



Reappraisal of *Dendroceros cucullatus* (Dendrocerotaceae, Anthocerotophyta)

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Dendroceros is an epiphytic or epiphyllous genus within Anthocerotophyta, with about 48 extremely specialised species in having endosporic germination (Villarreal et al. 2010; Garcia et al. 2012). *Dendroceros difficilis* was originally described by Stephani (1917: 1009), based on a collection made by V. Schiffner from Java, Indonesia. Hasegawa (1980) reduced a little-known species *D. cucullatus* Stephani (1923: 429) from the Philippines, to its synonym. An examination of the holotypes of both species, however, reveals that *D. cucullatus* is quite different from *D. difficilis* in thallus margin, structure of costa and epidermal cells of capsule. *Dendroceros cucullatus* is thus reinstated as a separate species. Based on Schuster's (1987) treatment, these two species belong to subgenus *Apoceros* Schuster (1987: 195) based on the cavernous costa in both. *Dendroceros difficilis* has been described and illustrated by Hasegawa (1980) and Piippo (1993). The following description of *D. cucullatus* is based on the holotype kept in Geneva Herbarium (G) and recently collections from Thailand.

Dendroceros cucullatus Steph. Sp. Hepat. 6: 429. 1923. (Figs. 1 & 2)

Type:—Philippines, Mindanao, Butuan Subprovince, 15 m, on tree trunk, March–July 1911, *C. M. Weber 1341* (holotype G-19699!).

Illustrations: Hasegawa (1980, p.305, Fig. 9b, c, f & h).

Thalli pale brown to blackish when dry, medium-sized, up to 15 mm long, 1.6–2.5 mm wide, irregularly subpinnately branched or sometimes subdichotomously branched. Costa rather broad, 0.5–1 mm wide, in transverse section more or less flat dorsally and convex ventrally, cavernous, lacunae 20–90 µm in diameter, arranged in 1 or 2 rows of larger lacunae together with additional smaller ones. Lamina unistratose, strongly crispate or forming a hood-like structure, with large perforation especially conspicuous near margin, margins nearly entire; epidermal cells 20–25 × 25–35 µm at margin, 25–35 × 30–40 µm from middle to costa, thin- to slightly thick-walled, trigones rather large, triangular to triangular-cordate. Rhizoids colorless, scattered on ventral side of costa, inner wall smooth. *Nostoc* colonies embedded in the thallus, scattered on both dorsal and ventral sides of costa, especially in older parts.

Monoicous. Androecia scattered on main branches; antheridia solitary, rounded-ovoid. Involucre erect, cylindrical, 5–7 mm long. Capsules slender, up to 15 mm, bivalved when mature; stomata absent; epidermal cells rectangular, 35–55 × 20–25 µm, with narrow lumens and strongly thickened walls, prorate at the tips of cells. Spores subglobose to rounded-triangular, various in size depended on growing stage, 55–75 µm in diameter, green, multicellular with numerous cells; proximal surface irregularly ridges with wart-like structures; distal surface spinulose, the surface between spinules irregularly ridges. Pseudoelaters pale brown, unbranched, ca. 450 µm long, ca. 10 µm wide, with a single helical band.

Dendroceros cucullatus is similar to *D. difficilis* in habit and lamina cells. According to our observations of type material and recent collections from Malaysia and Thailand of the two species, *D. cucullatus* can be immediately separated from *D. difficilis* by the more strongly galeate laminae with entire margins (Fig. 1A, C); costa with smaller lacunae (Fig. 1B), costa network not visible dorsally and epidermal cells of capsule more elongate (Fig. 1F). Moreover, the spore ornamentation of *D. difficilis* differs from *D. cucullatus* in having more densely wart-like structure on its proximal surface (Fig. 2, 4).

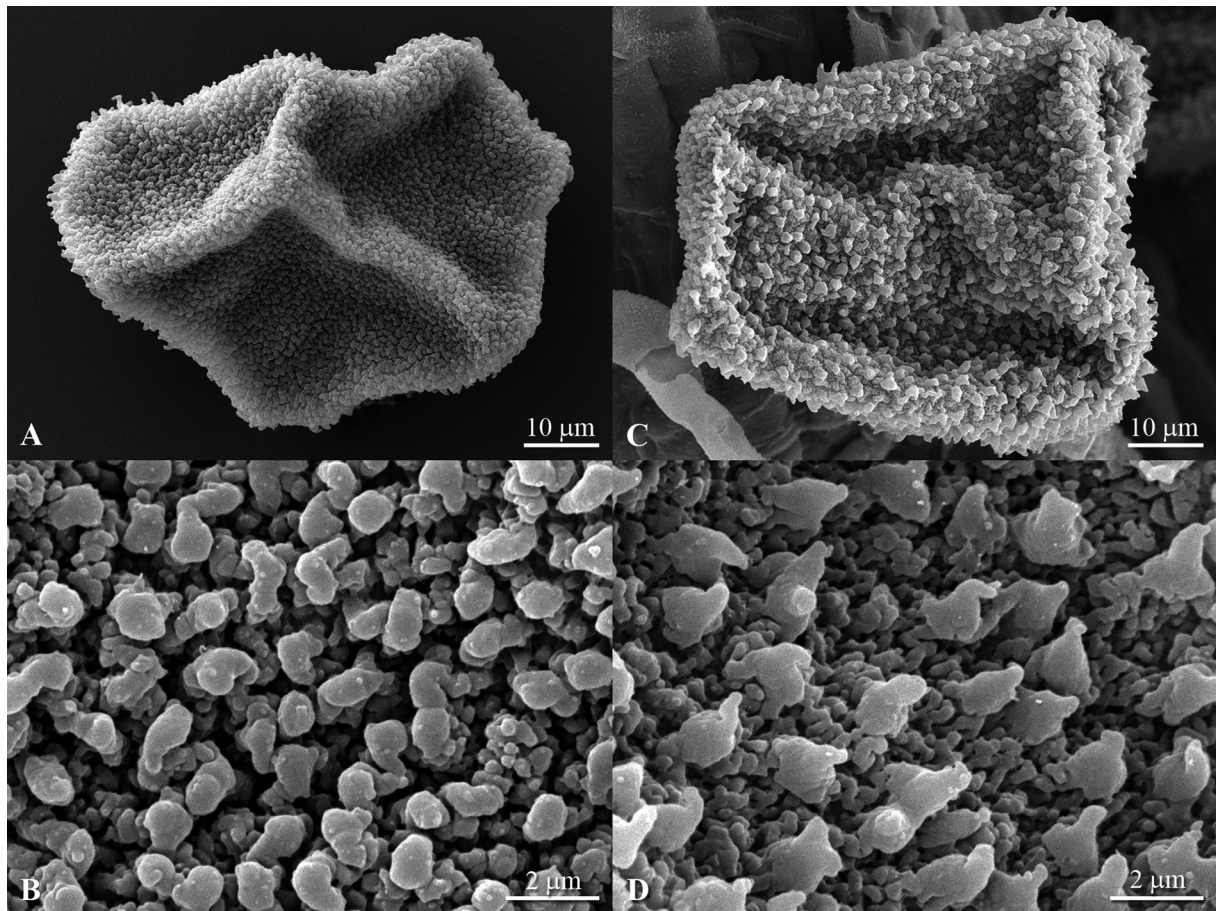


FIGURE 4. SEM photos of *Dendroceros difficilis* Steph. A. Proximal view of spore. B. High magnification of the proximal face with densely wart-like structures. C. Distal view of spore. D. High magnification of the distal face with spinules and irregular ridges. All from *S. Chantanaorrapint, J. Inuthai & C. Promma 1950* (PSU).

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