



## [Introduction]

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## SPECIAL FEATURE: MAMMALIAN BIOGEOGRAPHY

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In 1761, Buffon made the observation that the terrestrial mammalian biota of North America differed in taxonomic composition from its Old World counterpart. The science of biogeography, the study of the geographical distribution of organisms, was conceived based on evidence provided by mammals. A recent review (Anderson and Patterson, 1994) summarized the central role mammals have played in the development of biogeography during the past century. Hopefully, the selection of papers in this Special Feature demonstrate that mammals continue to provide a fruitful resource for biogeographers.

Biogeography recently has undergone a revitalization due to at least four factors. First, the traditionally separate fields of historical and ecological biogeography have been placed convincingly within a more synthetic perspective that recognizes the equivalent and complementary importance of evolutionary, systematic, and ecological explanations for biogeographic patterns (Myers and Giller, 1988). Second, biogeographers have made significant progress in moving away from purely descriptive or narrative research programs and are addressing the study of animal and plant distributions within an increasingly more investigative or explanatory framework (Rosen, 1988). Notable examples include phylogenetic approaches to investigating long-term evolutionary, geological, and climatic components of biogeographic patterns (Brooks and McLennan, 1991; Humphries et al., 1988); and use of the dynamic equilibrium model of MacArthur and Wilson (1967) to investigate short-term processes maintaining or leading to changes in biogeographic distributions. Third, incorporation of technical, analytical, and theo-

retical ideas from systematics (Brooks and McLennan, 1991; Humphries et al., 1988), molecular biology (Avice, 1994), ecology (Patterson and Atmar, 1986), and evolutionary biology (McKittrick and Zink, 1988) has provided biogeographers with a powerful array of tools. Finally, biogeography is a fundamental component of research programs in ecology (Lubchenco et al., 1991; Ricklefs and Schluter, 1994) and conservation biology (Vane-Wright et al., 1991).

How well have mammalian biogeographers incorporated conceptual, technical, and analytical innovations into their research? One way of addressing this question is to explore the extent to which current research efforts in mammalian biogeography are likely to stimulate intellectual activity not only within mammalogy, but throughout the scientific community. The four papers in this Special Feature are representative of the vast array of research areas that infuse biogeography with a distinctly-unique, scientific vitality. One goal of this Special Feature was to choose papers that represent the temporal and spatial breadth that characterizes modern biogeography. Thus, while each is clearly a contribution in mammalogy, the results and ideas hopefully will find an audience beyond the realm of mammals. Additionally, each contribution offers a unique and perhaps counterintuitive perspective that, at the very least, should be provocative. Riddle uses molecular systematic, paleoecologic, and geologic information for *Perognathus*, *Chaetodipus*, and *Onychomys* to propose that the basic biogeographic structure of extant aridlands rodents in western North America has remained largely intact since the original Miocene and Pliocene development of arid landscapes. The importance

of Pleistocene glacial-interglacial cycles leading to substantial rearrangement and diversification of biotas (as often has been either assumed or explicitly stated) may differ greatly among biotas. Hafner and Sullivan use allozymic, ecologic, and demographic data on pikas (*Ochotona princeps*) to address a distributional pattern that lies at the interface of historical and ecological biogeographic perspectives. Their research demonstrates that Pleistocene glacial-interglacial fluctuations and current metapopulation dynamics explain different components of genetic structure within and among populations of pikas across the North American cordillera. Switching to an explicitly ecological timeframe, Kaufman (recipient of the A. Brazier Howell Award at the 1994 annual meeting of The American Society of Mammalogists for this work) revisits a long-standing issue in biogeography: why is there a gradient in decreasing species richness as one goes from tropical to polar regions of the earth. Of particular interest is her re-framing of the question within a testable comparative framework that argues for a large phylogenetic component (e.g., the bauplan) underlying this well-documented pattern. While the first three papers have potential implications for conservation biology, the paper by Lomolino and Channell addresses an important, conservation issue head-on by asking: can we use biogeographic and macroecological theory as tools to predict the expected pattern of range collapse in acutely extinction-prone species of mammals. In a rather sobering conclusion, they argue that anthropogenically-induced reductions of ranges follow a different set of "rules" than would be expected from biogeographic and macroecologic theory. We hope that these papers serve their intended purpose of stim-

ulating further research in biogeography, both within and outside the mammalogical community.

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