

PRELIMINARY OBSERVATIONS OF THE DIEL FEEDING
MIGRATIONS OF THE ATHERINID FISH PRANESUS
PINGUIS IN THE MARSHALL ISLANDS

by

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ABSTRACT

The atherinid fish Pranesus pinguis was observed over two weeks in the lagoon at Majuro Atoll. During the day, individuals over 35 mm standard length formed into a school near shore and were observed to be generally inactive throughout the day. Each day, shortly after sunset, the school migrated offshore and followed the same route each evening. Once offshore, the fish dispersed to feed on plankton in the lagoon surface waters during the night. With first morning light, the school reformed. Swimming over the same route used to move offshore the previous evening, the school returned shortly after sunrise to its inshore schooling site to undertake another day of inactivity.

Many marine fish that school in shallow water near shore during daylight are nocturnal feeders which migrate to offshore feeding grounds at nightfall. In the Gulf of California, this phenomenon is known in certain clupeids, pomadasyids, carangids, sciaenids and lutjanids (Hobson, 1965, 1968), and reports indicate equally widespread occurrence in the tropical Atlantic (Starck and Davis, 1966).

The atherinid Pranesus pinguis (Lacépède), which is distributed widely in the western Pacific and Indian Oceans (Schultz et al., 1953), is known to school in shallow water, close to shore, during the day. Because its daytime behaviour is so similar to that of fish known to make nightly migrations offshore, we entertained the hypothesis that P. pinguis too would prove to make such migrations. This possibility had attained importance in a current programme of the U.S. National Marine Fisheries Service. During a study of potential bait fishes in Micronesia - part of a project to determine the feasibility of a local tuna fishery for these islands - P. pinguis was found to be one of the more promising bait species in the Marshall Islands. The need having been established for biological information on this species, we visited Majuro Atoll (Fig. 1) during March 1972, to investigate the question of a nightly offshore migration. Observations were made from shore, from a skiff, and underwater using a face plate and snorkel.

At the time of our visit, a concentration of P. pinguis was located along the beach of Arniel Island (Fig. 1) on the north-east side of the atoll. Observations were made over a 2 week period, with detailed accounts of the activity of P. pinguis being gathered over 3 days and 3 nights. All observations were consistent with the pattern outlined below.

During the day, individuals between about 35 and 65 mm standard length hovered in a quiet, inactive school that was strung out along the shore. By late afternoon, however, the school had drawn together as a compact unit at one point near the shore. Furthermore, whereas earlier the school had occupied most of the water column (where it was about 1 m deep), by sunset it was concentrated in the upper levels, just beneath the water's surface. Then, shortly after sunset, the school headed away from its daytime location. The school did not move directly away from the beach; rather it moved along the shore toward a point of land at the western end of the island. On arriving at the point, the school turned away from shore and headed out into the lagoon.

When observed later during the night, these atherinids were spread out immediately beneath the water's surface, with several metres between each individual. They were most numerous just beyond the drop-off into the deeper waters of the lagoon, about 400 m offshore, but individuals also occurred in decreasing numbers as far as 1500 m further out. Every indication was that P. pinguis was feeding on plankton at this time. The situation remained essentially unchanged until first morning light, about 1 hour and 15 minutes before sunrise. At this time individuals began to concentrate in the shoreward part of their feeding ground. Soon it was apparent that the school was reforming offshore from the point of land where the school had departed from the island during the previous evening. The fish continued to re-group until 30 minutes before sunrise, by which time the school had attained daytime dimensions. Then, retracing the route over which the school had migrated outward about 11 hrs earlier, the fish moved in along the beach to once again take up station at the daytime schooling site. In all, the pattern was much like that described for the clupeid Harengula thrissina, in the Gulf of California (Hobson, 1968).

This general picture of the diel pattern in P. pinguis is currently being refined. Feeding habits are under analysis, with material in the guts of specimens collected at different times of day and night being compared with plankton sampled day and night in the areas of the lagoon known to be frequented by this species. Not only will these facts aid in determining the potential of P. pinguis as a bait fish, but, more important, they will provide biological information essential for intelligent management of the species.

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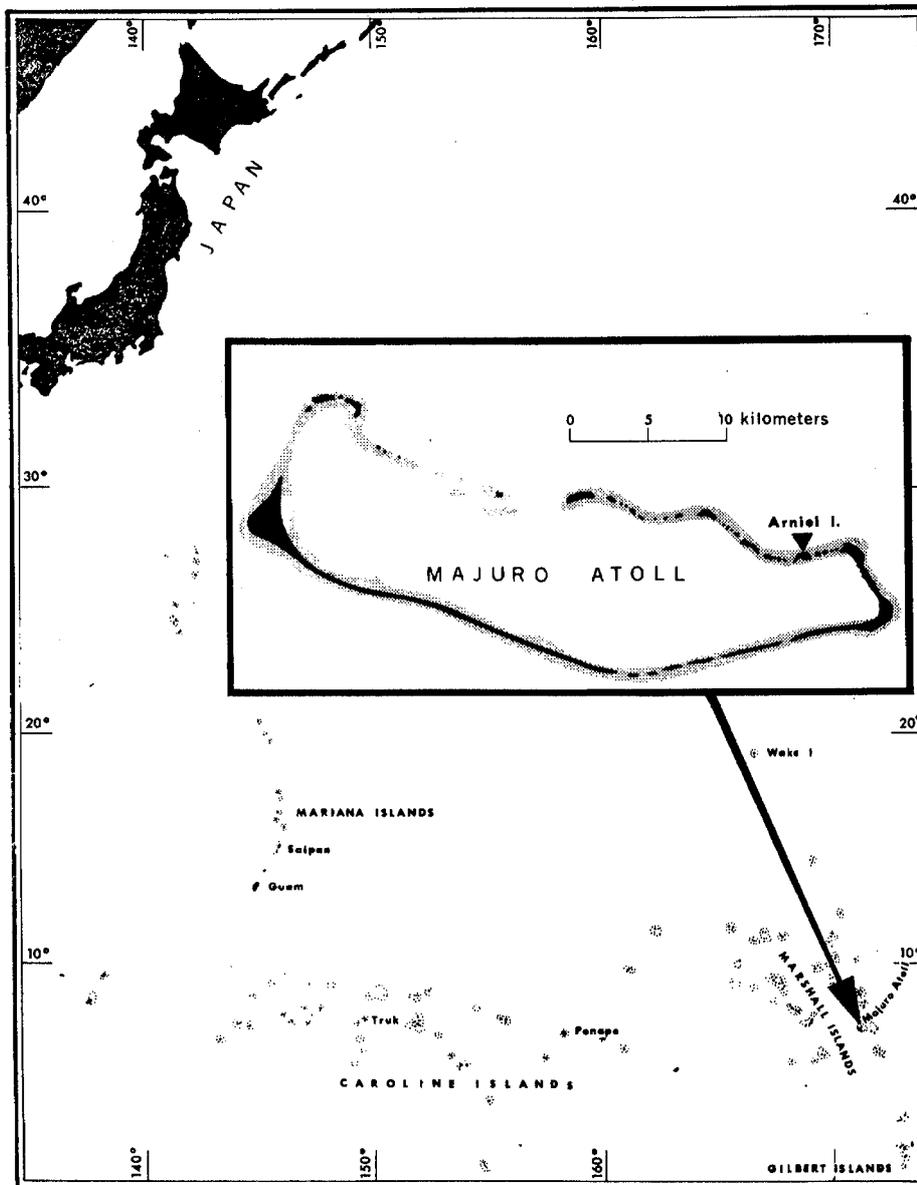


Fig. 1 Location of observational site (Arnie Island) in Majuro Atoll, Marshall Islands

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