Assessment of Yolk Sac Depletion Within Inland Silverside and Sheepshead Minnow Larvae

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Background

- Crude oil, such as petroleum, can be discharged into aquatic ecosystems and may be harmful to marine life
- In previous research efforts, sheepshead minnow (*Cyprinodon variegatus*) and inland silverside (*Menidia beryllina*) embryos were exposed to crude oil for a 7-day period, hatch success and mortality was recorded
- Differences in mortality amongst species was observed

WHY?

- Aquatic organisms use a yolk sac as an energy reserve during early stages of development, differential rates in energy reserve exhaustion may contribute to observed differences in death
- **Objective:** Determine the rates of yolk sac depletion among inland silverside and sheepshead minnow larvae during early development

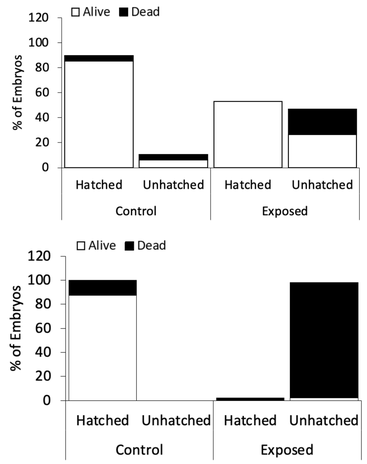
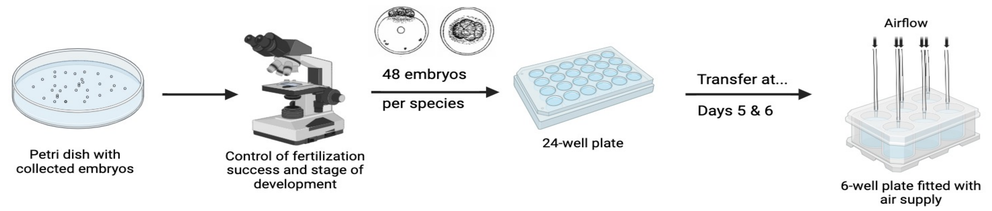


Figure 1: Hatch success and survival rates for inland silverside (top) and sheepshead minnow (bottom) embryos

Experimental Approach



- Collected 48 embryos (at ≤ 8-cell stage) per species
- Yolk sac presence or absence was determined
- Lateral and dorsal images were obtained

Figure 2: General experimental design characterizing embryo and larval maintenance from collection to euthanasia

Results

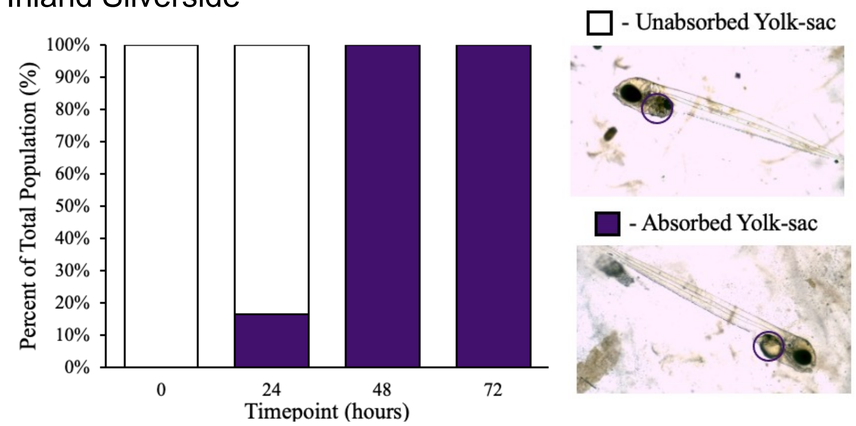


Figure 3: Inland Silversides with absorbed and unabsorbed yolk sacs measured as a percent of the total population

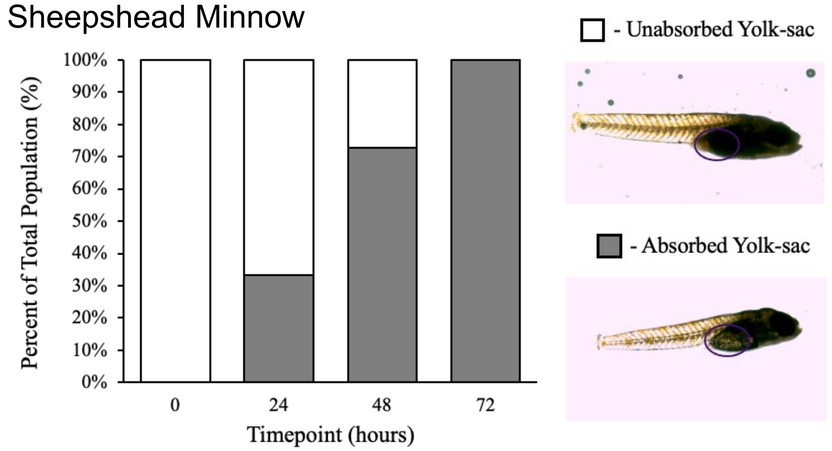


Figure 4: Sheepshead Minnow with absorbed and unabsorbed yolk sacs measured as a percent of the total population

- 100% of hatched sheepshead minnows exhibited total yolk sac absorption by 72-hours
- 100% of hatched inland silversides exhibited total yolk sac absorption by 48-hours
- Observed difference in yolk sac utilization and exhaustion

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Conclusions & Future Directions

- It was determined that the majority inland silversides had absorbed the yolk sac 24 hours earlier than the sheepshead minnows
- Differences in energy reserve exhaustion may play a role in observed mortality differences
- This work highlights how it is necessary to consider the physiology of the model organism and how it might influence outcomes of chemical exposure

LEAD ON.