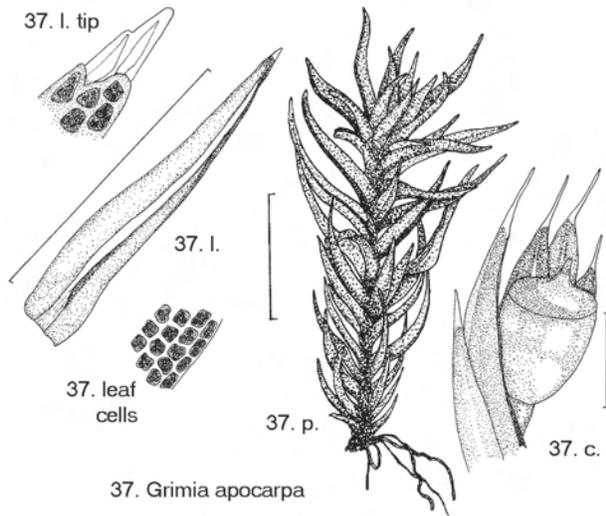
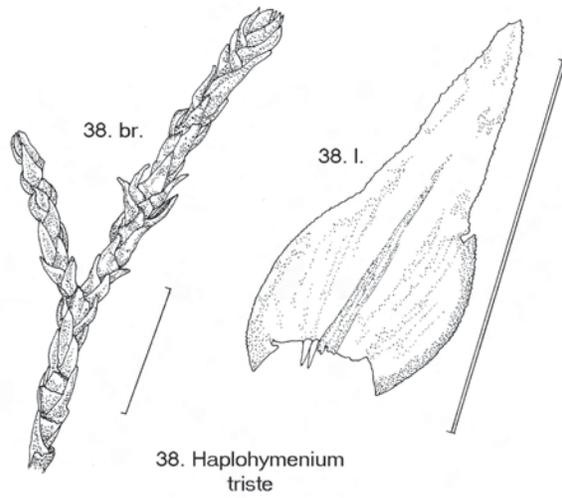


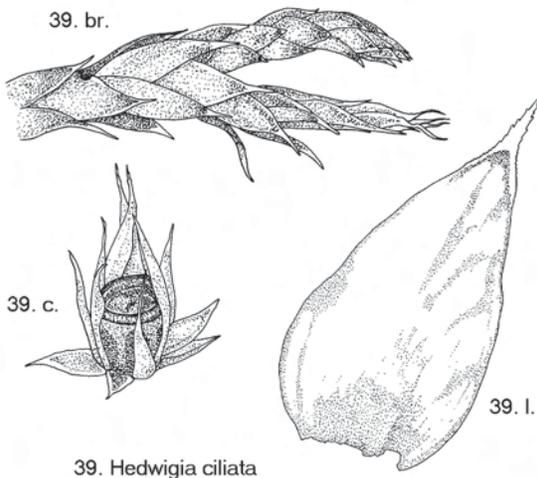
PLATE 7



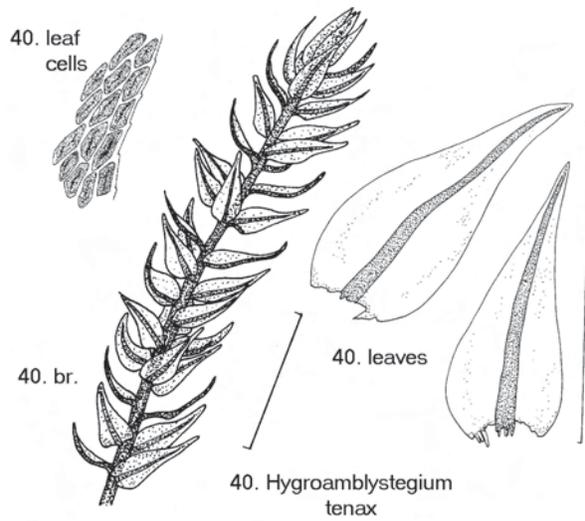
37. *Grimia apocarpa*



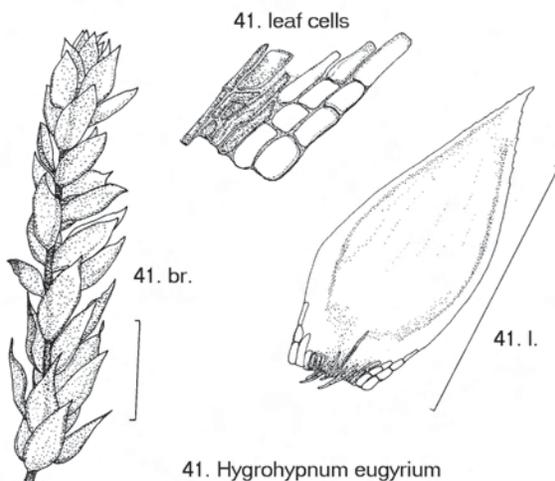
38. *Haplohymenium triste*



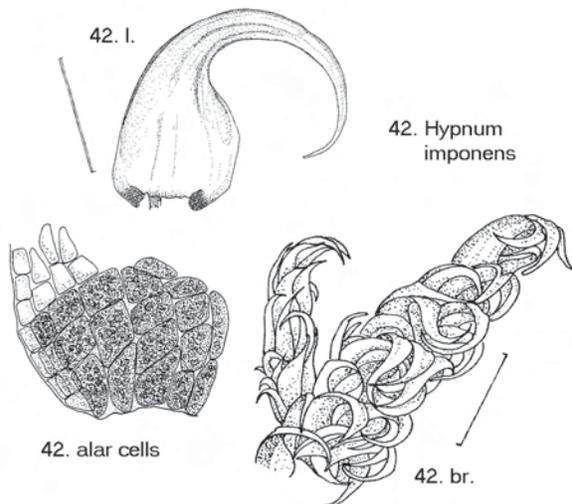
39. *Hedwigia ciliata*



40. *Hygroamblystegium tenax*



41. *Hygrohypnum eugyrium*



42. *Hypnum imponens*

- 2a. Leaves not keeled (V-shaped in cross-section), lying flat on a slide; midrib flat, not prominent at back; leaf tip usually acute; capsules exserted *G. laevigata*
- 2b. Leaves keeled, some lying folded at least at apex; capsules immersed *G. apocarpa*

1. *Grimmia alpicola* Hedw.

On dry granite rock. Prince Edward County.

2. *Grimmia apocarpa* Hedw.

On rocks in dry exposed places. Lunenburg, Nottoway counties. Plate 7.

3. *Grimmia laevigata* (Brid.) Brid.

On exposed rock or soil over rock. This species is important in primary succession on vast expanses of flat granitic rocks along the Fall Line and throughout the Piedmont. Albemarle, Amelia, Lunenburg, Nottoway, Prince Edward, Spotsylvania counties.

38. *Haplohymenium* Dozy & Molke

Small creeping plants, freely and irregularly branched, in dull, dark green or yellow-green to brown rigid mats.

Haplohymenium triste (Ces. ex De Not.) Kindb.

On trunks, sometimes branches of trees, rarely on logs or rocks in loose patches. Amherst, Buckingham, Prince Edward counties. Plate 7.

39. *Hedwigia* P. Beauv.

Robust, irregularly branched, erect mosses in dull green, yellow, or grayish mats, usually with clear-tipped leaves. Capsules almost spherical, deeply immersed in sheathing leaves.

Hedwigia ciliata (Hedw.) P. Beauv.

On dry granitic boulders in fields or dry and open woods. Appomattox, Fluvanna, Halifax, Lunenburg, Nottoway, Prince Edward counties. Plate 7.

40. *Hygroamblystegium* Loeske

Small, dark or yellow-green creeping mosses, freely and irregularly branched, forming mats in wet, often submerged, habitats. Leaves with strong midribs. Setae long, capsules curved-cylindrical.

Hygroamblystegium tenax (Hedw.) Jenn.

(*Amblystegium tenax* of some authors) - On wet rocks in and beside brooks. Amelia, Buckingham, Campbell, Mecklenburg, Prince Edward, Spotsylvania counties. Plate 7.

41. *Hygrohypnum* Lindb.

Creeping, irregularly branched, moderate-sized mosses, in shiny, yellowish to golden-brown soft mats. Leaves concave, crowded, with midrib short, single or forked, strong. Setae long, reddish, capsules cylindrical, almost erect, curved when dry.

Hygrohypnum eugyrium (BSG) Loeske

On wet rocks in or along streams. Buckingham, Spotsylvania counties. Plate 7.

42. *Hypnum* Hedw.

Creeping slender to robust mosses, irregularly to pinnately branched, in green, yellowish, or golden green mats or tufts. Stems and branches usually hooked at tips. Leaves crowded, strongly curved and turned to one side. Setae long; capsules erect to inclined, cylindrical, curved and asymmetric.

1a. Cells at basal angles of leaves squarish, not thin-walled or inflated; capsules suberect 2.

1b. Basal angle cells clear, + enlarged or inflated, thin-walled; capsules inclined 3.

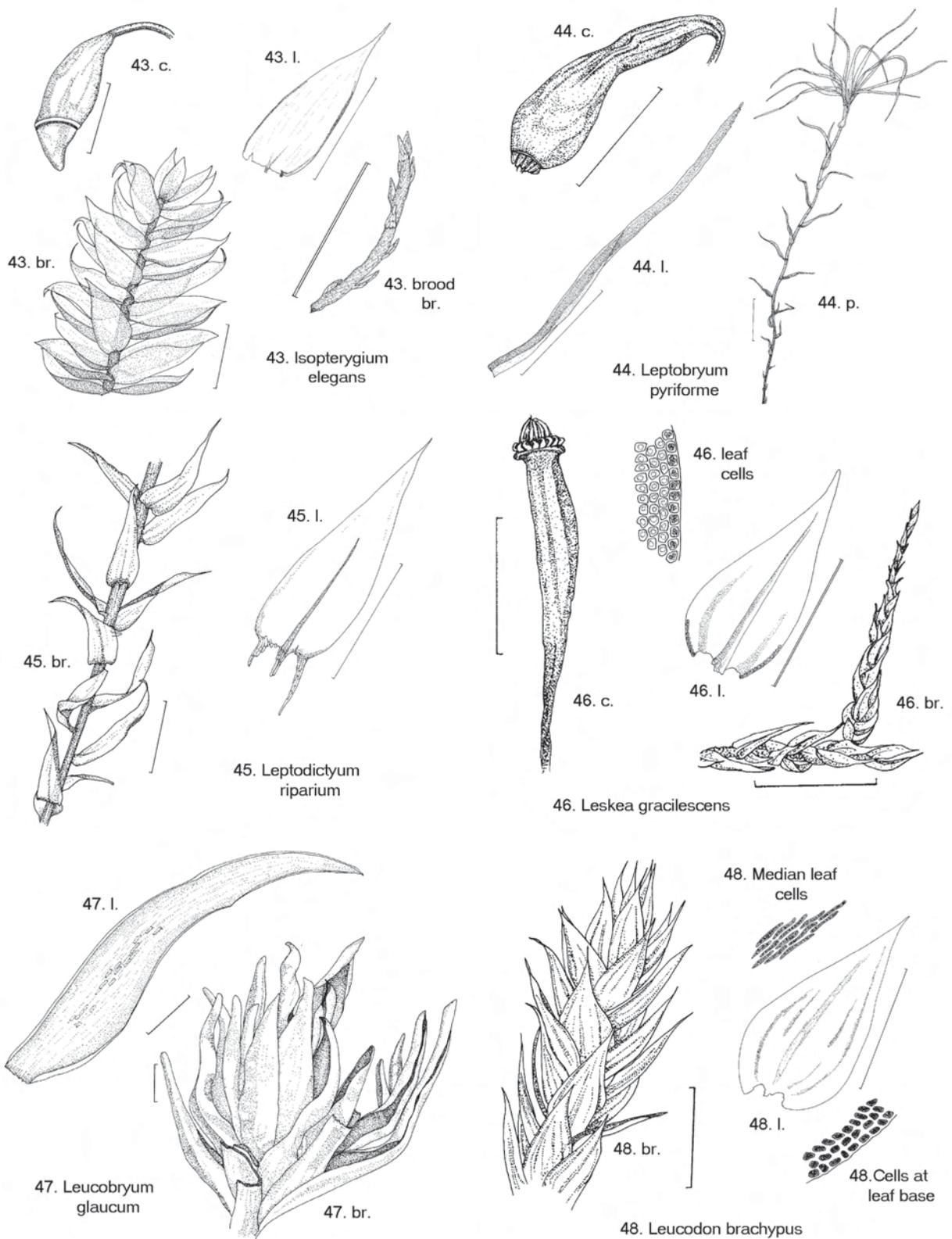
2a. Rather robust plants with 4-6 opaque, squarish cells occurring along leaf margins, below them a few somewhat larger, clear or orange-brown cells *H. imponens*

2b. Rather small plants with numerous opaque quadrate cells occurring in triangular groups; leaf margins with small teeth nearly all around *H. pallescens*

3a. Stems prostrate, closely and regularly pinnate; outer stem cells not or somewhat enlarged; leaves toothed to well below apex, usually in the upper 1/3 to 1/2 4.

3b. Stems usually ascending, loosely and irregularly branched; outer stem cells conspicuously enlarged; leaves entire or toothed only near apex; basal cells abruptly inflated *H. lindbergii*

PLATE 8



- 4a. Outer stem cells not enlarged; pseudoparaphyllia (leaf-like structures) none; leaves broad, triangular-ovate, broadly tapering to apex, abruptly rounded at base to leaf insertion *H. curvifolium*
- 4b. Outer stem cells somewhat enlarged; pseudoparaphyllia present at base of branches or where new branches are forming; leaves narrow, lanceolate, somewhat rounded to insertion *H. fertile*

1. *Hypnum curvifolium* Hedw.

In moist shady soil in pine-oak forests, on banks, sometimes on humus, logs, or bark at the base of trees. The commonest upland *Hypnum* in our area. Appomattox, Buckingham, Fluvanna, Halifax, Mecklenburg, Prince Edward, Spotsylvania counties.

2. *Hypnum fertile* Sendtn.

On rotten logs in woods. Appomattox, Buckingham, Campbell, Prince Edward, Spotsylvania counties.

3. *Hypnum imponens* Hedw.

On rotten logs and commonly also on rock, soil, humus, or rarely bark at the base of trees in moist or wet forests. Campbell, Fluvanna, Nottoway, Prince Edward counties. Plate 7.

4. *Hypnum lindbergii* Mitt.

On wet soil, humus, or rotten logs in swamp forests or sedge meadows, especially along low margins of lakes or ponds. Amelia, Buckingham, Campbell, Fluvanna, Mecklenburg, Prince Edward counties.

5. *Hypnum pallescens* (Hedw.) P. Beauv.

(*H. reptile* Michx.) - On bark at the base of trees, less commonly on logs, rocks, and other substrata, in woods.

43. *Isopterygium* Mitt.

Small creeping mosses in shiny, pale or bright green to yellowish mats. Stems irregularly to pinnately branched; branches spreading. Leaves flattened, lanceolate to ovate; midrib short and double or lacking. Setae long, capsules inclined to horizontal, ovoid to cylindrical, symmetric to curved.

- 1a. Brood branchlets distributed along length of stems and branches, clustered in leaf axils; basal cells (alar) of leaf not or slightly differentiated *I. elegans*

- 1b. Brood branchlets lacking; cells of basal angles of leaf somewhat different, short oblong to square *I. tenerum*

1. *Isopterygium elegans* (Brid.) Lindb.

On granitic type rocks on hemlock bluffs, also on soil or humus of banks in moist woods. Campbell, Charlotte counties. Plate 8.

2. *Isopterygium tenerum* (Sw.) Mitt.

On logs and stumps, bark at the base of trees, and sandy soil, typically in rather dry places such as pine woods but sometimes in swampy habitats. Prince Edward County.

44. *Leptobryum* (BSG) Wils.

Slender, erect, unbranched mosses in loose or dense shiny, light or yellow-green tufts. Leaves small and remote below, abruptly larger and crowded at stem tips. Setae terminal, long; capsules strongly inclined to pendulous, pear-shaped from a slender neck.

Leptobryum pyriforme (Hedw.) Wils.

A common weed on soil, rotten wood, humus, or occasionally rock in wet places, particularly in swamps, burned-over habitats, common in greenhouses, eve-drip zone on soil around houses. Plate 8.

45. *Leptodictyum* (Schimp.) Warnst.

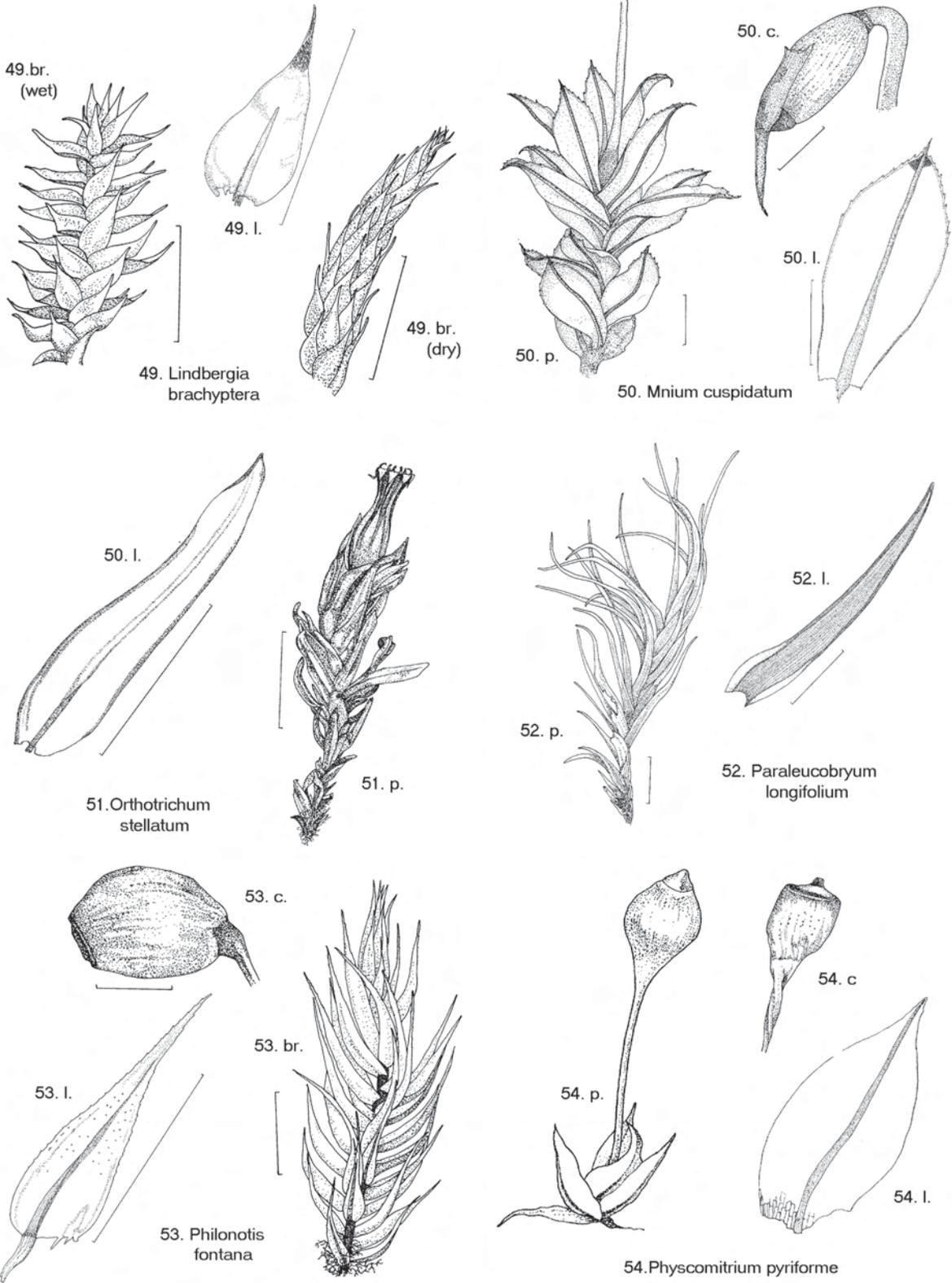
Creeping, mosses, medium-sized to robust; in thin, dull, dirty green or yellowish mats, usually in wet places, sometimes submerged. Stems freely and irregularly to subpinnately branched. Leaves soft, flat, distant, wide spreading; midrib single above mid-leaf; cells smooth. Setae long; capsules curved, not common.

- 1a. Leaves wide-spreading, forming an angle of 80-90 degrees with stem, 1-1.6 mm long; median leaf cells 3-6 times as long as wide *L. humile*
- 1b. Leaves erect-spreading, forming an angle of 30-60 degrees with stem; 1.2 - 5.0 mm long; median leaf cells 5-15 times as long as wide *L. riparium*

1. *Leptodictyum humile* (P. Beauv.) Crum

(also *L. trichopodium*) - On soil, rocks, and decaying wood in wet, shady places like swamps, but often in

PLATE 9



lawns and meadows. Appomattox, Halifax, Prince Edward counties.

2. *Leptodictyum riparium* (Hedw.) Warnst.

On wet humus, leaf litter, decayed wood, and fallen twigs and branches in swamps, frequently in wet depressions. Buckingham, Lunenburg, Mecklenburg, Nottoway, Prince Edward counties. Plate 8.

46. *Leskea* Hedw.

Small creeping mosses in dull, dark green or brownish mats, freely to subpinnately branched, branches often ascending; paraphyllia few. Leaves ovate to ovate-lanceolate; midrib extending almost to apex, single; upper cells hexagonal, bulging, singly papillose. Setae long, cylindrical, erect, symmetric or somewhat curved.

- 1a. Leaves somewhat longer than broad, often slightly asymmetric; capsules subcylindric, curved..... *L. polycarpa*
 1b. Leaves not much longer than broad, not asymmetric; capsules oblong-cylindric, straight 2.

- 2a. Leaves rounded at apex *L. obscura*
 2b. Leaves acute or bluntly-pointed at apex
 *L. gracilescens*

1. *Leskea gracilescens* Hedw.

On bark, usually at the base of trees, less commonly on rocks or logs, in hardwood forests, swamps or along roadsides. Charlotte, Prince Edward counties. Plate 8.

2. *Leskea obscura* Hedw.

On bark at base of trees, rocks; swamps. Cumberland County.

3. *Leskea polycarpa* Hedw.

On bark at tree bases, occasionally on logs (in places subject to flooding). Lunenburg, Prince Edward counties.

47. *Leucobryum* Brid.

Medium-sized to large mosses, in dense, whitish, grayish or bluish-green cushions or clumps. Stems forked. Leaves crowded, thick, and fleshy. Setae long, red-brown; capsules curved, strongly inclined.

- 1a. Plants large, 2-10 cm high, leaves 3-9 mm long
 *L. glaucum*
 1b. Plants smaller, 1-2 cm high, leaves 1-4 mm
 long..... *L. albidum*

1. *Leucobryum albidum* (Brid.) Lindb.

On moist rotten logs or stumps, less often on bark at base of trees (including pines!), soil, humus, or rock. Buckingham, Campbell, Charlotte, Halifax, Prince Edward counties.

2. *Leucobryum glaucum* (Hedw.) Angstr. ex Fries

On humus or soil in moist forests, often covering extensive low mounds, sometimes on logs or stumps or on bark at the base of trees; commonly in pine forests or mixed oak woods. Buckingham, Fluvanna, Halifax, Nottoway, Prince Edward counties. Plate 8.

48. *Leucodon* Schwaegr.

Robust creeping mosses in dull, dark green rigid tufts. Secondary stems simple or sparsely branched. Leaves ovate, dense, pressed to stem when dry, wide-spreading when moist; midrib lacking; cells smooth, thick-walled, rhombic above. Setae short to long, capsules mostly exserted, erect and symmetric, cylindrical.

- 1a. Leaves not or obscurely creased, tightly overlapping when dry, ovate and somewhat abruptly narrowed to a tapering point; capsules usually shortly exserted..... *L. julaceus*
 1b. Leaves longitudinally creased, erect or curving when dry; ovate and gradually narrowed to a long point; capsules usually immersed
 *L. brachypus*

1. *Leucodon brachypus* Brid.

On bark of trees, rarely on logs, stumps, or rock. Buckingham, Campbell, Prince Edward counties. Plate 8.

2. *Leucodon julaceus* (Hedw.) Sull.

On trunks of trees, also on logs and stumps, occasionally on boulders. Campbell, Halifax, Mecklenburg, Nottoway, Prince Edward counties.

49. *Lindbergia* Kindb.

Slender, creeping mosses in loose, dull, rigid, dark-green to brownish mats. Stems irregularly branched. Leaves crowded, pressed to stem when dry, wide-spreading when moist, concave; midrib to mid-

leaf, cells smooth or unipapillose; brood branchlets common in clusters in axils of leaves along the stem. Setae long; capsules erect and symmetric.

Lindbergia brachyptera (Mitt.) Kindb.

On trunks of trees, especially roadside elms and maples, occasionally on old logs or fence rails. Plate 9.

50. ***Mnium*** Hedw.

Medium-sized to robust, erect mosses in light to dark-green, brown, or reddish tufts, often hairy below. Stems simple or forked, erect (sometimes sterile stems spreading and somewhat flattened). Leaves elliptic, oblong, to round, contorted when dry, the margins usually bordered by linear cells, toothed; midrib nearly to apex; upper cells hexagonal to round. Setae long, capsules cylindric, pendulous (hanging).

- 1a. Leaves entire or indistinctly toothed 2.
 1b. Leaves distinctly toothed 3.
- 2a. Leaves 3.5 - 7.0 mm long; stems clean, not fuzzy ***M. punctatum*** var. ***punctatum***
 2b. Leaves 7-14 mm long; stems with fuzzy hairs ***M. punctatum*** var. ***elatum***
- 3a. Leaf border none or very obscure ... ***M. stellare***
 3b. Leaf border clearly differentiated 4.
- 4a. Leaf border with teeth in pairs (side by side); leaves long and narrow; midrib ending below apex (except sometimes in uppermost leaves) ***M. hornum***
 4b. Leaf border with single teeth 5.
- 5a. Leaves toothed only in upper half ***M. cuspidatum***
 5b. Leaves sharply-toothed nearly to the base ... 6.
- 6a. Marginal teeth elongate, composed of 1-4 cells; sporophytes usually single at tips of stems ***M. affine*** var. ***ciliare***
 6b. Marginal teeth composed mostly of single cells; sporophytes usually clustered at tips of stems ***M. medium***

1. ***Mnium affine*** Bland. var. ***ciliare*** C. Muell. (*Mnium ciliare* (C. Muell.) Schimp.) - On soil, humus, rotten wood, bark at the base of trees, and rock in moist shady places beneath trees or shrubs near streams.

Amelia, Lunenburg, Nottoway counties.

2. ***Mnium cuspidatum*** Hedw.

On moist soil or humus, decayed logs and stumps, bark at the base of trees or drainage channels in trunks, characteristic of banks and low mounds in hardwood forests, also commonly on poor lawns. Amelia, Buckingham, Campbell, Fluvanna, Prince Edward, Spotsylvania counties. Plate 9.

3. ***Mnium hornum*** Hedw.

On moist acid soil or rocks, especially in ravines and on banks of brooks, occasionally on rotten wood. Campbell, Prince Edward counties.

4. ***Mnium medium*** BSG

On wet rock and humus, rarely on the base of trees, in wet woods, often near brooks and springs. Prince Edward County.

5. ***Mnium punctatum*** Hedw. var. ***elatum*** Schimp.

In wet places in woods, around springs, in seepage zones and along streams. Appomattox, Mecklenburg, Nottoway, Spotsylvania counties.

6. ***Mnium punctatum*** Hedw. var. ***punctatum***

On wet, humic or mineral soil, humus, decayed wood, and rocks in swampy, coniferous woods, especially in depressions along streams and seepage near springs. Prince Edward County.

7. ***Mnium stellare*** Hedw.

On the base of trees and stumps and, less often, on soil of banks, rocks and rotten logs, in moist wooded places. Prince Edward County.

51. ***Orthotrichum*** Hedw.

Plants erect, small to robust, typically in small tufts, dark green or brownish with rhizoids at base, stems forked or forming branches in clumps. Leaves ovate lanceolate, acute, keeled; midrib strong, ending near apex; cells papillose. Setae short to long, capsules immersed to exserted, cylindric and often 8-ribbed when dry, erect, symmetric. The stomates of the capsule are important identifying characters and the capsules must be cut longitudinally, flattened, with spores removed before examination.

- 1a. Plants growing on concrete walls; capsules usually emerging from leaves ***O. strangulatum***
 1b. Plants growing on trees 2.

- 2a. Capsules small, pale, smooth or faintly ribbed, not constricted beneath mouth when dry; leaf apex often minutely toothed *O. pusillum*
- 2b. Capsules darker, distinctly ribbed and usually contracted beneath the mouth when dry 3.
- 3a. Leaves short-pointed and sometimes sparsely toothed at apex; cells surrounding stomata of capsules not noticeably protruding
..... *O. pumilum*
- 3b. Leaves not pointed or toothed at apex; cells surrounding stomata clearly protruding..... 4.
- 4a. Capsules dark brown, strongly ribbed and contracted below mouth when dry; cells surrounding stomata projecting horizontally *O. stellatum*
- 4b. Capsules straw-colored, narrowly and distantly ribbed and not or slightly contracted below mouth when dry; cells surrounding the stomata jutting steeply or vertically *O. ohioense*

1. *Orthotrichum ohioense* Sull. & Lesq. ex Aust
On bark of hardwood trees, especially those with smooth and hard bark; in hardwood forests, especially along streams. Halifax, Prince Edward counties.

2. *Orthotrichum pumilum* Sw.
On rough bark of trees (red maple, hickory, *Carpinus*) common in open forests or along roadsides; often on shade trees in towns. Campbell, Prince Edward counties.

3. *Orthotrichum pusillum* Mitt.
Bark of hardwoods, especially elms and other soft-barked trees, occasionally on red cedars, most commonly along roads or town streets. Prince Edward County.

4. *Orthotrichum stellatum* Brid.
In small tufts on trunks of hardwood trees principally in closed oak-hickory forests, also on logs, stumps, fence rails. Halifax, Prince Edward counties. Plate 9.

5. *Orthotrichum strangulatum* P. Beauv.
Normally on limestone boulders (which are lacking in study area) but occasionally collected on mortar or concrete walls. Prince Edward County (on wall).

52. *Paraleucobryum* (Lindb.) Loeske

Erect, robust mosses, in gray-green or yellow, shiny

tufts. Leaves erect to curved and turned to one side, lanceolate, forming tubes above; midrib broad (from 1/3 to 9/10 leaf base) filling most of tip; cells smooth, basal cells inflated. Setae long; capsules erect and symmetric, cylindrical.

Paraleucobryum longifolium (Hedw.) Loeske
On granitic-type rocks in moist woods, less commonly on bark at base of trees or rotten wood; N-facing hemlock bluffs. Campbell, Charlotte counties. Plate 9.

53. *Philonotis* Brid.

Plants erect, small to moderately robust, usually in dense tufts, dull or bright or whitish-green to yellowish, with dense basal rhizoids. Stems forked or whorled below inflorescence. Leaves erect to spreading, ovate to lanceolate; midrib ending in leaf tip or extending beyond it; cells papillose at ends. Male inflorescences terminating branches and usually disk-like. Setae long, erect; capsules inclined to horizontal, almost spherical, asymmetric and ribbed.

1a. Leaf cells papillose at lower ends at back and at upper ends on inner surface; stems red.....
..... *P. fontana*

1b. Leaf cells papillose only at upper ends; stems brownish to yellowish 2.

2a. Midrib ending in or just below leaf tip; leaf margins minutely singly-toothed in upper half.
..... *P. muhlenbergii*

2b. Midrib extending beyond leaf tip in a short or long point; margins minutely toothed to leaf base..... *P. marchica*

1. *Philonotis fontana* (Hedw.) Brid.
On soil or rock in wet, seepy places, usually in the open around ditches, springs, streams. Campbell, Lunenburg, Prince Edward counties. Plate 9.

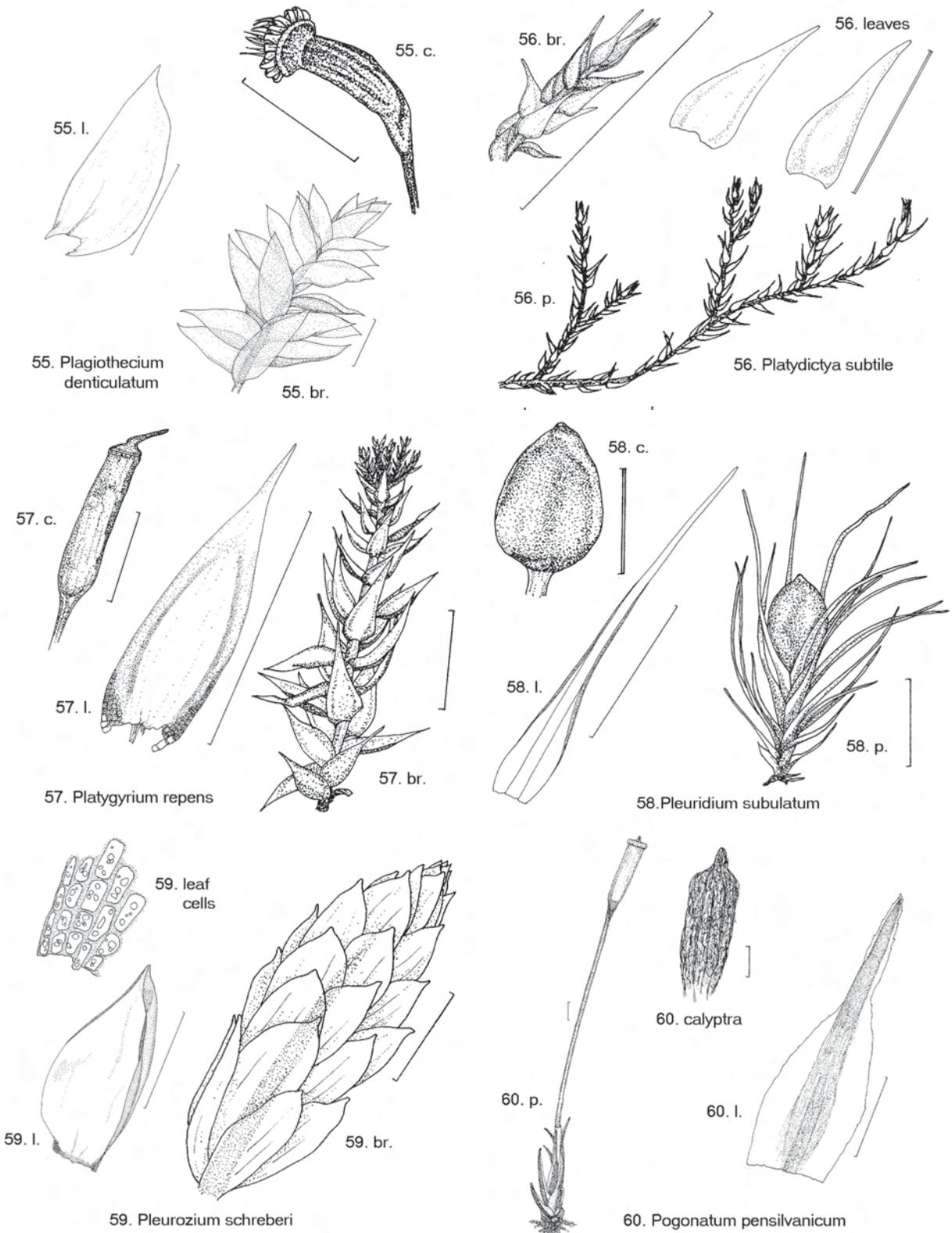
2. *Philonotis marchica* (Hedw.) Brid.
On soil in wet places, such as seepy roadbanks or edges of springs. Prince Edward County.

3. *Philonotis muhlenbergii* (Schwaegr.) Brid.
On soil in wet places. Amelia, Lunenburg counties.

54. *Physcomitrium* (Brid.) Furnr.

Small, erect mosses, growing close together, light

PLATE 10



green with simple or forked stems. Leaves erect or spreading, oblong-lanceolate; midrib ending below apex or, rarely, extending beyond; cells large and lax. Setae long, erect; capsules spherical to pear-shaped.

Physcomitrium pyriforme (Hedw.) Hampe

Disturbed places on wet soil, banks of streams or ditches, in swamps, at roadsides, and in lawns, pastures and old fields in spring. Amelia, Appomattox, Buckingham counties. Plate 9.

55. ***Plagiothecium*** BSG

Plants creeping, irregularly pinnately branched, branches somewhat flattened in shiny, yellowish to bright or dark green mats. Leaves lanceolate to broadly ovate or elliptic; midrib short and double or lacking; cells linear, smooth. Setae long; capsules erect to horizontal.

- 1a. Leaves symmetric or nearly so, typically concave, not or only irregularly flattened (and if so, shrunken, contorted and scarcely overlapping when dry) ***P. cavifolium***
 1b. Leaves asymmetric, flat, the plant distinctly flattened ***P. denticulatum***

1. ***Plagiothecium cavifolium*** (Brid.) Iwats.

On shaded soil or humus, sometimes on rotten wood or tree bases, usually in hardwood forests. Prince Edward County.

2. ***Plagiothecium denticulatum*** (Hedw.) BSG

In swamps, sometimes on rotten wood, bases of trees, soil or humus. Nottoway, Prince Edward counties. Plate 10.

56. ***Platydictya*** Berk

Small, slender, creeping mosses in green or brownish, dull, irregularly branched. Leaves very small, erect-spreading, lanceolate; cells short, rhombic, smooth. Setae long; capsules cylindrical, erect, symmetric.

Platydictya subtile (Hedw.) Crum

Bark at base of hardwood trees. Buckingham, Prince Edward counties. Plate 10.

57. ***Platygyrium*** BSG

Small creeping plants in flat, dark, golden- or brownish-green glossy mats, freely branched, the

branches ascending, bearing clusters of minute brood branchlets at tips. Leaves erect to spreading, concave, ovate to lanceolate, margins mostly entire; midrib short and double or lacking; cells smooth, rhombic in middle, quadrate in basal angles. Setae reddish, long; capsules erect and symmetric, cylindrical.

Platygyrium repens (Brid.) BSG

Common on logs and stumps, also on trunks or bases of trees; in dry wooded areas, moist hardwoods, and wet hardwood swamps. Campbell, Charlotte, Halifax, Prince Edward counties. Plate 10.

58. ***Pleuridium*** Rabh.

Small erect mosses, in loose, yellow-green or yellow-brown tufts. Leaves 1.5- 4 mm long, loosely erect or spreading, gradually tapering to apex from an ovate or oblong base, V-channeled to tubular at tip; midrib filling most of leaf tip; cells mostly linear, rectangular at base. Setae short; capsules immersed, elliptic to ovoid.

Pleuridium subulatum (Hedw.) Raben.

A spring ephemeral on bare soil in lawns, old fields, cemeteries, grassy roadsides. Amelia, Appomattox, Buckingham, Prince Edward counties. Plate 10.

59. ***Pleurozium*** Mitt.

Robust creeping mosses in loose, light green or yellowish shiny mats, pinnately branched; stems red. Leaves loosely overlapping, concave, wrinkled when dry, broadly ovate, rounded at apex to point; midrib short and double; upper cells linear, smooth, basal cells oblong, orange. Setae long, red or yellow; capsules inclined to horizontal, curved to symmetric (not seen).

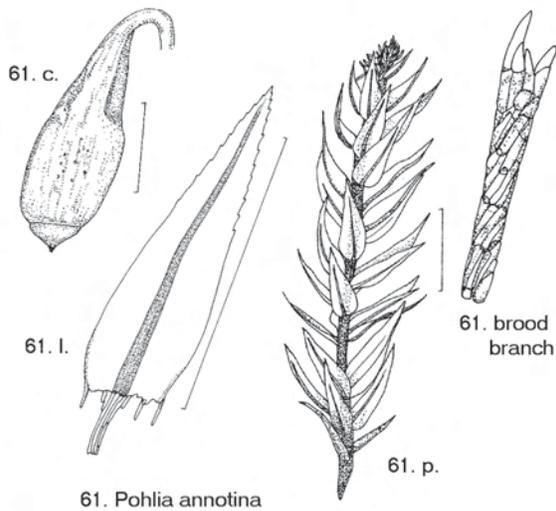
Pleurozium schreberi (Brid.) Mitt.

On soil and humus in dry open woods (pines) and bogs; said to be an indicator of acid soils. Prince Edward County. Plate 10.

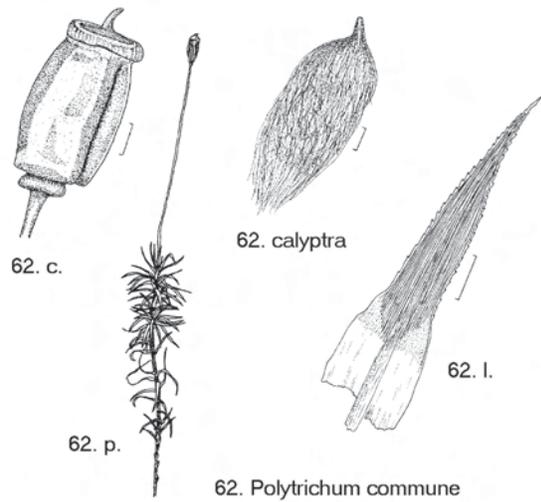
60. ***Pogonatum*** P. Beauv.

Small, erect mosses growing close together from a persistent green protonema (these two species only); leaves few, oblong or oblong-ovate with several erect lamellae (ridges of cells) on upper surface over midrib and leaf blade. Setae long; capsules cylindrical, symmetric or somewhat asymmetric, erect or inclined to horizontal.

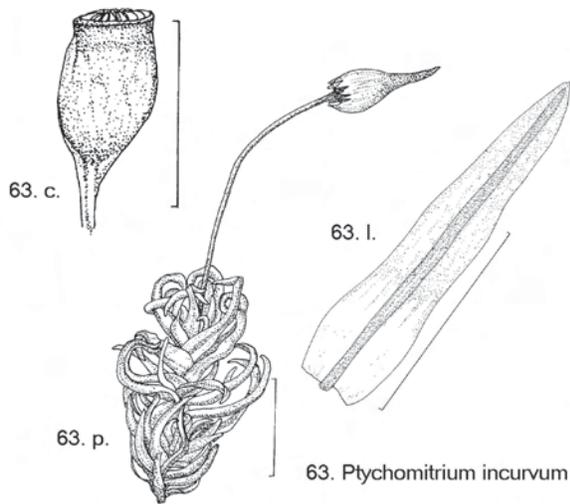
PLATE 11



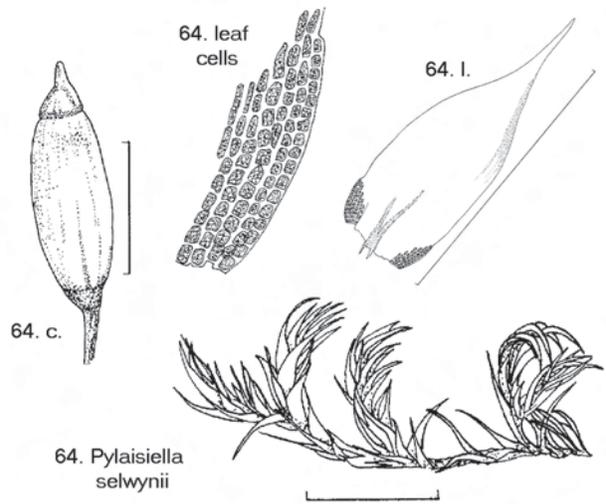
61. *Pohlia annotina*



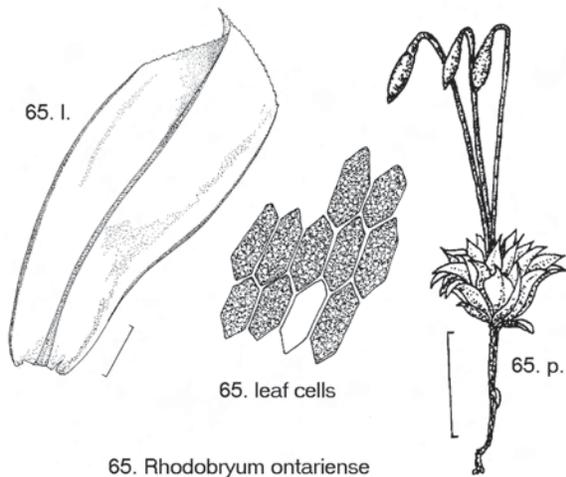
62. *Polytrichum commune*



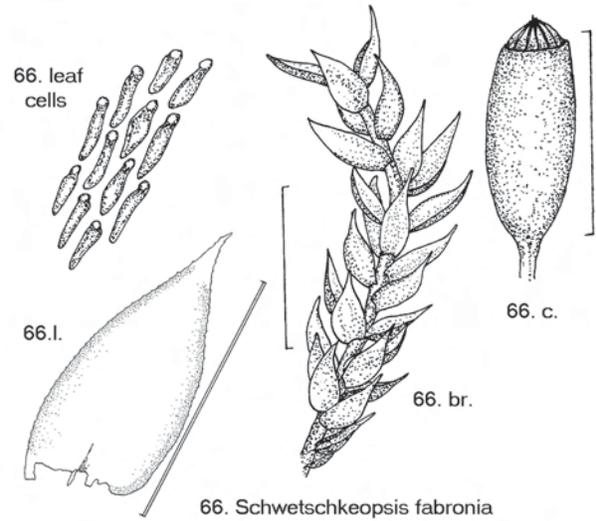
63. *Ptychomitrium incurvum*



64. *Pylaisiella selwynii*



65. *Rhodobryum ontariense*



66. *Schwetschkeopsis fabronia*

- 1a. Leaves irregularly notched to toothed on margins; lamellae few, 11-16
..... *P. pensilvanicum*
- 1b. Leaves entire; lamellae many, 25-39, covering most of leaf surface *P. brachyphyllum*

1. *Pogonatum brachyphyllum* (Michx.) P. Beauv.
On bare sandy or clayey soil on banks of ditches or ravines, usually in open situations. Prince Edward, Spotsylvania counties.

2. *Pogonatum pensilvanicum* (Hedw.) P. Beauv.
A pioneer of recently exposed, steep banks of moist clay or silt, especially on roadbanks. Buckingham, Prince Edward counties. Plate 10.

61. *Pohlia* Hedw.

Plants erect, small to fairly robust, in loose or dense green, yellowish, or rarely, reddish, sometimes glossy tufts; stems usually red. Leaves crowded at stem tips, erect, lanceolate, toothed near tips; midrib ending below or at apex; upper cells long and narrow, lower cells shorter and rectangular. Setae long, twisted, often curved above; capsules inclined or drooping, ovoid or cylindrical, each with a neck.

- 1a. Plants producing twisted, elongated, top-shaped brood bodies in leaf axils; stems red below and green above *P. annotina*
- 1b. Plants not producing brood-bodies; capsules elongate; upper leaf cells rhombic, thick-walled; stems red throughout..... *P. nutans*

1. *Pohlia annotina* (Hedw.) Lindb.
On soil in moist open places along ditches. Prince Edward County. Plate 11.

2. *Pohlia nutans* (Hedw.) Lindb.
On turfy soil, decaying logs and tops of rotten stumps; also rock crevices. Appomattox, Lunenburg, Spotsylvania counties.

62. *Polytrichum* Hedw.

Robust, erect mosses in loose or dense, dark, green, brownish or bluish-green tufts. Leaves lanceolate from a sheathing base, spreading, usually with a long point at tip, the upper blade covered from base to apex by many erect lamellae (files of cells); margins plane or abruptly folded inward, entire or coarsely toothed;

midrib strong, continuing into the long pointed tip. Setae long, erect; capsules almost erect to horizontal, 4 - 6 angled in cross-section, gradually or abruptly narrowed to a swollen base, calyptra densely covered with brown to tan hairs. These are known as the "hair-cap" mosses.

- 1a. Leaf margins entire, thin and infolded; leaf tip forming a toothed, red-brown awn
..... *P. juniperinum*
- 1b. Leaf margins coarsely toothed, not infolded.....
..... 2.
- 2a. Capsules cubical; plants robust, 4-4.5 cm tall; terminal cell of lamellae, in leaf cross-section, notched..... *P. commune*
- 2b. Capsules much longer than broad; plants smaller, 1.5 - 6 cm tall; terminal cell of lamella, in section, rounded or flat-topped, never notched..... *P. ohioense*

1. *Polytrichum commune* Hedw.
Large plants on soil, humus, and rocks in wet habitats, in pastures and meadows, and at the edges of bogs and swamps. Amelia, Appomattox, Lunenburg, Prince Edward counties. Plate 11.

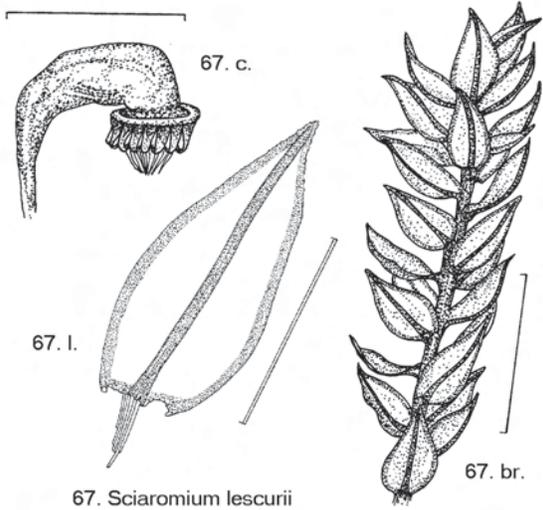
2. *Polytrichum juniperinum* Hedw.
On soil, humus, and rocks in dry to moist hardwood forests, especially in pine-oak forests. Amelia, Prince Edward counties.

3. *Polytrichum ohioense* Ren. & Card.
On soil or humus (often overlying rock), sometimes on stumps, characteristic of banks or sides of trails or at bases of trees in rather dry, open woods or pastures (rarely in moist woods). Amelia, Buckingham, Campbell, Prince Edward, Spotsylvania counties.

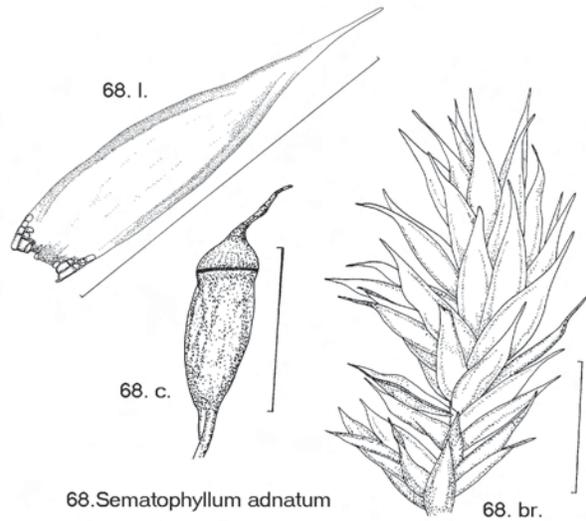
63. *Ptychomitrium* Fuernr.

Small erect mosses in loose or dense, dull, dark green cushions. Leaves erect with curved points or crisped when dry, spreading when moist, concave and long-lanceolate from a broad sheathing base, blunt or acute, margins entire to faintly toothed near apex; midrib strong, ending in or below apex; upper cells small, rounded to quadrate, smooth; lower cells linear to laxly oblong. Setae long, yellowish; capsules erect and symmetric, ovoid to cylindrical.

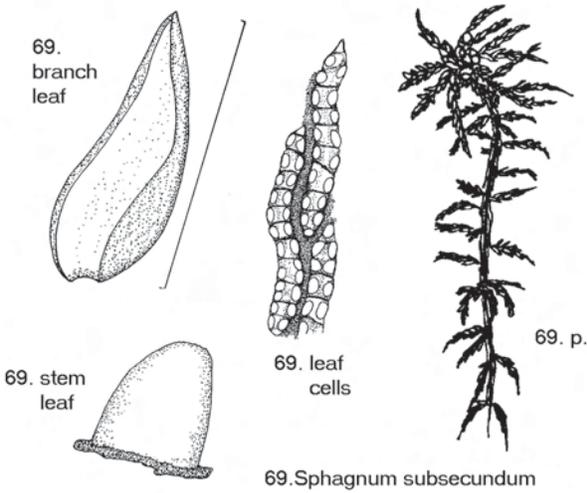
PLATE 12



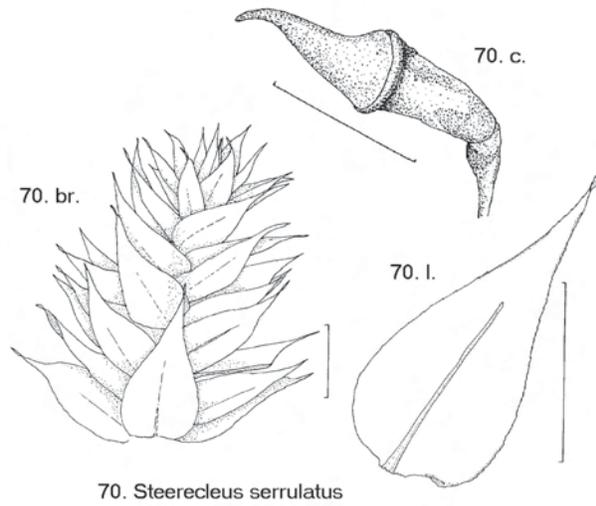
67. *Sciaromium lescurii*



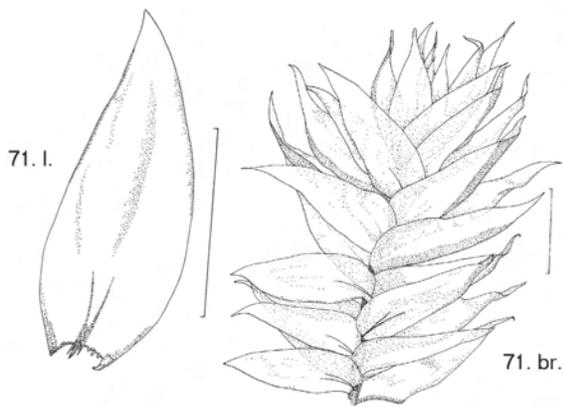
68. *Sematophyllum adnatum*



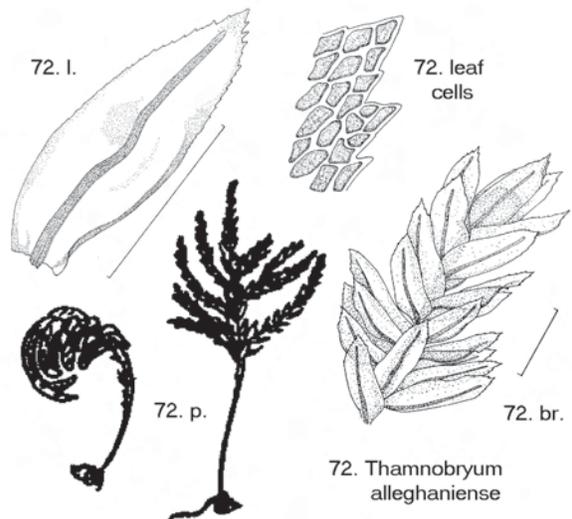
69. *Sphagnum subsecundum*



70. *Steerecleus serrulatus*



71. *Taxiphyllum taxirameum*



72. *Thamnobryum alleghaniense*

- 1a. Leaves erect and slightly incurved when dry, notched-finely toothed above; growing on bark of trees or on old wood *P. drummondii*
 1b. Leaves crisped and contorted when dry, entire; growing on rock *P. incurvatum*

1. *Ptychomitrium drummondii* (Wils.) Sull.
 On tree trunks, including their bases, especially on elms and cedars, along streams; often on trunks of shade trees along streets of towns.

2. *Ptychomitrium incurvatum* (Schwaegr.) Spruce
 On rocks of all types; common in crevices of boulders in hardwood forests. Amelia, Nottoway, Prince Edward counties. Plate 11.

64. *Pylaisiella* Kindb.

Plants creeping in slender or medium-sized, flat, light to dark green or brownish shiny mats; irregularly to pinnately branched, branches ascending, usually curved. Leaves crowded, spreading when moist, concave, ovate-lanceolate, with short- to long-tapering tips; midrib short and double; cells linear, small and quadrate in rows at basal angles. Setae long; capsules erect and symmetric, cylindrical to ovoid.

- 1a. Quadrate basal cells of leaves few, less than 10 at margins *P. intricata*
 1b. Quadrate basal cells numerous, 10-20 or more along margins *P. selwynii*

1. *Pylaisiella intricata* (Hedw.) Grout
 On trunks of hardwoods and red cedars, rarely on logs. Buckingham, Prince Edward counties.

2. *Pylaisiella selwynii* (Kindb.) Crum, Steere & Anders. - On trunks of hardwoods and red cedars, rarely on logs. Halifax, Prince Edward counties. Plate 11.

65. *Rhodobryum* (Schimp.) Hampe

Robust, dark green, erect mosses from a subterranean, rhizome-like stem; erect stems forming rosettes at their tips (like green flowers); leaves distant, small and scale-like below, larger and crowded at stem tips, wide spreading when moist, contorted when dry, oblong-obovate, broadly acute and abruptly pointed, bordered and toothed on margins above; midrib strong, ending in apex or forming a short point; upper cells large, oblong-hexagonal, lower cells elongate-rectangular.

Setae long, single or clustered, hooked or curved at the tip; capsules horizontal to hanging, curved, cylindrical, the neck usually conspicuous.

Rhodobryum ontariense (Kindb.) Par. in Lindb.
 [*Rhodobryum roseum* (Hedw.) Limpr.] - On shaded humus or soil over rocks, also on old logs or bark at the base of trees. Buckingham, Prince Edward counties. Plate 11.

66. *Schwetschkeopsis* Broth.

Slender, small, creeping mosses, freely branched, the branches often tapering in soft, dense, slightly shiny, green or yellow-green mats; leaves erect, crowded, ovate-lanceolate, tapering to a slender apex, lacking a midrib, minutely toothed all around; upper cells rhombic, thick-walled, papillose at back because of projecting upper ends, basal marginal cells quadrate in several rows. Setae elongate; capsules erect and symmetric, cylindrical.

Schwetschkeopsis fabronia (Schwaegr.) Broth.
 On bark of hardwoods, especially on trunks of smooth-barked trees. Predicted (Crum & Anderson, 1981) but not yet found in this area. Plate 11.

67. *Sciaromium* (Mitt.) Mitt.

Coarse and rigid, creeping plants of moderate size, in loose, dull, yellow-green or dark, dingy green mats, freely branched, branches erect. Stems frequently lacking leaves in older parts, leaves somewhat concave, ovate, incurved and twisted when dry, spreading when moist, bordered by several rows of thick-walled cells in 2 or more layers; midrib strong, ending in leaf tip or extending slightly; cells rhombic to hexagonal, basal cells not much differentiated. Setae elongate; capsules strongly inclined to hanging, curved and asymmetric, contracted below mouth when dry.

Sciaromium lescurii (Sull.) Broth.
 On wet rocks in streams, sometimes in cascades. Buckingham County. Plate 12.

68. *Sematophyllum* Mitt.

Small to medium-sized creeping mosses, in dense, dull or shiny, green to yellowish or brownish mats; somewhat pinnately branched, the branches ascending and often curved. Leaves erect or spreading, asymmetrically curved to one side, concave, lanceolate

to ovate, acute to shortly drawn out at tips; midrib absent or short and double; cells mostly linear, smooth, 3-6 cells at basal angles abruptly inflated and yellow. Setae long; capsules erect and symmetric to horizontal and curved, contracted below mouth when dry.

- 1a. Leaves oblong-lanceolate, gradually narrowed to tip; capsules erect or nearly so; on bark of trees or logs ***S. adnatum***
 1b. Leaves oblong-ovate, acute or shortly narrowed to tip, capsules inclined to nearly horizontal; on rocks ***S. demissum***

1. ***Sematophyllum adnatum*** (Michx.) E.G. Britt.
 On bark at the base of trees, logs, rarely, rock or soil; commonly in swamps, but also pine-oak forests, or hemlock stands on N-facing bluffs. Appomattox, Charlotte, Prince Edward counties. Plate 12.

2. ***Sematophyllum demissum*** (Wils.) Mitt.
 Wet acid rocks near streams. Buckingham, Charlotte, Prince Edward counties.

69. ***Sphagnum*** L.

Sphagnum, the peat mosses, is sometimes a difficult genus to identify because of the technical nature of characters used for identification. Fortunately we have few species on the Piedmont, some of which can be identified through field characteristics. Even so, the leaves may need to be sectioned across their width with a clean, sharp razor blade. Staining with a solution of crystal violet gives good contrast. The convex surface is the upper, and the concave is the lower surface.

Robust mosses, growing in wet places or seepage. Stems erect, sparsely forked, the central woody cylinder surrounded by 1 or more layers of clear, thin-walled epidermal (cortical) cells. Branches usually in clusters, but crowded at stem tip in a head-like tuft. Leaves spirally arranged around branches, composed of linear, green cells in a network surrounding large, empty, rhombic, clear cells, nearly always reinforced by thickened fibrils, usually with large rounded pores. Stem leaves different from branch leaves, less crowded, often larger or of different shapes. Capsules spherical, black when fresh, elevated on an elongated branch, but collapsed, dry and cylindric when empty. [Five additional species of *Sphagnum* are known from Piedmont counties bordering the Fall Line. These are *S. bartlettianum*, *S. cuspidatum*, *S. magellanicum*, *S. recurvum*, and *S. tenerum*. Users may wish to consult

a more thorough treatment of this genus for identification purposes. – Ed.]

- 1a. Branch leaves hood-shaped at apex 2.
 1b. Branch leaf margins inrolled or flat but not hood-shaped; branch leaves not curved backwards when wet; leaves with a border of narrow linear cells 5.
 2a. Stem leaves small and triangular, <1 mm long (branch leaves somewhat standing away from branch when moist), plants pale brownish green, sometimes tinged with violet; leaves very narrowly bordered by linear cells ***S. compactum***
 2b. Stem leaves large, >1 mm long, tongue shaped; branch leaves tightly or loosely overlapping; plants green, yellow, or brown but not red; leaves not bordered 3.
 3a. Tufted head of moss small and distinctly flattened with small pointed branches; plants green, reddish brown in capitulum; newest branches in capitulum noticeably shorter than branches below ***S. henryense***
 3b. Head large and rounded; plants green, brown, purple brown; newest branches not noticeably shorter than older branches 4.
 4a. Stem leaves >1.5 mm long with length almost twice the width; plants green to golden-brown; growing in margins of mineral rock habitats, rarely dominant ***S. palustre***
 4b. Stem leaves < 1.5 mm long and only slightly longer than broad; branch leaves frequently standing away from branch; plants slender overall; plants green, tinged with brown or purple brown ***S. affine***
 5a. Stem leaves 0.5 - 1.0 mm long; branch leaves slightly curved to one side, stem dark brown ***S. subsecundum***
 5b. Stem leaves >1.0 mm long; branch leaves rarely curved to one side; stem and branch leaves noticeably different in size and structure ***S. lescurii***

1. ***Sphagnum affine*** Ren. & Card.
 (also *S. imbricatum* Hornsch. ex Russ.) - In loose wide mats in seepage areas or small streams in pine-oak-hickory forests. Prince Edward County.

2. *Sphagnum compactum* DC ex Lam. & DC

In small cushions on wet sandy silt and moist rock; on moist hemlock bluff. Fluvanna County.

3. *Sphagnum henryense* Warnst.

In loose carpets and low cushions on peaty humus in wooded or shrubby swamps, at the edges of ponds or along streams, rarely submerged.

4. *Sphagnum lescurii* Sull.

(also *S. subsecundum* Nees ex Sturm. var. *rufescens* Nees) - On wet soil at the margins of creeks and ponds, also in meadows and shaded swamplands. Lunenburg, Prince Edward counties.

5. *Sphagnum palustre* L.

Forming wide carpets in more or less mineral-rich, swampy habitats, usually in shade in hardwood swamps. Not yet found in Piedmont but suggested as present by Crum & Anderson (1981).

6. *Sphagnum subsecundum* Nees ex Sturm.

In wet sedgy habitats, in seepage or among rocks. Plate 12. [*Sphagnum subsecundum*, in the strict sense, is generally regarded as a rare species of the north extending south to the mountains of North Carolina. That plant is not presently known in Virginia. The basis for Dr. Breil's inclusion of this name is unknown. - Ed.]

70. *Steerecleus* Robins.

Creeping mosses of moderate size, in flat, shiny, bright or yellow-green mats; irregularly branched. Leaves not crowded, spreading and flattened on stems, about 2 mm long, ovate, narrowed to a slender, twisted apex; margins minutely toothed, often to base; cells linear, cells of basal angles not differentiated. Setae long, yellow, becoming brown or reddish; capsules inclined to horizontal, cylindrical, strongly curved when dry, brown.

Steerecleus serrulatum (Hedw.) Robins.

[*Rhynchostegium serrulatum* (Hedw.) Jaeg. & Sauerb.] On soil or humus, rotten wood, bark at base of trees, and rock in rather dry to moist hardwood forests, sometimes in lawns and grassy fields. Buckingham, Campbell, Fluvanna, Halifax, Prince Edward, Spotsylvania counties. Very common. Plate 12.

71. *Taxiphyllum* Fl.

Creeping mosses in flat, small to medium-sized, green or yellow, often glossy mats; branching irregular to subpinnate; small lance-like leaves surrounding branch bases or branch initials. Leaves crowded, ovate, with gradually drawn out tips, leaves apparently flattened into 2 rows; margins toothed all around; midrib short and double or lacking; cells linear, the upper ends sometimes minutely projecting, cells shorter at apex and base. Setae long; capsules erect or inclined; oblong or ovoid.

Taxiphyllum taxirameum (Mitt.) Fleisch.

On soil or rock. Plate 12.

72. *Thamnobryum* Nieuwl.

Plants robust, in rigid, loose, dull mats; primary stems creeping, leafless; secondary stems ascending and freely, often pinnately branched above; often tree-like; paraphyllia none. Leaves ovate, not or rarely flattened, blunt to acute or drawn-out at apex, toothed above; midrib stout, usually ending below apex; cells smooth, rounded-quadrate to rounded-hexagonal, longer toward base. Setae long; capsules cylindrical, inclined to horizontal or drooping.

Thamnobryum alleghaniense (C.M.) Nieuwl.

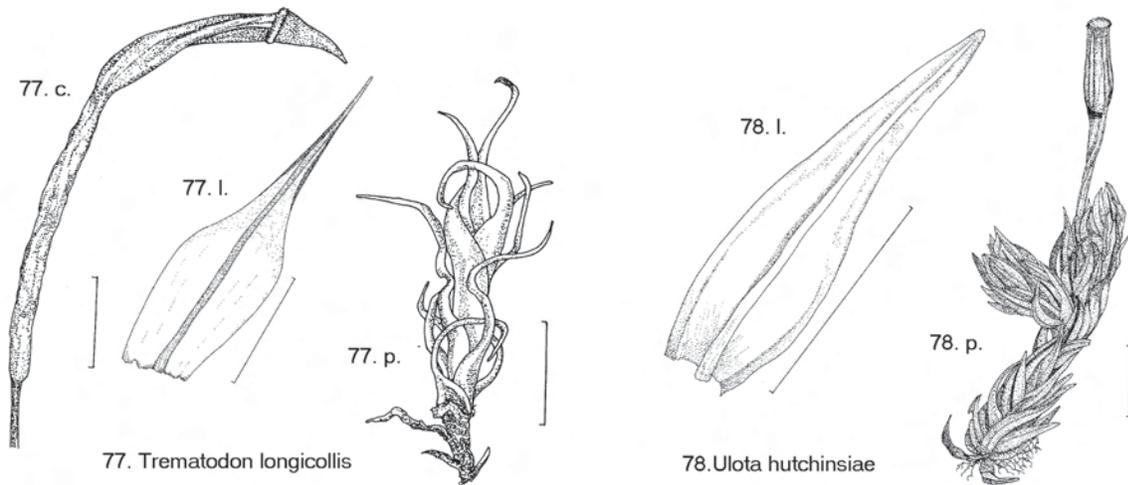
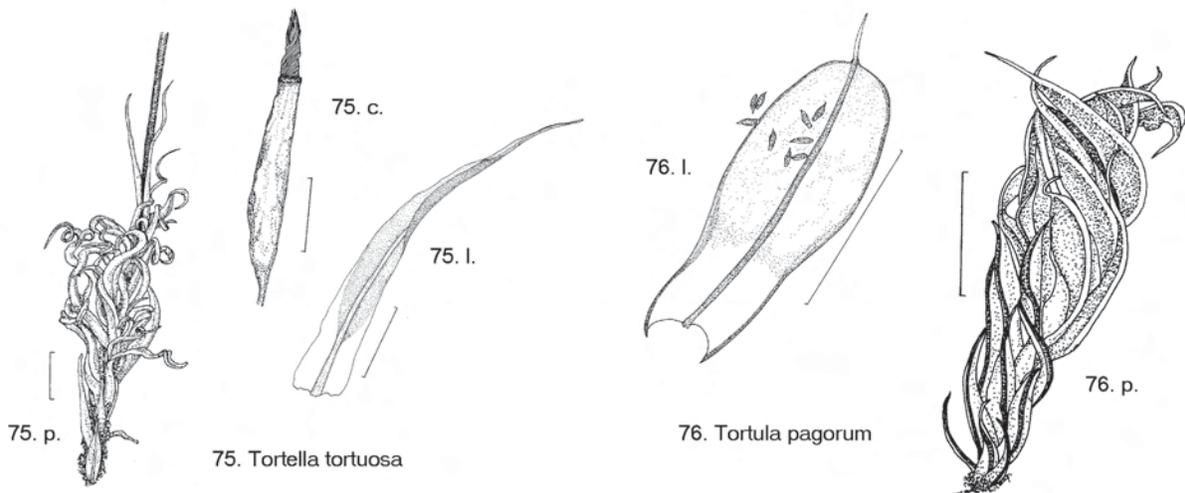
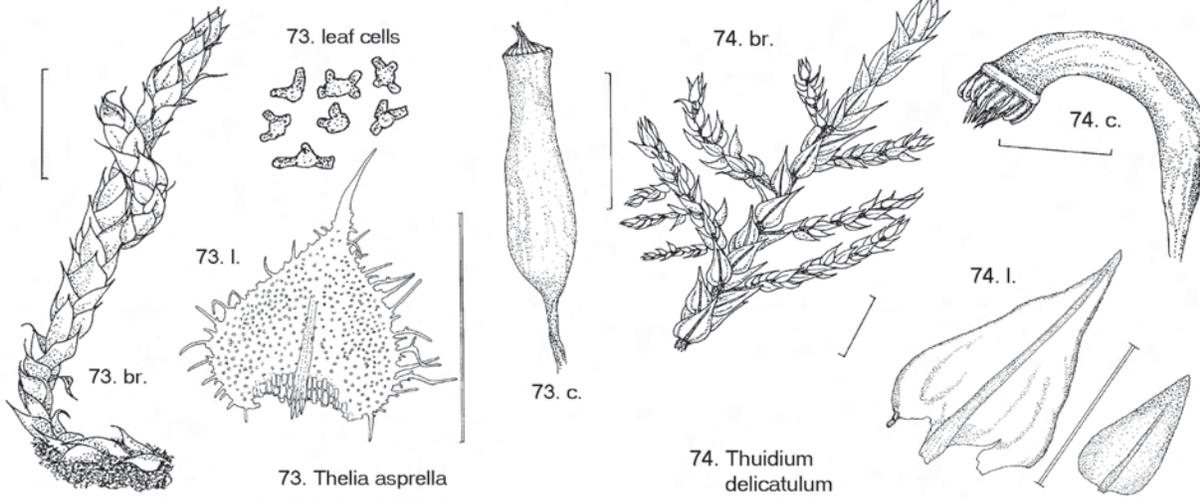
On rocks in wet, shady, cooler ravines and on north-facing bluffs. Buckingham, Prince Edward counties. Plate 12.

73. *Thelia* Sull.

Medium-sized creeping mosses in dark green to yellowish or grayish mats; irregularly or pinnately branched, branches usually cylindrical often ascending; paraphyllia few to many. Leaves densely overlapping, concave, triangular-ovate, abruptly drawn to a point at apex; margins regularly to irregularly sharply toothed, the teeth sometimes branched; midrib single, ending above leaf middle; cells rhombic and coarsely singly papillose at back; papillae long and simple or elaborately branched. Setae yellow to red-yellow; capsules erect, symmetric, cylindrical.

- 1a. Leaf cells with simple papillae; on trees
..... *T. hirtella*
- 1b. Leaf cells with elaborately branched papillae
..... 2.

PLATE 13



- 2a. Stems creeping, covered with rhizoids; on trees
..... *T. asprella*
- 2b. Stems crowded and ascending, not or only
slightly covered with rhizoids; on sandy soil
..... *T. lescurii*

1. *Thelia asprella* Sull.

On bark at base of trees, sometimes on rotten logs and stumps, rarely on soil. Buckingham, Charlotte, Fluvanna, Prince Edward, Spotsylvania counties. Plate 13.

2. *Thelia hirtella* (Hedw.) Sull.

On bark at base or on trunks of hardwood and red cedar trees; sometimes on decayed logs and stumps; rarely on rock or soil. Buckingham, Nottoway counties.

3. *Thelia lescurii* Sull.

On soil, especially sand, occasionally rocks, rarely on bark at base of trees, in dry open areas such as cedar, pine, or oak barrens and oak-hickory woods. Appomattox, Prince Edward counties.

74. *Thuidium* BSG

Robust, creeping mosses in dull, green, yellowish, or brownish, loose mats. Stems creeping to ascending, often curved; regularly 2-3 pinnate; paraphyllia abundant, papillose, often polymorphic. Stem leaves larger than branch leaves. Leaves ovate, tapered to tip and narrowed at base, usually with 2 pleats lengthwise, margins revolute below; midrib usually ending below apex, sometimes extending into it; cells mostly uniform, rounded, hexagonal, thick-walled, minutely multipapillose on one or both surfaces; tips of branch leaves ending in a cell with 2 or more terminal papillae. Setae long; capsules inclined to horizontal, curved, cylindrical.

- 1a. Stem leaves incurved at base and wide-spreading at tips, midrib nearly filling tip; (perichaetial leaves surrounding base of sporophyte) not ciliate on margins
..... *T. recognitum*
- 1b. Stem leaves erect, with margins recurved and midrib ending well below apex; perichaetial leaves ciliate on margins *T. delicatulum*

1. *Thuidium delicatulum* (Hedw.) BSG

On moist shaded soil, humus, rock, logs or stumps, less commonly on bark at the base of trees, or even well up the trunks in moist places, apparently more

often on acid substrates than *T. recognitum*. Buckingham, Campbell, Fluvanna, Lunenburg, Prince Edward, Spotsylvania counties. Plate 13.

2. *Thuidium recognitum* (Hedw.) Lindb.

On moist soil or humus and rocks, infrequently on logs or bark at the base of trees, usually in woods, sometimes in meadows, forest clearings, or timber trails.

75. *Tortella* (Lindb.) Limpr.

Small to medium-sized erect mosses, growing in loose or dense, green, yellowish or brownish tufts. Leaves curled and contorted when dry, spreading when moist, oblong-lanceolate to linear-lanceolate; midrib strong, ending in tip to extending beyond; upper cells round to hexagonal, green, obscure, densely papillose on both surfaces; lower cells lax, rectangular, clear, abruptly set off from the upper cells in a V-shaped region extending above the shoulders in a short to elongate border. Setae elongate, becoming reddish; capsules erect and symmetric or somewhat curved, cylindrical; peristome teeth long and twisted.

- 1a. Leaves 4-6.5 mm long, gradually long-narrowed, with tips spirally curled when dry; on concrete or mortared walls *T. tortuosa*
- 1b. Leaves 2-4 mm long, more abruptly pointed, irregularly incurved and contorted when dry; on trees *T. humilis*

1. *Tortella humilis* (Hedw.) Jenn.

On bark at the base of trees or on rock, soil, humus, or logs, generally in dry places. Amelia, Buckingham, Nottoway, Prince Edward counties.

2. *Tortella tortuosa* (Hedw.) Limpr.

Normally on limestone, this has been found locally on concrete walls. Prince Edward County. Plate 13.

76. *Tortula* Hedw.

Small, erect mosses, in dull, green to brownish tufts, often tinged with red, simple or forked, with many rhizoids below. Leaves often larger and more crowded toward stem tips, wide-spreading to recurved when moist, erect, folded along midrib and twisted around stem when dry, strap-shaped, elliptic and widest above the middle, broadly rounded to obtuse at tips, ending in long awns; margins entire; midrib strong, usually extending into long awn; upper cells hexagonal,

multipapillose, the papillae circular or C-shaped; lower cells large, rectangular, thin-walled, smooth, clear. Setae long; capsules cylindric, erect and symmetric to somewhat curved, peristome teeth developing 32 long filaments that are spirally wound.

- 1a. Plants developing propagula in axils of leaves; on trees *T. pagorum*
 1b. Plants not producing propagula or brood bodies; on rock or concrete walls... *T. muralis*

1. *Tortula muralis* Hedw.

On mortared brick or stone walls, concrete abutments and storm drains and limestone in natural habitats. Prince Edward County.

2. *Tortula pagorum* (Milde) De Not.

On bark of trees especially near habitation, sometimes on rocks, bricks, or stone walls. Farmville, Prince Edward County (courthouse trees). Plate 13.

77. *Trematodon* Michx.

Small, erect plants, loosely associated or tufted, light green or yellowish. Leaves spreading when moist, curled when dry, oblong-ovate and clasping at base, gradually to abruptly narrowed to a linear tip; midrib extending to tip but not filling awn; cells short-rectangular above, laxly rhombic to rectangular below. Setae long; capsule with neck twice as long as urn.

Trematodon longicollis Michx.

On damp sand or clay of banks (particularly roadside ditches), also on soil of bottomlands, old fields, and lawns, burned areas. Prince Edward County. Plate 13.

78. *Ulota* Mohr ex Web.

Small erect mosses, in small tufts, green, yellowish or brownish above, dark brown to blackish and covered in rhizoids below. Leaves crowded, slightly curved or crisped and contorted when dry, spreading when moist, lanceolate from a broader concave base and gradually narrowed to a slender, bluntly acute apex; midrib ending near apex; upper cells round, thick-walled, smooth to obscurely unipapillose on both surfaces; cells of sheathing base linear, arranged in a radiating pattern, yellowish, very thick-walled. Setae terminal, elongate; capsules cylindric, 8-ribbed, erect, with a relatively long, tapering neck; calyptra hairy.

- 1a. Plants growing on rock; leaves slightly curved, but not crisped or contorted when dry
 *U. hutchinsiae*
 1b. Plants growing on trees; leaves very crisped and contorted when dry *U. crispa*

1. *Ulota crispa* (Hedw.) Brid.

On bark of trees, usually hardwoods. Expected but not yet collected.

2. *Ulota hutchinsiae* (Sm.) Hamm.

On siliceous rocks, usually boulders in mesic hardwood forests. Prince Edward County. Plate 13.

79. *Weissia* Hedw.

Small dull green, yellowish or brownish mosses, in loose or dense tufts. Leaves larger toward stem tips, strongly curled and contorted when dry, spreading when moist, narrowly lanceolate from a narrow oblong base, the apex acute, margins inrolled from the shoulders to the apex; midrib shortly extending beyond tip as a fine point; upper cells small, hexagonal, densely papillose, lower cells smooth, rectangular, pale. Setae long; capsules erect and symmetric, ellipsoidal to cylindric.

Weissia controversa Hedw.

Common and weedy, on soil or rock in open disturbed places such as roadsides and abandoned fields, lawns. Appomattox, Buckingham, Charlotte, Halifax, Prince Edward counties. Figure 2.

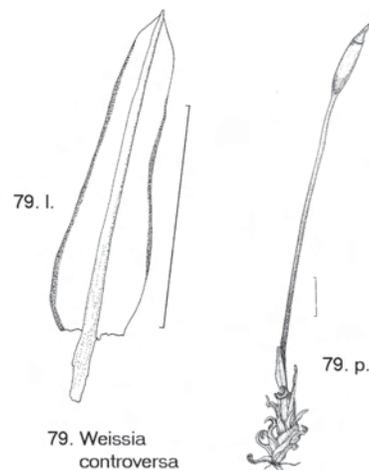


Fig. 2.

ACKNOWLEDGMENTS & NOTE

The botany editor thanks Dr. Jonathan Shaw, bryologist at Duke University, for the much needed overview of technical content. His review was invaluable. Sue Williams also reviewed the original draft and made helpful comments. In addition to her fine illustrations, she deserves special thanks for making her original drawings available to the botany editor in high resolution, digital format, greatly facilitating the production of Plates. Technical support was provided by the New Media Center at Virginia Tech. Special thanks to Rob Dickert at Computer Lab Support at Virginia Tech for converting the original text files to a current, usable format. Steve Roble made helpful suggestions along the way and was a great encouragement.

A concerted effort has been made to preserve the original intentions of the author in bringing this paper to completion, however, discrepancies between various portions of the draft needed to be resolved without the benefit of feedback from the author. As the title indicates, this paper treats common and occasional mosses. Users will undoubtedly encounter species not included herein, but it is hoped that Dr. Breil's efforts will spur many a curious naturalist to enjoy these beautiful little plants. TFW, Botany Editor.

GLOSSARY

acrocarpous - with gametophyte producing sporophyte at apex of a stem or main branch. Acrocarpous mosses generally grow erect in tufts (rather than mats) and are sparsely or not branched (as opposed to pleurocarpous)

acute - sharp pointed, with terminal angle less than 90° but greater than 45°

alar cells - referring to cells at basal margins (angles) of a leaf; these cells are often differentiated in size, shape or color from other leaf cells, e.g., *Dicranum*.

apical - at apex; summit or point of a structure

basal cell - cell at the base; in leaves, frequently differentiated cells of the lower 1/4 - 1/3 of a leaf

brood body - a generalized term used to denote various types of specialized vegetative reproductive structures; e.g., reduced buds, leaves, branches or plant fragments (propagules)

brood branch – see cladium

calyptra (pl. calyptrae) - a membranous covering of haploid tissue over the developing sporophyte (generally remaining attached as a cap atop the capsule)

capsule - the sporangium; terminal spore-producing part of the sporophyte; in most mosses it is differentiated into an apical operculum, central urn (spore-bearing region) and a sterile basal neck

cladium (pl. cladia) - modified, regenerant branch that arises from normal shoots and detaches readily for vegetative reproductive purposes

costa (pl. costae) - nerve or midrib of a leaf, always more than one cell thick

crisped (crispate) - wavy; often used more loosely to mean variously curled, twisted, and contorted

decurrent - with basal leaf margins extending down the stem past the leaf insertion as ridges or narrow wings

exserted - projecting and exposed; e.g., capsules or perianths held clear of the tips of perichaetial leaves (cf. emergent)

falcate - curved like the blade of a sickle

fibril - fine, fiber-like wall thickenings

filiform - slender and elongate, filamentous, thread-like

foliose - leafy or leaf-like; closely covered with leaves

gametophyte - the haploid, sexual generation; the dominant generation in mosses, consisting normally of green, leafy plants

gemma (pl. gemmae) - uni- or multicellular, filamentous, globose, ellipsoidal, cylindrical, stellate or discoid brood bodies, relatively undifferentiated, serving in vegetative reproduction

globose - spherical

immersed - submerged or below the surface; referring to a capsule or perianth exceeded by the blades or awns

of the perichaetial leaves (cf. exserted)

insertion - the place or line of attachment of a structure; applied to leaves and branch on a stem, peristome, etc.

lamella (pl. lamellae) - parallel photosynthetic ridges or plates along a leaf blade, costa or thallus

median - central, middle; e.g., median leaf cells are from the upper middle of a leaf, midway between costa and margin

midrib - a mid-vein or single costa of a leaf or thallus

neck - the sterile basal portion of a capsule, sometimes considerably differentiated

operculum (pl. opercula) - the lid covering the mouth of most moss capsules

papilla (pl. papillae) - cell ornamentation, a solid microscopic protuberance

papillose - bearing papillae; monopapillose - bearing one simple, unbranched papilla on the cell surface
multipapillose - bearing several papillae, or one compound or branched papilla on the cell surface.
Loosely applied to any minutely rough surface

paraphyllum (pl. paraphyllia) - small green outgrowths of various shapes, i.e., filiform, lanceolate, scale- or leaf-like or sometimes branched; produced randomly on the stems or branches of many pleurocarpous mosses

perichaetial leaf - modified leaf or underleaf (bract; bracteole) associated with the gynoecium (female sexual organ); collectively forming the perichaetium

peristome - a circular structure, generally divided into 4, 8, 16, 32, or 64 teeth, arranged in a single or double (rarely multiple) row around the mouth of a capsule

pinnate - with numerous, spreading branches on opposite sides of the axis and thus resembling a feather

pleurocarpous - producing sporophytes laterally from a perichaetial bud or a short, specialized branch rather than at the stem tip; with stems usually prostrate, creeping, and freely branched, thus mosses growing in mats rather than tufts

propagulum (propagule) - reduced bud, branch, or leaf serving in vegetative reproduction (see brood body)

protonema (pl. protonemata) - a filamentous, globose or thalloid structure resulting from spore germination and including all stages of development up to the production of one or more gametophytes; in mosses the protonema is typically filamentous although *Sphagnum*, *Andreaea*, and *Tetraphis* have thallose protonemata

pseudoparaphyllum (pl. pseudoparaphyllia) - small, unistratose (one cell layer thick), filiform or foliose structure resembling paraphyllum, but restricted to the areas of the stem around branch primordia; often found in pleurocarpous mosses

recurved - curved downward and inward; in leaves, referring to margins, apices, or marginal teeth

rosette - a compact cluster of leaves encircling the stem

secund - turned to one side; e.g., leaves on a stem

seta (pl. setae) - elongated portion of the sporophyte between the capsule and foot; loosely used for axillary bristles

sporophyte - the spore-bearing generation; initiated by the fertilization of an egg; remaining attached to the gametophyte and partially dependent on it; typically consisting of foot, seta, and capsule

thallus (pl. thalli) - a more or less flattened gametophyte, not differentiated into a stem and leaves

unipapillose - with a single papilla per cell

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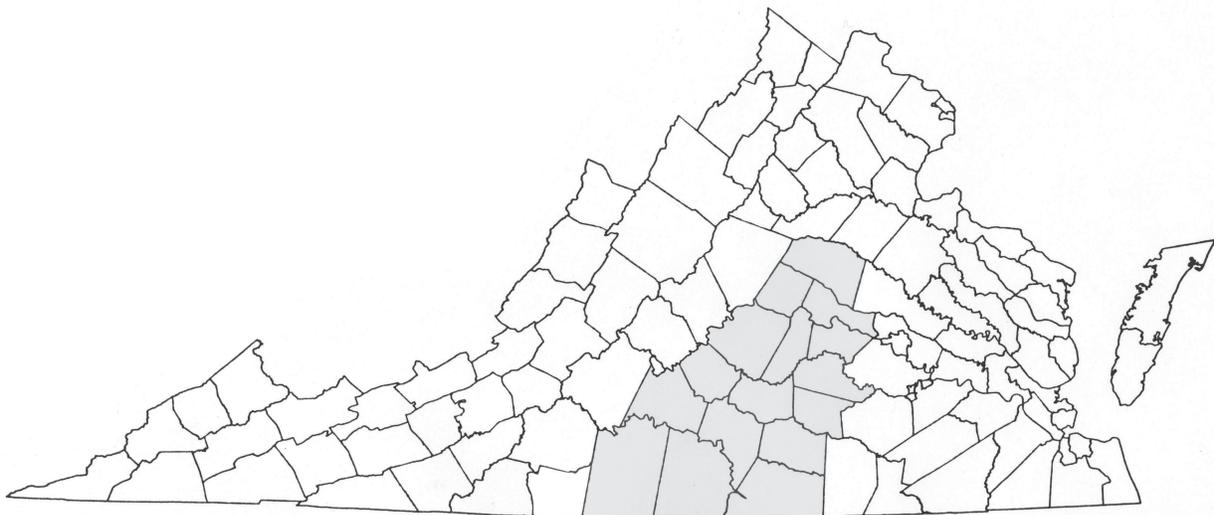


Fig. 3. Counties included in study area (shaded) showing location in Piedmont region of Virginia.

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CHECKLIST OF VIRGINIA PIEDMONT MOSSES

Amblystegium (Amblystegiaceae)
serpens (Hedw.) BSG
varium (Hedw.) Lindb.

Anacamptodon (Fabroniaceae)
splachnoides (Brid.) Brid.

Andreaea (Andreaeaceae)
rupestris Hedw.

Anomodon (Thuidiaceae)
attenuatus (Hedw.) Hueb.
minor (Hedw.) Furnr.
rostratus (Hedw.) Schimp.
viticulosus (Hedw.) Hook. & Tayl.

Aphanorrhagma (Funariaceae)
serratum (W.J. Hook. & Wils. ex Drumm.) Sull.

Astomum (Pottiaceae)
muhlenbergianum (Sw.) Grout

Atrichum (Polytrichaceae)
angustatum (Brid.) BSG

undulatum (Hedw.) P. Beauv.

Aulacomnium (Aulacomniaceae)
heterostichum (Hedw.) BSG
palustre (Hedw.) Schwaegr.

Bartramia (Bartramiaceae)
pomiformis Hedw.

Brachythecium (Brachytheciaceae)
acuminatum (Hedw.) Aust.
oxycladon (Brid.) Jaeg. & Sauerb.
plumosum (Hedw.) BSG
rivulare BSG
rutabulum (Hedw.) BSG
salebrosum (Web. & Mohr) BSG

Brotherella (Sematophyllaceae)
recurvans (Michx.) Fleisch.

Bruchia (Dicranaceae)
drummondii Hampe ex E.G. Britt.
flexuosa (Sw. ex Schwaegr.) C. Muell.

Bryhnia (Brachytheciaceae)
graminicolor (Brid.) Grout
novae-angliae (Sull. & Lesq. ex Sull.) Grout

Bryoandersonia (Brachytheciaceae)
illecebra (Hedw.) Robins.

Bryohaplocladium (Leskeaceae)
microphyllum (Hedw.) Wat. & Iwats.
virginianum (Brid.) Wat. & Iwats.

Bryum (Bryaceae)
argenteum Hedw.
caespiticum Hedw.
capillare Hedw.
creberrimum Tayl.
pseudotriquetrum (Hedw.) Gaertn.,
Meyer & Scherb.

Buxbaumia (Buxbaumiaceae)
aphylla Hedw.

Campylium (Amblysteriaceae)
chrysophyllum (Brid.) J. Lange
hispidulum (Brid.) Mitt.

Ceratodon (Ditrichaceae)
purpureus (Hedw.) Brid.

- Clasmatodon* (Fabroniaceae)
parvulus (Hampe) Hook. & Wils. ex Sull.
- Climaceum* (Climaciaceae)
americanum Brid.
- Cryphaea* (Cryphaeaceae)
glomerata BSG ex Sull.
- Ctenidium* (Hypnaceae)
malacodes (Hedw.) Mitt.
- Dicranella* (Dicranaceae)
heteromalla (Hedw.) Schimp.
varia (Hedw.) Schimp.
- Dicranum* (Dicranaceae)
flagellare Hedw.
fulvum Hook.
scoparium Hedw.
spurium Hedw.
- Diphyscium* (Buxbaumiaceae)
foliosum (Hedw.) Mohr
- Ditrichum* (Ditrichaceae)
lineare (Sw.) Lindb.
pallidum (Hedw.) Hampe
pusillum (Hedw.) Hampe
- Drummondia* (Orthotrichaceae)
prorepens (Hedw.) E. G. Britt.
- Entodon* (Entodontaceae)
cladorrhizans (Hedw.) C. Muell.
compressus C. Muell.
seductrix (Hedw.) C. Muell.
- Ephemerum* (Ephemeraceae)
crassinervium (Schwaegr.) Hampe
serratum (Hedw.) Hampe
spinulosum Bruch & Schimp. ex Schimp.
- Eurhynchium* (Brachytheciaceae)
hians (Hedw.) Sande Lac.
pulchellum (Hedw.) Jenn.
- Fabronia* (Fabroniaceae)
ciliaris (Brid.) Brid.
- Fissidens* (Fissidentaceae)
adanthoides Hedw.
bryoides Hedw.
bushii (Card. & Ther.) Card. & Ther.
cristatus Wils ex Mitt.
fontanus (B. Pyl.) Steud.
osmundoides Hedw.
subbasilaris Hedw.
taxifolius Hedw.
- Fontinalis* (Fontinalaceae)
dalecarlica BSG
filiformis Sull. & Lesq.
novae-angliae Sull.
sullivantii Lindb.
- Forsstroemia* (Cryphyaceae)
trichomitria (Hedw.) Lindb.
- Funaria* (Funariaceae)
flavicans Michx.
hygrometrica Hedw.
- Grimmia* (Grimmiaceae)
alpicola Hedw.
apocarpa Hedw.
laevigata (Brid.) Brid.
- Haplohymenium* (Thuidiaceae)
triste (Ces. ex De Not.) Kindb.
- Hedwigia* (Hedwigiaceae)
ciliata (Hedw.) P. Beauv.
- Hygroamblystegium* (Amblystegiaceae)
tenax (Hedw.) Jenn.
- Hygrohypnum* (Amblystegiaceae)
eugyrium (BSG) Loeske
- Hypnum* (Hypnaceae)
curvifolium Hedw.
fertile Sendtn.
imponens Hedw.
lindbergii Mitt.
pallescens (Hedw.) P. Beauv.
- Isopterygium* (Hypnaceae)
elegans (Brid.) Lindb.
tenerum (Sw.) Mitt.

- Leptobryum* (Bryaceae)
pyriforme (Hedw.) Wils.
- Leptodictyum* (Amblystegiaceae)
humile (P. Beauv.) Crum
riparium (Hedw.) Warnst.
- Leskea* (Leskeaceae)
gracilescens Hedw.
obscura Hedw.
polycarpa Hedw.
- Leucobryum* (Leucobryaceae)
albidum (Brid.) Lindb.
glaucum (Hedw.) Angstr. ex Fries
- Leucodon* (Leucodontaceae)
brachypus Brid.
julaceus (Hedw.) Sull.
- Lindbergia* (Leskeaceae)
brachyptera (Mitt.) Kindb.
- Mnium* (Mniaceae)
affine Bland. var. *ciliare* C. Muell.
cuspidatum Hedw.
hornum Hedw.
medium BSG
punctatum Hedw. var. *punctatum*
punctatum Hedw. var. *elatum* Schimp.
stellare Hedw.
- Orthotrichum* (Orthotrichaceae)
ohioense Sull. & Lesq. ex Aust.
pumilum Sw.
pusillum Mitt.
stellatum Brid.
strangulatum P. Beauv.
- Paraleucobryum* (Dicranaceae)
longifolium (Hedw.) Loeske
- Philonotis* (Bartramaceae)
fontana (Hedw.) Brid.
marchica (Hedw.) Brid.
muhlenbergii (Schwaegr.) Brid.
- Physcomitrium* (Funariaceae)
pyriforme (Hedw.) Hampe
- Plagiothecium* (Plagiotheciaceae)
cavifolium (Brid.) Iwats.
denticulatum (Hedw.) BSG
- Platydictya* (Amblystegiaceae)
subtile (Hedw.) Crum
- Platygyrium* (Hypnaceae)
repens (Brid.) BSG
- Pleuridium* (Ditrichaceae)
subulatum (Hedw.) Raben.
- Pleurozium* (Entodontaceae)
schreberi (Brid.) Mitt.
- Pogonatum* (Polytrichaceae)
brachyphyllum (Michx.) P. Beauv.
pensilvanicum (Hedw.) P. Beauv.
- Pohlia* (Bryaceae)
annotina (Hedw.) Lindb.
nutans (Hedw.) Lindb.
- Polytrichum* (Polytrichaceae)
commune Hedw.
juniperinum Hedw.
ohioense Ren. & Card.
- Ptychomitrium* (Ptychomitriaceae)
drummondii (Wils.) Sull.
incurvatum (Schwaegr.) Spruce
- Pylaisiella* (Hypnaceae)
intricata (Hedw.) Grout
selwynii (Kindb.) Crum, Steere & Anders.
- Rhodobryum* (Bryaceae)
ontariense (Kindb.) Par. in Lindb.
- Schwetschkeopsis* (Fabroniaceae)
fabronia (Schwaegr.) Broth.
- Sciaromium* (Amblystegiaceae)
lescurii (Sull.) Broth.
- Sematophyllum* (Sematophyllaceae)
adnatum (Michx.) E. G. Britt.
demissum (Wils.) Mitt.

- Sphagnum* (Sphagnaceae)
affine Ren. & Card.
compactum DC ex Lam. & DC
henryense Warnst.
lescurii Sull.
palustre L.
subsecundum Nees ex Sturm.
- Stereocleus* (Brachytheciaceae)
serrulatum (Hedw.) Robins.
- Taxiphyllum* (Hypnaceae)
taxirameum (Mitt.) Fleisch.
- Thamnobryum* (Neckeraceae)
alleganiense (C.M.) Nieuwl.
- Thelia* (Theliaceae)
asprella Sull.
hirtella (Hedw.) Sull.
lescurii Sull.
- Thuidium* (Thuidiaceae)
delicatulum (Hedw.) BSG
recognitum (Hedw.) Lindb.
- Tortella* (Pottiaceae)
humilis (Hedw.) Jenn.
tortuosa (Hedw.) Limpr.
- Tortula* (Pottiaceae)
muralis Hedw.
pagorum (Milde) De Not.
- Trematodon* (Dicranaceae)
longicollis Michx.
- Ulota* (Orthotrichaceae)
crispa (Hedw.) Brid.
hutchinsiae (Sm.) Hamm.
- Weissia* (Pottiaceae)
controversa Hedw.