



Molecular phylogeny of Caribbean dipsadid (Xenodontinae: Alsophiini) snakes, including identification of the first record from the Cay Sal Bank, The Bahamas

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Abstract

We document the first specimen of a dipsadid snake from the Anguilla Cays, Cay Sal Bank, The Bahamas. We analyze 3,426 base pairs (bp) of sequence data derived from five mitochondrial loci and one nuclear locus using Maximum Likelihood (ML) and Bayesian Inference (BI) methods. Our molecular data agree with some aspects of morphology (e.g., scale counts, dentition, and color pattern) supporting identification of this specimen as the Cuban Racer, *Cubophis cantherigerus cantherigerus* (Bibron 1840), a species previously regarded as endemic to Cuba. This discovery provides another example of the strong Cuban affinities of the terrestrial vertebrate fauna of Bahamian islands.

Key words: Cuba, West Indies Racers, *Cubophis*, Dipsadidae, molecular phylogenetics, The Bahamas

Introduction

Dipsadidae is one of the largest families of snakes, consisting of approximately 754 species primarily found in the Neotropical region (Uetz & Hošek 2015). The subfamily Xenodontinae is exclusive to South America northward to Mexico, and the West Indies, and highly diverse in both morphology and natural history (Cadle & Greene 1993, Vidal *et al.* 2000; Sheehy 2012). The Tribe Alsophiini comprises about 43 species restricted to the West Indies. Alsophiine snakes are typically slender, fast-moving, and active diurnal foragers (Hedges *et al.* 2009). While taxonomic classifications of xenodontines were historically based on hemipenial, dentition, external morphology, and color pattern (Cope 1893, Dunn 1928, Maglio 1970, Zaher *et al.* 2009), recent molecular analyses of Alsophiini are not necessarily in agreement regarding monophyly of the group (Hedges *et al.* 2009; Zaher *et al.* 2009; Burbrink *et al.* 2012; Grazziotin *et al.* 2012; Pyron *et al.* 2013).

In 2012, we collected the first known dipsadid snake on the Cay Sal Bank, The Bahamas. Only two snake species have been previously recorded from any island on the Cay Sal Bank: the Bahamian Slender Blindsnake, *Typhlops biminensis* Richmond 1955, on Elbow Cay; and the Northern Bahamas Trope, *Tropidophis curtus* (Garman 1887), on both Elbow Cay and Double Headed Shot Cay (Buden & Schwartz 1968; Buckner *et al.* 2012). In this paper, we examine the external morphology, dentition, and color pattern, and conduct molecular analyses of Caribbean Alsophiine snakes to determine species identity and phylogenetic placement of our Cay Sal Bank specimen.

Material and methods

Site of study. On 28 May 2012, during nest surveys for Audubon's Shearwater, *Puffinus lherminieri* (Lesson 1839), on the Anguilla Cays, Cay Sal (pronounced "Key Sal") Bank, The Bahamas, a dipsadid snake was observed at 22:00 h along an expansive plateau with sparse vegetation and weathered karst rock. This site (23.56927°N 79.58675°W, datum WGS84, 1 m above sea level) lies approximately 72 km NE of Cuba, 162 km SW of Andros,