

NOTES

Courtship Behavior of the Lined Shore Crab, *Pachygrapsus crassipes* Randall

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IN HIS DEFINITIVE MONOGRAPH on the biology of the lined shore crab of the Pacific, an important member of the high intertidal community and useful to physiologists, Hiatt (1948) describes the copulation pattern of this species from repeated observations. Having seen little preliminary activity, he precludes extensive prenuptial behavior. On the basis of several observations of courtship behavior in this species that I have made, the opportunity to extend Hiatt's data prompts this note.

These observations were made on crabs kept in laboratory bowls in the course of ecological work to be reported elsewhere. The following sequence is typical of this courtship behavior.²

The pattern is overtly initiated by the male's approaching a female in a threat posture with chelae extended. However, this is not followed by the usual strike. The female is instead pushed—one is tempted to say, gently—with the chelae flexed horizontally. The female reaction to this gesture is a deliberate retreat, in which she is closely followed by the male. Lateral movements by the female are countered by the male, in a manner which may best be described as herding. This initial phase may end in a radical escape movement by the female, and as such is identical to a male-to-male herding activity by the more dominant individual. This first phase may last from less than a minute to several minutes.

If the female is acceptant, the second phase is marked by the cessation of herding and a

retreat by the male, closely followed by the female. The tempo of movement increases as the activity becomes a courtship dance. The pair moves in complete synchrony, chelae to chelae but not grasping. The movements are of two sorts: a forward and backward as well as lateral walking, and a lateral swaying movement of the body without walking. The intensity and synchrony increase for a period up to a minute or two. This phase is culminated during a backward movement by the male as he rolls onto his back with the female walking over him in the characteristic dorsal copulatory position of the female described by Hiatt (1948).

Sexual harmony is the striking product of this behavior; in the courtship activities the male at no time forcibly holds the female, nor (in corroboration of Hiatt's observations) is there aggressive grasping during copulation. However, the initial phase is definitely a type of male aggression and may end in a strike or a fight. In like manner, the postcopulatory male behavior may return to the aggressive pattern. While some pairs separate and proceed independently, in others only one partner is released from the sexual sequence. In one instance the female escaped following copulation and the male transferred immediately to a second female. Conversely, another copulation ended with the female still in the following sequence and the male returning to the aggressive role with a violent strike at the female. This close relationship between sexual and aggressive behavior would seem to be characteristic of many decapod crustaceans (Andrews, 1895; Chidester, 1911; Crane, 1941; Bovbjerg, 1946) and indeed of many vertebrates.

No investigation was made of the cues involved, though Hiatt (1948) notes sexual be-

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² Dr. Richard A. Boolootian, Department of Zoology, University of California at Los Angeles, personal communication, has observed at least some aspects of this behavior and has recorded these in some of his motion picture studies.

havior of males with males and with the cast skin of a female. It is tempting to compare this crab pattern to the now classical picture of the stimulus-reaction chain of the three-spined stickleback (Tinbergen, 1951).

The complexity of the sexual behavior of *P. crassipes* seems to have no parallel among the Crustacea with the exception of the genus *Uca*, where Crane (1941) found species differences in sexual posturing and a complex and variable pattern of courtship. The behavior cited in the present report may be equally variable under natural conditions. The singularity of such complex behavior patterns in crustaceans may be more apparent than real when the amount of investigation devoted to them is considered relative to that given to insects and vertebrates.

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