



Article

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A phylogeny and taxonomy of the Thai-Malay Peninsula Bent-toed Geckos of the *Cyrtodactylus pulchellus* complex (Squamata: Gekkonidae): combined morphological and molecular analyses with descriptions of seven new species

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Abstract

An integrative taxonomic analysis using color pattern, morphology and 1497 base pairs of the ND2 mitochondrial gene and its five flanking tRNAs demonstrated that nine monophyletic species-level lineages occur within the *Cyrtodactylus pulchellus* complex (*Cyrtodactylus pulchellus sensu strictu* and *C. macrotuberculatus*) of the Thai-Malay Peninsula that have a sequence divergence between them ranging from 5.9–16.8%. Additionally, each lineage is discretely diagnosable from one another based on morphology and color pattern and most occur in specific geographic regions (upland areas or islands) that prevent or greatly restrict interpopulation gene flow. Six of these lineages were masquerading under the nomen *C. pulchellus* and are described as the following: *Cyrtodactylus astrum* sp. nov. from northwestern Peninsular Malaysia and southwestern Thailand; *C. langkawiensis* sp. nov., at this point endemic to Langkawi Island, Malaysia; *C. bintangrendah* sp. nov., a lowland species surrounding the Banjaran (=mountain range) Bintang of northwestern Peninsular Malaysia; *C. bintangtinggi* sp. nov., endemic to the upland regions of the Banjaran Bintang of northwestern Peninsular Malaysia; *C. trilatofasciatus* sp. nov., endemic to upland regions of Cameron Highlands in the central portion of the Banjaran Titiwangsa in Peninsular Malaysia; and *C. australotitiwangsaensis* sp. nov. from the more southerly upland regions of the Banjaran Titiwangsa. An additional species, *Cyrtodactylus lekaguli* sp. nov. from Satun, Trang, Surat Thani, and Phang-nga provinces in southern Thailand, was identified on the basis of morphology and color pattern and is hypothesized to be part of a clade containing *C. astrum* sp. nov. and *C. langkawiensis* sp. nov.

Key words: Taxonomy, Phylogeny, *Cyrtodactylus*, Gekkonidae, Malaysia, Thailand, Molecular systematics, New species

Introduction

The genus *Cyrtodactylus* is the most speciose group of gekkonid lizards to date (152 species at present count; see www.reptile-database.org plus Shea *et al.* 2011) and the remarkable frequency at which new species are being described shows no signs of abating (i.e., David *et al.* 2011; Iskandar *et al.* 2011; Ngo, 2011; Oliver *et al.* 2011; Schneider *et al.* 2011; Shea *et al.* 2011). The vast majority of these recent descriptions were born out of