



Three new species of scaly tree ferns (*Cyathea*-Cyatheaceae) from the northern Andes

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Abstract

Three species of the genus *Cyathea* (Cyatheaceae-Polypodiopsida) are described as new to science from the northern Andes: *Cyathea aemula* from southern Colombia and northern Ecuador, *C. ars* from southeastern Ecuador, and *C. guentheriana* from northeastern Ecuador. All species are illustrated and compared to their putative closest relatives.

Key words: Andean cordillera, biodiversity, Colombia, *Cyathea*, Ecuador, ferns, pteridophytes

Introduction

The small Andean republic of Ecuador holds an outstanding position in the global species count, with 15,306 native species and an estimated endemism of 27.3 % in vascular plants (Jørgensen & León-Yáñez 1999). The exceptionally high number of species compared to the small size of the country is due to its varied relief and the contact of several biogeographic units (Valencia *et al.* 1994), which are mainly caused by different precipitation regimes along the Andes (Killeen *et al.* 2007). The Andean cordillera effectively separates a western and an eastern lowland rainforest biome (Gentry 1982). Despite the relatively short distance, an exchange of species between the western and eastern Andean slopes is restricted, e.g. about 25% of the pteridophyte species found on the western side do not occur on the eastern side (Moran 1995a).

The botanical explorations of this country still yield new discoveries of unknown species, including sizeable and conspicuous plants like the scaly tree ferns of the genus *Cyathea* (Moran 1991, 1995b, León & Moran 1996, Moran & Øllgaard 1998). The checklist of Ecuador lists 51 native species of *Cyathea* (Jørgensen & León-Yáñez 1999) but several new discoveries increased the total count to 64 species in the meantime (Lehnert 2003, 2006a, 2006b, 2008, 2009).

The family Cyatheaceae contains ca. 600 species with a pantropical-southern temperate distribution (Smith *et al.* 2006). Its members differ from other families of the tree fern alliance by having not only the common pluricellular hairs, but also various types of scales in their indument (Kramer & Green 1990). The family includes the tallest living ferns, whose erect trunk-like rhizomes can reach over 20 m tall. Due to their size they are less frequently and more fragmentarily collected than other fern groups (Janssen 2006). The taxonomic status, geographical range and ecological potential of many poorly understood species are just beginning to clarify (e.g. Lehnert 2005, 2008, Moran *et al.* 2008) thanks to an increased number of long-term field explorations.

The generic subdivision of the family was long disputed (Holtum & Tryon 1977). Holtum (1963) recognized only one universal genus *Cyathea* with the two subgenera *Cyathea* and *Sphaopteris*, including several sections. Tryon (1970) recognized six genera (*Cyathea*, *Cnemidaria*, *Trichipteris*, *Alsophila*, *Nephelea*, *Sphaopteris*) based on studies focused on Neotropical species. Two of these genera, *Trichipteris*