



Molecular phylogenetics and taxonomy of leaf-toed geckos (*Phyllodactylidae*: *Phyllodactylus*) inhabiting the peninsula of Baja California

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Abstract

Herein we assess the phylogenetic relationships and taxonomy of geckos of the genus *Phyllodactylus* inhabiting the peninsula of Baja California, Mexico using five mitochondrial and two nuclear genes. Phylogenetic analysis using maximum parsimony (MP) and Bayesian inference (BI) recovered three distinct peninsular clades with high statistical support. Sequence divergence estimates between peninsular taxa approached 13%. Two of the species, *P. unctus* and *P. xanti* are Cape Region endemics, whereas *P. nocticolus* is widespread throughout much of the peninsula and extreme southern California. Monophyly of the peninsular taxa was strongly supported. In the MP analysis, *P. unctus* rooted at the base of the peninsular clade, resolving *P. xanti* and *P. nocticolus* as sister taxa. Conversely, BI placed *P. nocticolus* and *P. unctus* as sister taxa. These data provide further evidence for a trans-peninsular seaway near the Isthmus of La Paz, severing the Cape Region from the rest of the peninsula. The analysis also supports the validity of *P. nocticolus* as a distinct species and suggests a single invasion to the peninsula from mainland Mexico, presumably during tectonic activity during the Miocene.

Key words: biogeography, cryptic species, Gekkota, phylogeny, speciation

Introduction

The complex geological history of Baja California and the Gulf of California has contributed significantly to the evolution of their regional biota. One hypothesis on the formation of the peninsula and the origin of its flora and fauna suggests a trans-gulfian vicariance model. This posits that tectonic activity during the Miocene led to rifting partitions of western Mexico off the North American Plate (Murphy 1983a,b; Hausback 1984; Lonsdale 1989; Riddle *et al.* 2000). This biogeographic model, in part, explains the patterns of evolutionary relationships observed between several taxa distributed on opposite sides of the Gulf of California (Murphy 1983b).

The dynamic paleogeographic history of the peninsula has, in turn, led to numerous taxonomic and phylogenetic studies conducted throughout Baja California, islands in the Gulf of California, and mainland northwestern Mexico. Several of these studies evaluated genetic breaks in mitochondrial DNA (mtDNA) lineages that coincide with trans-peninsular seaways, one mid-way on the peninsula and one across the Isthmus of La Paz, just north of the Cape Region (Upton & Murphy 1997; Riddle *et al.* 2000; Lindell *et al.* 2005, 2006, 2008).