## Physcomitrium collenchymatum

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PHYSCOMITRIUM COLLENCHYMATUM nov. sp. (1) Plants minute (2-3mm.) gregarious, simple or with subfloral innovations, from scanty protonema; leaves erect spreading, slightly contorted when dry, larger toward stem tip (1-2mm.), ovate to obovate, serrulate in upper half by projecting cells; costa ending in apex; leaf celis large, thin walled, oblong hexagonal (20-30 x 80-100  $\mu$ ), longer and rectangular in base. Monoicous or polygamous. Seta 2 mm. long; capsule sublobose 1 mm. broad, dark walnut brown, symmetric; no annulus, 5 to 7 rows of transversely elongate cells below the mouth, remainder of exothecium made up of collenchyma cells; operculum mammilate and shortly apiculate; calyptra with long neck, 4 lobed, covering capsule at maturity. Spores 25-32  $\mu$  (ave. 28  $\mu$ ), papillose, maturing in June.

Type locality; Cooley Lake (SW1/4 Section 1, Tier 51 North, Range 30 West), Clay County, Missouri, June 22, 1954. Altitude 220 meters. Habitat on dried soil along margin of lake. Exsiccati: L. J. Gier No. 6915 with immature capsules and No. 6924 (TYPE) are in the herbarium of William Jewell College. Duplicates of No. 6924 have been distributed as co-types to several herbaria in the United States and abroad.<sup>(2)</sup>

This species was collected on the drying lake bottom in considerable quantity. When first observed, it was mistaken for *P. pyriforme* Brid. (formerly *P. turbinatum* Mx. See Crum and Anderson, The Bryol. 58:1-15) but was soon found growing with this species from which it could readily be distinguished by comparison. Specimens were sent to several bryologists and to the Moss Clinic. One student suggested it appeared to be an intergeneric hybrid between *Physcomitrium* and

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(1). PHYSCOMITRIUM COLLENCHYMATUM nov. sp. Plantae minutae; caulis 2-3 mm longus, simplex vel innovando; folia 1-2 mm. longa, ovata ad obovata, margine medio ad apicum serrulato, costa valida ad apicem; cellulae hexagono-areolatae, basilares oblongo-rectangulae. Flores monoici, terminales; seta 2 mm. longa; capsula subglobosa. cellulae exotheciales pachydermae et collenchymae. Operculum mammiliforme et breviter apiculatum; calyptra 4 lobata circa basi capsulam obtengens. Sporae papilloses ca 28  $\mu$  diam., in mense Junio maturantes.

(2). Private herbaria of A. LeRoy Andrews, Edwin B. Bartram, H. S. Conard, and Madame S. Jovet-Ast. Institutional herbaria of American Bryological Society, Botanical Museum (Unioninkatu, Helsinki). Botanisches Museum (Berlin.Dahlem), Botaniska Museet (Uppsala), British Bryological Society, Brooklyn Botanic Garden, Chicago Museum of Natural History. Conservatoire et Jardin Botaniques (Geneva). Farlow Herbarium (Harvard), Hattori Botanical Laboratory, Kansas University. Laboratoire de Cryptogamie (Paris), Lucknow University (India), Missouri Botanical Garden. Missouri University. Montreal Botanical Garden. National Museum of Canada, New York Botanical Garden, Rijksherbarium (Leiden). Riksmuseum (Stockholm). Royal Botanic Gardens (Kew), Southern Methodist University (Dallas), State University of Iowa, and Universitetets Botamisk Museum (Oslo).

Aphanorrhegma. Ripe spores were sowed in finger bowls of lake bottom soil in the laboratory on June 28, They were kept in subdued light with a high humidity until October 7 when they were transferred to a bench with 12 hours light per day (2-40 watt fluorescent lights at about 45 cm.). In about two weeks, they produced capsules. This generation was identical to those collected originally so they apparently were not hybrids.



PLATE 1.

PHYSCOMITRIUM COLLENCHYMATUM nov. sp.

- Fig. 1. Plant showing branching.
- Fig. 2. Plant showing habit.
- Fig. 3. Leaf shapes.
- Fig. 4. Portion of exothecium showing suboral cells and collenchyma.
- Fig. 5. Calyptra, same scale as Fig. 2.

- Fig. 5. Carypta, same scale as Fig. 2. Fig. 6. Protonema. Fig. 7. Leaf apex. Fig. 8. Median leaf cells. Fig. 9. Basal leaf cells. Scale shows magnification for Figs. 4, 6, 7, 8, and 9. All drawings made with camera lucida a fram projections of photomicrographs of type precimen camera lucida or from projections of photomicrographs of type specimen.

	H	table 1. C	Jomparison of	several re	lated species	i of Physco	mitrium.		
	P. colleachymetum Clet	P. badium Broth. Shenem No. 4912	P. badium Broth. Schnem No. 4512	P. hians Lindh. N. Amer. Mosses Herb. of Columbia Univ.	P. Platyphylloides Paris I Y PB Ule No. 941	P. platyphyljum Kindb. TYPE	P. serulatum Mitt. Ule No. 23	P. subspheericum Schp. Orcutt No. 6922	P. thieleanum Hampe Ule No. 23
<b>Innova</b> tions	+	+	~	+	÷	~	~	+	+
Leaf shape	ovate to obovate	ovate lanc.	broad evate	lance L. ovate	lance	ovate	lance	lance ovate	lance ovate
Leaf cells	28 × 80 µ	хц Т	Ħ	1620× 48-64	16-20× 48-64	30 × 80	30 × 80	30 × 80	30 × 8C
Lesf border	none	0-2 cells	none	0-2 cells	-none	none	0-1 cell.	1-3 cells	none
Capqule shape	Hemisph	haerical	Hemisphacrical	short neck	Hemi- sphaerical	short	H <del>e</del> mispl short neck	haerical	H <del>e</del> mi- sphaerical
Exothecial cells	32-40 #	40-60 #	long thick walled	mixed	32 µ	ax al	24-30 #	alt. bands	24-32
Collenchyma	+	+	0	+	+	0	+	H	+
Spore size	28-15 H	• 9	1	48-50 A	30-34 #	23-30 #	30-35 #	28-92 p	28-32 #

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About one month later, a second set of capsules started developing from subfloral innovations but these failed to mature because of sudden chilling.

This species closely resembled the drawings of Müller's *P. platy-phyllum (P. platyphylloides* Paris) so it was decided to check this species before publishing. Kindberg had listed both *P. platyphyllum* and *P. platyphylloides* for Missouri. Specimens of both of these and of other related species were examined, compared, and photographed. The principal comparisons are given in Table I.

Müller's type (Ule 941) was obtained from Helsinki. Kindberg's type was borrowed from New York Botanical Garden along with some other packets of this group, all of which had been examined by Mrs. Britton. Other specimens were borrowed from E. B. Bartram, H. S. Conard, Farlow Herbarium at Harvard, National Museum of Canada, and Smithsonian Institution. We wish to thank all of these for their help, as well as the Department of Ancient Languages at William Jewell College for help in writing the Latin description.

Grout considered Kindberg's *P. platyphyllum* and *P. platyphylloides* (#132a in Farlow Herbarium) to be synonyms of *P. turbinatum*. Mrs. Britton wrote on the sheet containing the type of *P. platyphyllum* Kindb. "These specimens of *P. platyphyllum* have no character. They are too young to show (illegible) and deserve to be relegated to the limbo of uncertainty." A specimen of *P. platyphyllum* from Nebraska (Weber #2) showed patches of collenchyma in the exothecium. Mrs. Britton and Grout had both indicated this collection to be inmature *P. turbinatum*.

The specimen of *P. hians* examined had been marked "*P. platy-phyllum* fide Macoun" but the spores are much too large for *P. hookeri* Hampe as this species is listed by Grout. One specimen of *P. badium* (Sehnem #4512) was much different from the other in that the exothecial cells are much elongated and the walls lack the characteristic of thickened angles found in the other (Sehnem #49).

Of the specimens examined (listed in Table 1), all had leaf margins serrate, at least in the upper part, except *P. hians*. The sub-oral rows of horizontally elongated cells were common to all but were fewer (1-4) in the specimen of *P. subsphaericum* Schp. instead of 5-9 rows in the others. *P. collenchymatum* Gier seems to be most closely related to *P. serrulatum* Mitt., *P. platyphylloides* Paris, *P. badium* Broth. (as illustrated by Sehnem #49), and *P. thieleanum* Hampe.