Impact of temperature and prey shell thickness on feeding of the oyster drill *Urosalpinx cinerea* Say

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Urosalpinx cinerea, known as the oyster drill, preys on oysters and other marine bivalves. As ocean temperatures rise and acidification increases, the predator–prey relationship between oyster drill *Urosalpinx cinerea* Say and one of its prey species, the eastern oyster *Crassostrea virginica* Gmelin, is changing. Since coastal waters are predicted to experience a 2 to 4 °C increase in seawater temperature by 2100, climate changes could result in longer feeding seasons for *U. cinerea* on the eastern oyster. In this study Lord and Whitlatch (2013) wanted to understand if at temperatures elevated 4 °C above seasonal ambient water, will *U. cinerea* consume more oysters than at the control temperature, and will *U. cinerea* have a longer feeding season compared to life under control conditions? These questions could provide insight into future changes in the predator–prey relationship between oysters and oyster drills as the climate changes.

This experiment assessed the impact of elevated temperature on *U. cinerea* feeding rates. Researchers set up 16 tanks, and all tanks contained two oyster drills and 5 oysters. Control tanks were left at ambient seawater temperature, and elevated temperature tanks were maintained 4 °C above ambient seawater temperature. Feeding rates in the control and heated conditions were tested over seven months between June 15, 2012, and January 8, 2013. Feeding was measured as both number of oysters consumed per week and tissue weight of oysters consumed per week. Feeding rates in heated and control treatments for each month were statistically compared with t-tests to test for an effect of warmer temperatures on feeding rates.

Oyster drills in the elevated temperature treatment did not show a significant change in feeding from May to August. However, they did show a higher feeding rate at the elevated temperature in September, October, and December. The largest difference between feeding rates in the heated and control treatments occurred in the early fall (September and October),

when control temperatures dropped rapidly but temperatures in the heated treatment remained in the summer range. Overall, the data show that warmer oceans would indeed increase the feeding season of oyster drills through at least September and October. What precise effect this would have on oyster populations remains to be studied, especially where the oyster drill is invasive in the UK, Netherlands, and on the west coast of the U.S. Of particular interest is the effect on the Olympia oyster, whose populations are in danger on the west coast. The effects of ocean acidification should also be tested on the oyster drill's feeding rates, as seawater will become more acidic in coming years, along with warmer ocean temperatures.

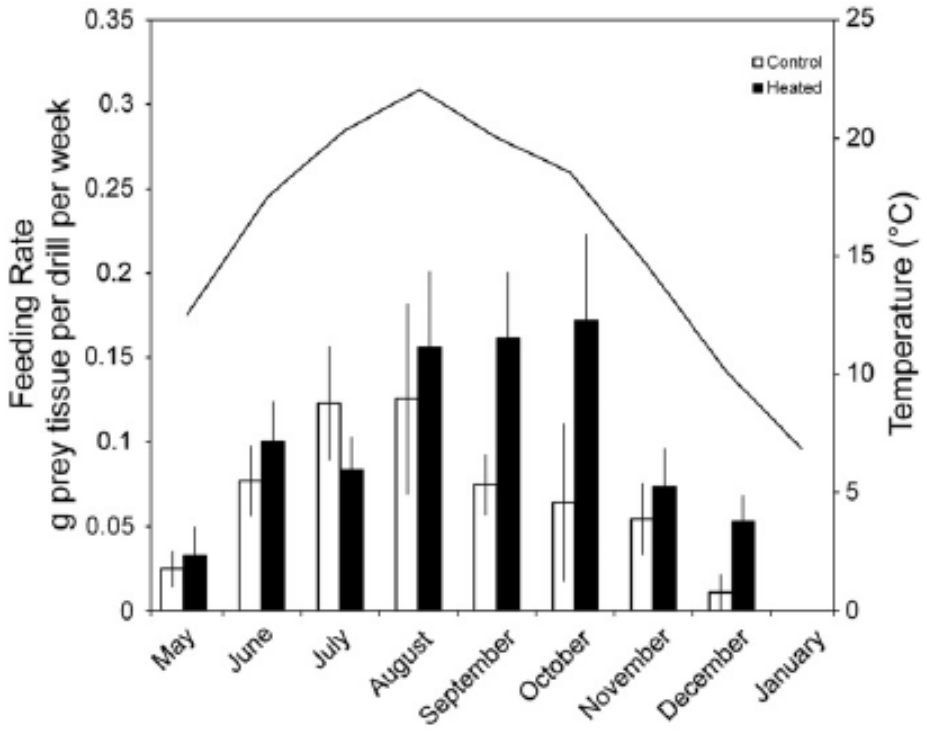

Fig. 3. Oyster drill feeding rates (grams of prey tissue per week) in control and elevated temperature treatments for each month from May 2012 to January 2013. There is no significant difference in feeding rate between treatments during spring and early summer, but *U. cinerea* at elevated temperature treatments in September, October and December fed significantly more than controls. The line shows ambient seawater temperatures (control) over the course of the experiment (±SE bars).