

Anchovy (Family Engraulidae) Diversity in North Carolina

Engraulidae is a small family comprising six species in North Carolina (Table 1). Their common name, anchovy, is possibly from the Spanish word *anchova*, but the term's ultimate origin is unclear (<https://en.wiktionary.org/wiki/anchovy>, accessed December 18, 2020). We are not aware of any other common names applied to this family, except for calling all of them anchovies. Each species has an American Fisheries Society-accepted common name (Page et al. 2013) and a scientific (Latin) name (Table 1; Appendix 1).

Table 1. Species of anchovies found in or along the coast of North Carolina.

Scientific Name/ American Fisheries Society Accepted Common Name	Scientific Name/ American Fisheries Society Accepted Common Name
<i>Engraulis eurystole</i> - Silver Anchovy	<i>Anchoa mitchilli</i> - Bay Anchovy
<i>Anchoa hepsetus</i> - Striped Anchovy	<i>Anchoa cubana</i> - Cuban Anchovy
<i>Anchoa lyolepis</i> - Dusky Anchovy	<i>Anchoviella perfasciata</i> - Flat Anchovy

North Carolina's anchovies range in size from about 100 mm Total Length for Bay Anchovy and Cuban Anchovy to about 150 mm Total Length for Striped Anchovy (Munroe and Nizinski 2002a).

Anchovies from large schools of fishes that feed on zooplankton. In North Carolina they may be found in all coastal basins, nearshore, and offshore (Tracy et al. 2020; NCFishes.com). All species are found in saltwater environments, but Bay Anchovy is a seasonal freshwater inhabitant in our coastal rivers as far upstream as near Lock and Dam No. 1 and Castle Hayne (Cape Fear basin), Jacksonville (White Oak basin), New Bern (Neuse basin), Williamston (Roanoke basin), and Cannon Ferry (Chowan basin) (Tracy et al. 2020).

The identification of anchovies is relatively straight-forward, but often requiring the use of a compound microscope. Key characteristics for their proper identification include the length and shape of the maxillary bone; length and positioning of the pseudobranch; and positioning of the anus relative to the anal fin origin and pelvic fin tips.

Identification Key to the Species of Anchovies (Family Engraulidae) in North Carolina

- 1a. Maxilla short, tip blunt, not reaching or just reaching anterior margin of preopercle (Figure 1)2
- 1b. Maxilla long, tip pointed, reaching onto or beyond preopercle (Figure 1).3

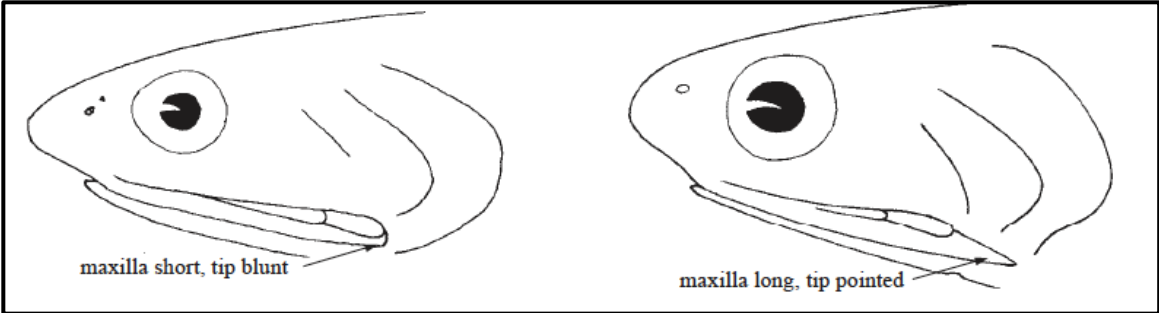


Figure 1. Left – Maxilla with a short, blunt tip; Right – Maxilla with a long, pointed tip. Illustrations courtesy of Munroe and Nizinski (2002a).

- 2a. Pseudobranch short, length less than eye diameter (Figures 2 and 3)
 Flat Anchovy, *Anchoviella perfasciata*
- 2b. Pseudobranch long, length greater than eye diameter (Figures 2 and 4)
 Silver Anchovy, *Engraulis eurystole*

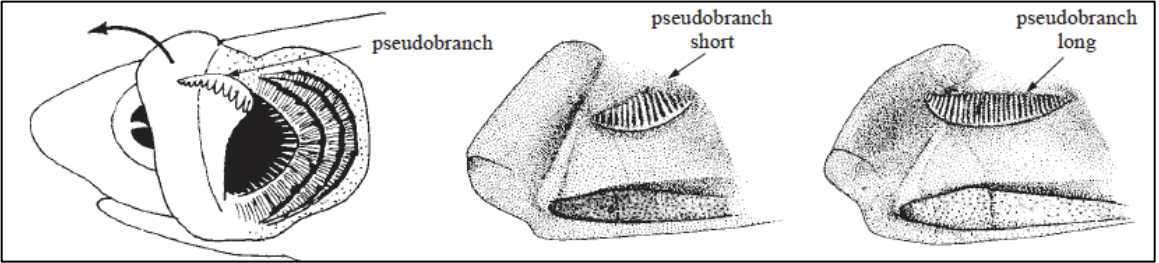


Figure 2. Left – Location of pseudobranch with gill cover folded forward; Center – Pseudobranch not reaching inner face of operculum; Right – Pseudobranch ending onto inner face of operculum. Illustrations courtesy of Munroe and Nizinski (2002a).

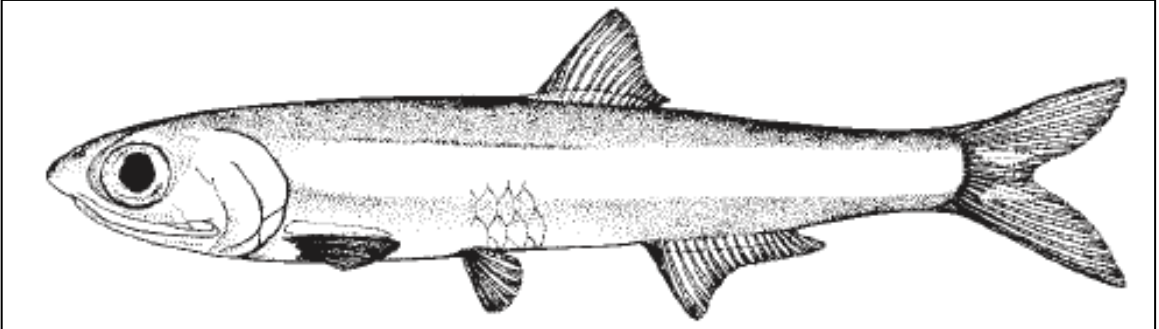


Figure 3. Flat Anchovy. Illustrations courtesy of Munroe and Nizinski (2002a).

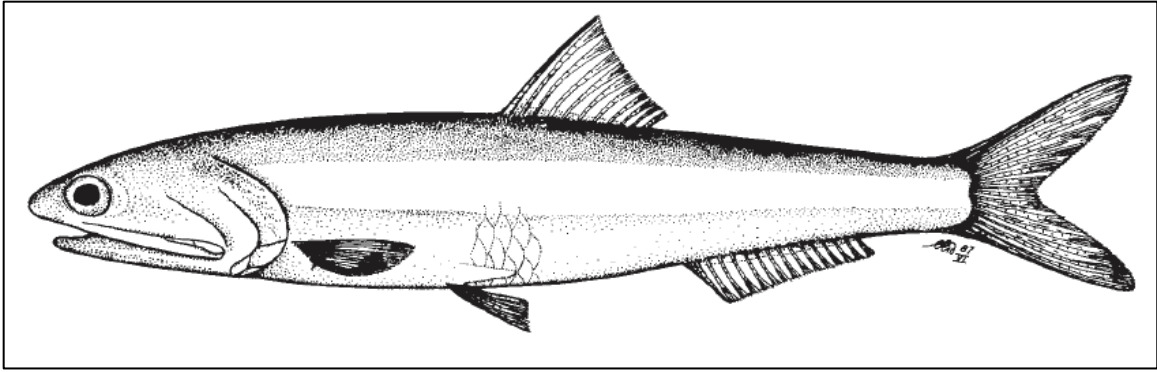


Figure 4. Silvery Anchovy. Illustrations courtesy of Munroe and Nizinski (2002a).

- 3a. Pseudobranch long, greater than eye diameter, extending onto inner face of operculum (Figures 2 and 5) Dusky Anchovy, *Anchoa lyolepis*
- 3b. Pseudobranch short, not extending onto inner face of operculum (Figure 2)4

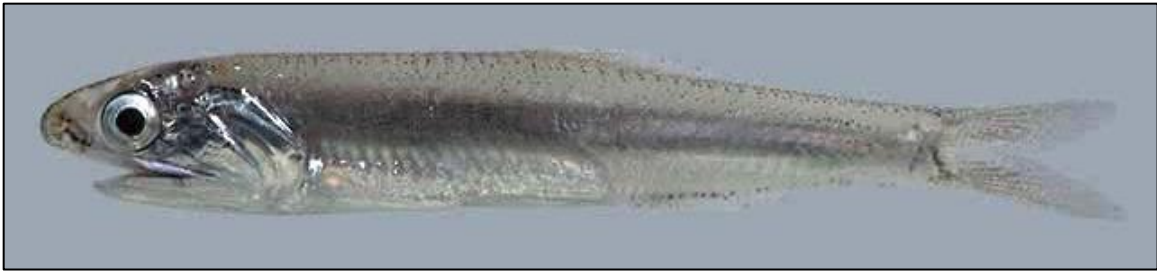


Figure 5. Dusky Anchovy. Photograph courtesy of the Smithsonian Tropical Research Institute's Shorefishes of the Greater Caribbean online information system, <https://biogeodb.stri.si.edu/caribbean/en/pages/random/848>, accessed December 17, 2020.

- 4a. Anus closer to anal fin origin than to pelvic fin tips (Figures 6 and 7) Striped Anchovy, *Anchoa hepsetus*
- 4b. Anus opening near to pelvic fin tips to anal fin origin (Figure 6).....5

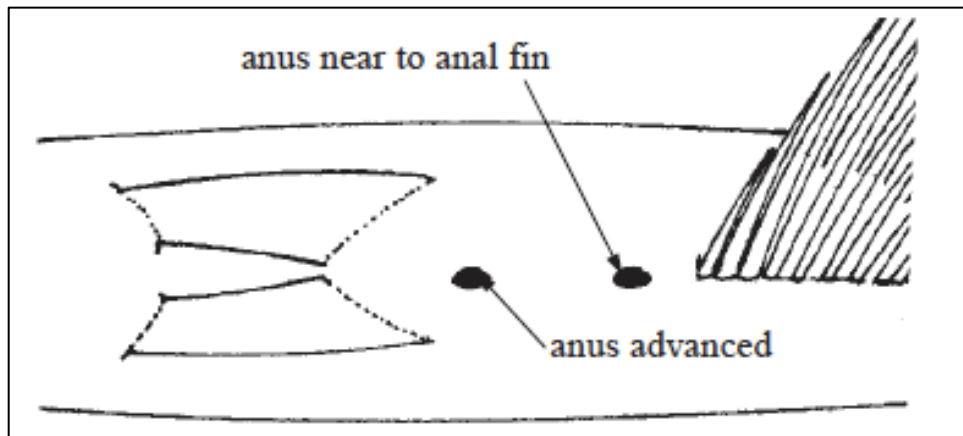


Figure 6. Location of anus relative to pelvic fin tips and anal fin origin. Illustrations courtesy of Munroe and Nizinski (2002a).



Figure 7. Striped Anchovy. Illustrations courtesy of Munroe and Nizinski (2002a).

- 5a. Anal fin origin at vertical through dorsal fin origin (Figure 8) Bay Anchovy, *Anchoa mitchilli*
- 5b. Anal fin origin more posterior, at or near vertical through midpoint of dorsal fin (Figure 9)
..... Cuban Anchovy, *Anchoa cubana*



Figure 8. Bay Anchovy.

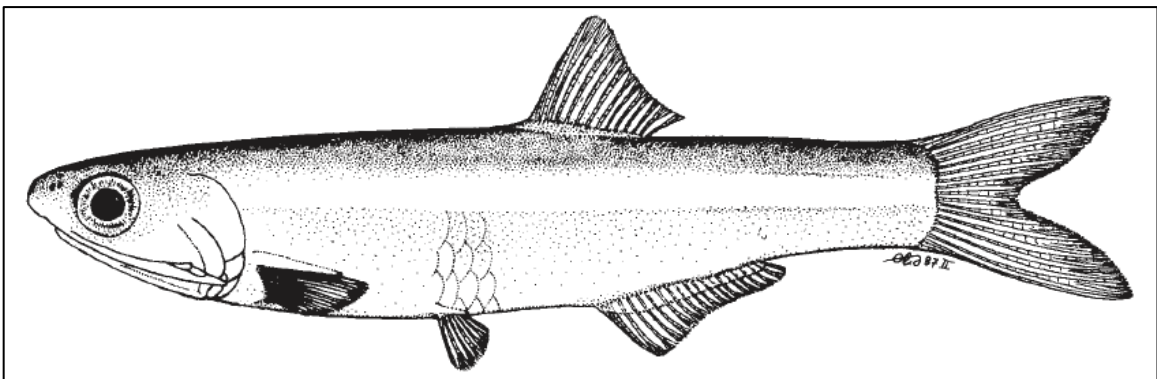


Figure 9. Cuban Anchovy. Illustrations courtesy of Munroe and Nizinski (2002a).