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Rodent diversity and gene flow across urban landscapes in metro Phoenix

Arid ecosystems are rapidly urbanizing across the globe, changing the structural and functional connectivity of the landscape. Urbanization often reduces native biodiversity through habitat loss and fragmentation, but it is unclear which ecological traits predispose taxa to loss. Due to their small size and fast population turnover times, rodent studies provide a powerful window into how urbanization can change the evolutionary history of populations. In xeric regions, desert rodents provide valuable ecosystem services such as seed dispersal and food for higher trophic levels, presenting a need to develop baseline knowledge of how these species respond to urbanization. I am investigating the relationships between urbanization and species/genetic diversity of desert rodents in the Phoenix Metro area, using protected open spaces (desert parks, Rio Salado) and private residences as two common but distinct urban land use types. First, I ask, how does urbanization affect rodent community composition across an arid city? To answer this I am sampling wild populations along a gradient of percent impervious surface area. I am using live-trapping methods, pest control donations, and genetic identification to estimate the effects of urbanization on species diversity within communities. Next, I ask, how does urbanization affect the genetic connectivity of ecologically different rodent species? To answer this I am using genomic data to investigate population structure, genetic health, and gene flow directionality among species. Previous studies in this region have morphologically investigated rodent species diversity, but did not directly measure genetic diversity or the effects of urbanization on community composition. This project will thus produce the first genetic investigation of rodent species diversity in the Phoenix Metro area, as well as provide an in-depth analysis of their genetic connectivity. Results from this project will be valuable for understanding and managing wildlife-human interactions in an increasingly urban world.

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