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SCAMPI (Fresh Water Prawn) FARMING

* **Dr. G. Ganesh, **Dr. N. Rajanna,**
*Subject Matter Specialist (Aquaculture)
**Programme Coordinator& Head
Krishi Vigyan Kendra, P.V. Narsimha Rao Telangana Veterinary University, Mamnoor, Warangal-506 166.
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Introduction

The largest freshwater prawn is called a "scampi" and is called *Macrobrachium rosenbergii*. It is a native of South East Asia and India. It is a promising species for aquaculture because of its quick growth rate, high demand in the market, hardness, euryhaline nature, and compatibility with main carps in India. Being naturally slow, it spends the day partially buried in the silt or concealed in a structure that is shielded from the sun. It typically looks for shallow areas with lots of organic debris and aquatic flora. Even in captivity, it breeds all year round, reaching its peak during the monsoon season. To finish its life cycle, it requires habitats in freshwater and brackish water. The juvenile and adult forms are benthic omnivores, whereas the larvae consume zooplankton. Scampi reaches a maximum size of 30-32 cm (350-450 g), with its cephalothorax occupying half of its body.

The mature male prawn has a notably larger second chelipedes and is substantially larger (heterogenous individual growth, or HIG) than the female. The male's abdomen is narrower and head is proportionally larger. The male's genital pores are located at the basal area, in between

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the fifth walking leg. Male morph types are classified into three categories: small male (SM), orange claw male (OC), and blue claw male (BC). The male BC's second pair of peraeopods are blue and incredibly lengthy, the male OC's are golden, and the male SM's are little, thin, and nearly translucent. It's interesting to note that other intermediate male forms, such as transforming orange claw (TOC), strong orange claw (SOC), and weak orange claw (WOC) males, have also been identified.

The base of the third walking leg is where the female genital pore is located. The female has a longer pleura (the sides of the abdominal segment that protrude) and a wider abdomen than the male. During the incubation phase, which is the time between laying and hatching, the eggs are carried in a brood chamber formed by the pleura of the female's first, second, and third tail segments. When a huge orange mass occupies a significant section of the dorsal and lateral regions of the cephalothorax, it is easy to identify a ripe or ovigerous female The terms virgin females (V or VF), berried (bearing eggs) (BE or BF), and open brood chamber (spent) females (OP) are occasionally used to describe female prawns. The Azhikode hatchery of the Kerala State Fisheries Department was the first facility in India to develop the technology of mass rearing larvae for commercial purposes.

Seed Production

Broodstock development

The sub adult or adult is harvested from a wild or grow-out pond when it weighs at least 60 g. It is then carefully carried in a polythene bag or an aerated plastic container (with the rostrum, telson, and chelipedes sealed). It is stocked in an earthen pond with a 0.2-1 ha water spread area and a water depth of 1 m after being disinfected with 0.3 ppmCuSO4 for 30 minutes upon arrival at the hatchery. Typically, a male to female sex ratio of 1:4 is used together with a stocking density of 0.5–1 no./m2. To preserve the genetic quality of the broodstock and progeny, it would be beneficial to obtain adults from various areas. In order to prevent the spread of disease, appropriate quarantine procedures and routine physical examinations for the presence of germs, viruses, and parasites must be observed. Feeding the prawns three times a day at a rate of 3-5% of their body weight with commercial pelleted feed that contains 35–40% protein is an option.

Mating

Adult spermatozoa (spermatophore) deposit a gelatinous mass on the bottom of the thoracic region and between the female's walking legs as a result of mating. Only ripe, soft-shelled females who have just finished their pre-mating moult—typically at night—and hard-shelled males can successfully mate. Though their behaviours can vary, all male species are capable of fertilising females. Mating takes place year-round in the wild, with regional climate changes contributing to this. Furthermore, periodic surges in activity can be attributed to

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environmental factors such as temperature, salt intrusion, and monsoon showers. Breeding often occurs in the summer in temperate regions.

After a few hours of mating, the eggs are forced through the gonopores and directed into the brood chamber by the ovipositing setae (stiff hairs) located at the base of the walking legs. In this process, the spermatozoa that are affixed to the outside of the female's body fertilise the eggs. The pleopods and swimmerets vigorously move to keep the ovigerous setae in the brood chamber, where the eggs are kept aerated. With some minor temperature-dependent variations, the female carries the eggs for three weeks during the incubation process. It can be concluded that 28–30°C is the best temperature for a successful incubation. When a female reaches full maturity, her fecundity can reach 100,000 or more eggs in a single spawning, depending on her size. On the other hand, first brood—those born in their first year of life—typically lay between 5,000 and 20,000 eggs. Generally speaking, 1 g of a healthy female can produce 500–1000 larvae.

Seed production

The berried female, which is the source of her dark grey eggs, is kept in PVC pipes or cylinders that are capped on both sides with netting to prevent punctures to the bag. The pond is used for the brood stock pond. Rubber tubes serve as protective caps for the rostrum and telson. During transit, the temperature inside the container is regulated with ice bags. Prawns that have been starved for a few hours before to packaging accumulate fewer metabolites during transit. As soon as the berried prawn reaches the hatchery, it is immediately bathed in 100 ppm formalin for 10 minutes and then rinsed in freshwater to get rid of any epifauna. The berried female is housed in individual 500 litre FRP containers with 300 litres of filtered water at a salinity of 6 ppt, and she is fed oyster or clam flesh. Continuously available mild aeration is given. Every morning, metabolic wastes and leftover food are taken from the tank, and half of the water is replenished.

Maturity stages

When an egg hatches, its colour changes from yellow to bright orange to pale grey and finally slate grey. Hatching will begin at 26–30°C in 48–72 hours

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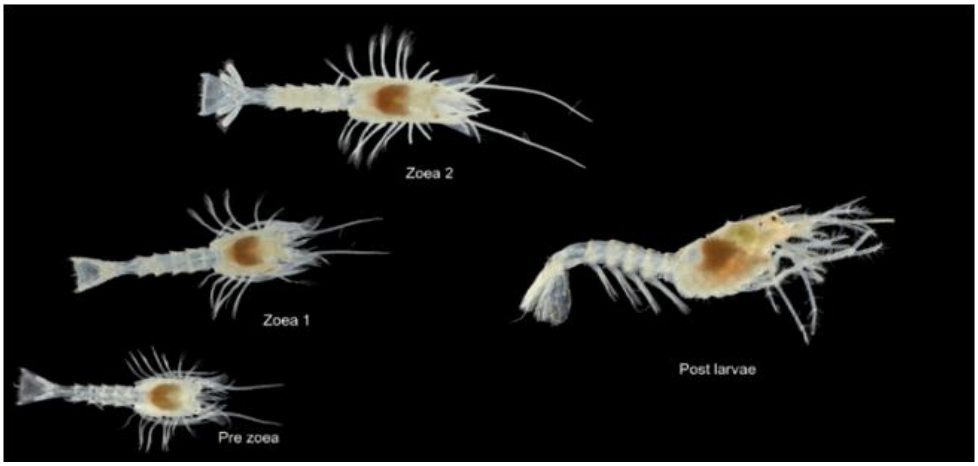
S.No.	Parameter	Range
01	Temperature	28-30ºC
02	pH	7- 8.5
03	Salinity	10-12ppt
04	DO	5 ppm
05	Alkalinity	80-100 ppm
06	Photoperiod	2/12 hr L /D
07	Turbidity	Nil
08	TAN	<0.1ppm
09	NO_2-N	<0.01ppm
10	Iron	<0.02 ppm
11	Hardness	<120 ppm
12	TDS	<200 ppm

after the egg colour turns dark grey. Using a scoop net, the larvae are gathered early in the morning. Shortly after hatching, the female is gently returned to the stock tank.

Rearing of larvae

Prior to transformation into post-larva (PL), the larva goes through 11 zoeal stages. PL is typically carried out in a FRP tank with a capacity of 500, though this might vary depending on the hatchery's convenience and capability. One hundred to three hundred hatching larvae are stocked. The following lists the factors of water quality that are necessary for raising larvae.

Before metamorphosing into post-larva (PL), the larva goes through 11 zoeal phases. This transformation typically occurs in a FRP tank with 500 L capacities, while the exact size of the tank depends on the hatchery's needs and convenience. Stocked at 100–300 no./L are the hatching larvae. The following lists the water quality requirements for raising larvae.



Filtered freshwater and saltwater are combined with a sodium hypochlorite solution (35 ppt) to produce 12 ppt saline water. After that, the mixture is left to aerate for a full day in order to eliminate the chlorine. If necessary, excess chlorine can be removed by treating the area with

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sodium thiosulphate. The larvae are fed egg custard and live Artemia nauplii in addition to their prepared meal. Care is used when feeding to avoid overfeeding or underfeeding. The details of the daily ration are shown in above table. Every day, between 60 and 80 percent of the water is refilled. Every morning, leftover food, metabolic wastes, debris, shells, and dead larvae are removed by turning off the aeration and removing the settled particles from the tank bottom.

The non-synchronous metamorphosis goes through 11 larval stages in 16–28 days, depending on the temperature and water quality. The larvae that are in good health float at the top of the water when they reach stage V, while the unhealthy ones congregate at the bottom of the tank.

Artemia nauplii requirement

DOC	No. of Artemia nauplii requirement/larva	Daily feeding frequency
3-4	10	Three
5-6	15	Five
7-8	20	Five
9-11	30	Six
12-14	40	Six
15-24	50	Seven
25-30	40	Seven
31-35	30	Seven

Rearing of Post-Larvae (PL)

The metamorphosed PL (7-9 mm) is similar to the juvenile, which rests or crawls on the surface of the tank, but it is more benthic. It is maintained in a cement tank (20 t capacity) with constant aeration, a stocking density of 40–60 no./1, and a gradual acclimatisation to freshwater. To stop cannibalism, submerged artificial shelters (tiles, PVC pipes, etc.) are available. Three to four times a day, it is fed a finely crumbled pelleted feed that accounts for 10–20% of its body weight.

Egg custard with minced fish, mollusk or prawn flesh can be used once or twice a day in place of pelleted diet. Every day, there should be a 60–80% water exchange. It grows to a size of 16–21 mm in the following 15 days and has a 70–80% survival rate. Given that the PL are cannibalistic by nature, adequate nutrition is essential.

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Harvest and transportation

PL is removed by scooping out of the tank. The leftover PL gathers in the vicinity of the rearing tank's lit section, which is covered in black sheets. The raising tank's salinity is lowered to the appropriate levels before packaging. The quantity of PL is spooned out into 1000–2000 polythene bags, depending on the PL's size and the length of the transit. There are other similarities with tiger shrimp.

Pond Farming

Site selection and pond construction

Freshwater prawn culture is best suited for rectangular ponds measuring 0.2–0.4 hectares and having a water depth of 100–150 cm. From the water intake to the outlet, the pond's bottom should be smooth and slope gradually. Fertiliser can be used on sandy-clay or sandy-loam soil. The pond's banks have to be high enough to prevent flooding. There should be no impurities in the input water. The other factors are nearly the same as those that were discussed for the larger carps.

Preparation of pond

Once the pond has completely drained, it is sun-dried for around two weeks, causing the soil to fracture and eliminating pathogens while also enhancing soil fertility. Tilling the pond bottom allows offensive gases to escape and allows organic materials to oxidise. For the purpose of farming large carps, the remaining pond preparation tasks are completed as described.

Water quality requirements

The optimum range of water quality parameters are given below:

- ✓ Temperature: 26-31ºC
- ✓ pH: 7-8.5
- ✓ Transparency: 30-40 cm
- ✓ Salinity: 0-7 ppt
- ✓ DO: >4ppm
- ✓ Alkalinity: 80-120 ppm
- ✓ TAN :<0.1ppm
- ✓ NO_2-N :<0.01ppm
- ✓ NO_3-N :<10 ppm
- ✓ Calcium: 50-100 ppm
- ✓ Iron :<1 ppm
- ✓ Hardness: 40-100 ppm

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Stocking

A density of 2-3 no./m2 is used to store the seeds (PL-15). When the water in the container is spun, healthy seeds aggressively swim against the current, have a straight body, exhibit the full range of appendages, and react quickly to external stimuli. As the current decreases, it will usually stick to the sides of the container instead of flowing through the middle. To guarantee the highest possible survival rate, the seed can first be raised at a density of 20–25/m2 in a small nursery pond until it reaches a size of 3–5 g. A nursery pond could occupy five to ten percent of the entire grow-out area.

Feeding

The prawn is fed twice a day with a specially designed feed that has 25–30% protein and 8–10% fat, which is initially given at 8% of body weight and then reduced to 2% by the end of the culture period. If clam flesh is reasonably priced, it can also be fed to it.

Care and monitoring

A filter net with a mesh size of 60 pm is used to filter water drawn from natural open sources in order to reduce the possibility of infections and carrier organisms. Evaluations of animal growth, health, and water quality every two weeks are crucial. The health is negatively impacted by abrupt changes in the physio-chemical properties of pond water. An increase in ammonia could cause the animal to die in large numbers due to leftover food, metabolic wastes, or a sudden collapse in plankton. Because the species has a high cannibalism rate, hiding places include pipework, nylon screens, and chopped tree branches.

Harvesting

It's standard procedure in freshwater prawn farming to regularly cull huge individuals. After the prawn grows to a marketable size of 50–100 g, the entire crop is harvested at the end of the culture period.

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