

Studies in Indiana Bryophytes XII

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Since the publication of Mosses of Indiana, July 23, 1957, by the author, the following species, not included in the manual, have been collected in the state. Although the list of names was published by H. A. Miller and J. W. Thomson, in their foray report in *The Bryologist* (1959), two of the species had been collected previously, after the manual manuscript had been submitted to the publisher and before the American Bryological Society 1958 Foray in Indiana.

Specimens of the collections cited are in the Herbarium of DePauw University. Unless otherwise stated, the nomenclature is that of A. J. Grout, *Moss Flora of North America North of Mexico*.

The total number of known species of mosses in Indiana is now 221, varieties 35, and forms 9, representing 95 genera and 26 families.

Ditrichaceae

Ditrichum lineare (Sw.) Lindb. (Fig. 1.) According to statements by H. S. Conard and A. J. Grout, *D. pusillum* and *D. lineare* may grow together and many intermediate forms may occur. *D. lineare* differs from *D. pusillum* and *D. pallidum* by the following combination of characteristics: Stems frequently bearing innovations or offshoots; leaves 1-1.5 mm. long, costa strong, generally percurrent, occupying $\frac{1}{3}$ - $\frac{1}{2}$ of width of acumination, margins very slightly serrulate to entire, very narrowly revolute, leaf apices canaliculate, blunt; awn of perichaetial leaves much shorter than the long-sheathing base; dioicous; seta and capsule erect, operculum short conic, 0.5 mm. long, urn cylindric and subcylindric, usually about 1.5 mm. long, occasionally up to 1.75 mm. in length, often somewhat wrinkled or longitudinally grooved when dry, annulus frequently one row of large cells above two rows of small cells, peristome teeth irregularly divided, sometimes forked to base, frequently united above; spores 15-18 μ in diameter, smooth, maturing in late autumn or in winter.

Habitat: On clayey or sandy soil, especially on freshly exposed clay.

Indiana distribution: Putnam County, Hoosier Highlands, Sandstone Gulch (H. A. Miller 5776, 5777, 5817 A, Aug. 24, 1958).

Seligeriaceae

Seligeria calcarea (Hedw.) BSG. (Fig. 1.) Dr. Conard's statements are so appropriate for these plants that the author has copied them. "These tiny mosses grow in velvety coatings on cool, shaded rocks, often in deep crevices. They are barely visible, and must be scraped off the rock with a knife."

Plants minute, gregarious; stems usually less than 1 mm. high; leaves up to 1 mm. long, abruptly narrowed from a concave, oblong base into a linear, subulate, subobtuse to obtuse apex, costa indistinct, flattened, filling the apex, margins entire or nearly so; seta erect, up to 2 mm. long, capsule erect, minute, operculum shorter than urn, the urn about 0.5 mm. long, with neck distinct, oval to pyriform when young, turbinate in age, peristome teeth 16, undivided, without median line, fragile; spores smooth, 8-10 μ in diameter, mature in spring or summer.

Habitat: On calcareous rocks.

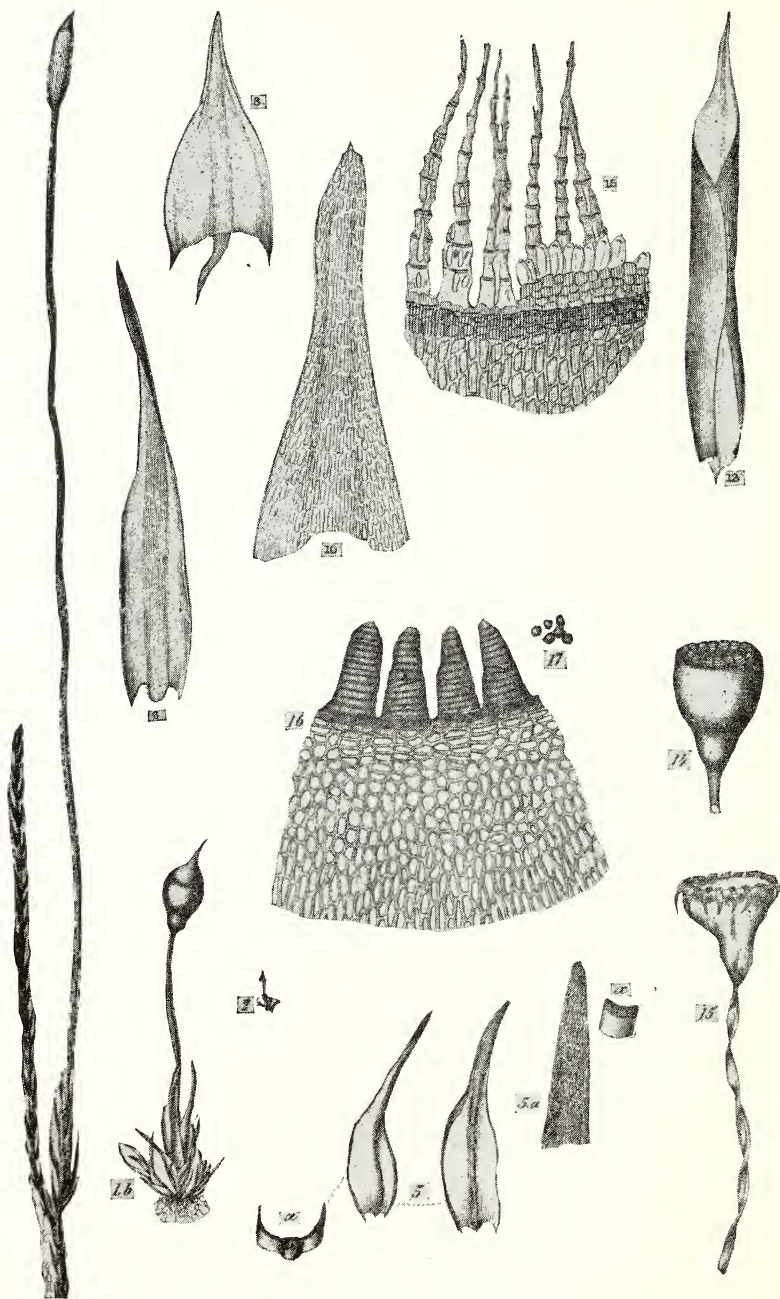


Figure 1

Indiana Distribution: Putnam County, Hoosier Highlands (Paul L. Redfearn, Jr. and Richard D. Houk 3933, Aug. 24, 1958).

Dicranaceae

Brothera leana (Sull.) C. Müll. (Fig. 2.) Plants in low, dense, whitish green or straw-colored mats, stems erect, up to 1 cm. high, thickly foliate, frequently bearing in axils of upper leaves head-like clusters of numerous, deciduous, small, rudimentary leaves or fusiform brood-bodies or gemmae, leaves channeled, lanceolate-subulate, up to 3.5 mm. in length, costa broad, filling most of upper portion of blade, occupying $\frac{1}{3}$ - $\frac{3}{8}$ of lower part of leaf, in cross section near middle of blade, consisting of 3 layers of cells, the cells of upper and lower layers similar and slightly larger than the cells of the middle layer, without distinct stereid band, margins entire throughout or slightly denticulate at apex. [Dr. Grout, in Moss Flora of North America, states that North American plants are sterile. R. S. Williams, in North American Flora, describes the fruit from a specimen collected in Japan.]

Habitat: On bark of trees or rotten logs and stumps, or on humus in shaded places; in Indiana, on sandstone.

Indiana distribution: Parke County, Turkey Run State Park (Zen Iwatsuki, Leo Koch, and A. J. Sharp 1806, Nov. 29, 1957); Putnam County, Hoosier Highlands (Paul L. Redfearn, Jr. and Richard D. Houk 3953, Aug. 24, 1958; Winona H. Welch 17905, Aug. 24, 1958).

Pottiaceae

Eucladium verticillatum (Brid.) BSG. (Fig. 2.) Plants in dense tufts, pale glaucous-green above or yellowish green, often covered with encrusted lime and whitish; stems generally 1-5 cm. high, freely branching, fragile; leaves linear-lanceolate to linear subulate, up to 2.5 mm. long, crispate when dry, costa broad, sometimes $\frac{1}{3}$ of width of blade, disappearing in apex, or percurrent to briefly excurrent, apices acute or apiculate because of excurrent costa, margins plane, toothed just above the base at the meeting of the chlorophyllose cells and the hyaline basal cells, upper cells of leaves papillose, with thick walls, rectangular, quadrate, irregular, or rounded, 7-12 μ in longest diameter; sporophyte erect, seta 1-2 cm. long, urn bearing 16 papillose, peristome teeth.

Habitat: On calcareous rocks.

Indiana distribution: Monroe County, Cascades Park, near Bloomington (Winona H. Welch 17487, July 5, 1956); Putnam County, Vermillion Falls, near Greencastle (Winona H. Welch 17912, Aug. 23, 1958).

Sterile plants of *Eucladium verticillatum* may be collected for species of *Gymnostomum*. The serration on the leaf margins of *Eucladium* will distinguish that genus from the entire margins of *Gymnostomum*. The presence of a peristome in *Eucladium* and its absence in *Gymnostomum* is also a distinctive characteristic.

During the past year (1958-59), Dr. Lewis E. Anderson, Duke University, has carefully examined the author's collections of *Gymnostomum*

Fig. 1. *Ditrichum lineare* (from Grout, MFNA 1: pl. 28 A; from Sullivant, Icones Musc. pl. 28). On left, gametophyte with innovation and sporophyte, enlarged; 6, leaf; 8, lower leaf; 10, leaf apex; 13, perichaetial leaf; 15 (upper), portion of urn, peristome, and annulus. *Seligeria calcarea* (from Grout, MFNA 1: pl. 34; from Bry. Eur. pl. 110). 1b, plant enlarged; 2, plant; 5, stem leaves; 5a, leaf apex; 14, 15 (lower), capsules; 16, portion of urn and peristome; 17, spores.

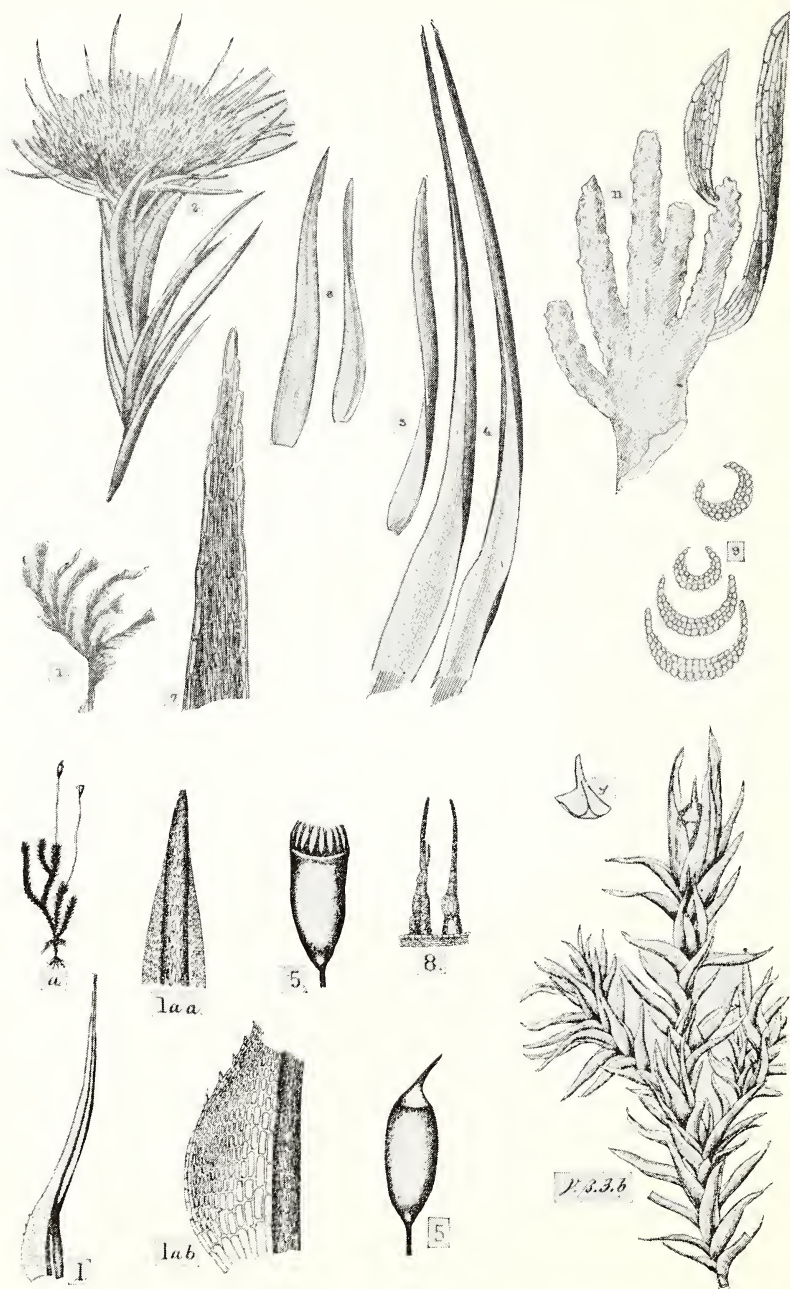


Figure 2

calcareum, cited in the Mosses of Indiana. He regards them, instead, to be *G. aeruginosum*, in accord with the studies published in 1956 by Crum and Anderson.

Grimmiaceae

Grimmia apocarpa Hedw. var. *alpicola* (Hedw.) Hartm.* (Fig. 2.) The var. *alpicola* differs from the species, *apocarpa*, in the following combination of characteristics: Plants commonly pulvinate, leaves ovate-lanceolate or lanceolate, 1.5-3 mm. long, apices acute or obtuse, muticous, calyptra cucullate, capsule ovate, spores 16-20 μ in diameter, mature winter to spring.

Habitat: On various rocks.

Indiana distribution: Putnam County, Vermillion Falls, near Greencastle (H. A. Miller 5598, 5604, Aug. 23, 1958), Hoosier Highlands (H. A. Miller 5648, Aug. 24, 1958).

Note: As to the reports of *Atrichum crispum* and *A. macmillani* (The Bryologist 62: 72, 1959), the author regards one of the collections reported as *A. crispum* to be *A. angustatum* and the other to be *A. undulatum*, and the collection reported as *A. macmillani* to be *A. angustatum*.

The illustrations are taken, with permission, from Grout, Moss Flora of North America North of Mexico, and from Conard, How to Know the Mosses (1944).

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* According to Sayre (1952), *G. apocarpa* var. *alpicola* replaces *G. alpicola* Hedw. and includes *G. alpicola* var. *rivularis* (Brid.) Broth., f. *papillosa* Jones, and var. *latifolia* (Zett.) Möller, as presented by Jones (1933), in Grout, Moss Flora of North America.

Fig. 2. *Brothra leana* (from Grout, MFNA 1: pl. 50; from Sullivant, Icones Musc. pl. 18). 1, plant natural size; 2, plant, much enlarged; 4, 5, 6, leaves; 7, leaf apex; 9, cross sections of leaf; 11, branches of upper portion of stem, with rudimentary leaves which are assumed to function as brood bodies. *Eucladium verticillatum* (from Grout, MFNA 1: pl. 79 C; from Braithwaite, Brit. Moss Fl. 1: pl. 35 C. a, plant, natural size; 1, leaf, much enlarged; 1aa, leaf apex; 1ab, portion of leaf base, both enlarged; 5 (lower), capsules, enlarged; 8, peristome teeth, enlarged. *Grimmia apocarpa* var. *alpicola* (from Grout, MFNA 2: pl. 2; from Bry. Eur. pl. 234). On lower right, plant enlarged; g., cucullate calyptra, enlarged (from Conard. HKM. fig. 73).