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Growth and Reproduction of the Saltmarsh Topminnow (*Fundulus jenkinsi*)

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Habitat

- Saltmarshes along the Gulf of Mexico from FL to TX

- Low to moderate salinities 1,2,3

- Link between saltmarsh vegetation and *Fundulus jenkinsi* occurrences 4

- Utilize edge of saltmarsh habitat 5

Conservation Status

- Listed as a species of concern in LA, MS, AL, and FL

- Petition to list species as threatened or endangered under the Endangered Species Act issued in 2011
  - USFWS commissioned to review species' status and make a determination
Significance of Study

- Lack of information about the minnow’s population characteristics

- Need to obtain more complete and comprehensive data on life history characteristics for future effective management
Study Objectives

- Assess distribution and abundance of the *Fundulus jenkinsi* in Galveston Bay and Sabine Lake, TX

- Identify factors attributing to *F. jenkinsi*’s presence between sites

- Estimate demographic parameters of population
  - Size, age, sex distribution
  - Growth
  - Reproduction
Location of Study

- Monthly sampling in Moses Bayou

- Site Characteristics
  - Freshwater inflow
  - Tidally influenced
  - Saltmarsh vegetation

- Sampling Method
  - Straight seine
  - Breder traps
Reproductive Analysis

- Specimens measured in lab
  - Standard length
  - Total weight
- Sex determined
- Gonads Extracted
- Gonadosomatic indexes (GSI) calculated for each individual
  - $GSI = \frac{\text{Gonad weight}}{\text{Total Body weight}} \times 100$
Ovary Stage Analysis

- Ovary stages further examined and classified (Lopez et al. 2010)
  
  A.) Latent / Immature
  
  B.) Early maturing
  
  C.) Late maturing
  
  D.) Mature
  
  E.) Ripe
Results - Standard Length Distributions

- No significant difference between standard length distribution and season ($H = 4.82; p = 0.090$)
Results - Modal Progression Analysis

- Significant difference in standard length distributions across months ($H = 143.3; p < 0.001$)
- Bi-modal distribution
- Computed standard length means
  - November 2014
    - Age 1 - 21 mm (±3.5 SD)
    - Age 2 - 35 mm (±4.0 SD)
  - February 2015
    - Age 1 - 23 mm (±1.6 SD)
    - Age 2 - 34 mm (±7.3 SD)
Results - Length & Weight

- Standard lengths and body weight did not significantly differ between genders
  - Standard length ($U=624.2; p=0.195$)
  - Body weight ($U=5369.5; p=0.176$)

- Positive non-linear correlation between standard length and body weight ($R^2=0.9872$)

\[
y = 0.00001x^{3.0976} \quad R^2 = 0.9872
\]
Results - GSI

- Females had significantly larger GSI values ($t(77)=5.39; p<0.001$)

- Mean GSIs significantly differ between months
  - Females ($F=38.58; p<0.001$)
  - Males ($F=13.11; p<0.001$)
Results - GSI

- Female standard length showed a significant correlation to GSI value
- Male standard length was not significantly correlated to GSI value
- Body weight not significantly correlated to GSI value
  - Females ($p = 0.085$)
  - Males ($p = 0.108$)
Results - Ovarian Stage Analysis

<table>
<thead>
<tr>
<th>Season</th>
<th>N = 13</th>
<th>N = 2</th>
<th>N = 27</th>
<th>N = 36</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Spring</td>
<td>Summer</td>
<td>Fall</td>
<td>Winter</td>
</tr>
<tr>
<td>Percent Occurrence</td>
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<tr>
<td>Latent / Immature</td>
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<tr>
<td>Early Maturing</td>
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<td>Late Maturing</td>
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<tr>
<td>Mature</td>
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</tr>
<tr>
<td>Ripe</td>
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</tr>
</tbody>
</table>

[Graph showing distribution of ovarian stages across seasons.]
Conclusions

- Evidence of at least two distinct age classes
- No sexual dimorphism in relation to size
- Greater reproductive activity in spring and summer months
- Larger females correlated to larger GSI values
- Evidence of seasonal progression in ovary maturation
Future Studies

- Mark-Recapture
- Oocyte and spermatocyte histological analysis during high water events
- Fecundity counts
Acknowledgements
Questions?