

***Racopilum tomentosum*: First Report of Its Sporophytes in Florida,
and Observations on Its Sexuality**

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Racopilum tomentosum (Hedwig) Bridel is known in the United States only from Florida, where it occurs sporadically in a few counties in the southern part of the state and along the western side of the peninsula as far north as Citrus and Sumter counties. Although this moss is often fertile in the extra-U.S. portions of its range (American tropics, Bermuda, Africa), sporophytes were not known from the U.S. populations (Breen 1963; Crum & Anderson 1981) until they were discovered during my review of *Racopilum* for the Flora of North America project.

Sporophytes are present in various stages of development in a collection of *R. tomentosum* from Florida, Collier County: Collier--Seminole State Park, Royal Palm Hammock, *H. A. Crum and L. E. Anderson, Mosses of North America* 595, (*L. E. Anderson & H. Crum* 13440). Of the four duplicates of this collection I have seen, those at DUKE, FLAS, and LAF have sporophytes while the one at MICH has gametoecea but lacks sporophytes. The sporophytes of the Collier County specimen are described below.

Seta brown, 14--27 mm long. Capsule curved, brown, sulcate when dry, 3--4 mm long. Operculum obliquely rostrate, 2.5 mm long. Calyptra tardily cucullate, 2.5--3 mm, usually with sparse delicate hairs, sometimes naked with age. Spores smooth, 13--15 μ m.

The sexuality of *R. tomentosum* has been described as autoicous (e.g., Brotherus 1925; Crum & Anderson 1981). Breen (1963), however, stated that in several instances she found the "sex organ buds" to contain both antheridia and archegonia, i.e., the synoicous condition. Presumably her observations are based on Florida specimens. The gametoecea of *R. tomentosum* are tiny and may be difficult to find. They sit approximately erect along the flanks of the stem, axillary to the lateral leaves but seemingly displaced dorsally. Their long-awned leaves make the gametoecea visible at high magnification under the dissecting microscope.

In the case of the MNA specimen cited above, dissection of three gametoecea from a single stem without a sporophyte revealed that both antheridia and archegonia are present, confirming Breen's observations. One gametoeceum contained six old archegonia and eight large empty antheridia; the second contained ten old archegonia and about six empty antheridia; the third contained nine old archegonia and ca. four old antheridia. In another specimen from Florida, *Philips* 97 (LAF), the gametoecea examined contained only archegonia.

Sexuality of *R. tomentosum* in extra-Florida Specimens

The 18 extra-United States specimens of *R. tomentosum* at LAF constitute a sample for the examination of sexuality. Eight of these specimens include plants bearing gametoecea and sporophytes, four have plants with gametoecea but lacking sporophytes, and six evidently lack sexual expression. The results of my dissection of sexual structures from the 12 collections bearing gametoecea are given below.

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- BRAZIL. *Lowey SP101*. Sporophytes present. One gametoeccium from a stem with a sporophyte: All antheridia. Five gametoeccia, all from a single stem lacking a sporophyte: 1. All archegonia; 2. All antheridia; 3. Three mature antheridia (two unopened, one empty) + 13 archegonia, mostly mature and dehiscent. In this gametoeccium the antheridia clearly matured after most of the archegonia had already dehiscent. 4. Sixteen dehiscent and two immature archegonia + two immature antheridia; 5. Seventeen nearly mature but unopened antheridia. AUTOICOUS and SYNOICOUS.
- COLOMBIA. *Churchill et al. 13405-a*. Sporophytes lacking. Four gametoeccia from three different stems: All archegonia. DIOICOUS?
- COLOMBIA. *Linares et al. 1543*. Sporophytes present. Four gametoeccia from a stem with sporophytes: All archegonia. Five gametoeccia from a stem without sporophytes: All archegonia. Eleven gametoeccia from a stem with sporophytes: All archegonia. Three gametoeccia from a stem without a sporophyte: All archegonia. DIOICOUS?
- COSTA RICA. *Griffin & Morales B 118*. Sporophytes present. Four gametoeccia from a stem with a sporophyte: Three contained all antheridia, the other had all archegonia. Two gametoeccia from another stem with a sporophyte: Both had all antheridia. AUTOICOUS.
- ECUADOR, GALÁPAGOS. *Weber M-131*. Sporophytes lacking. Two gametoeccia from a single stem: Both contained all antheridia. DIOICOUS?
- ECUADOR, GALÁPAGOS. *Weber M-364*. Sporophytes lacking. Two gametoeccia from one stem: Both had all archegonia. Three gametoeccia from a single stem: Two had all archegonia but the third gametoeccium contained two open archegonia, two unopened archegonia, and six unopened antheridia. SYNOICOUS p.p.
- HISPANIOLA, DOMINICAN REPUBLIC. *Reese 14994*. Sporophytes present. One gametoeccium at the base of a mature sporophyte contained all archegonia. Six gametoeccia from a single stem bearing mature sporophytes: Four included only archegonia; one had only antheridia; one contained two archegonia and several antheridia. AUTOICOUS and SYNOICOUS.
- HISPANIOLA, DOMINICAN REPUBLIC. *Reese 15424*. Sporophytes present (old setae): Two old seta bases from one stem: A few old archegonia on the flanks of the vaginula. One old seta base and two gametoeccia from a single stem: Only old archegonia in all three. DIOICOUS?
- JAMAICA. *Orcutt 4778*. Sporophytes present. Inner perichaetial leaves and flanks of the vaginula of a mature sporophyte: Only archegonia. Six gametoeccia from stems with mature sporophytes: 1. All archegonia; 2. All antheridia; 3. Two archegonia + several antheridia; 4-6. All archegonia. SYNOICOUS p.p.
- SURINAM. *P. & J. Florschütz 4715*. Sporophytes present. Two gametoeccia from stems with sporophytes: All antheridia. AUTOICOUS.
- VENEZUELA. *Gaincer (Bravo) 0026*. Sporophytes present. Inner perichaetial leaves and flanks of the vaginula of a mature sporophyte, and a single gametoeccium: All archegonia. DIOICOUS?
- VENEZUELA. *Griffin et al. 017450*. Sporophytes lacking. Six gametoeccia from one stem: All with only archegonia. Five gametoeccia from another stem: All archegonia. DIOICOUS?

Based on the specimens studied some populations of *R. tomentosum* in Florida, Brazil, Hispaniola, Jamaica, and the Galápagos include synoicous plants and others have autoicous plants. The possibility of the dioicous condition cannot be ruled out for some populations. No doubt synoicous populations occur elsewhere in the broad range of this moss. Synoicy is not clear-cut in *R. tomentosum* because in all specimens in which synoicous gametoeccia were discovered there were also perichaetia or perigonia, or both.

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