

MARINE RESOURCES DIVISION HEADQUARTERS
KOROR, PALAU
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AN INITIAL REPORT ON THE
SPINY LOBSTERS OF MICRONESIA

by

CRAIG D. MACDONALD
PEACE CORPS VOLUNTEER
MARINE RESOURCES DIVISION

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INTRODUCTION

Under the supervision of Peter T. Wilson, Chief of the Trust Territory's Division of Marine Resources at Koror, Palau, a thirteen month study (Oct 1969 - Oct 1970) of the life histories of Micronesia's two commercial species of spiny lobster, Panulirus penicillatus and P. versicolor, was undertaken. Upon completion, it was supplemented by behavior and habitat studies and a survey of existing lobster resources, species composition, and fishery feasibility in all districts.

Through the auspices of FAO of the United Nations and the South Pacific Islands Fishery Development Agency of the South Pacific Commission, findings of these studies were discussed with Dr. Raymond George, FAO spiny lobster expert and Senior Curator of the Western Australian Museum of Natural History, and with Mr. Rex Pyne, FAO spiny lobster technical consultant and Marine Biologist with the Department of Stocks, Agriculture, and Fisheries of the Territory of Papua and New Guinea, at the Pacific Islands Spiny Lobster Resources Conference convened at Port Moresby, New Guinea, Jan 19 - Feb 1, 1971.

DISCUSSION

Micronesian spiny lobster are prolific crustacea and depending upon size and species, the female bears 100,000 - 1,000,000 external eggs. According to Michel (1969) of O.R.S.T.O.M. at Noumea, New Calédonia, developing spiny lobster larvae are relatively abundant throughout the plankton of the surrounding ocean. Larval transport

by ocean currents spans interisland abysses (Thorson 1961) and although P. longipes femoristriga and P. versicolor are apparently restricted by distances greater than 1,000 miles (George 1968), P. penicillatus is almost intercontinental (Holthuis 1968). It is strongly believed that larval recruitment does not result from spawning events of local stocks but rather from those of far removed, distant island populations. It is imperative to observe that along Micronesia's narrow reefs no marine shelf exists and that essential substrate available to settling larvae and adult residence is at a premium. Consequently, regardless of availability of planktonic larvae, the paucity of suitable habitat available to settling animals is the primary limiting factor of abundance and is the major determinant of spiny lobster population size.

Populations of greatest density frequent shallow waters (1 - 30 ft deep) where the erosive action of waves along the windward, seaward reefs effect gradual slopes, and within the lagoon amongst patch and fringe reefs and over the inner reef flat where coral growth is most profound. In view of available evidence, existence of high density, deep water spiny lobster populations are mythical. Studies conducted by Emery, Tracy, and Ladd (1954, p.1) at Bikini, Eniwetok, Rongelap, and Rongerik atolls, reveal that slopes around the atolls between the reef edge and 200 fathoms average about 37.5° and are somewhat steeper on the submarine buttresses that underlie reef projections. At greater depths the slopes become gradually gentler, until between 2,000 and 2,500 fathoms they merge with the floor of the deep sea. A near vertical slope is unlikely to support large spiny lobster populations and there is

no evidence to suggest that there is a greater availability of habitat at greater depths. Furthermore, if large populations did indeed survive below the 8 fathom terrace, planktonic larval evidence would betray their presence. Adult stocks, by necessity of larval recruitment, would also exist amongst other island groups presently harvesting commercial quantities of spiny lobsters and it seems likely that promoters there would already have discovered and capitalized upon their illogical presence. This does not exclude the possibility of spiny lobsters inhabiting deep water; within Micronesia, it is strongly suspected that P. ornatus does just that, but it does exclude their being available in commercial quantities.

Within Micronesia, it would appear that P. penicillatus is the most likely species to support commercial interests. Extremely gregarious, it inhabits only a related range of restricted habitat along the very narrow seaward reef slope, which is buffeted over the majority of the year by heavy surf and strong winds. Present in varying numbers in all sectors, it is common along the northeast quadrant, that most often exposed to prevailing winds. Existence of a wide, level, submerged reef flat (Truk, Ponape, Marshalls) induces P. penicillatus to leave its shelter during the night, wade through heavy surf, and graze upon flora and fauna along the outer reef flat. Fishing is most lucrative during the calm, summer months when fishermen walk through ankle and knee deep water of the reef flat at night during lowest tides, illuminate lobsters with carbide lanterns or flashlights, firmly step upon the quarry to prevent escape, and deposit them by hand into burlap sacks.

RECOMMENDATIONS

Lobster traps are ineffective, nets are impractical, and traditional methods remain the most effective. There is no need of large investment for foreign equipment; there is no need to introduce involved techniques, but there does exist the highest monetary return per pound of lobster of any marine product. During an era of cultural and social change, here exists a fishery tailor-made to encourage Micronesian participation employing stable, traditional methods in a modern, foreign regulated economy. However, the resource is limited and will probably only satisfy local demands. Responsible management should discourage exports until it appears that sensible production is greater than local markets can absorb. Fishery controls at this stage should not be imposed upon Micronesian fishermen who should rather be encouraged, but proper documentation of catch per effort should be recorded to indicate fishery trends and provide an index to determine overfishing. Since habitat is suspected to be the most important limiting factor, experiments to provide artificial shelters might be warranted at selected sites.

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BACKGROUND

A graduate of the University of Maine, Mr. MacDonald received his BA degree in Zoology. He has been employed by the Fish & Game Departments of Maine and Vermont where he contributed to the management of cold water sport fisheries for landlocked salmon and trout. While a Peace Corps Volunteer, he has served as a marine biologist for the Trust Territory's Division of Marine Resources and in that capacity has assessed the spiny lobster resources of Micronesia. In completion of his studies, Mr. MacDonald served as technical consultant for FAO of the United Nations to the South Pacific Islands Fishery Development Agency and is credited with providing an ecologically sound basis for responsible fishery management throughout the tropical Pacific island realm where species considered occur.