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LABORATORY OBSERVATIONS OF INTERSPECIFIC BEHAVIORAL INTERACTIONS BETWEEN THE AMERICAN LOBSTER, *HOMARUS AMERICANUS*, THE CALIFORNIA SPINY LOBSTER, *PANULIRUS INTERRUPTUS*, AND THE ROCK CRAB, *CANCER ANTENNARIUS*

An Abstract of a Thesis

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ABSTRACT

A laboratory investigation of behavioral interactions between the American lobster, *Homarus americanus*, and the California spiny lobster, *Panulirus interruptus*, and between *H. americanus* and the rock crab, *Cancer antennarius*, was conducted to ascertain the possible effects an introduced population of *H. americanus* could have on these ecologically similar species native to southern California.

Observations were conducted in small tanks (512 liters) and large tanks (3 m in diameter, 9,000 liters). The frequency, duration and sequential relationship of behavioral acts between interacting heterospecific pairs were recorded using a 20 channel Esterline-Angus event recorder. The effects of both size and sex were considered.

Results of observations in both large and small tanks indicated that neither size nor sex had any significant effect on the frequency or duration of selected behavioral acts. These data indicated that *H. americanus* was the dominant species in *H. americanus-P. interruptus* encounters and that it performed a greater number of aggressive acts for longer durations than did

P. interruptus. The reverse was true in the case of avoidance behavior. Similar results were obtained from observations of *H. americanus-C. antennarius* encounters.

Intra-individual sequence analysis of behavioral acts indicated no significant difference between large and small tank data and no apparent effect due to either size or sex. Five sequence pathways were described for *H. americanus* and one for *P. interruptus*. The general flow of events involved an *H. americanus* approach followed by an aggressive act, an avoidance act and roam. Avoidance behavior dominated the *P. interruptus* pathway after the initial approach. Sequence pathways resulting from *Homarus-Cancer* encounters were similar except that *C. antennarius* performed displays more frequently than *H. americanus*.

Analysis of inter-individual sequence data or the flow of events between species revealed that the most frequent reaction of *P. interruptus* to an *H. americanus* act was no response. In cases where a response was elicited it was generally some type of avoidance. Again, similar results were obtained from *Homarus-Cancer* encounters. The high frequency of no response indicated that there is little interspecific communication.

Overall the data indicate the *H. americanus* was the more aggressive species in *Homarus-Panulirus* encounters, which often resulted in *P. interruptus* being displaced from the area of encounter. The outcome of *Homarus-Cancer* encounters was not as evident due to the low frequency of encounters. However, the general trend was similar to that for *H. americanus-P. interruptus* interactions, except that *C. antennarius* was sometimes able to displace *H. americanus*.

Although the frequency of encounters between species was low, the displacement of *P. interruptus* and, to a lesser degree *C. antennarius*, by *H. americanus* could have adverse effects on the distribution and abundance of these two species native to southern California. This could become important for *P. interruptus* and *C. antennarius* if they were competing for a limiting resource such as food or shelter, a situation which would not be expected considering the similar ecological requirements of these species.