

Livebearer (Family Poeciliidae) Diversity in North Carolina

North Carolina is home to four species of livebearers (Table 1) (Tracy et al. 2020). The common name of the family – Livebearers – stems from the fact that a female gives birth to live young, rather than depositing or scattering her eggs externally. A male fish impregnates the female using specialized anal fin rays termed a gonopodium. The family is as well-known to most lay people as are Goldfish (Family Cyprinidae). Pet shops are literally swimming with tanks of colorful guppies, mollies, and swordtails – all livebearers. Often the whole family is referred to simply as guppies or mosquitofish. But the American Fisheries Society has officially accepted common names (Page et al. 2013) (Table 1) and each species has a scientific (Latin) name (Table 1; Appendix 1).

Table 1. Species of livebearers found in North Carolina.

Scientific Name/ American Fisheries Society Accepted Common Name	Scientific Name/ American Fisheries Society Accepted Common Name
<i>Gambusia affinis</i> – Western Mosquitofish	<i>Heterandria formosa</i> – Least Killifish
<i>Gambusia holbrooki</i> – Eastern Mosquitofish	<i>Poecilia latipinna</i> – Sailfin Molly

In North Carolina, livebearers may be found from near Murphy in Cherokee County to Cape Hatteras in Dare County. Eastern Mosquitofish, our most widely distributed and commonly collected species, is indigenous (native) in all river basins east of the Mountains, except for the Savannah. However, it is nonindigenous (introduced probably by bait-bucket or through the transportation and sale of aquatic plants) in the middle and lower portions of the French Broad River basin in Henderson, Buncombe, and Madison counties. Least Killifish and Sailfin Molly are generally confined to the southeastern corner of the state in the White Oak, Cape Fear, and Waccamaw River basins.

The Least Killifish is listed as a state Special Concern species because of its limited distribution and the potential anthropogenic impacts upon their habitats and stream water quality (NCAC 2017; NCNHP 2020; NCWRC 2017).

Livebearers may be found in many freshwater Mountain and Piedmont streams and in Coastal brackish and estuarine waters. They can be very abundant in shallow, quiet water along the silty edges and side pools of slow moving streams and in heavily vegetated ponds, ditches, and sloughs.

Our four species of livebearers are small species; the largest of the four are females of Eastern Mosquitofish and Western Mosquitofish which reach a maximum Total Length of about 70 mm (2.8 inches) (Rohde et al 2009). Our smallest and one of the smallest vertebrates in the world to give birth to live young is the Least Killifish which reaches a maximum Total Length of only 36 mm (1.4 inches). But to put the diminutive size of the Least Killifish into proper perspective, it is only 0.8% as big as our largest freshwater fish species in North Carolina, the Atlantic Sturgeon, *Acipenser oxyrinchus*.

Key characteristics for their proper identification include the positioning of the origin of the dorsal fin relative to that of the anal fin; pigmentation patterns along the side and on the caudal fin; the number of dorsal and anal fin rays; and the presence or absence of teeth on the gonopodium. The gonopodium of *Gambusia* and counting the dorsal fin rays are best observed by examining the preserved or sedated specimen beneath a dissecting microscope.

Identification Key to the Species of Livebearers (Family Poeciliidae) in North Carolina

- 1a. Dorsal fin origin located well anterior of the anal fin origin (Figure 1). Body with about seven dark stripes (Figure 1) Sailfin Molly, *Poecilia latipinna*
- 1b. Dorsal fin origin located posterior to the anal fin origin (Figure 2). Body with one stripe or none (Figure 2).....2



Figure 1. Sailfin Molly. Left – Male; Right – Female with white bar showing positioning of the origin of the dorsal fin relative to that of the anal fin.

- 2a. Side with a broad lateral stripe; subocular bar absent (Figure 2). Black spot on the dorsal fin base (black spot also on only the female’s anal fin). Caudal fin without vertical rods of dots. Range restricted to the lower Cape Fear and Waccamaw River basins ... Least Killifish, *Heterandria formosa*
- 2b. Lateral stripe absent; subocular bar usually present (Figure 3). No large spot on the dorsal fin or the anal fin. Caudal fin with 2 or 3 vertical rows of dots (Figure 3). Range not restricted to the lower Cape Fear and Waccamaw River basins3

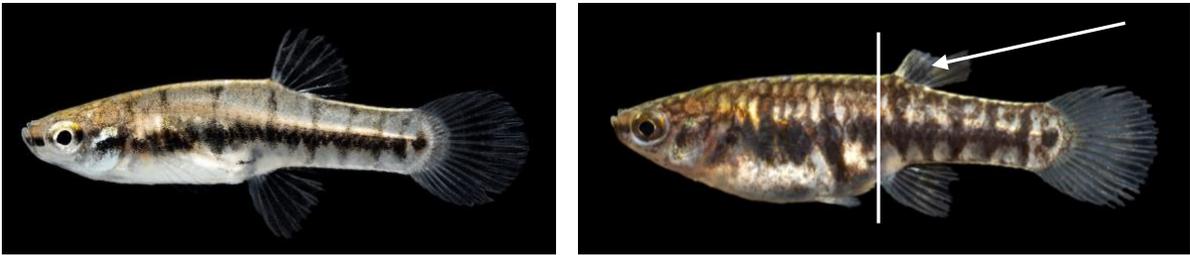


Figure 2. Least Killifish. Right - white bar showing positioning of the origin of the dorsal fin relative to that of the anal fin and white arrow pointing to the black spot at the base of the dorsal fin.

- 3a. Dorsal fin rays usually 7 (Figure 3). Anal fin rays usually 10. 3rd ray of the anal fin (the first ray of the gonopodium) of the male with a series of prominent teeth (observable only with the aid of a dissecting microscope) (Figure 4). Widespread across all Atlantic slope basins, except for the Savannah basin. Melanistic populations in southeastern North Carolina (Figure 3) Eastern Mosquitofish, *Gambusia holbrooki*
- 3b. Dorsal fin rays usually 6 (Figure 5). Anal fin rays usually 9. 3rd ray of the anal fin of the male without teeth, smooth (observable only with the aid of a dissecting microscope) (Figure 4). Range currently restricted to the French Broad, Little Tennessee, and Hiwassee River basins Western Mosquitofish, *Gambusia affinis*



Figure 3. Top Left - Female Eastern Mosquitofish with white arrows pointing to the dorsal fin with 7 fin rays and caudal fin with vertical rows of dots; Top Right and Bottom - Melanistic male specimens of Eastern Mosquitofish from eastern North Carolina.

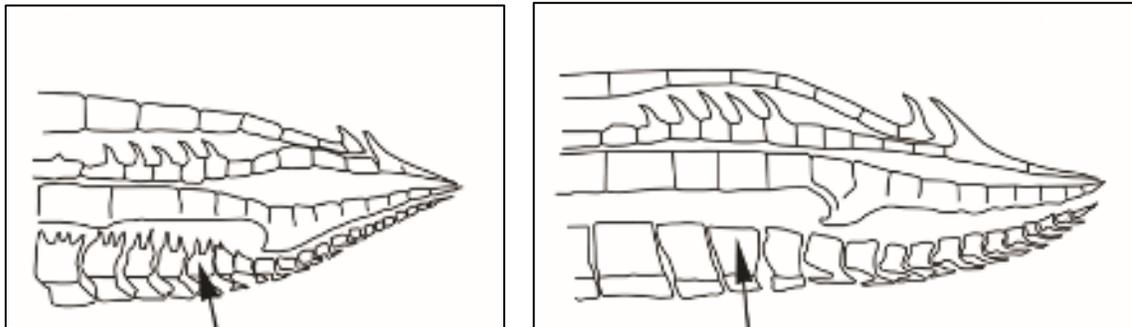


Figure 4. Gonopodia with black arrows pointing to the presence or absence of prominent teeth. Left – Eastern Mosquitofish; Right – Western Mosquitofish. Illustration from Rohde et al. (2009), modified from Etnier and Starnes (1993).



Figure 5. Western Mosquitofish. Left - Male with white arrow pointing to the dorsal fin with 6 fin rays. Right – Female.