1972 #5

SUPPLEMENTARY NOTES ON THE ECOLOGY AND BEHAVIOR OF HERMIT CRABS IN THE FRENCHMAN BAY AREA.

Claire Berman, Raymond L. Francis and William C. Grant, Jr., Williams College, Williamstown, Massachusetts

Studies were conducted in order to obtain additional information on the behavioral ecology of *Pagurus acadianus* and *P. pubescens* as reported by Grant and Ulmer, 1971 (Bull. MDIBL 11: 21-22 and 96-97). Empty shells are a critical resource base for both species of crabs. Analyses of shell availability were made by taking square foot, bottom samples at five-foot intervals along a hundred-foot swim line placed in Laboratory Cove and parallel to the shore south of Leland Point. Pooled data from seven swim lines gave an average concentration of habitable shells of 4.2 shells/sq. ft. Of a total of 543 shells collected 83.9 percent were in the smallest size range (up to 10 mm in shell aperture diameter) and only four shells were found with apertures over 15 mm in diameter. The average number of crabs was 0.39/sq. ft., 96.4 percent of which were in the smaller size category, and their numbers were distributed approximately evenly between the two species. This is indication that small shells constitute not only an abundant but also a fine-grained resource as their appearance in samples approximated a Poisson distribution. In contrast large shells appear to be a scarce and clumped resource.

Mobility of *P. acadianus* was studied in the field by two methods: (a) Release and recapture of large numbers of crabs over a period of days (b) Locating previously marked crabs and monitoring their movement at hourly intervals. Crabs were marked by scraping the manus of the major cheliped and by snipping the tips of walking legs; shells were marked with fluorescent paint and numbered. Speed, distance traveled and direction of movement varies widely among different individuals. Characteristically crabs remain in place for some hours before covering a distance in a new direction. The average speed of locomotion is about nine feet per hour although maximum hourly distances of over 20 feet were recorded. These findings confirm the errant nature of the crabs as reported by Grant, 1963 (Ecol. 44: 767-771) although frequent directional change may retain an individual within the same general area for some weeks.

Initial studies of predation conducted under laboratory conditions indicated that the rock crab, *Cancer borealis*, not the lobster, is a predator of hermit crabs. Rock crabs obtain the pagurids by fragmenting the occupied mollusc shells with their chelipeds. Hermit crabs in shells covered with colonies of *Hydractinia echinata* were not preyed upon which suggests that the hydroid affords the crab some measure of protective cover.

This work was supported by NSF Grants GY9938 and GB-31548.