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New combinations and an overview of *Cyathea* subg. *Hymenophyllopsis* (Cyatheaceae)

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Abstract

Several molecular phylogenetic analyses have recently shown that the family Hymenophyllopsidaceae, endemic to the Guayana Shield, is embedded within the tree fern genus *Cyathea*. This placement of *Hymenophyllopsis* necessitates six new combinations, and two new names, because the combinations already exist in *Cyathea*. These are provided here, together with their basionyms, synonyms, type information and distribution.

Key words: Guyana, *Cyathea*, Hymenophyllopsidaceae, *Hymenophyllopsis*, pedomorphosis, table mountain, tepui, tree ferns, Venezuela

Introduction

The Hymenophyllopsidaceae were proposed by Christensen (1938) to account for the strange filmy fern-like plants described by Goebel (1929) as *Hymenophyllopsis*. They were generally treated (Kramer & Green 1990) as a single genus family only found in the Guayana Highlands, where they are restricted to table mountains of Precambrian sandstone and quartzite (tepuis).

Christensen (1938) suggested a relationship with Plagiogyriaceae and Loxsomataceae, but Smith (in Gleason 1931) suggested an affinity with *Asplenium*. Copeland (1947) placed it between Pteridaceae and Davalliaceae, but stated that the family is of uncertain affinity and placed there "in ignorance of its proper position".

Hymenophyllopsis in its traditional sense (Lellinger 1984) comprises eight species of small delicate ferns with thin leaves, the tissue being 3–4 cell layers thick, allowing them to thrive without stomata (Lellinger 1984). Because of the superficial morphological resemblance to filmy ferns (Hymenophyllaceae), with their thin leaves and their pouch-shaped indusia, a relationship with these two families was suggested, now merely thought to be another example of convergent evolution (Wolf et al. 1999).

A morphological and molecular relationship of Hymenophyllopsidaceae with the scaly tree ferns, as already proposed by Christensen (1938), has been shown by Wolf et al. (1999). Recent molecular studies (Korall et al. 2007) gave evidence that the scaly tree fern genus *Cyathea* is paraphyletic, due to the placement of *Hymenophyllopsis* as sister to the New World *Cyathea* clade (fig. 1). *Hymenophyllopsis* shares a couple of morphological characters with *Cyathea*, e.g., marginal scales without apical setae, cyatheoid (cup-shaped) indusia and strongly verrucate spores (Tryon & Lugardon 1991). To make *Cyathea* a monophyletic genus it is clearly most parsimonious to merge the two genera.

In many aspects the species of *Hymenophyllopsis* differ from other scaly tree ferns. They have a creeping or ascending rhizome, that is only a few centimetres long, their thin blades lack stomata, and their indusia are pouch-shaped (Lellinger 1984). Despite these obvious differences in overall appearance, the presence of

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Key to the species of *Cyathea* subgen. *Hymenophyllopsis*

This key is adapted from Lellinger (1984).

1 Blades 22–27 cm long; rachises villous, with shiny translucent hairs ..... *C. trichomanoides*
- Blades to 20 cm long, usually less than 15 cm; rachises glabrous, scaly or sparsely hairy 2
2 Rhizome and petiole scales 7–10 mm long, linear, forming a tuft at the rhizome apices 3
- Rhizome and petiole scales 1.5–5 cm long, lanceolate or narrowly lanceolate, not forming a conspicuous tuft at the rhizome apices 4
3 Lamina triplipinnate; stipes and rachises with variable contorted hair-like scales ..... *C. ctenitoides*
- Lamina pinnate-pinnatifid, the lower pinnae, sometimes more dissected; stipes and rachises with short catenate hairs ..... *C. universitatis*
4 Soral valves narrowly lacerate; petiole 0.2–0.5 mm in diameter..... 5
- Soral valves broadly lacerate, repand, lobed or subentire; petiole (0.5–) 0.7–1.0 mm in diameter 6
5 Blades tripli- to quadripinnate; ultimate segments to ca 0.5 mm wide..... *C. hymenophylloides*
- Blades bi- to tripinnate; ultimate segments ca 0.7–1 mm wide..... *C. incognita*
6 Blades pinnate-pinnatifid to bipinnate; soral valves broadly lacerate ..... *C. asplenioides*
- Blades bi- to triplipinnate-pinnatifid; soral valves repand or subentire, sometimes triangularly lobed..... 7
7 Rhizomes, petioles and rachises with slightly dentate, dull, straminaceous, 2–5 mm long scales ..... *C. dejecta*
- Rhizomes, petioles and rachises with entire, glossy, brown, 1.5–2 mm long scales ..... *C. tepuiana*

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