

# Age and Growth of the Popeye Shiner (*Notropis ariommus*) in the Rockcastle River

Shelbie Black, Jared Vise, Zoe Baker, Caitlyn Senters, and David J. Eisenhour  
Department of Biology and Chemistry, Morehead State University

## Introduction

The Popeye Shiner (*Notropis ariommus*), occupies clear, gravel runs and flowing pools of creeks and small rivers throughout the Ohio River basin, but has declined in many areas (Figure 3). This species is a small silvery minnow with an unusually large eye (Figure 1). Despite being a candidate for the endangered species list (Department of the Interior, 2011), little life-history data have been published, which are needed to make conservation management decisions.

*Notropis ariommus* is categorized by the American Fisheries Society as a vulnerable minnow species (Warren et al, 2000). These fishes were previously known from Alabama, Pennsylvania, and Indiana, but are presumed extirpated from these states. In four more states it is considered imperiled or critically imperiled, and in two states, including Kentucky, it is considered vulnerable (*NatureServe Explorer 2.0*, 2023). Sufficiently-large populations persist in Kentucky, permitting us to study its life history: age and growth, reproductive cycle, and diet.

This study aims to determine the maximum age of *Notropis ariommus* and size distribution in the Rockcastle River, Kentucky. We also examine sexual dimorphism of growth and morphological features in this species.

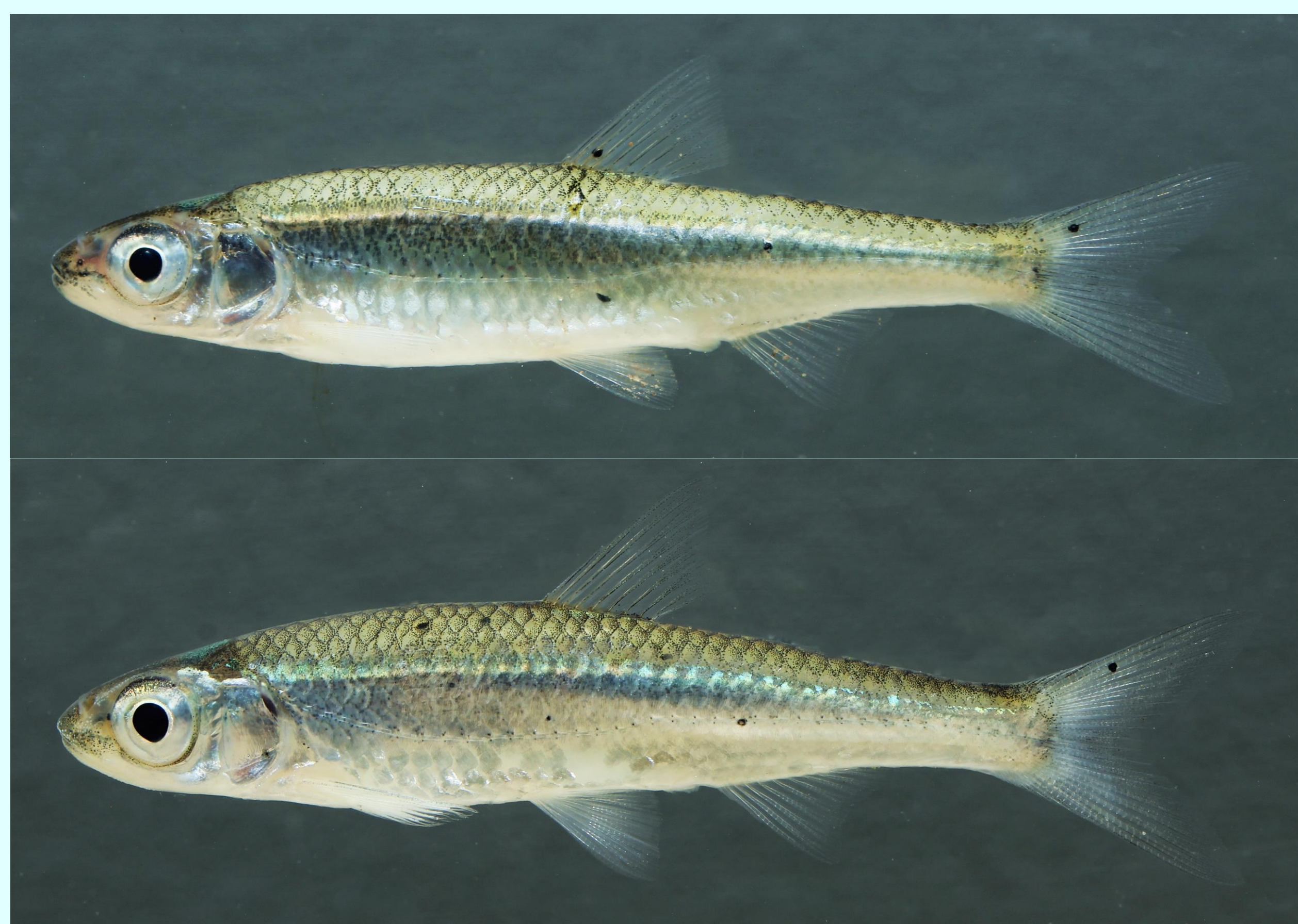


Figure 1. Popeye Shiners, *Notropis ariommus*. Top, female 67 mm SL; bottom, male, 65 mm SL.

## Methods

- Study location – Two sites in Rockcastle River in Rockcastle County, Kentucky.
- Monthly sampling, by seining, occurred from June - October 2022.
- Captured *N. ariommus* standard length was measured for length frequency analysis.
- At each location, 10-30 specimens were preserved for aging and gonad examination in the laboratory.
- Preserved specimens were aged by the number of annuli found on their scales (Figure 4). An annulus is deposited in the winter/early spring, thus for this study: Age 0 fish have no annuli, and are 0-4 months old. Age 1 fish have one annulus, and are 12-16 months old. Age 2 fish have two annuli, and are 24-28 months old.
- 1 June was used as birth date for all individuals, based on a study of *Notropis telescopus*, the closest relative of *N. ariommus* (Holmes et al. 2010).
- Sex was determined through examination of the gonads of preserved specimens.

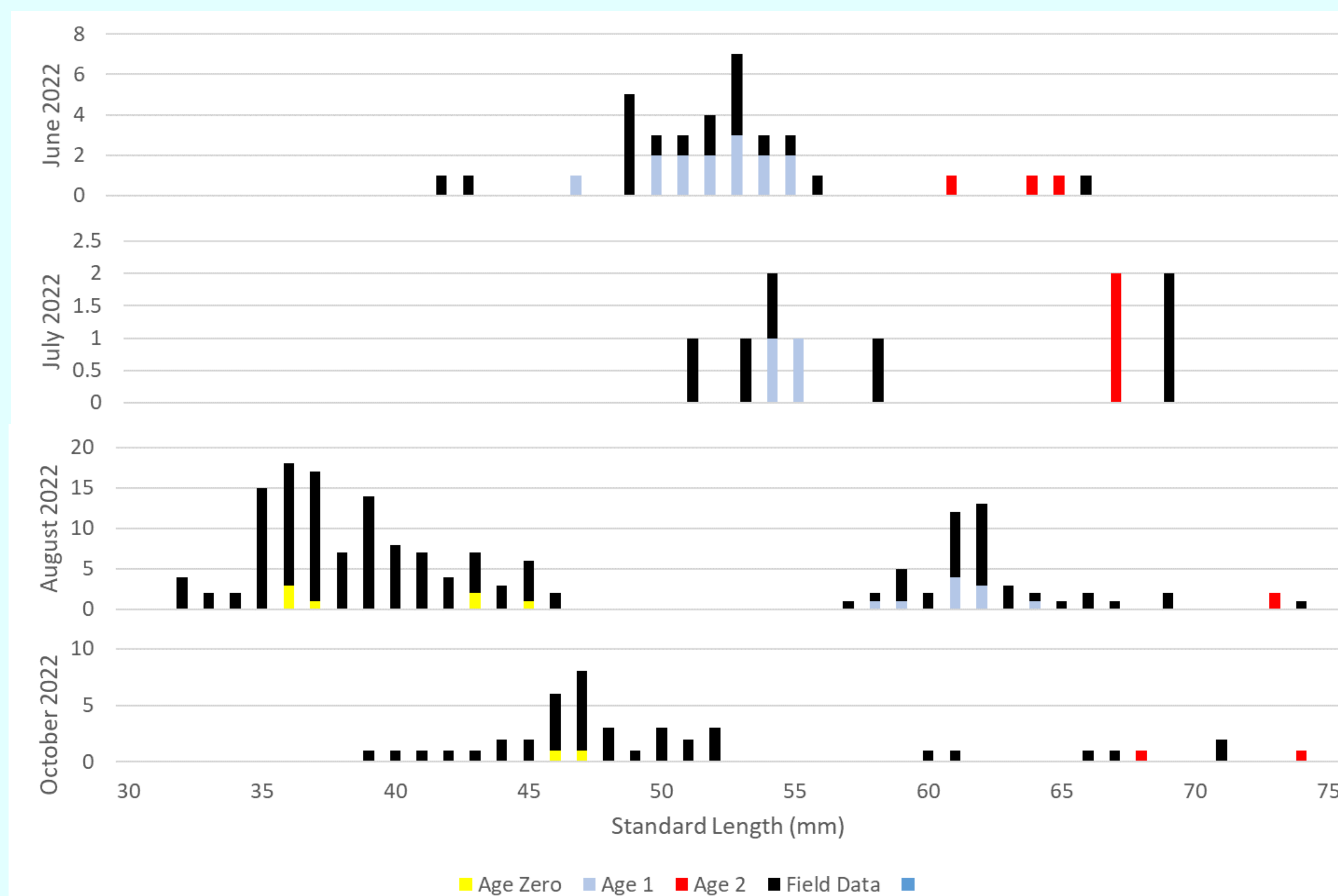


Figure 2. Length (mm) of *Notropis ariommus* sampled June through October of 2022 in Rockcastle River. Measurements of released fish are shown in black, while those of preserved and age-verified by examination of scale annuli are shown in yellow, blue, and red.



Figure 3. Rockcastle River at I-75 bridge, Rockcastle Co., KY. Arrow indicates the typical habitat of *N. ariommus*.

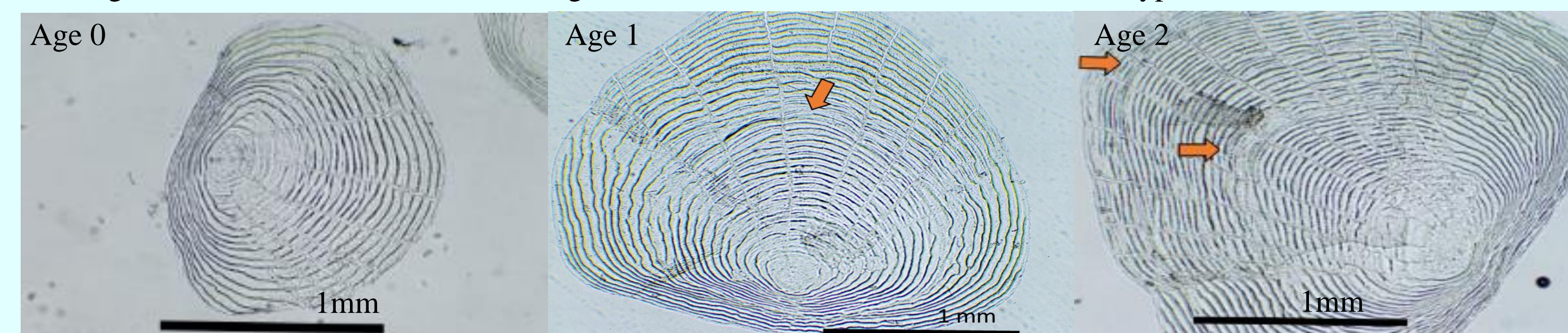


Figure 4. Scales of *N. ariommus*. The arrows indicate annuli.

Table 1. Comparison of lengths (mm SL) of preserved Age 1 male and female *N. ariommus* from June 2022. There was no significant difference in length between males and females (t-test; p=0.886).

|                       | Male  | Female |
|-----------------------|-------|--------|
| Number of Individuals | 6     | 6      |
| Mean                  | 52.3  | 52.2   |
| Range                 | 50-55 | 50-55  |

## Results

Length frequency analysis of scale annuli verified preserved fishes, as well as data collected in the field suggests few *N. ariommus* live past 2 years (Figure 2). Standard length averages about 52 mm at 12 months and around 62 mm at 24 months, indicating the majority of growth occurs in the first year. The largest individual was 72 mm standard length, in October 2022, and was confirmed to be age 2 by scale annuli making it about 28 months old with an assumed birth in June 2020 at the time of collection.

The early summer population consists predominantly of age 1 fish. By late summer, numerous age 0 fish (3-4 months old), many age 1 fish (14-16 months old), and a very few age 2 fish (27-38 months old).

Average length of age 1 males and females preserved from the June 2022 collection was almost identical at approximately 52 mm with median lengths of 52.5 and 52 mm respectively (Table 1). These results suggest that there is no sexual dimorphism in length, at least within the first year of life. There is no sexual dimorphism in color, but males develop small tubercles on their heads and pectoral fins.

## Summary

- Maximum age of 2-3 years
- Average standard length at 12 months and 24 months is 52 mm and 62 mm, respectively.
- Male and females are of same relative size, however tubercles on males during the breeding season can help distinguish males from females without examination of the gonads

## Future Research

This study is part of a larger project also examining the reproductive cycle and diet of *N. ariommus*. Currently we are examining gonad development of our preserved specimens to determine the reproductive season and age at spawning.

## Works Cited

- Holmes, B., Whittington, L., Marino, L., Adrian A., & Stallsmith, B. (2010). Reproductive Timing of the Telescope Shiner, *Notropis telescopus*, in Alabama, USA. *The American Midland Naturalist*, 163(2), 326-334. <http://www.jstor.org/stable/40730929>
- NatureServe Explorer 2.0*. (2023). [https://explorer.natureserve.org/Taxon/ELEMENT\\_GLOBAL.2.106578/Notropis\\_ariommus](https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.106578/Notropis_ariommus)
- Warren, M. L., Jr., S. J. Walsh, H. L. Bart, Jr., R. C. Cashner, D. A. Emier, B. J. Freeman, B. R. Kuhajda, R. L. Mayden, H. W. Robison, S. T. Ross, and W. C. Starnes. 2000. Diversity, distribution, and conservation status of the native freshwater fishes of the southern United States. *Fisheries* 25:7-29.

## Acknowledgements

Thanks to L.V. Eisenhour and J.D. Eisenhour, for their field assistance. Funding was provided by the Morehead State University Department of Biology and Chemistry and the Gerald Demoss Undergraduate Research Fellowship. Permits to study the fishes were provided by the Kentucky Department of Fish and Wildlife Resources and Morehead State University IACUC.