

SPRING-ADAPTED DARTERS (PERCIDAE: *ETHEOSTOMA*) AS A MODEL TO UNDERSTAND FACTORS THAT INFLUENCE DIVERSIFICATION, GENE FLOW, AND GENETIC VARIATION IN FRESHWATER FISHES

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Darters represent one of the most successful evolutionary radiations in North America and have become an exceptional model system in the study of freshwater fish diversification. I used a variety of phylogenetic and population genetic methods to determine the utility of coldwater spring inhabiting darters from the Southern Appalachians as a model to understand how demography, ecology, geography, and time interrelate to influence genetic variation, gene flow, and lineage diversification at fine scales within river drainages. Spring species showed high levels of genetic structure, small long-term effective population sizes, and reduced dispersal capabilities compared to stream inhabiting sister species. Phylogeographic reconstructions suggested that Pleistocene climatic fluctuations promoted rapid divergence of spring inhabitants within the Southern Appalachians. Collectively, my results suggest that the combination of habitat preference and spatiotemporal habitat stability strongly influence gene flow and lineage divergence on fine geographic scales in darters, a finding that has potentially important implications for understanding diversification of the rich North American freshwater fish fauna.

