Behavioral Variation Between Two Clades of *Leptasterias* spp.

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Abstract

*Leptasterias* spp. are stony-rayed sea stars found along the rocky intertidal of the northwestern Pacific, Alaska to Santa Catalina Island, southern California. In central California, three clades of *Leptasterias* are found in separate or mixed populations, in diverse habitats that range from shallow pools of seagrass and algae to bare rock exposed to crashing waves. Initial field observations of two clades from different locations suggested that behavioral variation may relate to habitat differences among clades. To measure differences in activity, the righting response was timed at both field sites. As a result of behavioral variation observed in the field, more extensive tests were conducted in the lab. Individual behaviors recorded included: location in tank, response to food cue, attachment and movement, substrate, attachment surface, and contact with other stars.

Methods

- 16 stars were collected from each location and acclimated to lab conditions for 6 days.
- In each of 4 replicate tanks, 4 stars from each population were placed in 10 gallon tanks using a mesh divider to keep the two populations separate. Stars from 1 tank died and were thus excluded from analysis.
- Stars were starved for 5 days to test food cue response using barnacle molts.
- Observations were taken daily for each individual star for behavior, location in tank, attachment behavior, and contact with other stars.

Behavioral Assays

- Field and laboratory results

- Righting responses of three stars from each population were timed in the field. Righting responses measured using the activity coefficient: 1000 righting time in seconds.

- Field: Pigeon Point (L. ochraceus) righting response faster than Mile Rock (L. clade)

- Lab: Pigeon Point shows greater interaction with eelgrass

- Figure 11: Mean number of arms curled, recorded over six days. An increase in curled arm behavior for both populations was observed on August 1, when food (barnacles) were added to tanks. Overall curled arm behavior decreased over time for Pigeon Point.

- Figure 12: Mean number of arms extended for Pigeon Point and Mile Rock recorded over a period of six observation days. Extended arm behavior was not affected in either population when food (barnacles) were added on August 1.

Discussion

- Behavioral variation among representative populations of two clades of *Leptasterias* spp. was quantified in field and lab assays to test a prediction on the relationship between substrate and attachment and movement behavior.
- Righting response was tested in the field to determine if behavioral variation existed between populations.
- Stars living in seagrass and algae were observed extending their arms and tube feet in the field. This observed behavior may be related to how the star moves and feeds within its habitat.
- Stars living on rocks and within crevices were observed to have their tube feet and arms conform to the irregularities of the rock surface with tight suction. This behavior may be related to an adaptation to crashing waves and directly feeding on prey.
- To test behavioral variation between populations, behavioral assays were tested in constant lab conditions with Pigeon Point stars exhibiting more curled arm behavior, more extended arm behavior, and greater attachment to eelgrass.
- These experiments provide measures of behavioral variation between clades and may help determine how behavioral variation is related to habitat differences.

References/Acknowledgments

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