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Phylogeny of the *Cyrtodactylus irregularis* species complex (Squamata: Gekkonidae) from Vietnam with the description of two new species

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Abstract

The number of described species of bent-toed geckos of the *Cyrtodactylus irregularis* species complex in Vietnam has increased from one to eight in the last six years. We combined morphological and molecular analyses to explore phylogenetic relationships among all described species in the group. The phylogeny required the description of two new species, *Cyrtodactylus phuocbinhensis* **sp. nov.** and *Cyrtodactylus taynguyenensis* **sp. nov.** Further, the tree resolved two additional undescribed clades that may also be new species. The species *C. bugiamapensis* and *C. zieglerei* were found to require redefinition. *Cyrtodactylus phuocbinhensis* **sp. nov.** is characterized by a series of enlarged femoral scales separated from preanal scales while *Cyrtodactylus taynguyenensis* **sp. nov.** does not possess enlarged femoral scales. Both new species are distinguished from other congeners by a combination of the following characters: small subcaudal scales, not transversely enlarged; presence (*C. phuocbinhensis* **sp. nov.**) or absence (*C. taynguyenensis* **sp. nov.**) of enlarged femoral scales; number of preanal pores; and dorsal pattern. Genetic distances between described species and new species were 16.5% and 2.0% in *COI* and *RPL35*, respectively, for *C. phuocbinhensis* **sp. nov.**, and these distances were 18.8% and 2.2% for *C. taynguyenensis* **sp. nov.**, respectively.

Key words: bent-toed geckos, *COI*, *RPL35*, matrilineal genealogy

Introduction

Vietnam is considered a global biodiversity hot-spot. Together with Laos and Cambodia, it contains over 600 species of amphibians and reptiles, roughly a quarter of which have been described within the last 15 years (Bain &

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APPENDIX 1. Additional specimens examined

- Cyrtodactylus bidoupimontis*: ITBCZ1536–39, topotypes, Bi Doup–Nui Ba National Park, Lam Dong Prov., Vietnam.
- Cyrtodactylus bugiamapensis*: ITBCZ340, 389–92, topotypes, Bu Gia Map National Park., Binh Phuoc Prov., Vietnam.
- Cyrtodactylus cattienensis*: ITBCZ1367, Ma Da Nature Reserve, Dong Nai Prov., ITBCZ605–7, Tan Phu forest, Dong Nai Prov., ITBCZ707, Binh Chau–Phuoc Buu Nature Reserve, Ba Ria–Vung Tau Prov., Vietnam.
- Cyrtodactylus cryptus*: PNKB1–4, and two released adult females, topotypes, U Bo, Phong Nha–Ke Bang National Park, Quang Binh Prov., Vietnam.
- Cyrtodactylus huynhi*: ITBZ516–22, 529, topotypes, Chua Chan Mountain, Dong Nai Prov., Vietnam.
- Cyrtodactylus pseudoquadrivirgatus*: ITBCZ3000 and ITBCZ3001, topotypes, A Luoi, Thua Thien–Hue Prov., Vietnam.
- Cyrtodactylus zieglerei*: ITBCZ482–5, paratypes, Chu Yang Sin National Park, Dak Lak Prov., Vietnam.
- Cyrtodactylus* sp1: VNMN2012–15, Na Nung, Dak Nong Prov., Vietnam.