STUDIES ON THE GROWTH OF SPINY LOBSTER, *PANULIRUS HOMARUS* IN MARINE CAGES

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ABSTRACT

A raft and four nylon cages were constructed to study the growth of fishes, prawns and lobsters. One of these cages of 2.5 × 1.6 × 4.0 m size was specially designed for lobster culture in the new harbour area at Tuticorin. The cage was provided with a bottom tray with 10 cm dia. P. V. C. tube bits of 0.5 - 2.0 m length open at both the ends. The cage was stocked with 40 nos of young **Panulirus homarus** *with an average weight of 19.7 g. At the end of the experimental period of eight months, a maximum growth of 210 g. was observed with a survival rate of 57.5%. The major constraints in cage culture of lobsters in marine conditions are dealt with and the possible means to overcome the problems are also analysed.*

INTRODUCTION

Experimental culture of spiny lobsters are in progress in countries like China, Japan, Korea and USA (Ling, 1972). An earlier review by Provenzano (1969) deals with the studies made on the larvae of spiny lobsters and slipper lobsters. A later review by Chittleborough (1974) commenting on the status and problems of lobster culture tells upon the prospects of rearing rock lobsters also. Studies on the growth of Indian spiny lobsters in India carried out at different centres are mainly confined in controlled conditions (Mohamed and George, 1968; Thomas, 1972; Kathirvel, 1973 and Kuthalingam *et al.*, 1980). Previous studies on the culturability of spiny lobsters were mainly conducted in experimental tanks or pens erected in the coastal waters. But the present study on the growth of the spiny lobster, *Panulirus homarus* was carried out in a cage suspended in the coastal waters of Tuticorin.

MATERIAL AND METHODS

Construction of the lobster cage

A floating raft was constructed by means of casuarina poles, nylon rope and empty oil drums. Four nylon meshed cages were suspended from the raft for the culture of fishes, prawns and

lobsters. One of the cages, 2.5x1 6x4 0m was specially designed for the culture of lobsters. The bottom of the cage was fitted with a tray made of thin GI sheet and its height was 10 cm. Two cross bars were provided at the bottom of the tray and two hooks were fitted on each bar for fixing the P. V. C. tubes. The bottom of the tray was provided with 1 cm dia. holes at a regular intervel of about 30 cm. P. V. C. tube bits of different lengths (0.5 m to 2.0 m) and diameter (7.5-10.0cm) were arranged in 3 rows at right angle to each other in the middle of the tray on the two cross bars. The tubes were arranged in both the upper and lower rows length wise and a middle row was along the breadth-wise so as to give more space for the lobsters to live. The arranged tubes were tied on to one another and also with the tray finally by means of a nylon rope. P.V.C. solvent was also applied in between the tubes to assure additional strength. The whole structure was launched in Tuticorin new harbour basin and stabilized by means of anchors.

Young ones of *Panulirus homarus* were collected from the coastal waters of Tuticorin during February and March. Forty numbers of young ones of the size 2.0 - 3.2 cm (carapace length) with an average weight of 19.7 g were stocked in the cage in March 1982. The stocking density was maintained at the rate of 10 nos / m^2. The lobsters were periodically fed with trash fish. Since the fouling organisms attach on the mesh of the cage and also on the P.V.C. housing, cleaning was done twice a month. Clay, barnacles and molluscs settled at the tray and they were also removed regularly to avoid additional weight to the cage. Water samples were also collected periodically to assess the quality of water. This experimental study was carried out for a period of eight months from March to November, 1983.

RESULTS AND DISCUSSION

During the period of study lobsters were found to have grown to an average weight of 165 g. The maximum growth of the lobster was 210 g. The survival rate was 57.5% and the growth rate was 18.2 g/month.

There was no significant fluctuation in the physico-chemical and biological conditions during the period of study. The salinity was between 34.8 and 35 3‰. Surface water temperature ranged from 26 to 30°C and the oxygen content was from 4.3 to 4.8 ml/l. The plankton was rich with copepods like *Oithona* sp., *Pontella* sp., *Corycaeus* sp., *Oikopleura* sp. and other meroplankters like polycheate larvae, copepod nauplii, cirripede nauplii, lucifer protozoea, crab zoea and shrimp mysis and fish eggs and larvae. The phytoplankton was mainly represented by *Rhizosolenia* spp., *Chaetoceros* spp, *Coscinodiscus* sp. and *Biddulphia* spp.

The lobsters were found to occupy the upper and middle row of tubes. Usually one or two individuals were found in each tube at a time. The barnacles and molluscs settled on the tray pose problems for the lobsters to move around and occupy the tubes, in addition to increasing the weight of the cage. Though the holes were provided at 30 cm intervals of the entire bottom of the tray, the shells remained at the sides and among the P. V. C. tubes. So, the number and size of the holes may

be increased to overcome this problem. In the place of tray, cross bars may be fixed in the supporting bottom frame in which P. V. C. tubes can be attached. Alternatively a cluster of P. V. C. tubes can also be suspended from the raft inside the cage, covering more area in different directions to provide more space for hiding. This would facilitate increased stocking density.

The other problem in the culture of lobster in cages is the fouling organisms as pointed out by Chua and Teng (1980). Fouling rate is much faster in the environment as pointed out by Coche (1976). The tray, its holding ropes and the P. V. C. housing were infested by simple ascidians, sponges, edible oysters and barnacles and so periodic cleaning is a must.

The stocking density can be further increased by giving additional protective places in different levels of the cage and feeding the animals intensively. By doing so, the production can be increased by utilizing the entire column of water. The hiding places may be provided in the form of pigeon holes of pockets made of light weight synthetic materials as Neoprene Pockets described by Hanson (1974) for the purpose of concentrating and harvesting of marine crops. Polyculture technique can also be adopted in cages introducing other compatible fishes, feeding on phytoplankton along with lobsters.

The fouling organisms of the cages may also attract their natural predators which may inturn affect cage culture. This can be overcome by providing an outer protective net.

The recent findings of growing lobsters to giant size by eye stalk ablation (Anon., 1982) can be adopted in cage culture of lobster to boost production.

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