Age Validation in a Short-lived, Marsh-resident Fish
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Abstract
Examination of otoliths, ear bones, is a popular method for estimating the age of fish. The two most common methods of otolith analysis were compared in this study in order to determine which method works best for Fundulus heteroclitus, and marginal increment analysis was used to discern if growth increments on otoliths of this species truly form once a year, and could therefore be used as a proxy for age. There was no significant difference in age estimates between the whole otolith analysis and cross-section analysis, and since whole otolith analysis is accurate and less time consuming, it was chosen as the optimal aging method for this species.

Objectives
1. To identify the optimal age determination method in F. heteroclitus.
2. To confirm that growth increments form once a year

Importance of Aging

Figure 1. The Age at length frequency (for fish in this size range) is highly variable, suggesting that length is not a good indicator of age.

Comparison of Whole vs. Cross-sectioned Otoliths
- Prep time: 10-20 minutes
- Features visible sometimes
- Limited usage in age studies
- Accurate estimator

Marginal Increment Ratio: The proportion of the most recent growth increment relative to the whole otolith (Age 1 fish) or to the previous year’s growth (Age 2 fish). This should be smallest just after an increment has formed.
- Fish (38-103 mm TL) were collected monthly for a year in baited minnow traps
- Marginal Increment Analysis was used to estimate the month of increment formation
- Age estimates of whole otoliths and cross-sections were compared using a paired t-test
- There was no difference (P=1) in age estimates between whole otolith and cross-section analyses

Age and Growth in Fundulus heteroclitus

- Figure 2. Fish length and otolith width were poor indicators of age for individuals in this size range.

Conclusion
- Whole otolith analysis was more efficient than cross-section analysis and is therefore supported in this study for age determination in Fundulus sp.
- A larger sample size is needed to determine the specific month of increment formation

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