

Studies in Indiana Bryophytes X

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The introductory remarks for this study are comparable to those of number eight in the series. The writer is indebted to the Indiana Academy of Science and the Graduate Council of DePauw University for research grants and to the State University of Iowa for three honoraria. The latter were used during the summers of 1950, 1951, and 1952 at the Iowa Lakeside Laboratory, in research on Indiana mosses under the leadership and generous counsel of Dr. H. S. Conard. The author in this way wishes to express deep appreciation to Dr. Conard.

LESKEACEAE (continued)

Key to the genera in Leskeaceae¹

1. Stem leaves with paraphyllia-like filaments at base.....*Helodium*
1. Stem leaves without paraphyllia-like filaments at base.....2.
2. Paraphyllia on stems and branches more or less abundant.....*Thuidium*
2. Paraphyllia on stems and branches occasional or absent.....3.
3. Plants light to glaucous green; leaf margins usually ciliate or spinose-dentate4.
4. Costa single, reaching middle of leaf, or short, or forking; paraphyllia present*Thelia*
4. Costa short or lacking; paraphyllia absent.....*Myurella*
3. Plants green, not glaucous; leaf margins not ciliate or spinose-dentate4.
4. Leaf apices colorless.....5.
5. Costa extending to middle of leaf.....*Lindbergia*
5. Costa ending just below apex.....*Anomodon*
4. Leaf apices green.....5.
5. Marginal cells bulging.....*Haplohymenium*
5. Marginal cells not bulging.....6.
6. Costa pellucid*Anomodon*
6. Costa not pellucid.....*Leskea*

Subfamily ANOMODONTEAE

Plants medium to moderately large in size; paraphyllia usually lacking; leaf cells small, rounded to subhexagonal, densely papillose; capsules erect, symmetric or nearly so; peristome of 16 slender teeth; inner peristome of a low basal membrane, frequently with short linear segments.

Key to the genera of Anomodonteae

- Plants very slender; leaves brittle, apices frequently broken from dry blades; costa extending to the middle of the leaf; marginal cells of leaf bulging*Haplohymenium*
- Plants somewhat robust; leaves not conspicuously brittle; costa ending in or just below apex; marginal cells not bulging.....*Anomodon*

¹ The study of the subfamily Thuidieae, treating the genera *Helodium* and *Thuidium*, was published in Proc. Ind. Acad. Sci. 61:106-110. 1952.

ANOMODON

Plants in dense mats or cushions, commonly dark green; branches sometimes flagelliform; paraphyllia lacking; leaves close, usually in 5 rows; lingulate from an ovate or oblong clasping base; margins plane and entire; costa strong, pellucid, smooth, usually ending just below apex; median cells rounded-hexagonal, densely papillose on both sides; capsules erect, symmetric, oblong-cylindric; peristome teeth linear-lanceolate; operculum conic to rostrate.

Key to species of Anomodon

1. Leaves slenderly acuminate, ending in a hair point.....*A. rostratus*
1. Leaves not ending in a hair point.....2.
2. Branches frequently attenuate to flagelliform; leaves usually apiculate and toothed at the apex.....*A. attenuatus*
2. Branches not attenuate or flagelliform; leaf apices rounded-obtuse and entire.....*A. minor*

A. attenuatus (Hedw.) Hueben. (Figs. 1-3.) Bartholomew, Benton, Blackford, Boone, Brown, Carroll, Cass, Clark, Clinton, Crawford, Daviess, Dearborn, Delaware, Dubois, Elkhart, Fayette, Fountain, Gibson, Grant, Harrison, Hendricks, Henry, Jackson, Jasper, Jay, Jefferson, Jennings, Johnson, Knox, Kosciusko, Lawrence, Madison, Martin, Miami, Monroe, Montgomery, Morgan, Noble, Orange, Owen, Parke, Perry, Pike, Porter, Posey, Pulaski, Putnam, Randolph, Ripley, Shelby, Spencer, Steuben, Union, Vermillion, Wabash, Warren, Warrick, Washington, Wayne, Wells, and White counties.

A. minor (Beauv.) Lindb. (Figs. 4-5.) Bartholomew, Benton, Brown, Cass, Clinton, Dearborn, Decatur, Delaware, Fayette, Fountain, Grant, Harrison, Hendricks, Jefferson, Jennings, Knox, Kosciusko, Lake, La-Porte, Lawrence, Madison, Martin, Monroe, Montgomery, Noble, Owen, Parke, Perry, Pike, Putnam, Randolph, Ripley, Shelby, Switzerland, Warren, and Wayne counties.

A. rostratus (Hedw.) Schimp. (Figs. 6-8.) Benton, Blackford, Brown, Cass, Clark, Crawford, Daviess, Dearborn, Delaware, Fayette, Grant, Harrison, Henry, Huntington, Jay, Jefferson, Jennings, Lake, Lawrence, Madison, Martin, Monroe, Montgomery, Noble, Owen, Parke, Perry, Porter, Posey, Putnam, Randolph, Ripley, Steuben, Union, Warren, Washington, Wayne, Wells, and White counties.

HAPLOHYMENIUM

Plants very slender, in loose mats, dull green; stems pinnately branched; leaves appressed when dry, squarrose-spreading when moist, very brittle, concave, subclasping, lanceolate from an ovate base, apices rounded, obtuse, or acute, often apiculate, very often broken from dried leaves; narrowly costate to about the middle of the leaf, costa papillose on back; cells of leaf somewhat translucent, turgid, bearing several large papillae on each face, rounded-hexagonal in upper portion of blade; marginal cells bulging and papillate; capsule unknown.

H. triste (Cesati) Kindb. (Fig. 9.) Hendricks, Jefferson, Jennings, Madison, Monroe, Montgomery, Morgan, Parke, Perry, Putnam, and Steuben counties.

Subfamily LESKEAE

Stems pinnately or subpinnately branched; leaves appressed when dry and erect-spreading to spreading when moist; capsules erect, usually straight, occasionally slightly curved; peristome perfect, with inner peristome short, rudimentary, or absent.

Key to the genera of Leskeae

Leaf apices frequently colorless; papillae on leaf cells single, large.....*Lindbergia*
 Leaf apices not colorless; papillae on leaf cells one to several, small.*Leskea*

LESKEA

Plants small to medium-sized, growing in mats or spreading tufts; stems prostrate, pinnately to subpinnately branched; paraphyllia sometimes present; leaves concave, costate, usually papillose, ovate to ovate-lanceolate, apices acute, acuminate, or obtuse, margins commonly entire, occasionally serrulate in apices; capsules straight or slightly curved, subcylindric or oblong-cylindric; peristome double, outer of 16 linear-lanceolate teeth and inner of 16 segments extending from a basal membrane 1/5-1/4 the length of the teeth; operculum conic, obtuse, acute, or apiculate.

Key to species of Leskea

1. Leaves of stems more than twice as long as wide.....*L. polycarpa*²
1. Leaves of stems less than twice as long as wide.....2.
 2. Leaves symmetric, lightly biplicate; margins frequently revolute.....*L. gracilescens*
 2. Leaves not symmetric, not or faintly plicate; margins plane.....*L. obscura*

L. gracilescens Hedw. (Fig. 10.) Bartholomew, Benton, Blackford, Boone, Carroll, Cass, Clark, Clay, Clinton, Crawford, Daviess, Dearborn, Decatur, Delaware, Dubois, Fayette, Fountain, Gibson, Greene, Harrison, Hendricks, Henry, Jasper, Jay, Jefferson, Jennings, Johnson, Knox, Kosciusko, Lagrange, Lake, Lawrence, Madison, Marion, Marshall, Martin, Miami, Monroe, Montgomery, Newton, Noble, Orange, Owen, Parke, Perry, Porter, Posey, Pulaski, Putnam, Randolph, Ripley, Rush, Scott, Shelby, Spencer, Starke, Sullivan, Switzerland, Tippecanoe, Tipton, Union, Vanderburgh, Vermillion, Wabash, Warren, Warrick, Wayne, Wells, White, and Whitley counties.

L. obscura Hedw. (Fig. 11.) Clark, Clinton, Harrison, Jasper, Jay, Jefferson, Knox, Kosciusko, Parke, Perry, Posey, Pulaski, Putnam, Ripley, Saint Joseph, Scott, and White counties.

² *Leskea polycarpa* Hedw. not yet reported from Indiana.

PLATE A

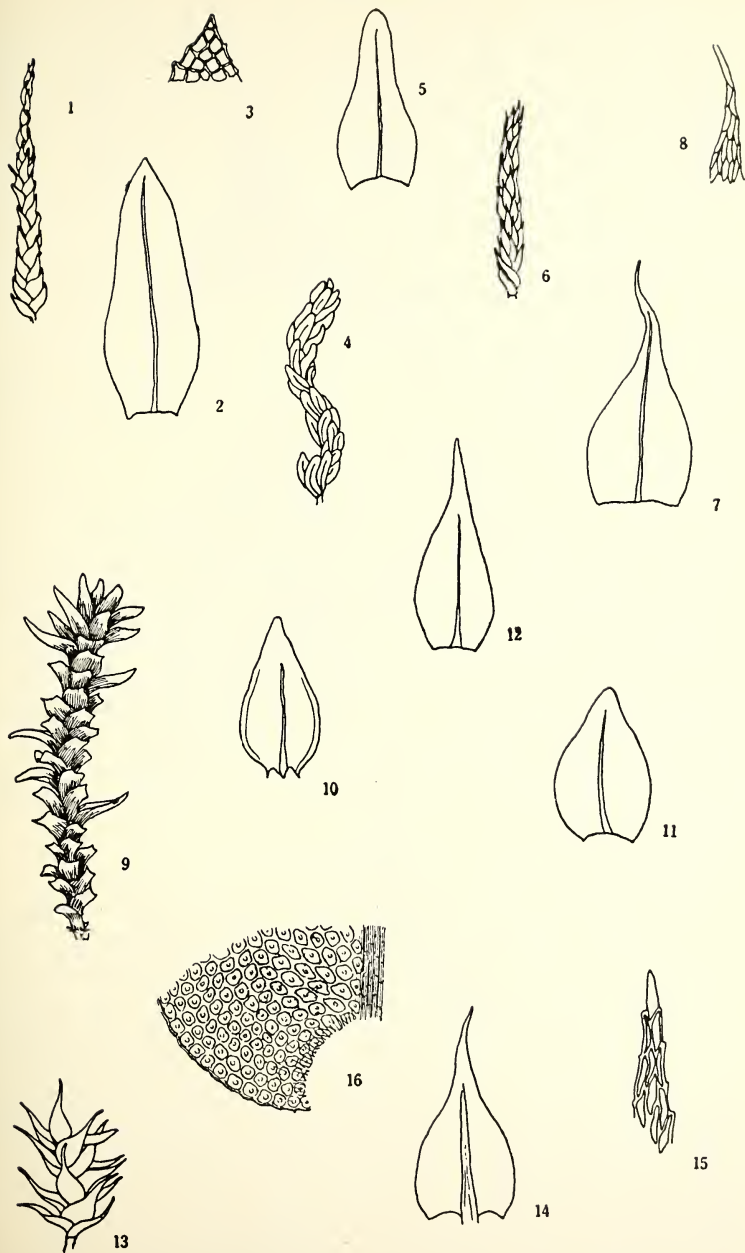
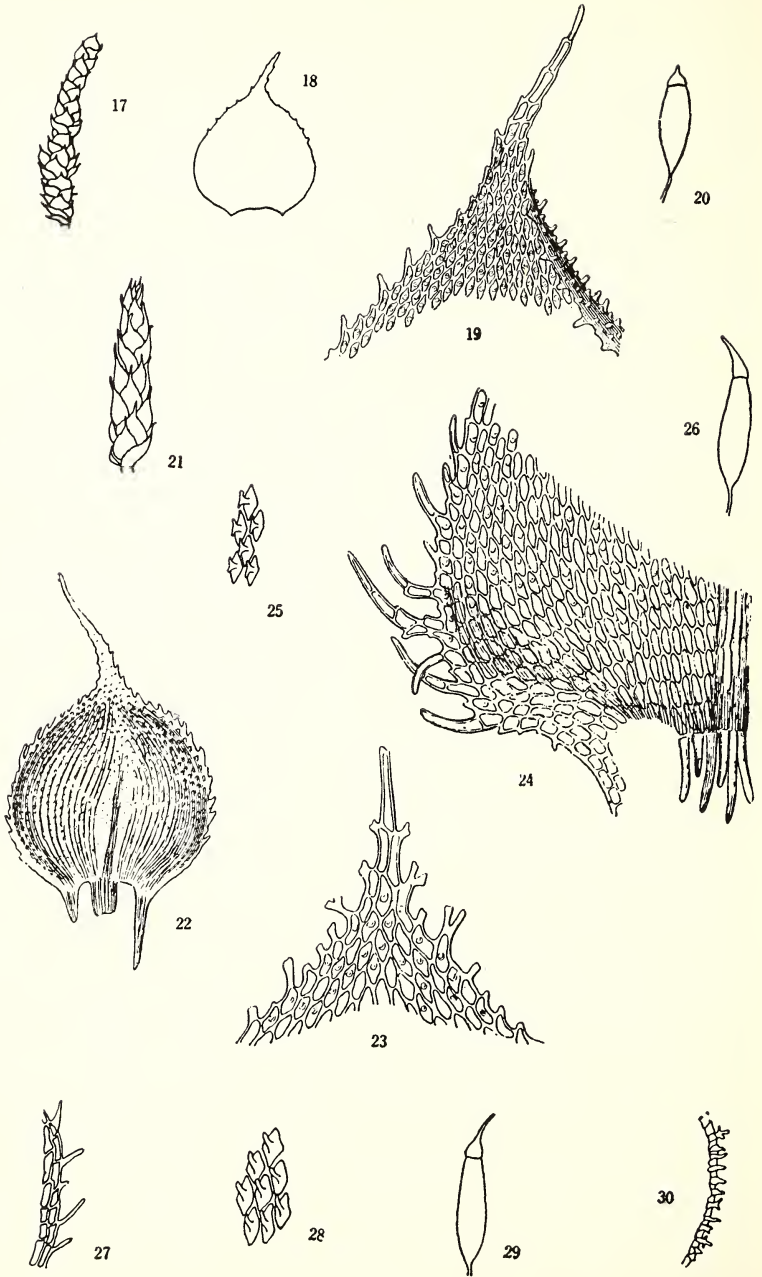


PLATE B



LINDBERGIA

Plants medium in size, loosely tufted; stems elongate, thickly foliated, irregularly branched; gemmae of very short branchlets with minute papillose leaves frequently present; paraphyllia few to none; leaves imbricate when dry, spreading to squarrose when moist, concave, ovate to ovate-lanceolate, gradually broadly acuminate to rather abruptly and slenderly acuminate; apices often colorless; margins plane, entire, occasionally slightly irregular above; costa extending to middle of leaf or a little beyond; median cells rounded-oval to rhombic-fusiform; apical cell elongated; all cells except apical papillose with a large central papilla on each surface; capsule ovoid-cylindric, erect, symmetric; peristome double, outer of 16 lanceolate, obtuse, papillose teeth, deeply inserted, inner of a narrow membrane; operculum conic, obtuse.

L. brachyptera (Mitt.) Kindb. var. *Austinii* (Sull.) Grout. (Figs. 13-16.) Boone, Brown, Cass, Clinton, Daviess, Harrison, Hendricks, Jackson, Jasper, Jefferson, Jennings, Putnam, Scott, Steuben, Tipton, Wabash, and Wayne counties.

Subfamily THELIEAE

Plants small; branches julaceous; paraphyllia present in *Thelia* and absent in *Myurella*; leaves ovate to suborbicular, concave and somewhat spoon-shaped, costa single, short to almost absent, occasionally forked; cells of leaves papillose with large single or forked papillae or nearly smooth; capsules erect, symmetric; peristome perfect, with inner peristome imperfect to perfect.

Key to the genera of Thelieae

Costa single, reaching middle of leaf, or short, or forking; paraphyllia present; segments of inner peristome rudimentary to lacking. . *Thelia*
 Costa short or lacking; paraphyllia absent; segments of inner peristome well developed, with cilia. *Myurella*

MYURELLA

Plants slender, small, growing in tufts or mats, light to glaucous green; stems irregularly branched; branches julaceous, often subfasciculate; small-leaved stolons present; paraphyllia absent; in *M. Careyana* leaves broadly round-ovate to suborbicular, abruptly apiculate to slenderly acuminate; margins spinose-dentate from base to apex; costa short to lacking; median leaf cells rounded-rhombic, pellucid, each with a very large dorsal papilla over the lumen; basal and apical cells elongated and nearly smooth; peristome perfect, segments of inner peristome about length of teeth, cilia two, shorter than the teeth; operculum conic.

M. Careyana Sull. (Figs. 17-20) Parke and Putnam counties.

THELIA

Plants small, growing in tufts or thin mats; stems regularly pinnate or nearly so; branches short, erect to ascending, julaceous, ends obtuse,

light to glaucous-green; paraphyllia present; leaves closely imbricate when dry or moist, very concave, broadly rounded-ovate, abruptly subulate-acuminate; margins usually ciliate-serrulate, ciliate to lacinate below; costa single and extending to middle of leaf, or short, or forked; median leaf cells rhombic to fusiform, each with large, dorsal, single or forked papilla; peristome whitish, double, outer of 16 slender teeth and inner of a basal membrane with segments rudimentary or lacking; operculum conic, rostrate.

Key to species of *Thelia*

1. Papillae of dorsal cells of leaves branched, 2-4 points; leaf margins sometimes ciliate2.
2. Plants growing on bark of trees; papillae usually 2-3 pointed; leaf margins with long cilia.....*T. asprella*
2. Plants growing commonly on sand or rock; papillae usually 3-4 pointed; leaf margins of many leaves indistinctly ciliate.....*T. Lescurii*
1. Papillae of dorsal cells of leaves not branched, curved toward leaf apex; leaf margins spinulose-dentate above and fimbriate-ciliate below....
..... *T. hirtella*
T. asprella Sull. (Figs. 21-26.) Kosciusko, Lake, Noble, Putnam, and Steuben counties.
T. hirtella (Hedw.) Sull. (Figs. 27-29.) Brown, Jefferson, Jennings, Monroe, Owen, Porter, Putnam, Spencer, and Warren counties.
T. Lescurii Sull. (Fig. 30.) Floyd, Lake, and Porter counties.

Explanation of Plates A and B

Figs. 1-30, enlarged, unless otherwise indicated. Figs. 1-8, 10-15, 17-18, 20-21, and 25-30, Conard, How to know the Mosses, by permission; 9, 16, and 19, Grout, Moss Flora of North America north of Mexico 3: pls. 51 and 57, with permission; 22-24, Grout, Mosses with Hand-lens and Microscope, pl. 60, with permission. Figs. 1-3. *Anomodon attenuatus* (Conard, fig. 127). Fig. 1. Portion of foliated and attenuate stem. Fig. 2. Leaf. Fig. 3. Leaf apex. Figs. 4-5. *A. minor* (Conard, fig. 126). Fig. 4. Portion of foliated stem. Fig. 5. Leaf. Figs. 6-8. *A. rostratus* (Conard, fig. 125). Fig. 6. Portion of foliated stem. Fig. 7. Leaf. Fig. 8. Leaf apex. Fig. 9. *Haplomyenium triste* (Grout, M.N.A.M. 3: pl. 57). Branch, X 20. Fig. 10. *Leskea gracilescens* (Conard, fig. 129). Stem leaf. Fig. 11. *L. obscura* (Conard, fig. 129). Stem leaf. Fig. 12. *L. polycarpa* (Conard, fig. 129). Stem leaf. Figs. 13-16. *Lindbergia brachyptera Austini* (Figs. 13-15, Conard, fig. 123; fig. 16, Grout, M.N.A.M. 3: pl. 51). Fig. 13. Portion of stem showing position of leaves when moist. Fig. 14. Leaf. Fig. 15. Leaf apex. Fig. 16. Papillose cells of portion of leaf base.

Figs. 17-20. *Myurella Carcyana* (Figs. 17, 18, 20, Conard, fig. 118; fig. 19, Grout, M.N.A.M. 3: pl. 51). Fig. 17. Portion of stem showing position of closely imbricated leaves. Fig. 18. Leaf. Fig. 19. Leaf apex showing cells and papillae. Fig. 20. Capsule. Figs. 21-26. *Thelia asprella* (Figs. 21, 25, 26, Conard, fig. 120; figs. 22-24, Grout, M.H.M. pl. 60). Fig. 21. Foliated branch. Fig. 22. Leaf. Fig. 23. Leaf apex. Fig. 24. Portion of leaf base. Fig. 25. Papillae Fig. 26. Capsule. Figs. 27-29. *T. hirtella* (Conard, fig. 121). Fig. 27. Margin of leaf. Fig. 28. Papillae. Fig. 29. Capsule. Fig. 30. *T. Lescurii* (Conard, fig. 120). Margin of leaf.