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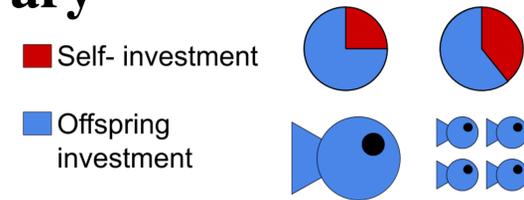
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The effects of temperature on maternal investment of ovary tissue in the fish species *Danio rerio*

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Background

- The average global water temperature is predicted to increase 2.3 °C by the end of the century (Altieri and Gedan, 2015)
 - Life history traits are vital to investigate how the shifting climate may affect population structures (Crook *et al.* 2015)
- Temperature is known to directly affect ectotherm metabolism (Brown *et al.* 2004)
- Maternal investment is the process of using energy to increase the fitness of their offspring and can occur during:
 - Prior to fertilization
 - During gestation
 - After birth
- Trade-offs in investing with a limited amount of resources
 - Quantity and quality of offspring
 - Future success

Objectives

- Investigate environmental temperature effects on maternal investment
- Develop a reliable, consistent method to measuring investment strategies

Methods

- Acclimation of *Danio rerio* (zebrafish) to an ecologically relevant temperature (22—32°C) for two weeks
 - Use of water baths to keep tanks at a consistent temperature
- Dissect the ovary tissue from females
 - Measure dry weight of the female and ovary tissue
 - Maternal investment = $\frac{\text{Ovary tissue (g)}}{\text{Female weight (g)}}$

Results and conclusion

- Female weight did not change in response to temperature acclimation ($R^2 = 0.008$, $p = 0.6921$; Figure 1.)
 - If weight did not change between treatment groups, it could be assumed equal amounts of resources to allocate and invest into ovary tissue
- Maternal investment decreased as temperature increased ($R^2 = 0.147$, $p = 0.07858$; Figure 2.)
 - This trend was present in each of the three trials (Figure 3.)
- Temperature does appear to affect maternal investment with an inverse relationship

References

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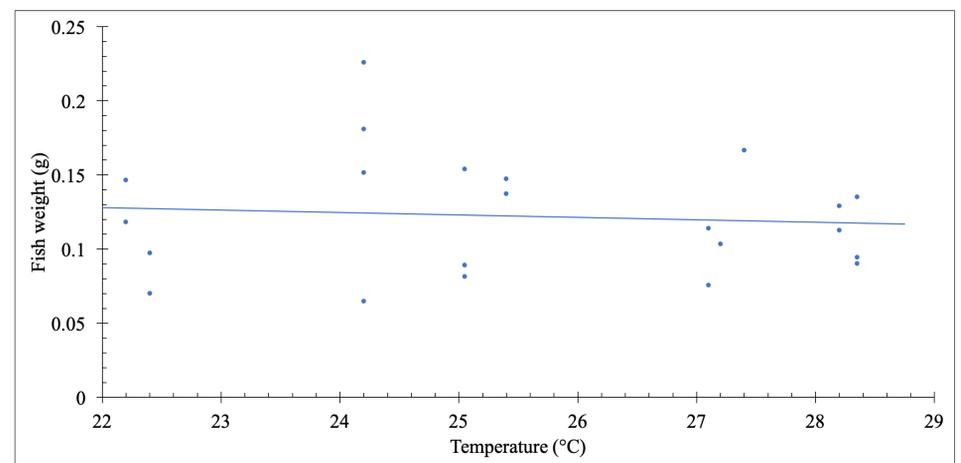


Figure 1. Association of the weight of female fish and acclimation temperature. As temperature increased, weight did not change ($R^2 = 0.008$, $p = 0.6921$).

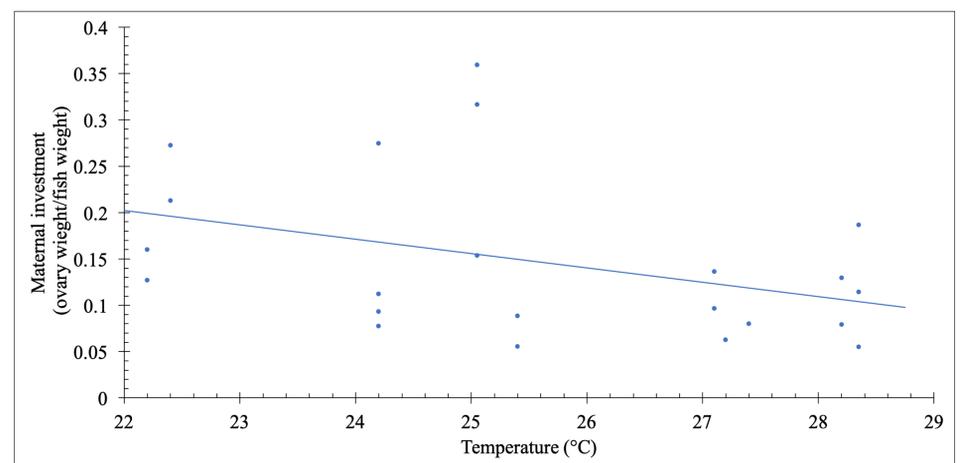


Figure 2. Association of maternal investment and acclimation temperature. As temperature increased, maternal investment decreased ($R^2 = 0.147$, $p = 0.07858$).

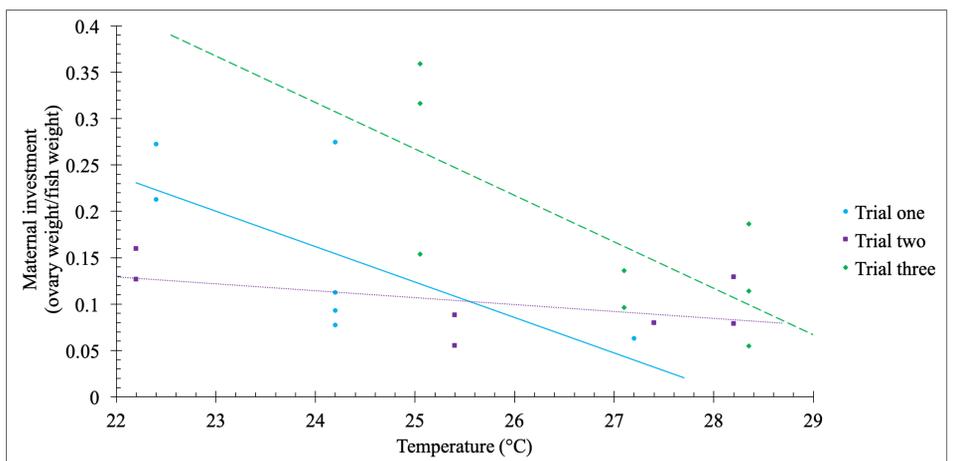


Figure 3. Association of maternal investment and acclimation temperature separated by trial. All treatment trials show the same trend that as temperature increased maternal investment decreased.

Future Directions

- Investigate the effects of temperature on maternal investment in guppies (*Poecilia reticulata*)
 - Live bearing fish
 - Offspring quality
 - Rate of development
- Study the nutrient content of investments
 - Lipids
 - Proteins

