



Comparative development of five sympatric coastal Fundulid species from the northern Gulf of Mexico

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Abstract

There are five coastal fundulid species in the northern Gulf of Mexico (nGOM) including *Fundulus jenkinsi*, which is recognized within all states from Louisiana through Florida and federally as a Species of Concern. This particular fundulid was listed because of a perceived linkage to salt marsh habitat, only scant data available on its ecology, and salt marsh habitat being altered throughout its range. Little is known about the life history of this coastal killifish, but a detailed diagnostic key of the early life stages of select members of Fundulidae can provide the foundation needed to accurately identify this rare species in need of conservation. Larval and postlarval stages of select members of the family Fundulidae along the east coast of the U.S. have been described and compared among species. We illustrated various stages of coastal *Fundulus* spp. and *Adinia xenica* in the northern GOM and quantified morphometric and meristic characters. Total length, head length, body depth, caudal peduncle width, snout length, eye diameter, anal and dorsal fin counts, and diagnostic pigment patterns were compared among species. The first branch of our dichotomous key utilized the number of branchiostegal rays to separate young fundulids (< 15 mm TL) into two groups that can then be identified by selected pigment patterns, morphometrics, and meristics.

Key words: Fundulidae, *Adinia xenica*, *Fundulus grandis*, *Fundulus jenkinsi*, *Fundulus pulvereus*, *Fundulus similis*, larvae, dichotomous key, morphometrics, diagnostic pigments, meristics

Introduction

The genus *Fundulus* comprises a large group of freshwater and saltwater killifishes (family Fundulidae); the saltwater group is a key component of intertidal estuarine food webs (Peterson & Peterson, 1979; Kneib, 1997). Intertidal estuarine habitats provide a number of services ranging from storm protection and pollution abatement to nursery habitat, protection from predators, and areas for foraging and spawning (Beck *et al.*, 2001; Peterson, 2003; Rountree & Able, 2007). Fundulids are adapted to intertidal life with large eggs that produce motile, large larvae that emerge and survive in the dynamic intertidal environment (Greeley *et al.*, 1988; Boehlert & Mundy, 1988). Lopez *et al.* (2010) recently quantified this habitat linkage in *Fundulus jenkinsi* (saltmarsh topminnow) in terms of feeding and, to a lesser degree, reproduction. Anthropogenic habitat alteration along the banks of estuarine marsh complexes threatens access by a myriad of taxa (Peterson & Lowe, 2009), thus preventing or reducing breeding, protection from predators, and vital nursery functions.

Fundulus jenkinsi is a northern Gulf of Mexico (nGOM) coastal fundulid that is recognized both federally (NOAA, 2009) and in a number of states (Gilbert & Relyea, 1992; MMNS, 2005), as a Species of Concern. It is generally believed that *F. jenkinsi* is rare, patchily distributed, found in low salinity, and uses *Spartina* marsh explicitly (Thompson, 1980, 1999). However, it has been recently shown that this species is more abundant than previously thought, mainly in habitats where salinity < 16 (Peterson *et al.*, 2003; Lopez *et al.*, 2011). *Fundulus jenkinsi* appears to behaviorally most closely resemble *Fundulus luciae* (spotfin killifish) from the east coast, and both Byrne (1978) and Kneib (1978) have documented that this small intertidal fundulid uses high marsh more than the