The Effects of Food Availability on Reproduction in Simultaneous Hermaphrodite *Doto chica*

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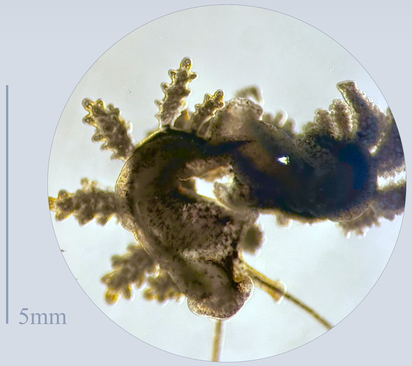
Background

- The ever-changing nature of coastal systems means that their inhabitants are exposed to a varying range of environmental conditions and long-term change.
- Food availability can play a significant role in population dynamics and behaviors of marine organisms.
- Therefore, it is important to determine the effects of food availability on the reproduction of intertidal species, particularly in reference to simultaneous hermaphrodites such as *Doto chica* as their reproductive behaviors have not been well-studied.
- This study aims to determine the effects of food scarcity on copulatory behavior and output of the sea slug *D. chica* in a laboratory setting.



D. chica pair mating

D. chica egg ribbon

Methods

- *Doto chica* specimens were collected from a field site in Panacea, Florida.

- Specimens were placed in individual vials and isolated for five days prior to treatment.

- Organisms were fed based on randomly selected food treatment groups: No food, and *ad libitum.*
- After five additional days of treatment, pairs were selected by matching individuals of similar body sizes.
- Pairs were separated into the following categories: Fed x Fed, Fed x Not fed, and Not fed x Not fed.
- During mating trials, time to initiate copulation, copulation success, copulation duration, and oviposition were all recorded.
- ANOVA tests were used to determine significant correlation between treatments and the recorded variables.

Results

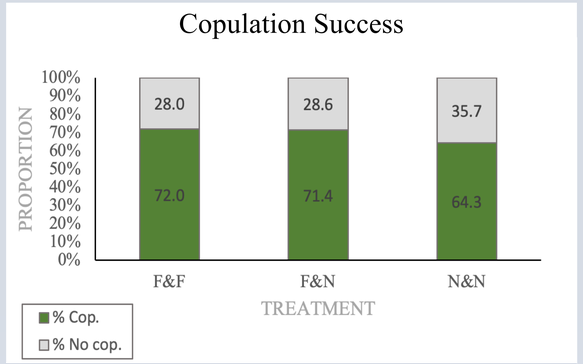


Chart showing the proportion of *D. chica* pairs which successfully copulated for each feeding treatment. No significant difference among treatments, with p = 0.84.

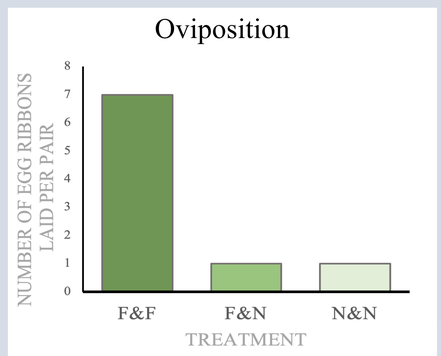


Chart showing the total number of egg ribbons laid by pairs that successfully copulated for each treatment. No significant difference among treatments, with p = 0.88.

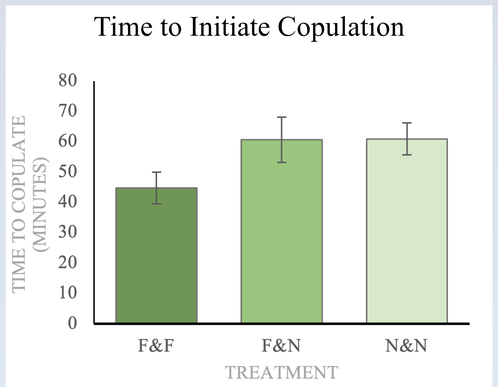


Chart showing the average time to initiate copulation per treatment, in minutes. No significant difference among treatments, with p = 0.08.

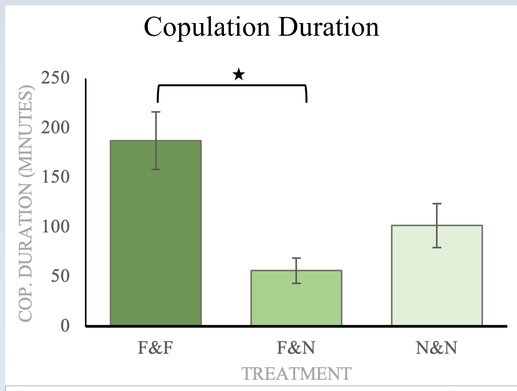


Chart showing the average copulation duration per treatment, in minutes. The asterisk denotes a significant difference in duration between F&F and F&N treatments, with p = 0.0035.

Conclusions

- Through this study, we show that reproductive behavior is affected by the availability of external food sources.
- Pairs still mate readily when food is scarce, but there is a significant decrease in time spent physically copulating and a superficial trend towards reduced oviposition.
- This leads us to conclude that *D. chica* individuals are less likely to dedicate excess energy towards reproduction when environmental stressors are present.
- These findings reinforce the importance of mitigating anthropogenic disturbance on coastlines; external stressors alter the reproductive behaviors of intertidal species that are already at risk.

References

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Acknowledgements

I would like to express my sincerest gratitude to Melanie Medina for letting me join her research project and for so much invaluable guidance.