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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]

Saltmarsh Topminnow Range

1) Peterson & Ross 1991; 2) Lopez et al. 2011; 3) Griffith 1974; 4) Peterson & Turner 1994; 5) Peterson et al. 2003

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**

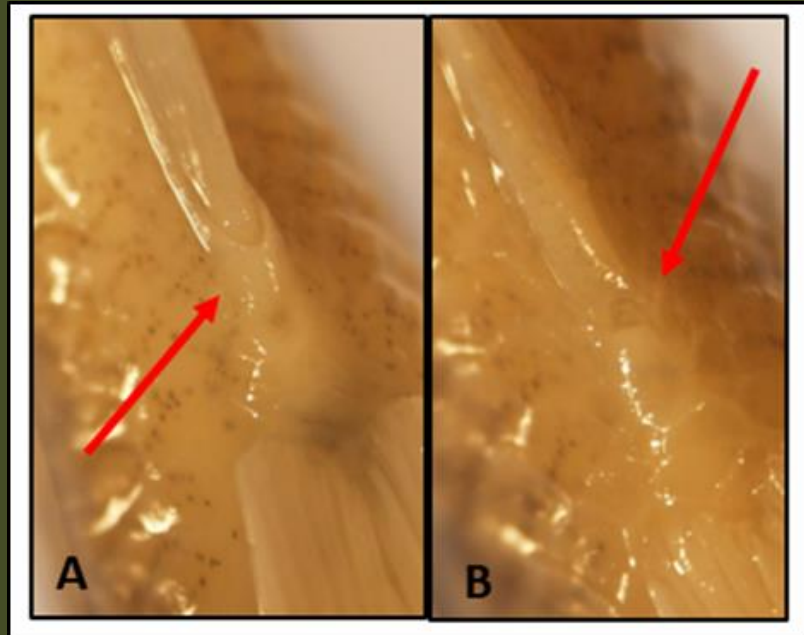   ▶ **Size, age, sex distribution**

   ▶ **Growth**

   ▶ **Reproduction**
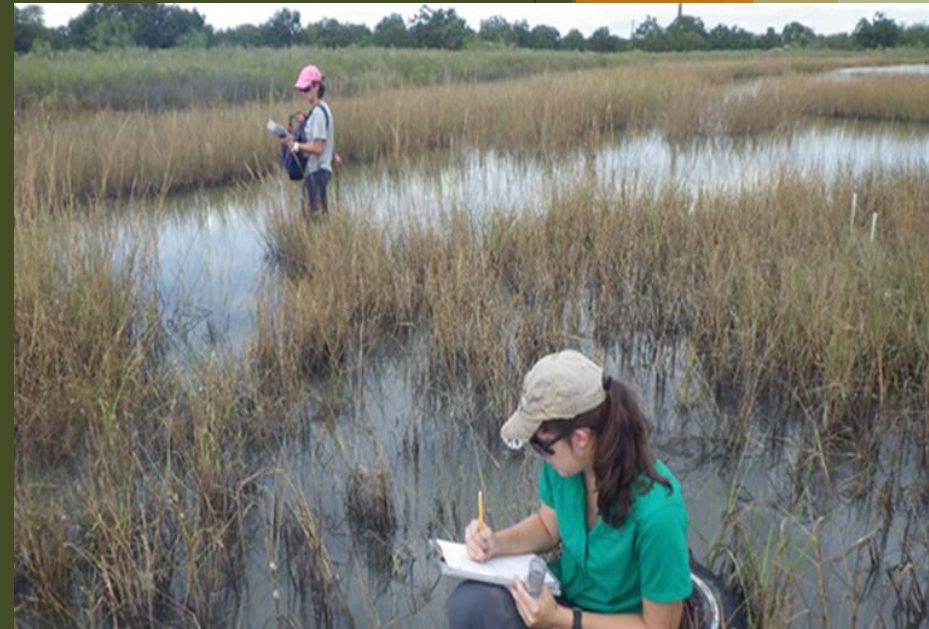
Location of Study

- Monthly sampling in Moses Bayou

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

- Sampling Method
  - Straight seine
  - Breder traps
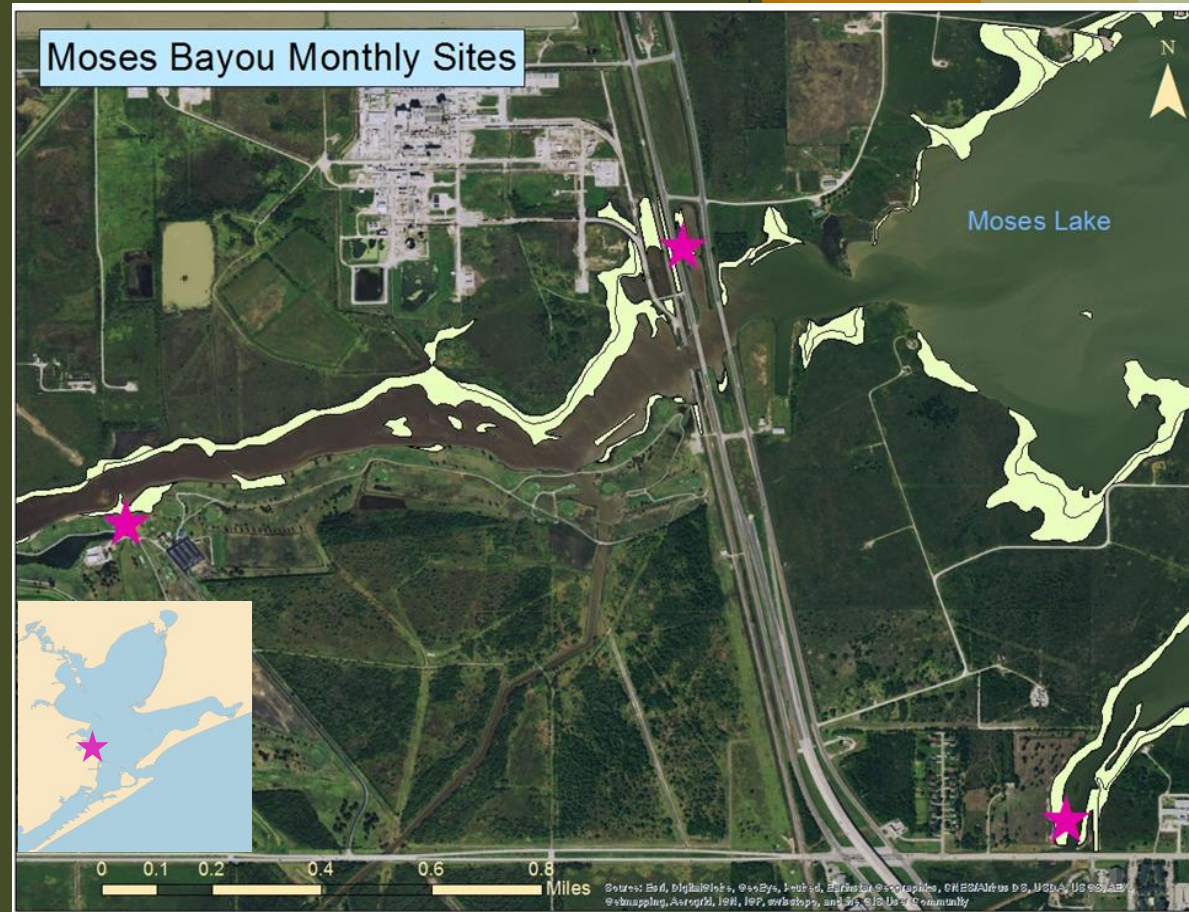
Reproductive Analysis

- Specimens measured in lab
  - Standard length
  - Total weight

- Sex determined

- Gonads Extracted

- Gonadosomatic indexs (GSI) calculated for each individual
  - GSI = (Gonad weight/ Total Body weight)*100

Ovary Stage Analysis

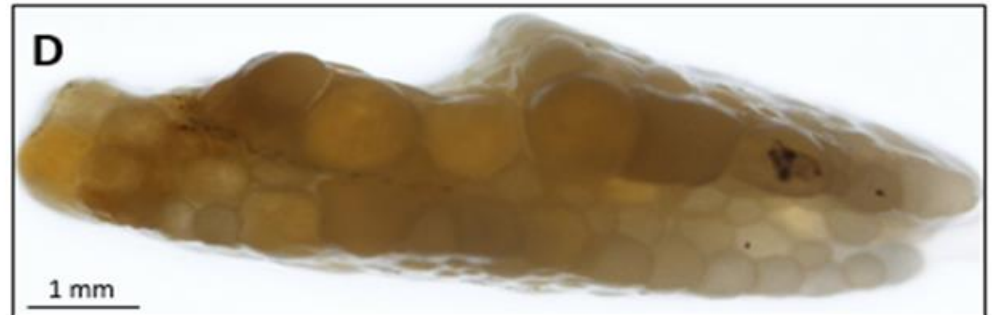▶ Ovary stages further examined and classified (Lopez et al. 2010)

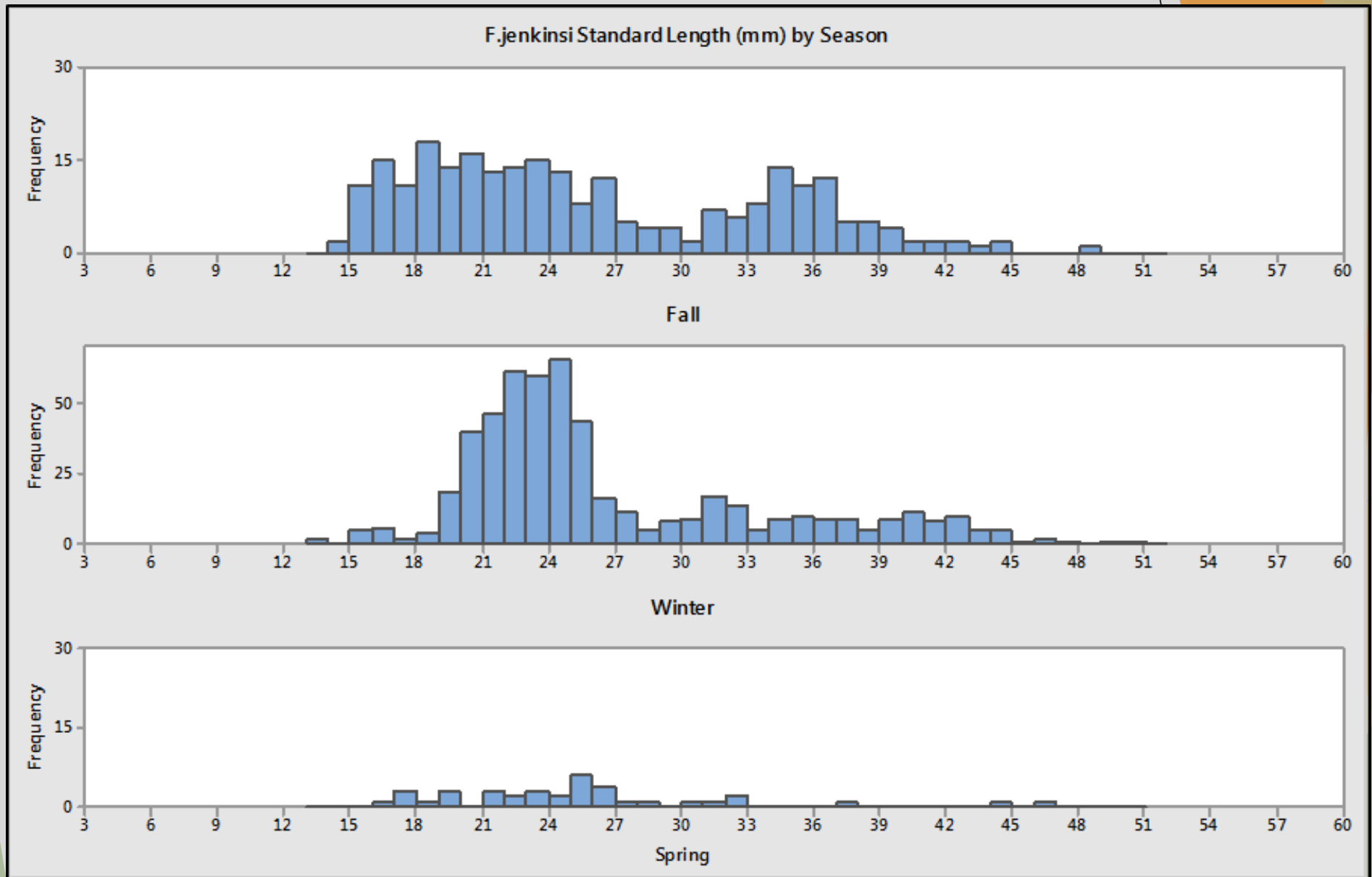   A.) Latent / Immature

   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)

F.jenkinsi Standard Length (mm) by Season

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)
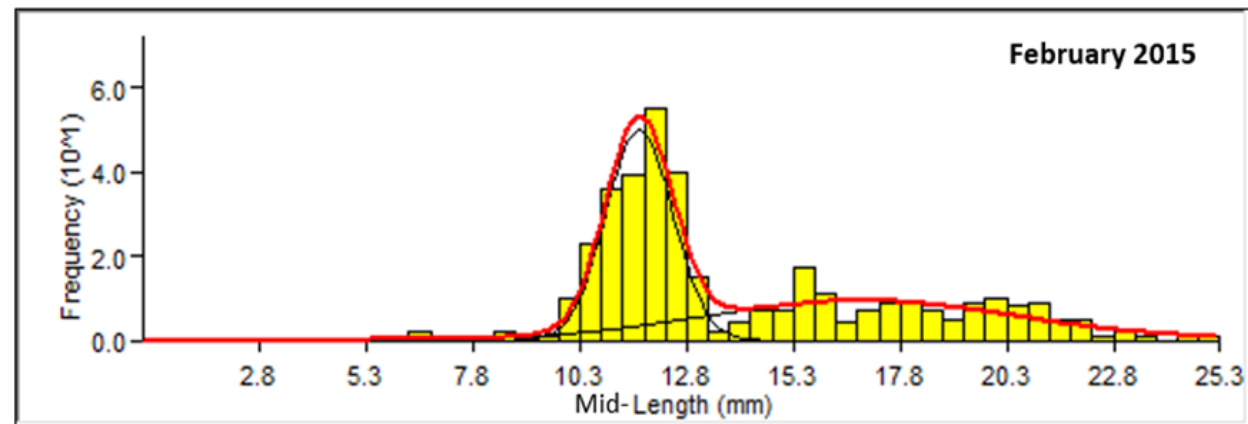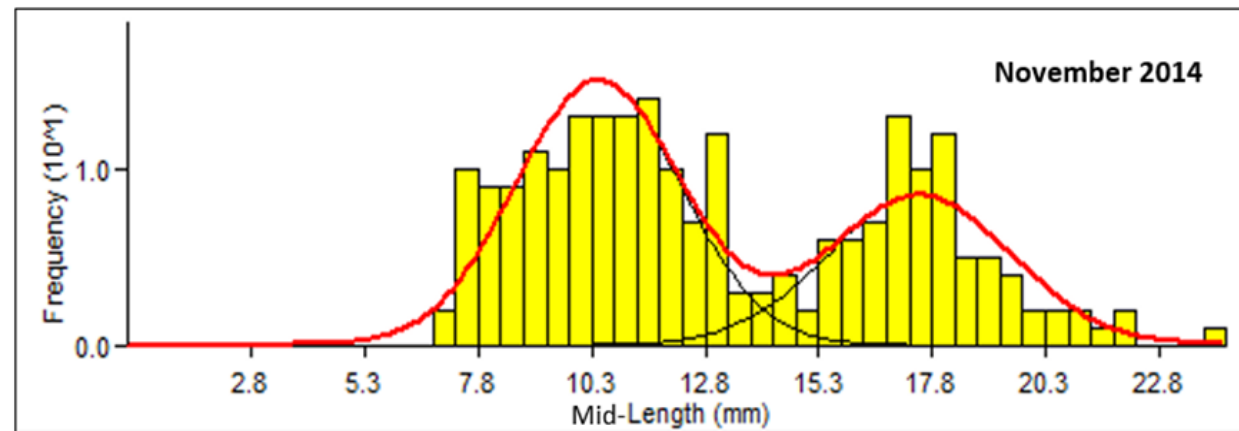
Results – Length & Weight

► 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)
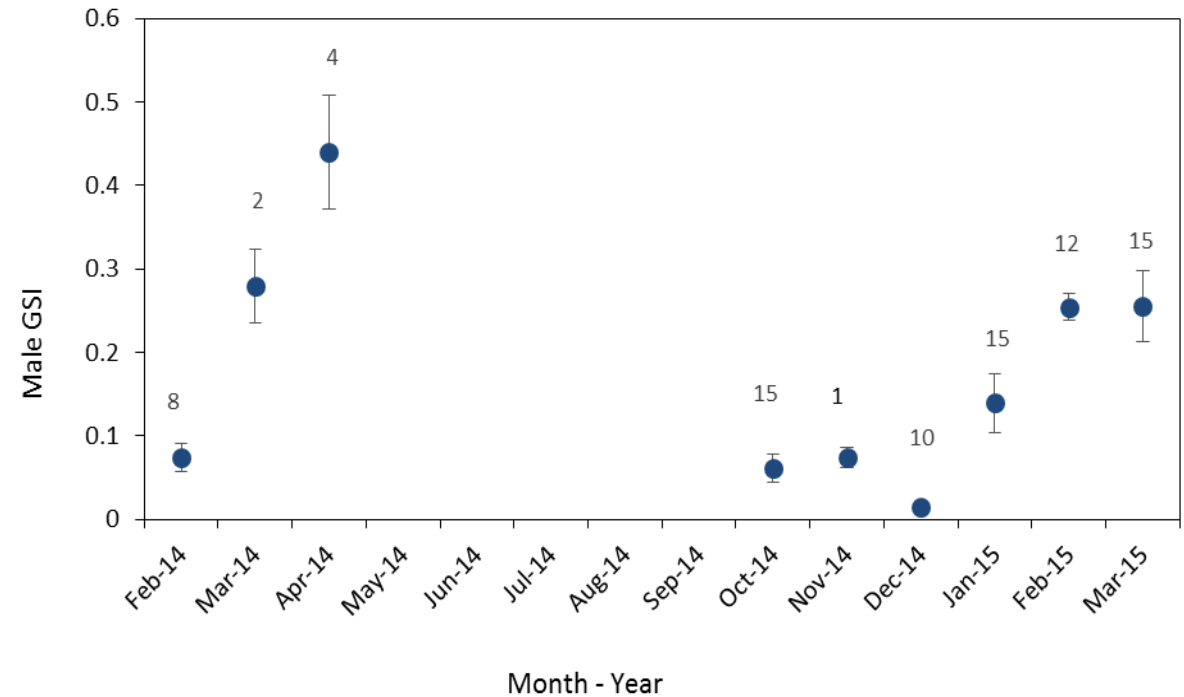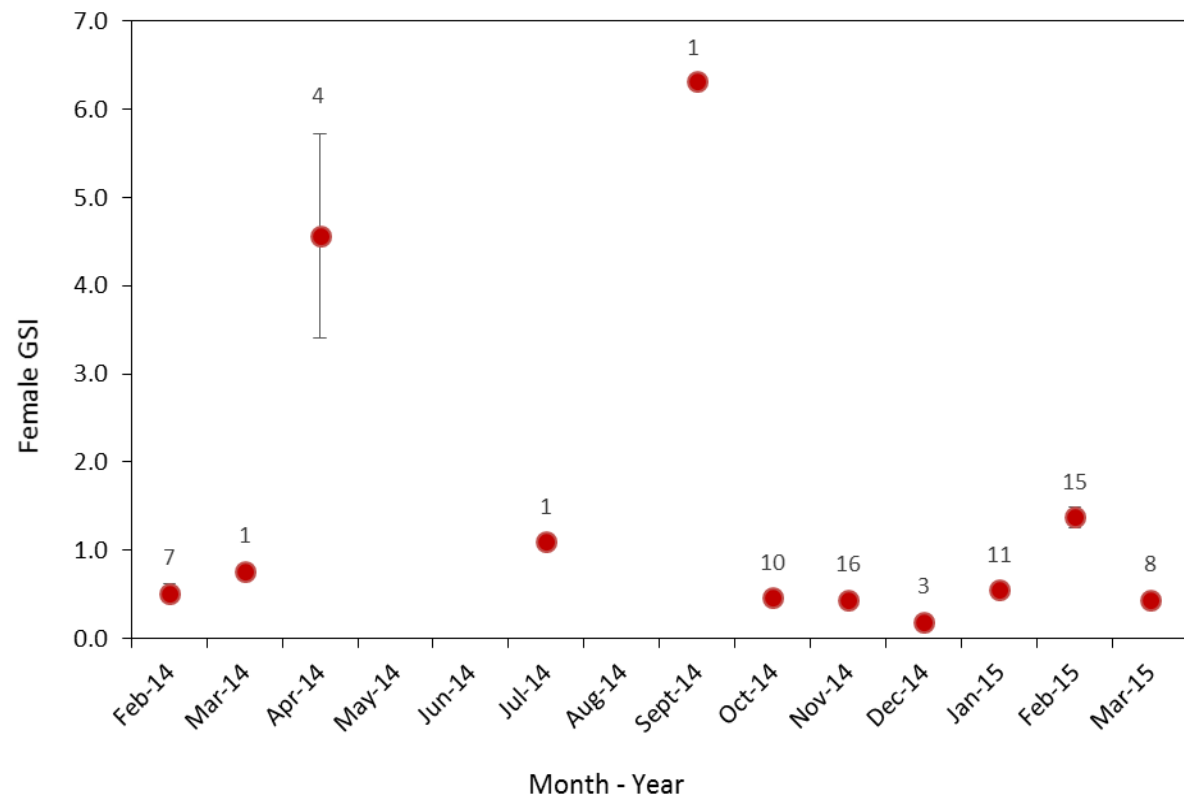
$$y = 0.00001x^{3.0976}$$
$$R^2 = 0.9872$$
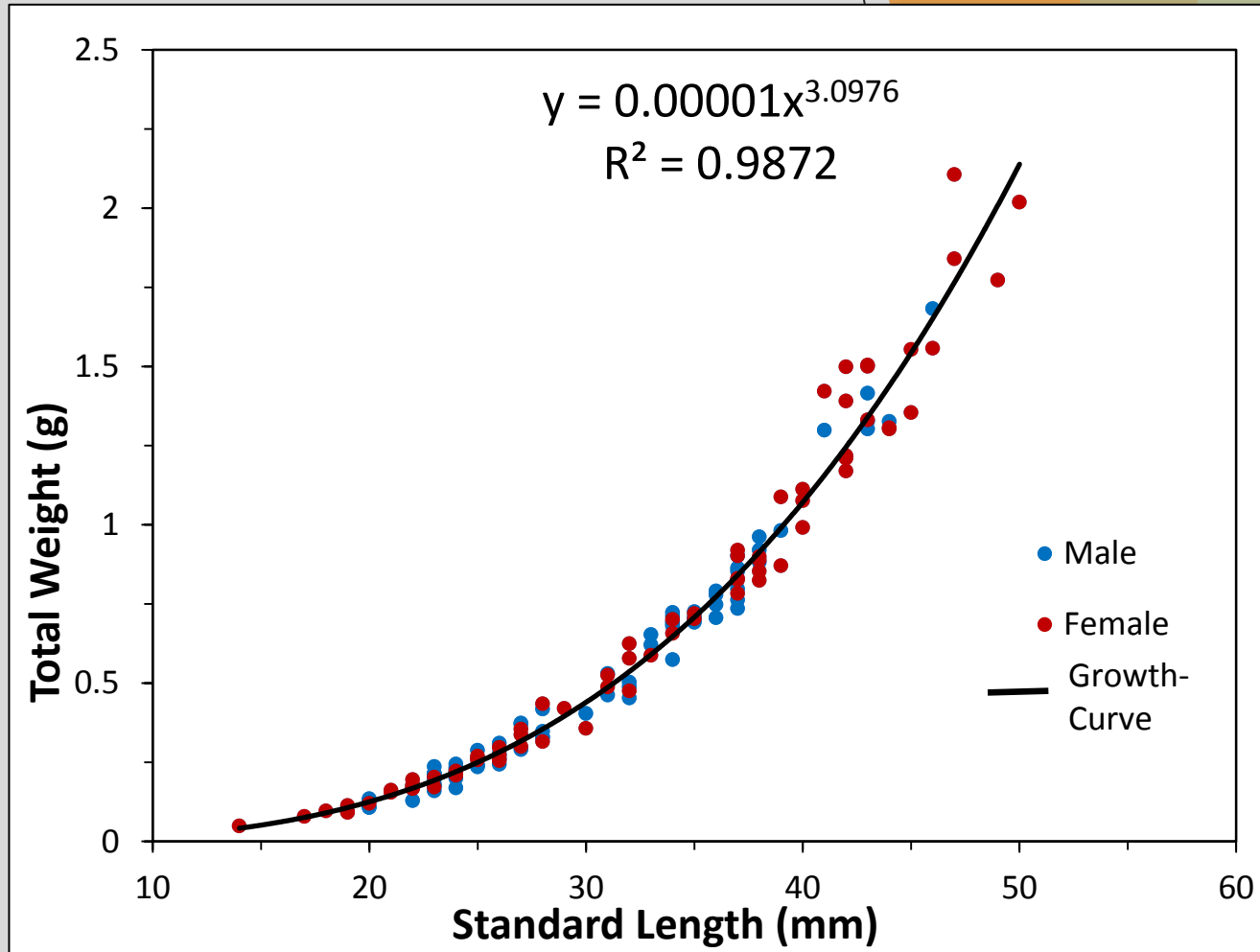
Results - GSI

▶ Females had significantly larger GSI values ($t_{(77)}=5.39$; $p<0.001$)
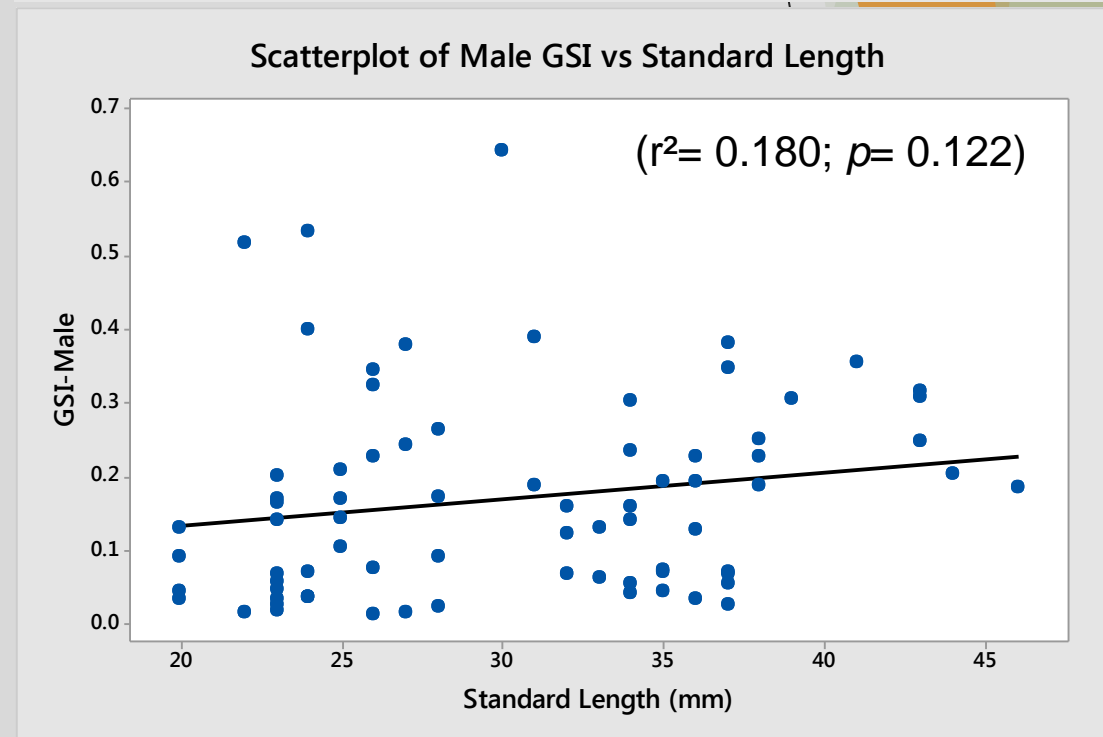
▶ Mean GSIs significantly differ between months

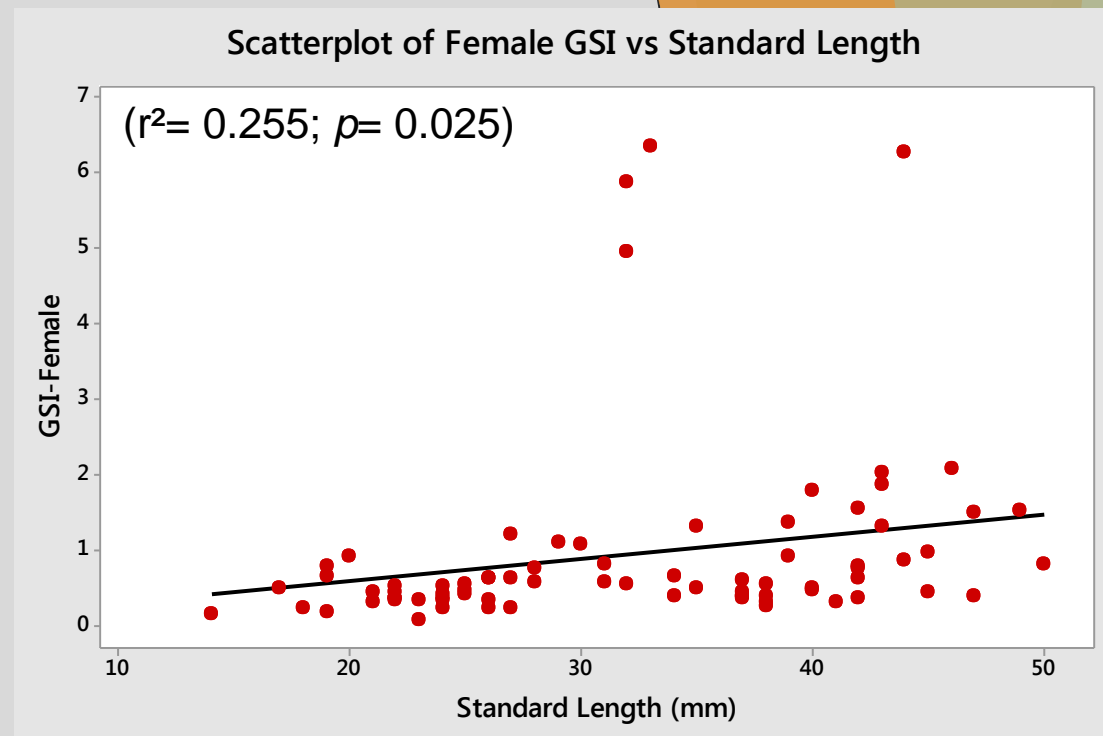 ▶ Females ($F=38.58$; $p<0.001$)
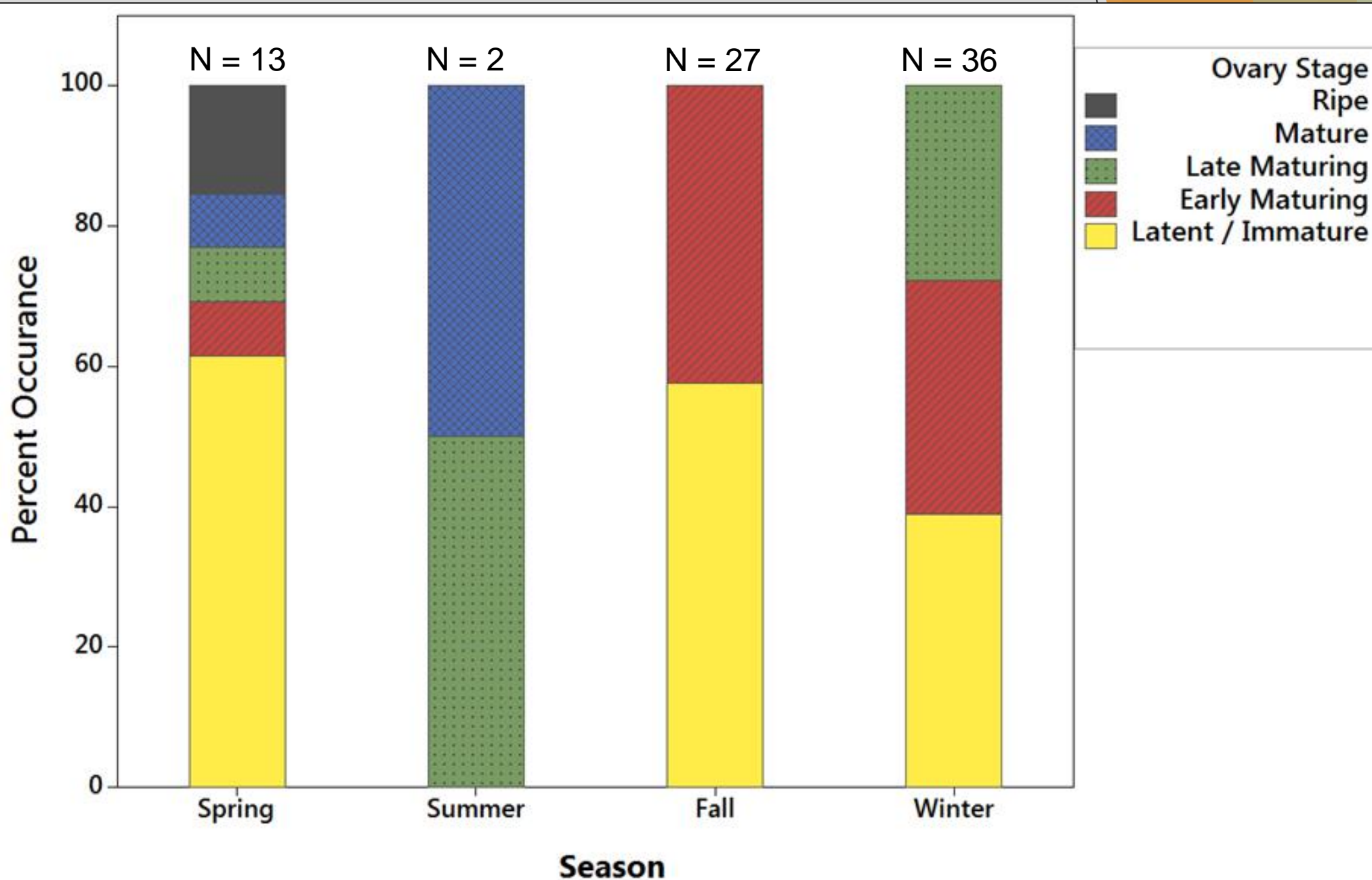
  ▶ Males ($F=13.11$; $p<0.001$)

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)

Scatterplot of Female GSI vs Standard Length

(r^2= 0.255; p= 0.025)

Scatterplot of Male GSI vs Standard Length

(r^2= 0.180; p= 0.122)

Results - Ovarian Stage Analysis

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?