

## RHIZOGONIACEAE

(Brian J. O'Shea)

**Plants** small to rather large, forming loose to dense tufts. **Stems** mostly erect, few branched, radiculose, often densely tomentose; central strand well developed. **Leaves** spirally arranged or appearing two-ranked, distant to rather crowded, ovate to narrowly or broadly oblong-lanceolate, or linear-lanceolate, apex acute to acuminate, base decurrent or not; margins plane or reflexed to recurved, crenulate, dentate or sharply serrate, teeth single and margins unistratose or double and margins bistratose; costa single, strong, percurrent to short excurrent, entire or toothed on back distally; laminal cells mostly isodiametric and smooth, or bulging mammillose, walls firm and entire; alar region undifferentiated. **Gemmae** in leaf axils of distal stems and branches (absent in *Pyrrhobryum*), cylindrical, smooth to papillose. **Autoicous** or dioicous. **Perigonia** bud-like, usually below perichaetia. **Perichaetia** lateral at base or at mid stem, or terminal, leaves small and differentiated. **Seta** elongate, wiry, smooth. **Capsule** erect to horizontal, urn short to rather long cylindrical, symmetric to asymmetric, curved or straight. **Operculum** conic or short rostrate, oblique. **Peristome** double or absent, exostome teeth 16, cross-striate below, papillose above, or papillose throughout; endostome basal membrane moderately high, segments 16, keeled, cilia usually present. **Calyptra** cucullate, naked and smooth. **Spores** spherical, lightly papillose.

DISCUSSION. The Rhizogoniaceae contain eight genera and some 40 species with a pantropical distribution, with two genera and three species in Africa. The family is placed in the Bryales. The distinguishing feature of the Rhizogoniaceae is that the sporophytes occur laterally near the base or midway along the erect stems (but terminal in *Leptotheca*). Manuel (1980) segregated *Pyrrhobryum* from *Rhizogonium*, a subdivision that appears well supported from several lines of evidence (cf. Inoue & Iwatsuki, 1976). Koponen (1988) has presented a classification in which *Leptotheca* and *Pyrrhobryum* are placed in an amended Mniaceae. Certainly the traditional concept of the Mniaceae, the Rhizogoniaceae and related families needs critical reassessment, although the cladistic analyses presented by Koponen only weakly support the new classification.

LITERATURE. **Inoue, S. & Z. Iwatsuki. 1976.** A cytotaxonomic study of the genus *Rhizogonium* Brid. (Musci). Journal of the Hattori Botanical Laboratory 41: 389-403. **Koponen, T. 1988.** The phylogeny and classification of Mniaceae and Rhizogoniaceae (Musci). Journal of the Hattori Botanical Laboratory 64: 37-46. **Manuel, M. G. 1980.** Miscellanea bryologica II. Classification of *Rhizogonium* Brid., *Penzigiella hookeri* Gangulee, and some nomina nuda. Cryptogamie, Bryologie. Lichénologie 1: 67-72. **O'Shea, B.J. 1997.** British Bryological Society Expedition to Mulanje Mountain. Malawi. 9. Regmatodontaceae, Rhachithecaceae, Rhacocarpaceae and Rhizogoniaceae (Bryopsida). Journal of Bryology 19: 805-813 [keys].

1. Leaves lanceolate, doubly-serrate, margins bistratose; exostome cross-striate **Pyrrhobryum**
1. Leaves ovate-lanceolate, singly-serrate, margins unistratose; exostome papillose **Leptotheca**

### **Leptotheca** Schwägr. (Fig. XX)

A genus of three species, of which only one occurs in Africa, *L. gaudichaudii* Schwägr., which is found in the South African Cape area, but also elsewhere in the circum-Antarctic region from Chile through to New Zealand.

**Plants** rather small to medium sized, forming tufts, light to dark green. **Stems** erect, to 3 cm tall, often densely tomentose below; in cross-section 5-sided, outer 2-3 rows of cells small, thick-walled, on corners rows to 5, inner cells larger, thick-walled, central strand well differentiated; rhizoids rusty-red, distinctly papillose. **Leaves** erect when dry, linear-lanceolate, 2--2.3 mm long, apex acuminate, base slightly decurrent; margins plane above,

recurved below, serrate in distal 1/2, teeth single, sharply toothed to spinose distally; costa strong, short excurrent, toothed on back; laminal cells smooth, thick-walled; median cells isodiametric or oval to irregularly rectangular-rounded; basal cells similar, but those associated with propagula cells long rectangular-rounded. **Gemmae** infrequently present on terminal stems in leaf axils, often in a dense cluster (like a bottle-brush), each long-cylindrical, golden-red, lightly papillose. **Diocious. Perichaetia** terminal; leaves lanceolate-acuminate, costa short to rather long excurrent, not serrate, upper cells similar, lower and basal cells short rectangular, lax, golden red. **Sporophyte** unknown in Africa.

**HABITAT.** In the Cape it is restricted to rock recesses and crevices in the mountain fynbos (Magill 1987), but elsewhere it is a common rainforest epiphyte, also growing on logs and rocks, in moist or wet premontane to high montane forests, 1000-3100 m.

**DISCUSSION.** This genus is distinguished by (when present) the bottle-brush appearance of clustered, papillose, cylindrical gemmae on distal portion of stems; additional features include the often very tomentose lower stems, the spirally arranged leaves, and the single toothed serration of the leaf margin.

**LITERATURE.** Churchill, S. P. & Buck, W. R. 1982. A taxonomic investigation of *Leptotheca* (Rhizogoniaceae). Brittonia 34: 1-11 [keys, illustrations, maps]. Magill, R.E. 1987. - see general refs. [description, illustration].

### **Pyrrhobryum** Mitt. (Fig. XX)

Probably only two species in Africa, *Pyrrhobryum spiniforme* (Hedw.) Mitt. (pantropical), and *P. vallis-gratiae* (endemic to the South African Cape) (O'Shea 1997); a pantropical genus of 15 about species.

**Plants** medium sized to somewhat large, forming loose to dense tufts, dark green. **Stems** erect or curved; in cross-section outer 2-3 rows of cells small, thick-walled, inner cells larger, moderately thick-walled, central strand distinct; rhizoids often forming a dense tomentum below. **Leaves** linear-lanceolate to broadly lanceolate, 4--8 mm long, apex acuminate, base decurrent or not; margins plane, bistratose and doubly-serrate to near base; costa strong, percurrent to excurrent, toothed on back, in cross-section stereids above and below guide cells; laminal cells uniform throughout except at base, isodiametric, rounded to 4-6 sided, thick-walled, smooth; juxtacostal basal cells often weakly differentiated, enlarged, short to rather long rectangular, lax or not. **Gemmae** absent. **Synioicous. Perichaetia** lateral, confined to base or lower part of stem; leaves oblong-lanceolate, marginal teeth single or double, upper cells elongate, oblong-rectangular, lower cells larger, lax, golden. **Seta** elongate, 2--6 cm long, smooth. **Capsule** inclined to horizontal, urn cylindrical, 1.5--3 mm long, usually curved, becoming striate and flared at the mouth when deoperculate; exothecial cells quadrate- to rectangular-rounded, moderately thick-walled, somewhat weakly collenchymatous at base; stomata at urn base, superficial. **Operculum** conic-rostrate, oblique. **Peristome** double, exostome teeth lanceolate, appearing cross-striate (actually finely striate-papillose), distally papillose; endostome basal membrane rather high, segments keeled and perforate, cilia 2-3. **Calyptra** cucullate, smooth. **Spores** spherical, lightly papillose.

**HABITAT.** On tree trunks, logs and soil or humus, leaf litter covered banks, silty rocks in streams; wet lowland to high montane forests, from near sea level to 2550 m.

**DISCUSSION.** The genus is characterized by the elongate stems, distal and spirally arranged broadly to narrowly lanceolate or linear-lanceolate leaves, doubly toothed, bistratose leaf margins, costa distally toothed at the back, mostly isodiametric laminal cells uniform to near base, and sporophytes positioned somewhat midway on stem or near the base. The local species were previously placed in the genus *Rhizogonium*. The two species may be differentiated by the following: *P. vallis-gratiae* - stem branching above, seta arising above base from short lateral branch, leaves < 2mm long, ovate-lanceolate, appressed when dry; and *P. spiniforme* - stem not branches or branched below, seta arising from base, leaves 4--8 mm long, linear-lanceolate, crisped when dry.

LITERATURE. **Magill, R.E. 1987.** - see general refs. [key, descriptions, illustrations].