penicillatum (Mitt.) Broth.

Plants autoicous, slender, in densely mats or tufts. Branches ascending, regularly bipinnate. Leaves crowded, small, ovate, filiform - acuminate, about 0.2 - 0.3 mm. wide and 0.5 - 0.7 mm. long; leaf margin entire, weakly toothed near the apex; costa absent; leaf cells smooth, elongate, about 5 - 8 μ wide and 60 - 80 μ long; alar cells few, large, inflated, supra alar cells subquadrate.

Seta elongate, about 1.5 - 2.0 cm. long, smooth; capsule horizontal, large, 1.0 - 1.2 mm. wide and 2.0 - 2.5 mm. long; lid long; spore round, about 20 μ in diameter; peristome teeth not seen.

Habitat : Summit region; mossy hill evergreen forest rich in Ericaceae on tree trunks and branches; small Sphagnum bog.

Illustrations: Figure XXXVI, 36.1 - 36.5

Specimens examined: Chieng mai, Doi (Mt.) Inthanon; Alt: 2500 - 2570 m. A. Touw No. 9723, No. 9763, No. 9778 (B.K.F.), O. Manop No. 78 (Dept. of Botany, Chulalongkorn University) Kachanaburi, Erawan Water Fall; Alt: 150 m. A. Touw No. 9818 (B.K.F.).

2. Acanthocladium piliferum (Broth.) P. Tx.

Plants autoicous, in dense mats; branches irregularly pinnate. Leaves crowded, ovate - lanceolate, acuminate, about 0.4 - 0.5 mm. wide and 1.0 - 1.5 mm. long; leaf margin entire; weakly toothed near the apex; costa absent; leaf smooth, rhomboidal - elongate, about 4 - 5 μ wide and 25 - 30 μ long; alar cells 3 or 4, inflated large, in deep brown.

Sporophyte not seen.

Habitat: On tree trunks under the stream.

Illustrations: Figure XXXVII, 37.1 - 37.4

Specimens examined : Chiangmai, Doi (Mt.) Inthanon;

Alt: 2500 - 2600 m. P.Tx. No. 3581, No. 4050 (B.K.F.)

Phitsanulok, Phu (Mt.) Mieng; Alt: 1300 m. P. Tx. No. 3580

(B.K.F.)

3. Acanthocladium deflexifolium Ren. & Card.

Plants autoicous, rather large, in dense mats.

Branches irregularly bipinnate. Leaves erect spreading, oblong - lanceolate, acuminate, about 0.4 - 0.6 mm. wide and 1.5 - 1.6 mm. long; leaf margin entire, toothed near the apex; costa absent; leaf cells smooth, linear, thin - walled, about 5 - 6 μ wide and 40 - 60 μ long; alar cells 3 or 4, large, inflated, pale yellow, cells above alar cells rectangular.

Seta elongate, about 2.5 - 3.0 cm. long, smooth; capsule large, 0.5 - 1.0 mm. wide and 2.5 - 3.0 mm. long; lid conic - rostrate; peristome teeth not seen.

Habitat: Humid hill evergreen forest along streamlet, on tree trunks and branches.

Illustrations: Figure XXXVIII, 38.1 - 38.5

Specimens examined : Chiangmai, Doi (Mt.) Inthanon; Alt: 2000 - 2300 m. A. Touw No. 10037, No. 10113, No. 10160, No. 10233 (B.K.F.), O. Manop No. 75, No. 80 (Dept. of Botany, Chulalongkorn University.)

4. Acanthocladium longipilum Broth.

Plants autoicous, rather large, slender, densely mats; branches irregularly pinnate, about 1.0 cm. long. Stem leaves erect spreading, lanceolate, abruptly slenderly acuminate, about 0.5 - 0.7 mm. wide and 2.0 - 2.7 mm. long, branch leaves smaller, lanceolate, gradually acuminate, about 0.2 - 0.4 mm. wide and 1.3 - 1.5 mm. long; leaf margin entire, sharply serrulate above; costa absent; leaf cells linear, unipapillate, about 3 - 5 μ wide and 20 - 30 μ long; alar cells 3 or 4, large, inflated, yellowish.

Seta very long, about 2 inches, smooth; capsule large, horizontal or suberect, about 1.0 mm. wide and 2.0 mm. long; lid conic rostrate; peristome teeth not seen.

Habitat: On trees and shrubs

Illustrations : Figure XXXIX, 39.1 - 39.6

Specimens examined : Chiang mai, Doi (Mt.) Inthanon; Alt: 1750 - 1800 m. A. Touw No. 8420, No. 8423, No. 9869, No. 9938, No. 19461, No. 10676 (B.K.F.). Prachinburi, Khao (Mt.) Khieo; Alt: 1200 - 1300 m. A. Touw No. 10708, No. 10750, No. 10964, No. 10993, No. 11011 (B.K.F.), O. Manop No. 84, No. 90 (Dept. of Botany, Chulalongkorn University.) Udonthani, Phu(Mt.) Luang; Alt: 1200 - 1350 m. A. Touw No. 11100, No. 12034, No. 12127, No. 12129 (B.K.F.)

5. Acanthocladium surculare (Mitt.) Broth.

Plants autoicous, slender, densely mats. Branches regularly pinnate. Leaves crowded, oblong - lanceolate, falcate, apex long acuminate, about 0.4 - 0.5 mm. wide and 1.4 - 1.5 mm. long; leaf margin entire, weakly toothed near the apex; costa absent; leaf cells pluripapillate over the lumen, about 4 μ wide and 25 - 30 μ long; alar cells 3 or 4, large, inflated.

Seta elongate, smooth at the base and rough near the apex, about 1.0 cm. long; capsule slender, horizontal or suberect, 0.4 mm. wide and 0.7 mm. long; peristome teeth not seen.

Habitat: Hill evergreen forest and open evergreen forest, on tree trunks and branches.

Illustrations: Figure XL, 40.1 - 40.5

Specimens examined: Chiangmai, Doi (Mt.) Chiengdao; Alt: 1500 - 1550 m. A. Touw No. 8505, No. 8523, No. 8745, No. 9085 (B.K.F.), Doi (Mt.) Inthanon; Alt: 1650 m. A. Touw No. 9652 (B.K.F.), Doi (Mt.) Suthep; Alt: 1600 - 1650 m. A. Touw No. 10288, O. Manop No. 86, No. 150 (Dept. of Botany, Chulalongkorn University) Prachinburi, Kahao (Mt.) Khieo; Alt: 1300 m. A. Touw No. 1044 No. 12134 (B.K.F.), Udonthani, Phu (Mt.) Luang; Alt: 1150 - 1250 m. A. Touw No. 16333 (B.K.F.)

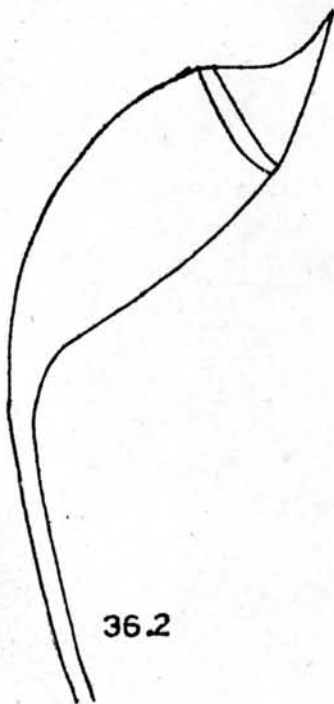
Figure XXXVI

Acanthocladium penicillatum (Mitt.) Broth.

- 36.1 Plant X 1
- 36.2 Dry capsule X 15
- 36.3 Leaf X 45
- 36.4 Leaf arrangement X 10
- 36.5 Leaf cells and basal leaf cells X 240



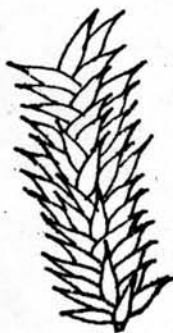
36.1



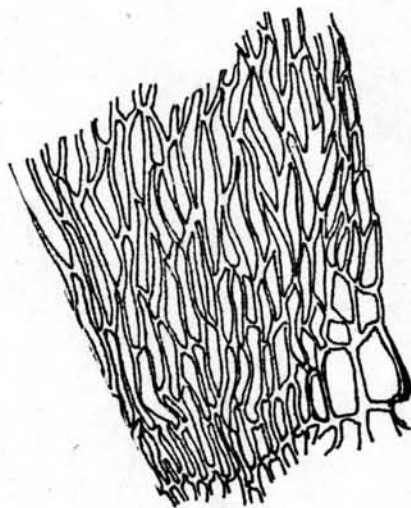
36.2



36.3



36.4



36.5

Figure XXXVII

Acanthocladium piliferum (Broth.) P.Tx.

37.1 Plant X 1

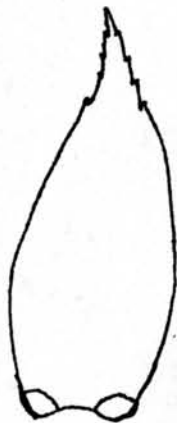
37.2 Leaf X 45

37.3 Leaf arrangement X 10

37.4 Leaf cells and basal leaf cells
X 240



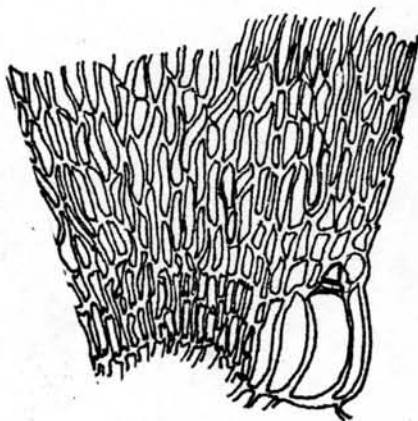
37.1



37.2



37.3



37.4

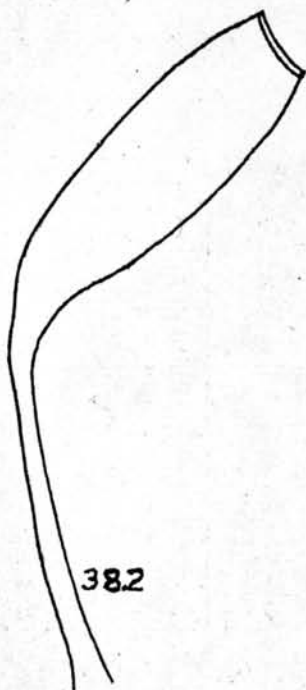
Figure XXXVIII

Acanthocladium . deflexifolium Ren. & Card.

- 38.1 Plant X 1
- 38.2 Dry capsule X 15
- 38.3 Leaf X 45
- 38.4 Leaf arrangement X 10
- 38.5 Leaf cells and basal leaf cells X 240



38.1



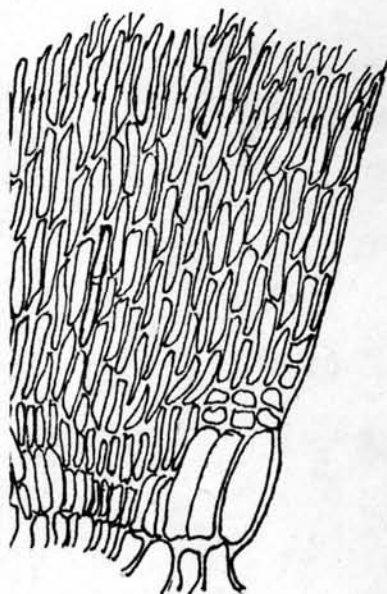
38.2



38.3



38.4

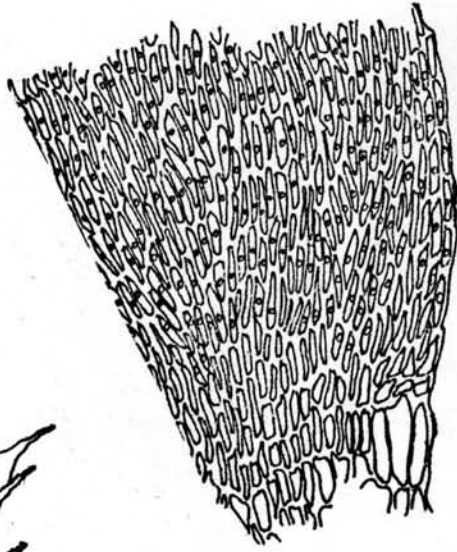
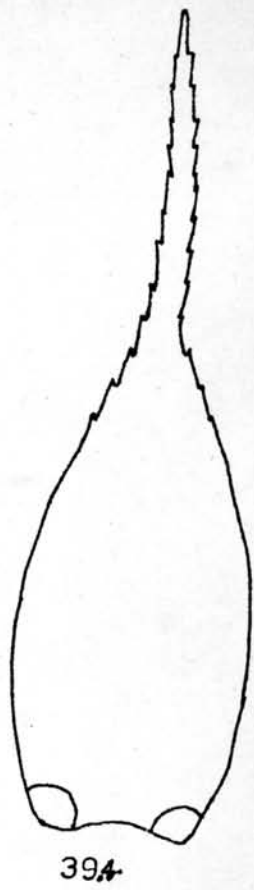
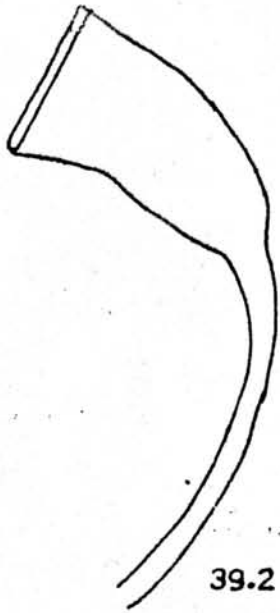


38.5

Figure XXXIX

Acanthocladium longipilum Broth.

- 39.1 Plant X 1
- 39.2 Dry capsule X 15
- 39.3 Branch leaf X 45
- 39.4 Stem leaf X 45
- 39.5 Leaf cells and basal
leaf cells X 240



39.5

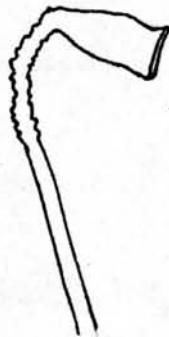
Figure XL

Acanthocladium surculare (Mitt.) Broth.

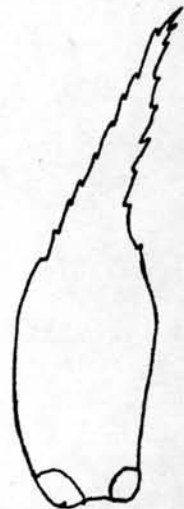
- 40.1 Plant X 1.
- 40.2 Dry capsule X 15
- 40.3 Leaf X 45
- 40.4 Leaf arrangement X 10
- 40.5 Leaf cells and basal
leaf cells X 240



40.1



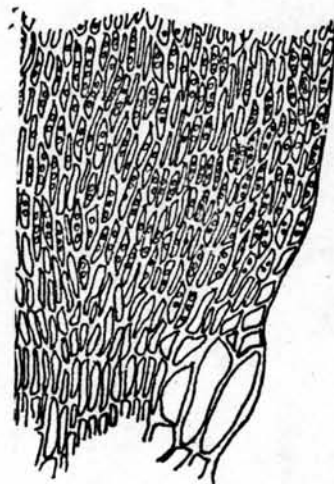
40.2



40.3



40.4



40.5