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PROVEN TECHNOLOGY

4. HATCHERY TECHNOLOGY FOR MASS PRODUCTION OF MARINE PRAWN SEEDS*

Highlights: Technology of rearing larval forms of marine prawns to stockable seed size has developed chiefly through Japanese efforts in recent years. Due to varying climatic conditions and occurrence of different candidate species in other parts of the world this technology could not be adopted *in toto* in other countries. It required adaptation to the local conditions. Due to the high priority given to development of prawn culture in our country it has become an imperative need to adapt this technology to our conditions. The Japanese technology relied on use of culture of the diatom *Skeletonema costatum* and the freshly hatched larvae of the brine shrimp *Artemia salina* for feeding the various larval stages. Although the species of diatom is available in the country, maintenance of cultures is rendered difficult due to the prevailing temperature regime. The brine shrimp eggs are too expensive. The method developed at the CMFRI obviates the use of both these organisms and instead relies on cultures of a locally available diatom, *Chaetoceros affinis* and a euryhaline strain of rotifer *Brachionus plicatilis*. Survival rate of 70% has been obtained by use of these organisms as larval feed.

Operational Details: The penaeid egg hatches out into a nauplius which passes through protozoea and mysis stages before it becomes a postlarva. The freshly hatched nauplii are stocked in 2 ton capacity plastic tanks containing settled and filtered seawater of salinity 30-32 ppt, at the rate of 50 larvae per litre. Vigorous aeration is provided from an oil free air compressor or blower throughout the rearing period. In the normal ambient temperature of 28°C the nauplius passes through 6 substages and transforms into protozoea after 2 days. In the last nauplius stage, separately cultured diatom, *Chaetoceros* (200,000 cells) per ml) is added at the rate of 200 litres per tank. This is done after reducing the water level of the tank to the extent of 200 litres. From protozoea I onwards the larvae begin to feed on the diatoms. The feeding operation is repeated every day. After a period of 3 - 4 days the protozoea, having passed through 3 substages, transforms into the mysis stage. At this stage in addition to the diatom culture, frozen rotifer *Brachionus plicatilis* (separately cultured, harvested and frozen into blocks) is also provided as food at the rate of 100 rotifers per larva per day. The mysis passes through 3 substages in as many days and metamorphoses into the first postlarva. At this stage the feeding of diatom is discontinued and frozen cladoceran, *Moina* sp. (separately cultured, harvested and frozen into blocks) is given as food at the rate of 20 per postlarva per day. Five days after they became postlarva they are harvested and counted before stocking in nursery or packing and despatching to the farmers who have nurseries.

From nauplius to postlarva an average survival rate of 70% is achieved although on several occasions survival rates as high as 95% have been recorded.

Fig 1. Live feed cultures at NPCL

Production: The magnitude of production depends on the facilities available. With the existing facilities available at the Narakkal Prawn Culture Laboratory (NPCL) of CMFRI, (6 rearing tanks of 2 ton capacity, 6 fibreglass tanks of 1 ton capacity for phytoplankton cultures, 1 rotifer tank of 40 ton capacity and 4 Moina tanks of 2.5 ton capacity) it is possible to rear 6,00,000 larvae per operation lasting 15 days i.e.1.2 million larvae per month. At the average rate of 70% survival 8,40,000 postlarvae can be produced per month. If 20 numbers of 10 ton capacity tanks are used for rearing and the other facilities are increased proportionately it should be possible to develop a system to produce 14 million prawn seeds per month.

Inventory and cost: It is to be clearly understood that the larval rearing technology is the most important aspect of prawn seed production but a unit of such production can function only along with other technological link-ups such as know-how for spawning prawns under controlled conditions, culturing and maintaining live feed for the larvae and mainte-

Fig 2. Larval rearing pools at NPCL of CMFRI.

Fig 3. A farmer taking consignment of prawn seeds.

nance of live prawn seeds for distribution. While considering a project for commercial production of prawn seeds all the above factors should be considered in an integrated pattern to work out the capital costs. For a unit aiming at a production of 14.0 million seeds per month for a period of 5 years the cost of chief equipments such as Pumps, Air compressors, Generators, Pools/tanks, refrigerator, deep freezer, Dinghies, Out-board motors, vehicles and lab equipments would be round Rs.1.5 million; land and buildings about Rs.1.0 million and contingencies including salaries, labour and maintenance expenditure about Rs.2.5 million (0.5 × 5) totalling Rs.5.0 million for 5 years.

It is difficult to work out the production cost based on the laboratory and small scale operations but on the basis of our experience the production cost of 1,000 seeds cannot exceed Rs.6.00.

Prospects: In the light of the present trend of development of prawn culture there is considerable scope for establishing hatcheries in the coastal districts of all maritime states of the country for distribution of prawn seeds to the farmers. There is also scope for development of export trade on live prawn seeds.

*Prepared by scientists of NPCL.