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A phylogenetic analysis of *Neotoma varia* (Rodentia: Cricetidae), a rediscovered, endemic, and threatened rodent from Datil Island, Sonora, Mexico

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Abstract

The systematics of the rediscovered and threatened rodent, *Neotoma varia*, from Datil Island in the Gulf of California, was assessed using sequences from the mitochondrial cytochrome *b* gene (Cyt *b*) regarding specimens of *N. albigula* from Tiburon Island and populations on the mainland off Datil Island. *Neotoma varia* was originally described as a species and subsequently considered a subspecies, relegated to subspecific status based on morphologic characters and few specimens; no genetic analyses have been published. Bayesian inference, maximum-parsimony, maximum-likelihood, and distance optimality criteria based on 828-bp of the Cyt *b* gene from individuals representing 11 populations, converged on essentially identical tree topologies, consistent with the inclusion of *N. varia* within *N. albigula*. The population of Datil Island is related to specimens from Tiburon Island and the adjacent mainland populations showing low levels of genetic differentiation with other subspecies of *N. albigula* (0.2–1.4%). Previous morphologic analyses indicated inconstancy in characters regarding the holotype; however, *N. varia* is morphologically different in the oclusal view of the upper molars. Under these conditions, we consider *N. varia* as a subspecies of *N. albigula*. *N. a. varia* has a very specific habitat and is present only on a very small part of the island; in spite of low divergence regarding other *N. albigula* subspecies, *N. a. varia* possesses a genetic identity and needs to be considered as a critically endangered population.

Key words: *albigula*, cytochrome *b*, islands, subspecies, *varia*

Introduction

Neotoma varia Burt, has been considered an endemic rodent species of Datil Island (also known as Turner Island), west-facing the coast of Sonora, Mexico (28.7204°N, 112.2934°W). Datil Island, which is just 1.7 km south of the large Tiburon Island in the Gulf of California, has an area of 4 km^2. *Neotoma varia* was originally described as a species (Burt 1932) based on a single specimen. The characteristics used for the description were the shape of the maxillary tooth rows, pattern of third upper molar, and form of the skull. However, a morphometric analysis of the skull of three adult specimens concluded that the specimens from Datil Island could be a subspecies of *N. albigula* (Bogan 1997), rather than a different species (Hall 1981; Lawlor 1983). The taxonomic revisions of the *Neotoma albigula* species group (Hall & Genoways 1970; Edwards *et al*. 2001) did not include *N. varia* specimens; however Hall and Genoways (1970) inferred that *N. varia* and *N. albigula* genetically are more closely related than to any other species because of their resemblance. On the other hand, Edwards *et al*. (2001) only examined DNA sequence data (cytochrome *b* gene) of the populations in the mainland and *N. varia* and *N. a. seri* were not included.

The Turner Island woodrat rat *N. varia* has been named an enigmatic putative species (Bogan 1997) because of the limited number of specimens known (only four), in spite of several collection expeditions (Bogan 1997; Álvarez-Castañeda & Ortega-Rubio 2003; Álvarez-Castañeda *et al*. in press). Consequently,

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