

## Studies in Indiana Bryophytes XV

WINONA H. WELCH

Department of Botany and Bacteriology  
DePauw University, Greencastle, Indiana 46135

### Abstract

*Aulacomnium androgynum* (Hedw.) Schwaegr. and *Fissidens exilis* Hedw., new to the flora of Indiana, were described and illustrated. These two species increase the number of mosses known to be present in Indiana to 230 species, 39 varieties, and 9 forms, representing 97 genera and 27 families, with a total of 278 kinds.

Two species of mosses, determined by Howard Crum, University of Michigan, were forwarded to me for examination because they were new records for Indiana: *Aulacomnium androgynum* (Hedw.) Schwaegr. and *Fissidens exilis* Hedw. They were discovered among numerous species, collected by Mrs. Patricia Armstrong (Mrs. Charles), in Porter County, and sent to Dr. Crum for determination in 1971. These mosses increase the Indiana list of known species to 230, varieties 39, and forms 9, representing 97 genera and 27 families, with a total of 278 kinds. Fragments of these collections are deposited in the DePauw University Herbarium.

### Aulacomniaceae

*Aulacomnium androgynum* (Hedw.) Schwaegr. Plants erect, in tufts, 1.5-3 cm high, occasionally to 7 cm., yellowish-green to green above. Leaves (dry)  $\pm$  crispate, lanceolate or narrowly ovate-lanceolate,  $1.25-2.5 \times 0.45 - 0.68$  mm, 2.5-4:1, occasionally to 5 mm long. Costa single, strong, narrowing upward and extending to apex, nearly to point, occasionally percurrent, often meandering above,  $60-175\mu$  wide at base, to  $22.5-50\mu$  wide at apex. Apices acute, ending in a sharp point or a single cell. Margins often narrowly revolute, here and there or throughout, the apical margins entire, serrate, or denticulate. Cells of leaves mostly quadrate, sometimes rectangular, the upper ones often rounded, usually unipapillose, sometimes minutely so to smooth, incrassate throughout, or upper walls incrassate and the lower ones thinner. The basal cells scarcely differentiated or not at all enlarged. Upper cells  $12 \times 7.5\mu$ , 1.5:1, the median  $8.5-13.5 \times 6.5-12\mu$ , 1-2:1. Papillae blunt, commonly to  $3.4\mu$  long, occasionally to  $6\mu$ . Pseudopodia frequently present, to 5 mm long, bearing at end a spherical head of small fusiform, stalked brood-bodies,  $60-67.5 \times 30-37.5\mu$ , 1.5-2.5:1. The stalks hyaline or color of brood-body, 15-30 $\mu$  long, the brood-bodies of 5-6 cells. Dioecious. Calyptra split on one side, cucullate, smooth,  $3.25 \times 0.48$  mm, 6.5-7:1, fugacious. Seta smooth, to 2 cm long. Capsule suberect, erect, or horizontal. Operculum conic,  $0.55-0.63 \times 0.5-0.8$  mm, longer than wide,  $0.575 \times 0.5$  mm,  $\pm 1:1$ , or wider than long,  $0.55-0.63$  mm long  $\times 0.58-0.8$  mm in diameter,  $\pm 1:1$ . Urn oblong or cylindrical, longitudinally ribbed [6-8],  $1.5-2 \times 0.5-0.75$  mm, 2-3.5:1, occasionally ca.  $3 \times 1$  mm. Peristome teeth linear-lanceolate, subulate acuminate; segments lanceolate-subulate; basal membrane ca. 1/2 height of teeth,

cilia 2-3, between segments. Spores 7-10 $\mu$  in diameter, pale, smooth, mature in early summer.

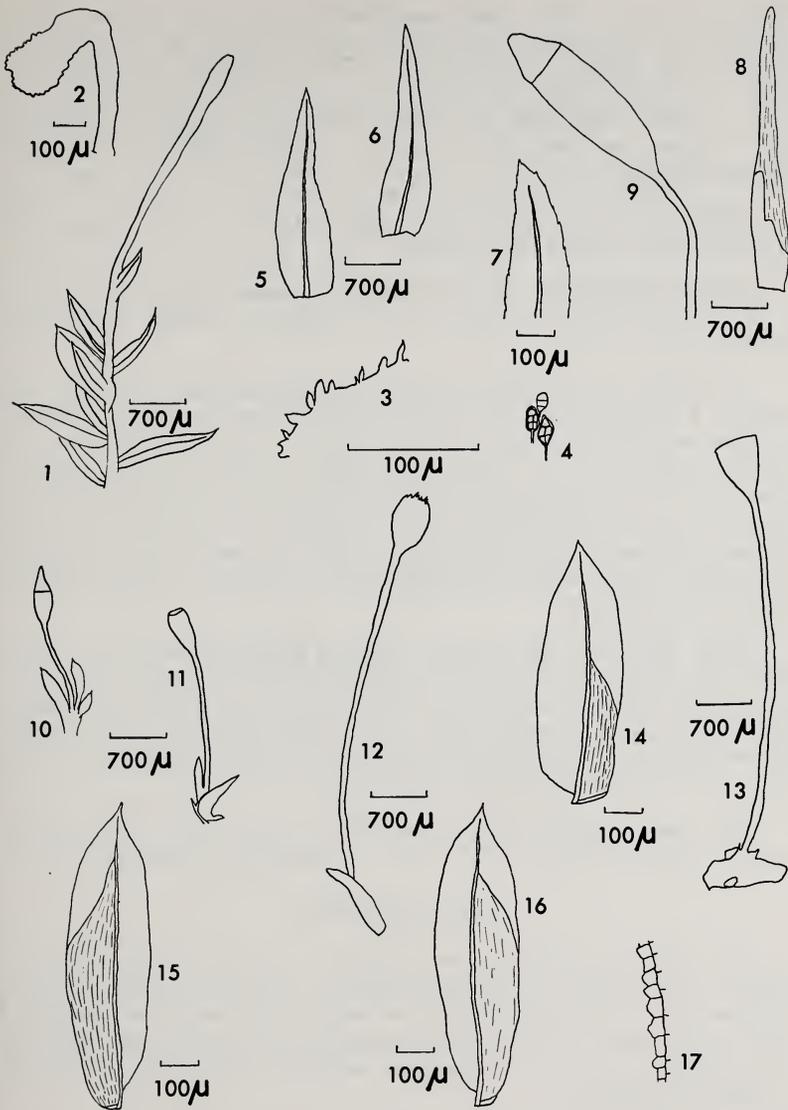
Habitat: In damp, very moist, or wet and swampy woods or forests, in shaded areas, along rivers and creeks, near lakes and harbors, in ravines or gulches, or along roadsides; at base of tree trunks, on decaying trees or logs, on stumps, soil, sand, charred wood, occasionally in medium dry sites, on dry logs, and on cliffs; to at least 1500 m altitude.

Indiana distribution: Porter County, swampy woods, Indiana Sand Dunes, April 1968, collected by Patricia Armstrong, No. 92.

*Aulacomnium androgynum* differs from *A. heterostichum* and *A. palustre*, the other species known in Indiana, in the following ways: *A. heterostichum* leaves elongate-ovate, apices obtuse and apiculate to subulate, margins strongly and coarsely toothed in upper 1/2-2/3; *A. palustre* leaves lanceolate or oblong, apices acute to slenderly acuminate, margins  $\pm$  denticulate near apex, basal cells swollen, and leaf-like brood-bodies in a cluster at upper end of pseudopodium; and *A. androgynum* leaves lanceolate or ovate-lanceolate, apices acute, margins entire below, often serrulate in apex, basal cells scarcely or not at all differentiated, and brood-bodies fusiform in sphere at upper end of pseudo-podium. (Fig. 1).

### Fissidentaceae

*Fissidens exilis* Hedw. Plants minute, rather closely gregarious or scattered, dark green. According to Steere, "Protonema abundant, persistent." Stems simple, erect, or somewhat prostrate or inclined below and ascending above, to about 2 mm long  $\times$  0.5 mm wide with leaves. The leaves erect-spreading, slightly contorted (dry), in 2-4 pairs, the lower ones very small, the upper blades larger, obliquely lanceolate-oblong, lanceolate, or oblong-lanceolate, all near apex of stem, some slightly curved, the upper ones 0.45-2  $\times$  0.15-0.5 mm, 1.5-6:1, the lower ones about 0.35  $\times$  0.12 mm,  $\pm$  3:1. Border none. Costa strong, extending almost into apex, subpercurrent, or rarely percurrent, 22.5-37.5 $\mu$  wide at base, narrowing upward, 15-22.5 $\mu$  wide near apex. Apices acute, sharply so, obtusely acuminate, or obtuse and apiculate. Margins subentire to irregularly crenate above with projecting transverse walls of the cells, the margins of the vaginant or sheathing lamina conspicuously, strongly, and rather regularly crenate-dentate. Vaginant or sheathing lamina  $\pm$  1/2 length of leaf, narrowing above to costa. The dorsal or inferior lamina narrowing downward and ending above leaf attachment to axis. Cells smooth, those of margins especially, and often other cells, incrassate. The marginal cells commonly  $\pm$  quadrate. In basal portion of leaf, the interior cells often rectangular. The quadrate cells 10-18.5  $\times$  6-12 $\mu$ , 1-2:1; the rectangular ones 22-25.5  $\times$  8.5-10 $\mu$ , 2.5-3:1. Upper leaf cells irregular, polygonal to  $\pm$  regularly hexagonal, 10-15 $\mu$  in diameter. The basal cells elongate, 40-60  $\times$  5-10 $\mu$ , 4-12:1. Dioecious or autoecious. Calyptra not seen. According to Steere, "Very small, covering beak of operculum only, shed very early." Sporophyte terminal. Seta smooth throughout, to 6 mm long, often



FIGURES 1-17. 1-9. *Aulacomnium androgynum*. 1. Upper portion of plant with naked pseudopodium. 2. Head of pseudopodium showing outlines of brood-bodies. 3. Outline of portion of spherical head of pseudopodium, with fusiform brood-bodies. 4. Cluster of stalked, fusiform brood-bodies. 5 & 6. Cauline leaves in outline. 7. Apical margin of leaf. 8. Calyptra. 9. Operculum, urn, and upper seta. FIGURES 1-7 from Armstrong 92, Indiana (DPU); 8-9 from Eyerdam 2231, California (DPU). FIGURES 10-17. *Fissidexilis*. 10. Plant, with sporophyte, one pair of upper leaves, and one lower leaf. 11. Plant with urn, seta, and pair of upper leaves. 12. Seta, urn, and remnant of peristome. 13. Substratum, seta, and urn. 14-16. Upper leaves. 17. Portion of crenate-denticulate margin of vaginant or sheathing lamina (enlarged, free-hand). FIGURES 10-17 from Patricia Armstrong 77, Indiana (DPU).

shorter, 2-4 mm, reddish with age. Capsule erect, minute, symmetric. Operculum conic-rostrate, beak usually small,  $0.2-0.4 \times 0.12-0.25$  mm, 1.5-2:1. Urn elliptic to cylindrical,  $0.4-0.8 \times 0.2-0.35$  mm, 1.5-3.5:1. Neck  $\pm 0.12$  mm long. Annulus present, 2-3 rows of cells. Peristome teeth not seen. According to Steere, "Red when mature, ca. 0.33 mm long." Spores not seen. Steere states, "Smooth, 10-12 $\mu$  in diameter, mature in winter."

Habitat: On bare clay soil, on a soil hummock in a marshy area, and on heavy clay in wet spot of a woods.

Indiana distribution: Porter County, on heavy clay, in wet spot, in the Bowers Woods, across from an orchard. Collected by Patricia Armstrong, No. 77<sup>1</sup>.

This moss is not collected often in the United States, it seems. An excellent description of the first plants of this species found in North America was described by Dr. W. C. Steere (4). This description was based, primarily, on two collections, fruiting, made by M. B. Walters, March 24, 1947 and March 24, 1948, on bare clay soil near mouth of a ravine, North Chagrin Reservation of the Cleveland Metropolitan Park System, Cleveland, Ohio. It was sent to Steere by the late H. S. Conard. Dr. Conard later shared this collection with me, also, for the DePauw University Herbarium.

In my herbarium, too, I have a fruiting collection made by Dr. Paul Biebel, No. 210, April 4, 1967, on a soil hummock in a marshy area near a saw mill, elevation ca. 215 m, in Florence Jones Reineman Wildlife Sanctuary, Blue Mountain, Perry County, Pennsylvania. This collection was verified by Dr. Harold Robinson, May 1967, and was regarded at that time as the third report in the United States.

This paper describes and illustrates in the Indiana Moss Series, the first known report of the species in Indiana, also with fruit.

#### Acknowledgements

The author is indebted to the Graduate Council of DePauw University and to the Indiana Academy of Science for aid in research; to Mrs. Armstrong for the fragments of the species for study and drawings; and to Dr. Howard Crum for the original determinations and referring the collections to me as new Indiana records for the series of Studies in Indiana Bryophytes.

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<sup>1</sup>Mrs. Armstrong has written me that the Bowers Woods property, in which she collected the *Fissidens*, is immediately south of U. S. Highway Route 6, near old Suman Road and is owned by the University of Chicago. She is Assistant in Education, The Morton Arboretum, Lisle, Illinois 60532.

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