

Abstract

Testing and revising hypotheses about evolutionary relationships helps us understand biodiversity beyond the simple enumeration of species. Anatomical (i.e., morphological) and genetic data from each species can help us place those species in evolutionary context. An especially diverse group is the family Characidae. More than 1,000 extant fish species belong to this lineage, whose distributional limits extend from parts of South and Central America to Mexico and the southwestern United States. Beyond the morphological diversity apparent from superficial examination of characid fishes, microscopical work has shown that some characid species exhibit insemination, a reproductive mode that is uncommon among other families of bony fishes. My research suggests that insemination evolved not once, but at least four times during the course of characid evolution. Furthermore, insemination (a functional trait) is strongly correlated with certain morphological traits involving cells and tissues of male reproductive tracts. For example, the family exhibits unexpected diversity in sperm morphology, with males of most inseminating species producing spermatozoa with unusual elongate nuclei. My research incorporates methods from molecular phylogenetics, histology, and other sub disciplines associated with zoology.