POWELLIA

Bernard O. van Zanten[1]

Powellia Mitt., *London J. Bot*. 10: 187 (1868); named after the Rev. T.Powell, collector of the genus.

Type: *P. involutifolia* Mitt.

Lateral leaves ovate to narrowly ovate-elliptic, obtuse to acute, 1.4–2.0 mm long, 0.3–0.9 mm wide, spreading sideways or obliquely forwards when moist, curved upwards when dry; margin undulate, either bordered by elongate cells or unbordered, ±entire to serrulate near the apex; costa percurrent or excurrent in a long arista; laminal cells quadrate to rhomboidal-hexagonal, 10–20 µm, firm-walled, bulging. Dorsal leaves smaller, triangular-ovate.

Perichaetial leaves ovate, blunt, acute or acuminate; cells thin-walled, 60–80 × 12–20 µm; paraphyses usually projecting beyond bracts. Calyptra cucullate. Setae 5–10 mm long, yellowish brown, twisted to the left. Capsules erect, cylindrical, straight, smooth or nearly so. Exostome teeth narrow, papillose, yellowish; endostome rudimentary, with a low basal membrane; processes fugacious; cilia absent.

A genus of five tropical species with scattered distributions in Malesia, tropical Australia (two non-endemic species) and the Pacific Islands.

References

Koponen, T. & Norris, D.H. (1986), Bryophyte flora of the Huon Peninsula, Papua New Guinea. XVII. Grimmiaceae, Racopilaceae and Hedwigiaceae (Musci), *Acta Bot. Fenn.* 133: 81–106.

Zanten, B.O. van (1970), De afgrenzing van het geslacht *Powellia* tegen *Racopilum* (Musci), *Jaarb. Kon. Ned. Bot. Ver*. 1969: 54–57.

Costa excurrent in a long arista; leaves not bordered..... **1. P. integra**
Costa percurrent; leaves bordered by a band of linear cells ..... **2. P. involutifolia**

1. Powellia integra (Dixon) Zanten, *Bryobrothera* 5: 21 (1999)

Racopilum integrum Dixon, *J. Bot.* 79: 61 (1941). T: Sarawak, Borneo, [Malaysia], 1888, *Everett 503*; holo: BM.

Racopilum brevisetum E.B.Bartram, *Occas. Pap. Bernice P. Bishop Mus.* 19: 226 (1948); *Powellia breviseta* (E.B.Bartram) Zanten, *Jaarb. Kon. Ned. Bot. Ver.* 1969: 56 (1970), *nom. inval.*; *Proc. Sixth Meeting Central & East European Bryol. Working Group* 3 (1989). T: Mt Victoria, Viti Levu, Fiji, *A.C.Smith 1151*; holo: FH.

Illustration: T.Koponen & D.H.Norris, *Acta Bot. Fenn.* 133: 88, fig. 3b, c, f, j–l (1986), as *Racopilum cuspidigerum*.

Phyllodioicous. Lateral leaves ovate or narrowly ovate, 1.4–1.8 mm long, 0.6–0.8 mm wide; apex obtuse or acute, strongly incurved when dry (arista usually pointing downwards); margin undulate, serrulate due to projecting cell tips; costa ending in a smooth arista 0.2–0.3 mm long, protruding at the back of leaf when dry; laminal cells rhomboidal-hexagonal, strongly bulging, 15–20 µm long, progressively smaller towards the margin, 12–15 µm long, not forming a border; juxtacostal cells rectangular, parenchymatous, 30–50 × 10–14 µm. Dorsal leaves 0.8–1.4 mm long, 0.3–0.6 mm wide, acute.

Perichaetial leaves ovate, gradually long-acuminate to a smooth arista c. 2 mm long. Calyptra with numerous erect hairs. Setae 5–7 mm long, yellowish brown, left-turned (1–2 turns).

[1] Vogelzangsteeg 8, 9479 TG Noordlaren, The Netherlands.

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Capsules erect, cylindrical, smooth; operculum not seen. Exostome teeth papillose, striate near base; basal membrane of endostome very low; processes fragile; cilia absent. Spores 11–12 µm diam.

Two collections are known from the Cairns area, north-eastern Qld; also in Fiji, Papua New Guinea, Indonesia (Borneo, Ceram), Malaysia and the Philippines (Luzon). Reported here for the first time from Australia, it was collected on branches in rather exposed forest sites at altitudes of 1000–1200 m.

Qld: State Forest 194, 15 km SW of Atherton, *B.O. van Zanten 68.1238A* (CANB, GRO); summit of Black Mtn, 25 km NW of Kuranda, *B.O. van Zanten 68.1341* (CANB, GRO).

All Australian specimens are female, and sporophytes are unknown here. The description of the sporophyte is based on the Fijian type. Dwarf male plants were observed only in one specimen from Fiji (*A.C.Smith 5300*).

The gametophyte closely resembles that of *Racopilum cuspidigerum*, but it can be distinguished by the bulging laminal cells. The easiest way to establish the presence of these bulges is to examine a folded leaf. Other vegetative differences between this species and *R. cuspidigerum* are the more strongly undulate leaf margin (hence *Powellia* has a less distinctly complanate appearance than *Racopilum*), dorsally stronger protruding costa, stronger incurved, not longitudinally convolute and more constantly laterally-spreading leaves, and the more yellowish colour. Koponen & Norris (1986), synonymised this species with *R. cuspidigerum*; however, this view is not accepted due to significant differences in the sporophyte and gametophyte.

2. Powellia involutifolia Mitt., *J. Linn. Soc., Bot.* 10: 187 (1868)

T: Fangasa Bay, Tutuila, [Western] Samoa, *T.Powell 43*; holo: NY; iso: BM, MO.

Helicophyllum australe Hampe, *Linnaea* 36: 524 (1870); *Powellia australis* (Hampe) Broth., *Nat. Pflanzenfam*. I, 3: 975 (1907). T: Rockingham Bay, Qld, *J.Dallachy s.n.*; holo: BM; iso: MEL, MO.

Illustrations: V.F.Brotherus, *Nat. Pflanzenfam.*, 2nd edn, 11: 51 (1925); T.Koponen & D.H.Norris, *Acta Bot. Fenn.* 133: 97, fig. 9a–g (1986).

Male plants similar in size to female. Lateral leaves narrowly ovate-elliptic, strongly incurved and ±spirally twisted when dry, 1.5–2.0 mm long, 0.7–0.9 mm wide; apex obtuse; margin entire or with a few small blunt teeth; costa percurrent, ending 1–3 cells below apex, strongly protruding at back of leaf when dry; laminal cells (sub)isodiametric, quadrate-hexagonal, 10–15 × 8–10 µm, strongly bulging; basal cells scarcely differentiated, but a few cells to 20 µm long; marginal cells smooth, in 1–3 rows, thick-walled, linear, to 80 µm long, forming a distinct yellowish border, failing below apex. Dorsal leaves obtuse, smaller.

Perigonial leaves broadly ovate, acute, c. 0.4 mm long. Perichaetial leaves ovate, acute to blunt or acuminate, sometimes irregularly toothed toward apex, 1.1–1.2 mm long, with or without a costa. Calyptra with some erect or hanging hairs near the base. Setae 6–7 mm long, yellowish to reddish brown, twisted to the left, sometimes to the right (at most a half turn) just below capsule. Capsules erect, cylindrical or narrowly elliptic, narrowed at mouth, 2.0–2.5 mm long, smooth or faintly irregularly ribbed when dry; operculum 0.6–0.8 mm long, obliquely rostrate; rostrum straight. Exostome yellowish, papillose, not perforated, or with narrow perforations along the ±straight median line; endostome a low basal membrane; processes rudimentary or absent(?); cilia absent. Spores 14–15 µm diam.

Occurs in Qld, from Cairns south to Mackay; also in New Guinea, New Caledonia, Fiji, Samoa and the Cook Islands. Primarily an epiphyte, it has also been recorded from rock and soil, from sea level to 800 m. It is found mainly in rainforest, but also in wet-sclerophyll forest.

Qld: Pat Daley Park, S of Millaa-Millaa on Ravenshoe road, *D.H.Norris* (CANB, GRO); road towards Conway State Forest, Whitsunday Coast, *B.O. van Zanten & P.Sollman 93.10.2749* (CANB, GRO).

This moss is readily recognised by the peculiar, spirally twisted leaves together with the complanate leaf insertion and strongly tomentose stems. Only two of the known collections bear sporophytes.

The type of *P. australis* is identical to that of *P. involutifolia* in terms of vegetative morphology and anatomy. However, the sporophytes could not be compared as the holotype of *P. australis* (BM) lacks capsules (the MO isotype, however, has one seta twisted to the left, which is usual for this species), Nevertheless, the sporophytic characteristics of Australian and extra-Australian specimens of both taxa are very similar. Synonymy of *P. australis* with *P. involutifolia* was suggested by Koponen & Norris (1986).