

***Euptychium piliferum* sp. nov. (Ptychomniaceae) from New Caledonia**

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Abstract – *Euptychium piliferum* Frank Müll. is described and illustrated. The species is most closely related to *E. cuspidatum*. Its distinctive features include leaves with piliferous acumina 0.7-1.0 mm long, a leaf length/width ratio of 4.5-6:1, a leaf length of 3.4-4.0 mm, leaf margins entire to weakly serrulate in the basal half, and strongly incrassate and porose leaf cells. A revised key to the species of the genus *Euptychium* is provided.

Bryophytes / new species / New Caledonia

INTRODUCTION

Euptychium Schimp. is a small genus traditionally placed in subfamily Garovaglioideae of the Pterobryaceae, but on the basis of molecular analyses the whole group of the Garovaglioideae including *Euptychium* was recently transferred to the Ptychomniaceae (Buck *et al.*, 2005). Furthermore, these authors transferred sect. *Crassisubulata* During with the single species *E. setigerum* (Sull.) Broth. to *Garovaglia* Endl. The genus, revised taxonomically by During (1977), includes now six species. The genus has a restricted distribution – East Australia, Lord Howe Island, New Caledonia, New Hebrides, and Fiji Islands. The greatest species diversity is found in New Caledonia with three species, of which *E. pungens* Broth. is endemic. The author made collections of *Euptychium* during two expeditions to New Caledonia in 2001 and 2003. Among these collections an undescribed species was found.

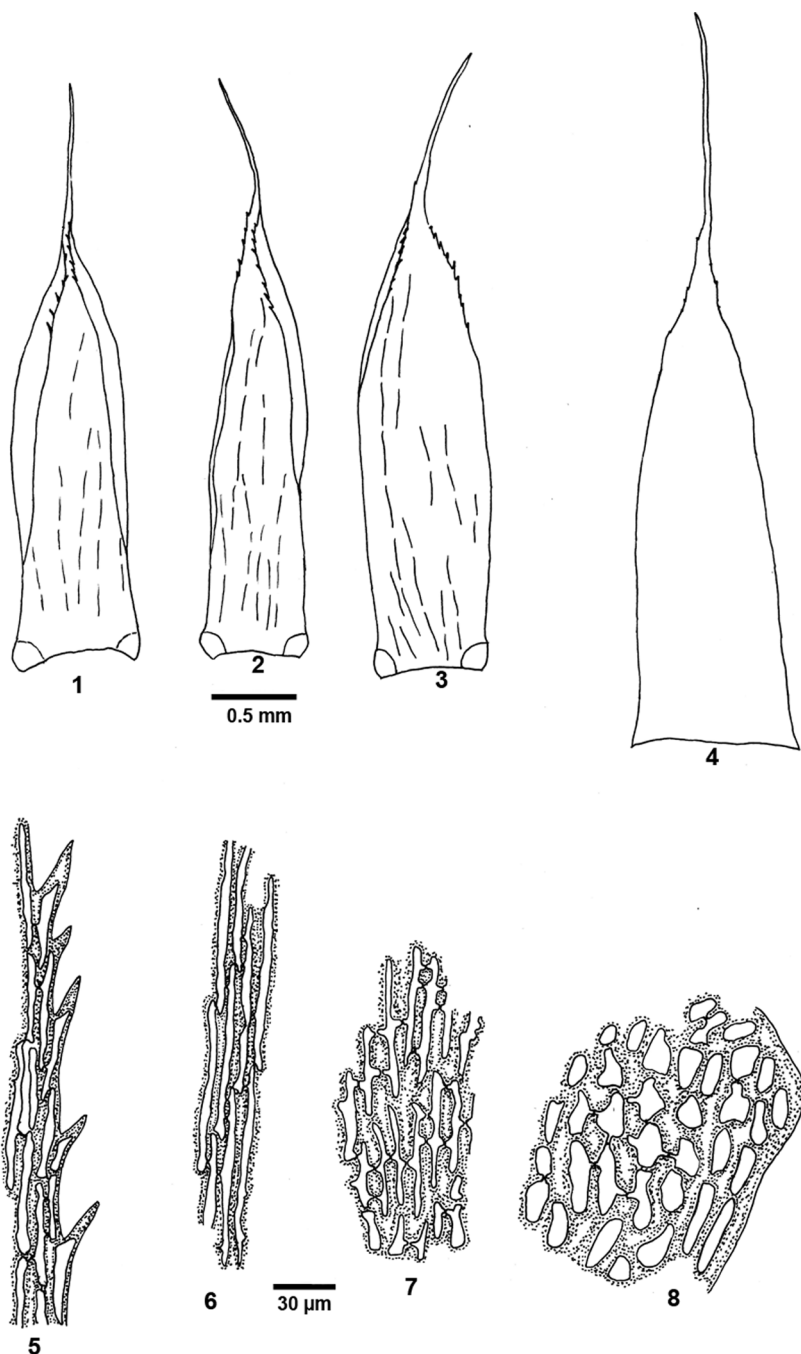
DESCRIPTION

***Euptychium piliferum* Frank Müll., sp. nov.**

Figs 1-10

Euptychii cuspidati similis, sed differt acumenibus piliferis foliorum longitudine 0.7-1.0 mm, foliis longitudine 3.4-4.0 mm, ratione longitudinis/latitudinis 4.5-6:1, marginibus in dimidio inferiore integris ad leniter serrulatis et parietibus cellularum brevioribus, valde incrassatis et porosis.

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Figs 1-8. *Euptychium piliferum*. 1-3. Stem leaves. 4. Perichaetial leaf. 5. Serration at leaf margin in the upper part below the piliferous acumen. 6. Cells at mid-leaf. 7. Cells at basal part of leaf. 8. Cells of alar region. 1-3, 5-8 drawn from the holotype (Müller NC 582, DR), 4 drawn from *Le Rat* s. n. 10/1904 (paratype, H-BR).



Figs 9-10. *Euptychium piliferum*. **9.** habit of sterile stems. **10.** habit of stems with sporophytes. 9 drawn from the holotype (Müller NC 582, DR), 10 drawn from *Le Rat s. n.* 10/1904 (paratype, H-BR).

Type: New Caledonia. Mt. Ouin, mossy forest, epiphytic, ca. 1000 m, 22°01'S, 166°28'E, 1 Sept. 2003, Müller NC 582 (**holotype**, DR). Mt. Dzumac, Oct. 1904, *Le Rat s. n.* (**paratype**, H-BR)

Plants glossy, yellow-green, older parts brown. **Stems** 2-9 cm × 3-4 mm with leaves, unbranched or seldom with short branches to 1 cm long, in cross section the outer 4-6 layers of cells strongly incrassate, isodiametric with red-brown walls, 8-12 µm wide, lumina small, nearly occluded; inner cells 12-32 µm wide, becoming less incrassate, isodiametric to shortly elongate with yellow, porose cell walls; central strand absent; axillary hairs 70-145 µm long, basal cell brown, 2-4 upper cells elongate, hyaline. **Leaves** crowded, appressed to spreading (to an angle of 45°), rigid, deeply plicate, 3.4-4.0 × 0.5-0.9 mm, length/width ratio 4.5-6:1, narrowly oblong, acute, concave, widest in the median lower part, sometimes shortly and narrowly decurrent, with long piliferous acumina, 0.7-1.0 mm long; margins widely involute, serrate just below the acumen, weakly serrulate to entire in the lower part, marginal teeth above 15-35 µm long, to 6 µm long below; costa absent; median cells 65-120 × 7-8 µm, with strongly porose and incrassate walls, 3.5-5 µm thick, smooth; lower cells shorter, with thicker, red-brown walls; alar cells in excavate groups, 4-5 cells high and 4-7 cells wide, 22-37 × 15-20 µm, with strongly porose and incrassate walls, 7-12 µm wide, red-brown.

Gemmae not seen. **Archegonia** ca 400 µm long with necks 220-250 µm. **Perichaetia** 4-5 mm long; perichaetial leaves 4.3-5.0 × 0.7-0.9 mm, inner perichaetial leaves abruptly narrowed into long piliferous acumina 1.5-2.0 mm long, margins entire below, serrulate-serrate at base of acumina, entire or distantly serrulate in the acumina, teeth 5-20 µm long; cells porose and thick-walled, smooth. **Theca** 1.5 × 0.7-0.8 mm, ± sulcate; exothecial cells at mouth quadrate to oblate, 15-19 × 18-24 µm, thin-walled; median cells short-rectangular, 24-40 × 16-22 µm, horizontal walls thin, vertical walls thick; exostome teeth 0.55-0.65 mm long, solid, thick, finely and densely transversely striated dorsally, with a distinct zigzag line and high lamellae, apices papillose, yellow-brown; endostome as long as the exostome, with a high basal membrane 1/3-1/2 the length of the teeth, with 16 solid, keeled, slightly papillose segments, yellow to hyaline. **Spores** ± papillose, 30-40 µm. **Operculum and calyptra** not seen.

DISCUSSION

The acuminate leaf apices and serrate leaf margins with teeth 15-35 µm long suggest a relationship of *E. piliferum* with *E. cuspidatum* (Mitt.) Mitt. and *E. dumosum* (Besch.) Broth. *Euptychium piliferum* is more closely related to *E. cuspidatum*. During (1977) determined a leaf length/width ratio of 3-4:1 for *E. cuspidatum* and found little variation in leaf shape and other foliar characters. The leaf apex was described as short and narrowly acuminate, about 0.1-0.3 mm long. One specimen from New Caledonia, *Le Rat s. n.*, 10/1904 (H-BR), however, was found to have leaf apices 0.8-1.0 mm long and a leaf length/wide ratio of 4-5:1. During hesitated to recognize this collection to be taxonomically different since in all other respects, including sporophyte characters, it conformed to typical *E. cuspidatum*. However, the gametophytic characters of this collection are identical with more recently collected material and both are treated here under the name *E. piliferum*. The Le Rat collection bears sporophytes and was used to describe the sporophyte of *E. piliferum*. However, there is little variation among the sporophytes of *Euptychium* and are of no value in distinguishing species. The principal difference between *E. piliferum* and *E. cuspidatum* are the long piliferous acumina of the leaves. Other differences are summarized in Table 1. *Euptychium piliferum* is distinguished from *E. dumosum* by leaves without teeth on the lamina, margins widely infolded above, and abruptly narrowed perichaetial leaves.

The discovery of *E. piliferum* and the transfer of *E. setigerum* to Garovaglia (Buck *et al.*, 2005) modify the key to the species of *Euptychium* as follows (see During, 1977):

1. Leaves ovate-lanceolate, very concave and boat-shaped in the upper part, apex obtuse or acute (Distribution: Lord Howe Island) *E. mucronatum*
- 1'. Leaves gradually or abruptly narrowed to longer points 2
2. Leaf apex acuminate or piliferous; margins often serrate to grossly serrate, teeth 20-30 µm long 3
- 2'. Leaves very gradually tapering to an acute apex; margins subentire to serrulate, teeth 0-15(-25) µm long 5
3. Leaves dorsally with several teeth on the lamina; margins plane; inner perichaetial leaves very gradually narrowed towards the apex, cells in the upper part of the perichaetial leaves often highly prorate (Distribution: New Caledonia, New Hebrides) *E. dumosum*

Table 1. Differences between *Euptychium piliferum* and *E. cuspidatum*.

	<i>E. piliferum</i>	<i>E. cuspidatum</i>
Leaf length	3.4-4.0 mm	2.4-3.4 mm
Length/width ratio of leaf	4.5-6:1	3-4:1
Leaf acumen	0.7-1.0 mm long, piliferous	0.1-0.3 mm long
Leaf serration	Distinctly serrate in the upper part below the piliferous acumen, entire to weakly serrulate in the basal part	Distinctly serrate in upper 1/2, serrate in lower part
Leaf cells in middle part of leaf	65-120 µm long, strongly incrassate, walls 3.5-5 µm wide, porose	100-150 µm long, moderately incrassate, walls 1-3 µm wide, moderately porose
Angular cells	Forming a concave group, cell walls 7-12 µm wide	Forming a flat to somewhat concave group, cell walls 2-5 µm wide

- 3'. Leaves without teeth on the lamina; margins often widely infolded above; inner perichaetial leaves rather suddenly narrowed towards apex, only few cells prorate4
4. Leaf acumen 0.7-1.0 mm long, piliferous; leaf length 3.4-4.0 mm, length/width ratio of leaf 4.5-6:1, leaves entire to weakly serrulate in the basal part; leaf cells in middle part of leaf 65-120 µm long, strongly incrassate, walls 3.5-5 µm wide, porose; angular cells forming a concave group, cell walls 7-12 µm wide (Distribution: New Caledonia) ***E. piliferum***
- 4'. Leaf acumen 0.1-0.3 mm long, not piliferous; leaf length 2.4-3.4 mm, length/width ratio of leaf 3-4:1, leaves serrate in lower part; leaf cells in middle part of leaf 100-150 µm long, moderately incrassate, walls 1-3 µm wide, moderately porose; angular cells forming a flat to somewhat concave group, cell walls 2-5 µm wide (Distribution: East Australia, New Caledonia)... ***E. cuspidatum***
5. Angular cells slightly coloured, forming a rather large, auriculate group (Distribution: Fiji Is.) ***E. vitiense***
- 5'. Angular cells deep red, group not auriculate.....6
6. Angular cells in 2-3 layers; leaves 4.4-7 mm long (Distribution: Lord Howe Island) ***E. robustum***
- 6'. Angular cells in one layer; leaves 3.4-3.6 mm long (Distribution: New Caledonia) ***E. pungens***

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