

Abstract

Fenlon, A.^{1*}, B. Larsen², A. Cortés-Hernandez¹, M. Prebus¹, N. Upham¹, and D. Rowsey¹.
Biogeographic History of Deer Mice in the Madrean Sky Islands.

The Madrean Sky Islands of southeastern Arizona are famed for being natural laboratories to test hypotheses of island biogeography. The mountains' critical position between two distinct biogeographic regions harbors unique community assemblages comprised, varying, of species whose extant distributions have resulted from vicariant or dispersal events. For non-volant animals, it is theorized that vicariance following post-Pleistocene warming is responsible for their current island distributions, yet molecular studies suggest much older histories while ecological biogeography suggests more recent dispersal for some mammal taxa. Here, we use a model rodent taxon—the deer mice of genus *Peromyscus*—to determine whether vicariance or dispersal explains its modern range. Leveraging genomic data from fresh tissue and museum *Peromyscus* skins across the Madrean Sky Islands, we infer a time-calibrated, coalescent-aware species tree to estimate the time since divergence between island populations. We then conduct a historical biogeography analysis in which we model the islands as a system of 5 'patches' representing modern distributions and attempt to predict dispersal and vicariant events backward through time. This study—the first biogeographic investigation of the region's rodents in over 30 years—follows the deer mouse's predicted history to its origin in the Sierra Madre Occidental. Further, contextualized with other taxa's biogeographic histories, the results suggest that dispersal/vicariance dynamics are highly idiosyncratic to each taxon. Given the archipelago's resemblance to urban ecosystems in the Phoenix metropolitan area—evidenced by their histories of fragmentation and similar island structure—we discuss the relevance of the findings to modeling biogeography in related urban rodents such as *Peromyscus eremicus*, imploring further research into the analogy between sky islands and habitat fragments.

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CAP V Interdisciplinary Research Teams: Ecosystem Structure and Functioning; Adapting to City Life