

# GENETIC POPULATION STRUCTURE IN AN ARID LANDSCAPE: A COMPARATIVE STUDY OF CHIHUAHUAN DESERT INVERTEBRATES

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Organisms with similar geographic distributions often differ in population genetic structure, typically resulting from differences in biological characteristics. We used microsatellite loci to investigate the population genetic structure and genetic variation of four desert spring invertebrates: an undescribed snail species within the pulmonate genus *Physa*, two species of prosobranch snails of the family Hydrobiidae (*Juturnia kosteri* and *Pyrgulopsis roswellensis*), and the amphipod *Gammarus desperatus*. The latter three species are federally listed as endangered. The location of this study, Bitter Lake National Wildlife Refuge, New Mexico, U.S.A., represents the entire range for the hydrobiids and *G. desperatus*, while *Physa* is limited to a larger portion of southeastern New Mexico. We did not find evidence of significant population genetic structure for *Physa* and *G. desperatus*, suggesting that neither species was dispersal-limited. The same was not true for the hydrobiids, which showed differing patterns of population structure throughout the refuge. Despite similarity in morphology and range, population structure suggested relatively limited dispersal ability for *J. kosteri*, and even less for *P. roswellensis*. Dispersal-limitation over small spatial scales (on the order of hundreds-to-thousands of meters) in hydrobiids (so-called “gilled snails”), likely accounts for microendemicity within this group, such that individual spring systems each harbor their own unique species. Not only do our results provide insight into fundamental interactions between species and their landscapes, they also suggest that individual spring systems are likely to harbor an array of endemic, poorly dispersing invertebrates that will require conservation and management efforts.