

HATCHERY TECHNOLOGY FOR FRESHWATER PRAWN



Freshwater prawn

The giant freshwater prawn, *Macrobrachium rosenbergii* (scampi) is a highly valued delicious food and commands very good demand in both domestic and export market. Due to its fast growth rate, high market demand, attractive price and its compatibility to grow with carps, it is fast becoming one of the most important cultured species in the inland aquaculture system in the country. This species can also be cultured in low saline brackish water areas (salinity < 10 dS/m) and can be cultured either alone (monoculture) or as a polyculture in combination with carps, tilapia and chanos. It is also a suitable species for incorporation in the paddy cum fish culture. Culture of freshwater prawn can be carried out in earthen ponds, cement cisterns, pens or in cages. However, most of the operations are being carried out in earthen ponds.

The Central Institute of Freshwater Aquaculture (CIFA), Bhubaneswar, has developed a viable hatchery technology for the production of high quality seed and for table size prawn production. The technology involves:

- Captive generation of high quality Broodstock in earthen ponds,
- Semi-closed, two phase clear water larval rearing, and
- High density rearing of post-larvae.

A. Captive Generation of Broodstock

The advanced juveniles, weighing more than 5 gram should be stocked @ 1–2/m², by keeping male to female ratio of 1: 4, in well prepared earthen ponds. The prawns should be fed with specially formulated broodstock diet (crude protein 38%, lipid 8%), twice daily @ 10% of the prawns weight for the first two months and subsequently at the rates of 2–5% of the biomass. The ponds should be monitored and managed on a regular basis to maintain optimum water quality. The prawns attain maturity in 2–3 months. Thereafter, females bearing advanced embryos are collected from these ponds regularly for the seed production purpose.

B. Semi-closed, Two Phase Clear Water Larval Rearing

Two-phase clear water technology is suitable for larval rearing for non-coastal hatcheries. This technology may be adopted after suitably modifying

as per location specific requirements also. The steps involved in the larval rearing technique are:

- Healthy mother prawns (bearing grey eggs on their pleopods and weighing more than 50 gram should be selected from the brood stock pond/tank and disinfected for thirty minutes with 0.3 ppm Copper Sulphate or 30 ppm formalin.
- Mother prawns are then stocked @100–150 g/m² (2–3 number of 50 gram female) in brackish water (salinity ≤ 5%) and reared till hatching. Tanks should be checked daily for appearance of larvae.
- Once hatching occurs it may continue for 24–48 hours. The spent females should be removed from the tank and released back to the brood stock pond.
- The salinity of the larval rearing medium is then increased to 12% and the rearing is continued in the same tank.
- During the first phase, the larvae (also called as Stage I or Zoea I) should be stocked in conical tanks at a high density (200–400 larvae per litre). About 50% of the medium is usually exchanged every other day with fresh medium of identical salinity. The larvae are reared for 10–12 days in this phase.
- In the second phase, the advanced larvae should be stocked at the rate of 50–80 per litre of medium in large cement tanks of a greater surface area and reared till metamorphosis. About 50% of the medium should be exchanged every other day.
- The freshly hatched *Artemia nauplii* should be given as live food to the prawn larvae, 4–5 times per day in the early stages (Stages II to V or VI). During later stages it can be given once during late evening in combination with wet larval feed which is usually given during day time. The brine shrimp *nauplii* are fed to the prawn larvae @ 5 to 50 *nauplii* per larva per day. About 2 kg of *Artemia* cysts is required to produce one lakh post-larvae.
- Wet larval feed (egg custard, minced fish/mollusc flesh; protein level of more than 50%) is fed @50–200 µg/larva/day depending on the larval stage. The wet feed is given during day time.
- The larval rearing tanks should be cleaned daily by siphoning off excess food particles and metabolic waste from the tank bottom. This should be done after stopping aeration, preferably in the evening hours before exchange of water and introduction of live food (*Artemia nauplii*).

- Daily monitoring of water temperature, salinity, pH and dissolved oxygen levels should be carried out to maintain the water quality at optimum level for successful seed production as per the given parameters.
- The appearance of first post-larva is usually observed 20 days after hatching, normally between 22 and 32 days (at 28–32°C) and 90% larvae metamorphose within next 10 days.
- The post-larval production normally ranges from 35–40 per litre and the cycle lasts for 35 to 40 days.
- The post-larvae are gradually acclimatized to freshwater and reared at high densities (2000–5000/m²) for 10–15 days in hatchery. The post-larvae should be fed on formulated diet @100% of the biomass daily. After a week or a fortnight, the post-larvae are suitable for stocking in grow-out ponds.

Water temperature	29–31°C
Salinity	10–13‰
pH	7.0–8.5
Dissolved oxygen	>5 ppm
Nitrite	< 0.1 ppm
Ammonia NH ₃ -N	< 0.1 ppm

C. Culture Technology of Freshwater Prawn

The technology aims at a sustainable production of 1.0 to 1.5 tonnes prawn/ha/crop. The technology involves an initial nursery phase of two months followed by a grow-out phase of six months. Prawn culture technology includes the following steps:

- Preparation of pond,
- Eradication of competitors and predators,
- Fertilization of pond with organic and inorganic manures,
- Provision of hide outs,
- Stocking of ponds with juveniles,
- Feeding,
- Management of water quality,
- Pond aeration,
- Sampling of prawns for growth measurement,
- Disease control, and
- Harvesting.

In the nursery phase hatchery produced post-larvae should be reared for two months in well-prepared earthen nurseries (0.02 to 0.1/ha)

@ 20–50/m². The post-larvae need to be fed twice daily with formulated pellet diet in crumble form @ 25–50% of the biomass. Aeration should be provided from an aerator for about 8 hours daily. The ponds are monitored and managed on a regular basis to maintain optimum water quality.

The nursed juveniles, weighing nearly one gram should be harvested from the nurseries and stocked in well prepared earthen production ponds @ 4–6/m². The prawns are fed daily with formulated pellet diet (2–3 mm size) @ 10% of the biomass initially and then reduced to 3% of the biomass at the end of the culture period. Daily monitoring of critical water quality parameters such as dissolved oxygen, pH, and temperature is essential to prevent any loss of stock due to poor water quality.

Phytoplankton bloom and decaying waste materials are usually the main reasons for dissolved oxygen depletion in prawn ponds. Regular monthly sampling with cast nets or small mesh seine nets should be done to assess growth of the prawns. After four months, prawns that achieved marketable size (more than 30 gram) are removed by using a seine net of suitable mesh size. Selective harvesting should continue once every 3–4 weeks for another 3–4 months and finally the pond may be harvested by complete draining of water.



Harvested prawn from grow out ponds

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