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# Two new frog species (Microhylidae: *Cophixalus*) from the Australian Wet Tropics region, and redescription of *Cophixalus ornatus*

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## Abstract

In Australia the frog family Microhylidae is largely restricted to tropical rainforests of the Wet Tropics region in the north-east of the country, but in that region the family is diverse. Only one species, *Cophixalus ornatus*, is widespread in the Wet Tropics but there has been suspicion that it may comprise multiple species. A recent study (Hoskin *et al.* 2011) assessed genetic and phenotypic variation across the range of *C. ornatus*, finding three deeply divergent genetic lineages that differ in mating call and some aspects of morphology. Two of these lineages abutt in the central Wet Tropics and in that area hybridization was found to be very limited despite sympatry at high densities. Based on multiple lines of data, Hoskin *et al.* (2011) concluded that the three genetic lineages represent biological species. The taxonomy of these three lineages is resolved here. I describe two new species, *Cophixalus australis* **sp. nov.** and *Cophixalus hinchinbrookensis* **sp. nov.**, and redescribe *C. ornatus*. The three species are not distinguishable based on any single morphological or call trait and are best identified by genetics or locality. The distributions of the three species are largely allopatric. *Cophixalus ornatus* is found in rainforest in the northern Wet Tropics, *C. australis* **sp. nov.** occurs in rainforest and adjacent wet sclerophyll forests in the central and southern Wet Tropics, and *C. hinchinbrookensis* **sp. nov.** inhabits rainforest and montane heath on Hinchinbrook Island. All three species are common. *Cophixalus australis* **sp. nov.** contains three genetic subgroups that are considered a single species based on phenotypic similarity and high levels of hybridization at contact zones. The description of *Cophixalus australis* **sp. nov.** and *Cophixalus hinchinbrookensis* **sp. nov.** brings the number of Australian *Cophixalus* species to 18, 15 of which are restricted to the Wet Tropics region.

**Key words:** *Cophixalus australis*, *Cophixalus hinchinbrookensis*, rainforest, heath, Australia

## Introduction

The family Microhylidae is represented in Australia by 21 species — 16 *Cophixalus* Boettger, 1892 and 5 *Austrochaperina* Fry, 1912. The centre for microhylid diversity in Australia is the Wet Tropics bioregion, an area of mountainous rainforest between Townsville and Cooktown in north-east Queensland. Fourteen species occur in this area, representing two-thirds of Australia's microhylid species (Hoskin 2004; Hoskin & Aland 2011). Since the major revision of the Australian microhylids by Zweifel (1985), only two new microhylid species have been described for the Wet Tropics — *Cophixalus monticola* Richards, Dennis, Trenerry & Werren, 1994 and *C. aenigma* Hoskin, 2004. The other three species described in the last 25 years have come from boulder-fields in remote areas of Cape York to the north of the Wet Tropics: *C. zweifeli* Davies & McDonald, 1998, *C. kulakula* Hoskin & Aland, 2011, and *C. pakayakulangun* Hoskin & Aland, 2011. Most Australian *Cophixalus* have very small distributions, generally being restricted to a single or several neighbouring mountain-tops or boulder-fields (Zweifel 1985; Hoskin 2004; Hoskin & Aland 2011). The major exception is *C. ornatus*, which is distributed through much of the Wet Tropics region. Previous studies of Australian microhylids have revealed the presence of divergent genetic lineages within *C. ornatus* (Hoskin 2004) and phenotypic differences between lowland and upland populations (Zweifel 1985; Hoskin 2004).

Hoskin *et al.* (2011) investigated genetic and phenotypic diversity across the range of *C. ornatus*. This revealed three highly divergent genetic lineages — the 'northern' lineage in the north of the Wet Tropics, the 'central'

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