

Mitochondrial DNA phylogeography of the polytypic north American Rat Snake (*Elaphe obsoleta*): a critique of the subspecies concept

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Frank T. Burbrink¹, Robin Lawson², and Joseph B. Slowinski³

¹Museum of Natural Science and Department of Biology, 119 Foster Hall, Louisiana State University, Baton Rouge, Louisiana 70803

E-mail: fthurbri@unix1.sncc.lsu.edu

²Osher Foundation Laboratory for Molecular Systematics and Department of Herpetology, California Academy of Sciences, Golden Gate Park, San Francisco, California 94118

E-mail: rlawson@mail.calacademy.org

³Department of Herpetology, California Academy of Sciences, Golden Gate Park, San Francisco, California 94118

E-mail: jslowins@calacademy.org

Abstract

Subspecies have been considered artificial subdivisions of species, pattern classes, or incipient species. However, with more data and modern phylogenetic techniques, some subspecies may be found to represent true species. Mitochondrial DNA analysis of the polytypic snake, *Elaphe obsoleta*,

yields well-supported clades that do not conform to any of the currently accepted subspecies

Complete nucleotide sequences of the cytochrome

b

gene and the mitochondrial control region produced robust maximum-parsimony and maximum-likelihood trees that do not differ statistically. Both trees were significantly shorter than a most parsimonious tree in which each subspecies was constrained to be monophyletic. Thus, the subspecies of *E. obsoleta* do not represent distinct genetic lineages. Instead, the evidence points to three well-supported mitochondrial DNA clades confined to particular geographic areas in the eastern United States. This research underscores the potential problems of recognizing subspecies based on one or a few characters.

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