



CENTRAL MARINE FISHERIES RESEARCH INSTITUTE

ERNAKULAM, COCHIN-682 031, INDIA

R & D SERIES FOR MARINE FISHERY RESOURCES MANAGEMENT

17. PRAWN CULTURE IN SALT PAN AREAS

The Central Marine Fisheries Research Institute has evolved new indigenous techniques for farming prawns on modern scientific lines. M/s Motha Brothers, the leading salt producers of Tuticorin, approached the Institute for development of prawn farming in the saline fallow coastal lands adjacent to their saltpans in Veppalodai, north of Tuticorin. Realising the importance of demonstration and dissemination of the technical know-how developed in the Institute, the Institute agreed to develop the farm on a trial basis, and the work was started in early 1986. All scientific and technical aspects of the culture programme, from designing of ponds to harvesting and marketing, were the responsibility of the Institute, while the land owners were to look after the management of work. The high rate of production obtained during these trials, viz. 1200-1700 kg/ha/crop, with an average annual production of 2434 kg/ha, has been very encouraging as it is a record for saltpan areas in India. The trials have indicated that the white prawn, *Penaeus indicus*, is the most suitable species for culture in saltpan areas, where the salinity ranges from 38 to 48 ppt.

Site development

The derelict land which was to be developed into the prawn farm was with sand-mixed clayey soil rich in organic matter. The estuary had a moderate tidal range, of nearly 0.75m, and a rich prawn seed resource. Ponds were constructed in an elevated place adjacent to the creek and the water was lifted from the creek by an electric pump to a height of 2 m. This arrangement helped to drain the ponds easily for perfect harvesting and for further preparation. Ponds were designed in rectangular size, 0.5 ha or 1 ha in area, with inlets and outlets on opposite bunds. Gradient slope was provided in the radiating canals, trenches and catching pit to facilitate quick draining. The mud excavated from the trenches and catching pit was used for raising bunds. The size of the bunds was 3m x 2m x 1½m. The ponds were ploughed well for softening the soil, and fertilized with 500 kg/ha of poultry dung or 1000 kg/ha of cow dung to promote algal development. Bloom of phytoplankton (or "green water") developed gradually, and then the stocking of ponds was made.

Culture management and production

Semi-intensive culture system was followed, wherein the selected species was the fast-growing *Penaeus indicus*. The culture experiments were designed according to the availability of seed in nature. The seed were collected from tidal pools and inlets near the estuarine region. February-May and August-October were the periods for maximum collection of seed of *P. indicus*. The most suitable size of seed for stocking was 15-25mm and the optimum rate of stocking, for best growth and production, was 70,000/ha. Change of water in rearing ponds was arranged in the cool hours of the day, and the depth of water was maintained at 0.70 m. Productivity of the pond, measured by light and dark bottle method, was in the range of 500-700 mgC/m²/day. This promoted the growth of benthic algal communities that formed the food of the juvenile prawn, particularly in the

early days of rearing. Pelletized supplementary feed was supplied at dawn and dusk of day from the second month onwards at a rate of 7-10% body weight. The ingredients of the feed was fishmeal powder, squid-waste powder, rice bran, wheat bran, tapioca powder, groundnut oil-cake and multivitamins. Semi-boiled clam meat and fish meat were given according to the availability. The food requirements were determined based on the percentage of stock surviving and the progress of growth in weight of the prawn. When instances of "stress" or suffocation due to depletion of oxygen in rearing ponds was noticed in the early hours, mostly in ponds with excessive "green water" or phytoplankton bloom, electrically operated air compressor and floating paddle wheel were used to generate more oxygen. Cessation of feeding on supplementary diet was noticed at times when water replenishment was interrupted. Such situations were managed by improving the flushing system. One-fifth of the volume of water in the pond was drained through outlets daily and replaced by pumping sea water from the creek. Water was screened to prevent entry of predators. There was an inverse relationship between the stocking intensity and growth rate. Seed of *P. indicus* released at 28 mm grew to 138mm/19.8 g in 153 days when stocked at the rate of 50,000/ha. The crop raised during monsoon season had a better growth than that raised during summer obviously because of the lower salinity and emperature. In summer, the prawn seed released at 20 mmt reached 125mm/16 g at harvest, after a culture period of 174 days. Conducive environmental factors as well as optimum stocking intensity were the primary concerns determining the growth of prawn. Salinity varied from 38 to 48 ppt, oxygen was in the range 3.80 — 4.42ml/l and pH was in the range 7.90 — 8.25.

Three crops were raised in a year by short term culture operation as it was found to yield higher production and income. Maximum production of 1600-1700 kg/ha/crop

was attained in high stocking intensity and longer period of culture, varying from 160 to 224 days. A total of 10,407 kg of *P. indicus* was produced from the 7 ponds that covered a total area of 4.2 ha, and, raising 2-3 crops in a period of 25 months, these operations fetched a gross income of Rs 3.9 lakhs. The rate of production in the existing system varied from 532 to 1706 kg/ha/crop, with an average of 991 kg and survival rate of 93%. The average income per crop of 144 days worked out to Rs 22,000/- per ha. The cost of inputs for the crop amounted to 50-60% of the income. The cost of feed was around Rs 4/kg, and the other major expenditure, which was the electricity charges for pumping water, was Rs 1000-1500 per ha of ponds/crop. The capital expenditure involved in the construction works and installation of pump sets etc. was recovered from the income from four crops, at the rate 25% of the profit. The conversion ratio of prawn production and supply of feed in the experiments was 1 : 5.4.

Remarks

With improved management and greater operational efficiency, the prawn farm at Veppalodai has set an example for the development of saltpan areas for prawn culture. The extent of low-lying brackishwater areas suitable for prawn farming in Tamil Nadu has been estimated to be 15000 ha. Similar land resources are available in Gujarat, Maharashtra, Karnataka and Andhra Pradesh for development.

Prepared by Shri R. Marichamy, Scientist S-2, and Published by
Dr. P. S. B. R. James, Director, CMFRI, Cochin-682 031,

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