NOTES:

CONCEALMENT BEHAVIOR OF THE SPANISH LOBSTER, *Scyllarides nodifer* (STIMPSON), WITH OBSERVATIONS ON ITS DIEL ACTIVITY.[1]

Because a camoulflaged or cryptically colored animal would lose a protective advantage if it cast a shadow, structural adaptations to conceal shadows, or the "Peter Pan effect," are a recognized and common adjunct to disruptive patterns observed in animals. Several species of terrestrial insects with flattened appendages and flanged body surfaces illustrate this structural adaptation (Portmann, 1959). I believe that the flattened antennal appendages and flanged latero-carapacial surfaces of the Spanish lobster, *Scyllarides nodifer,* are similarly employed and not used for burrowing as the local name "bulldozer lobster" would imply. The reef habitat of scyllarid lobsters (Lyons, 1970) provides few unconsolidated sediments in which to burrow, a defensive behavior of many marine and estuarine decapods. Concealment could be afforded, however, by the structural modifications mentioned above, enabling these lobsters to hide on the surface of the reef.

On March 30, 1971, at about 1200 hrs., I observed a 20 cm TL Spanish lobster clinging to the surface of a limestone ledge about 10 km off the coast of Panama City, Florida. The water depth at this natural reef, locally called the "Warsaw Hole," was 25 m, and the bottom temperature was 16° C. Horizontal visibility was approximately 9 m. I was impressed by the ability of this species to conceal itself on the face of this outcrop and photographed the lobster before disturbing it (Figure 1). The lobster was not only cryptically colored, but its body outline blended into the hard substrate. I placed

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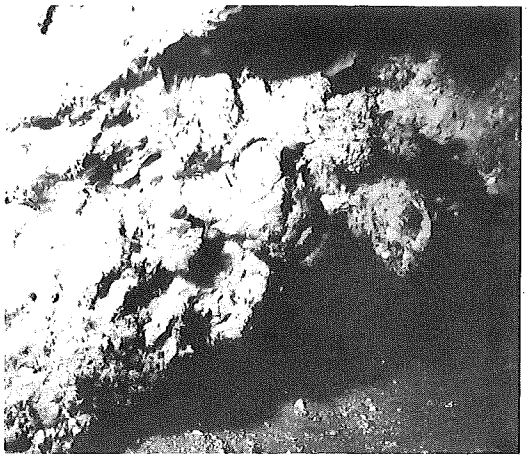

Figure 1. — A Spanish lobster, *Scyllarides nodifer,* clinging to the surface of a limestone ledge. Note how the antennal articles reduce shadows and enhance the camouflage effect.

Figure 2. — The same lobster after it was removed from its hiding place and placed on the bottom directly below the ledge.

the lobster on the sand bottom directly below the ledge where it was first observed and I took another photograph (Figure 2). It did not attempt to burrow, as penaeid shrimp do when released on the bottom during daylight hours (Fuss and Ogren, 1966), but remained quiescent for the duration of the observation. The distinct shadow it cast caused it to be most conspicuous.

I have observed this species for several years (1970-75) while diving on artificial reefs located near the general area of the "Warsaw Hole." I have seen them inside discarded tire casings clinging to the underside of the horizontal supports of a U.S. Navy offshore platform (Stage II), and on the legs of a nearby U. S. Navy underwater habitat (Sealab I). The lobsters were inactive during the daytime suggesting they forage for food at night. They are frequently captured by shrimp trawls fishing at night off Dog Island, Florida, at depths of 18 m, further suggesting that they leave their reef habitat at night. The trawlable bottom consisted of coarse sand and shell sediments, but live bottom habitat and limestone outcrops, which the lobsters use as diurnal retreats, are found in this general area.

Few data were found concerning predation on this species, but Lyons (1970) gave some evidence that large reef dwelling fishes (sharks and groupers) eat them. It seems probable that the vulnerability of the lobster to these active predators would be much greater were it not for their camouflage and cryptic habits.

This species was observed to be most numerous in the fall and early winter (September-December), but they were not seen during the winter months (January-February). In the northeastern Gulf of Mexico the Spanish lobster probably moves offshore in response to low water temperature.

LITERATURE CITED

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Larry H. Ogren, *NOAA, National Marine Fisheries Service, Southeast Fisheries Center, Panama City Laboratory, Panama City, FL 32401.*

NOTES ON THE OCCURRENCE OF THE SILVER ANCHOVY, *Engraulis eurystole,* IN THE NORTHERN GULF OF MEXICO. —

On 9 November 1970, several tightly-packed fish schools or pods (as defined by Breder, 1959) were observed moving into Choctawhatchee Bay at East Pass, Okaloosa County, Florida, apparently being carried into the bay by the flood tide. One dip with a small net from one of the pods yielded 574 *Engraulis eurystole,* 9 *Anchoa lyolepis,* and 3 *Sardinella anchovia.* At the time of this observation (10:30 CST), the current in the pass was stronger than usual and the Gulf was quite rough because of a rather strong south wind (about 10-15 knots). The water temperature was 22° C.

Engraulis eurystole had not previously been collected at East Pass during a detailed study of the fish fauna at the jetties there beginning in June, 1968, and continuing through 1970 (Hastings, 1972). One larval engraulid which is apparently this species was collected near the west jetty at East Pass on 26 December 1970. Its anal fin ray count (16) is too low for any of the species of *Anchoa* occurring in the Gulf of Mexico, but does correspond to counts of *Engraulis* collected in November. Other anchovies were seen when the single larva was collected, so other *Engraulis* may have been present. The species is apparently an open water fish, in view of its scarcity in