

Albert L. Tester Memorial Symposium

22-23 April 1976

A symposium, intended to be an annual event, was held in honor of Albert L. Tester, who, at the time of his death, was Senior Professor of Zoology at the University of Hawaii and an active participant in the affairs of the Department of Zoology in teaching formal courses, directing graduate student research, and serving on committees of the Department. The faculty and students of the Department of Zoology proposed an annual symposium of student research papers as a means of honoring, in a continuing and active way, Tester's lively encouragement of student research in a broad range of fields within marine biology. Papers reporting original research on any aspect of marine biology were solicited from students of the University of Hawaii. Income from contributions to the Albert L. Tester Memorial Fund of the University of Hawaii Foundation was used to provide two prizes, one for the best paper on fish or fisheries biology, Tester's own field of special interest, and one for the best paper in any other area. Papers were judged by National Science Foundation Distinguished Visiting Scholar Arthur M. Myrberg, Professor, Rosensteel School of Marine and Atmospheric Science, University of Miami, and by Drs. Julie Brock, James Shaklee, and John Stimson from the Department of Zoology, University of Hawaii. Papers were judged on quality, originality, importance of the research reported, and on the quality of the public presentation. Presentations honored with prizes were those of Paul Atkins with Dennis Gorlick, in fish biology, and of Tina Weatherby.

The Social Use of Space in the Hawaiian Ghost Crab,
Ocypode ceratophthalmus

FREDERICK J. LIGHTER

I studied the spatial pattern and related social behavior of the Hawaiian ghost crab, *Ocypode ceratophthalmus*, using nearest-neighbor and "mean crowding" techniques. Analyses were made of 13 different natural populations, representing a total of 901 individuals. Density measurements for these populations range from 0.48 to 1.01 crabs/m²; "mean crowding" estimates range from 0.58 to 1.78 other individuals/quadrat/individual. In 10 of the samples,

the spatial pattern of the population was random. Of the remaining three populations, two showed a pattern of aggregation and one showed a pattern of uniformity.

Both sex and age differences were present in burrowing behavior and burrow structure. Juveniles of both sexes constructed two basic patterns of burrow structure: mature females and mature nonreproductively active males constructed a similar structure and reproductively active males constructed another. Behavioral differences in burrow defense and social interactions were also observed. All crabs defended their burrows by using one or two defensive behaviors; a burrow inhabitant either

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assumed a threat posture toward the intruder and/or chased the intruder. However, reproductively active males utilized two additional defensive behaviors. Physical interactions with intruders took the form either of pushing with folded chelae or of actual combat.

Field measurements have demonstrated that reproductively active male *O. ceratophthalmus* show a uniform pattern of spacing among themselves when total population density is below approximately 0.6 crabs/m². Behavioral evidence

indicates that one male will prevent another from constructing a burrow within a radius of 71 cm from his own burrow. When total population density rose above 0.6 crabs/m², the male pattern of uniformity was lost, and the pattern became random. Behavioral evidence also indicated that, at population densities above this level, territorial defense of a burrow is lost, and agonistic behavior occurs in contexts which are not related to habitation and defense of a burrow.

Light Adaptation Strategies of Hermatypic Corals

RANDI REDALJE

Hermatypic corals growing at low light intensities generally show flattened growth forms, low calcification rates, and deep pigmentation. These characteristics can be attributed to the physiological adaptations of their symbiotic zooxanthellae. The responses of zooxanthellae to a range of light intensities can be compared to the light responses of "sun-" and "shade-" adapted phytoplankton, where a decrease in light intensity generally causes an increase in cell chlorophyll-*a* content. Two species of coral, *Cyphastrea ocellina*, a shallow reef species, and *Leptoseris incrustans*, a deeper reef species, were placed in four light treatments (10-, 20-, 40-, 60-percent surface illumination) to investigate changes in pigment concentration and in numbers of zooxanthellae with changes in light. For both species, chlorophyll-*a* concentra-

tion/cm² coral tissue increased with a decrease in light. *Cyphastrea* showed a decrease in chlorophyll-*a*/cm² at the lowest light level; *Leptoseris* did not show this decrease. There was no change in the numbers of zooxanthellae with light. Chlorophyll-*a*/algal cell increased with a decrease in light for both species except at the lowest light level, where *Cyphastrea* showed a decline. These preliminary results indicate that the zooxanthellae of *Cyphastrea* are adapted to higher light levels than are those of *Leptoseris* and are unable to increase further their cell chlorophyll content at light levels lower than 20-percent surface light. *Leptoseris* zooxanthellae would be expected to show a similar decrease in cell chlorophyll content but at a lower light level than was used in this experiment.

The Role of Relative Size in Competition for Shelter by *Macrobrachium rosenbergii* (Decapoda)

JOHN BRAD PEEBLES

Relative size has been reported to be an important behavioral factor influencing dispersal in a number of crustaceans. This factor was studied by pairing two adult animals in elliptical tanks (diameter 1 = 137 cm, diameter 2 = 75 cm, water depth = 34 cm). These tanks offered no avenues of emigration. A series of 15 male pairs was studied. Observations

were made on the day of simultaneous introduction, two, three, and six days after introduction. Behavioral interactions were recorded only on the day of simultaneous introduction. Position in space was recorded on all four observation periods. A total of 360 minutes of observation was made for the 15 male pairs. The results of a partial correlation of shelter use