

Scientific Guidelines for farmers engaged in freshwater Prawn farming in India

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The commercial importance and popularity of the giant freshwater prawn *M. rosenbergii* is gaining recognition due to its high growth rate, hardiness and very low protein requirement. A profitable and foreign currency earning venture, freshwater prawn farming has taken a unique place in the present aquaculture scenario of India. As the population grows more and more people are adopting prawn farming to fulfil the increasing demand for food.

In India, freshwater prawn farming could not catch the attention of the farmers until a few years ago due to unsophisticated and low production technologies. Now, after the occurrence of white spot virus in marine shrimp farming, and due to emergence of improved management practices capable of supporting higher production the farmers are adopting it with great enthusiasm. However, despite the development of sophisticated and high yield technologies most freshwater prawn farms in India use extensive farming systems. I have suggested some guidelines that will help farmers to increase both their production and the sustainability of their farm.

Guidelines for collection of wild / hatchery produced seeds

There are currently two sources of freshwater prawn seed in India. One is wild seed collected from the lower reaches of rivers and brackish waters and the other is hatchery-produced seed. It has been widely reported that the seed collected from wild habitats usually do not grow to appropriate marketable sizes. The main reason for this is that the wild seeds are usually a mixture of different species of prawns at different stages of development. As a result there is a wide variation in the size

of stock at harvest. To overcome this problem, prawn farmers should segregate the desired cultivable species from the other species of prawn. Farmers should also stock the larvae and post larvae of that particular species that are around the same weight or nearby. These problems can be reduced by using hatchery-produced seeds where available. Hatchery-produced seeds are also generally found to be better than wild seeds in terms of growth rate, resistance towards disease and tolerance to confined conditions.

If possible, both wild and hatchery produced seeds should be tested for serious pre-existing diseases before stocking. Some hatcheries can supply seed that has been screened for disease using advanced molecular diagnostic techniques like PCR, ELISA, and Latex agglutination. The seeds should be conditioned for two to three days before their release in the stocking pond to help them adjust to the culture conditions.

Guidelines for the grow out culture of fresh water prawns

Grow out culture of freshwater prawns is mostly carried out in earthen ponds ranging from 500 m² to 1 ha with average depth of 1-1.5 m. Post larvae at PL-20 stage and nursery-reared juveniles of 1-2 g are most suitable for stocking. The stocking density of the prawn larvae and juveniles should be based on desired marketable size and the different facilities available at the farm. It is generally found by most of the farmers that the marketable size at harvest is reduced with increasing stocking density. It is advisable to stock prawn seed at the rate of around 5-10/m² to get an appropriate harvesting size on the completion of entire culture period. When prawn larvae get to a somewhat

larger size, some hideouts or shelters like broken tiles, pieces of PVC pipes or earthen pipes should be placed at the bottom of the pond to reduce the problem of cannibalism.

Guidelines for feed & feeding in grow-out culture ponds

Feed management is the backbone of effective prawn farming on which the fate of the entire farm resides. Being an omnivorous or preferably carnivorous animal, a diet comprising of trash fish, mussel or clam meat, small worms, insect larvae and small molluscs is suitable to get proper growth and high production (note that the use of other crustaceans as feed carries a high risk of introducing disease). In addition, supplementary feed prepared from groundnut oil cake, soybean oil cake, crushed rice, wheat flour, fishmeal, egg, with added vitamin and mineral mixture can be used to raise the yield. Pelleted feeds are usually preferred to wet feeds to provide all the nutrients required by prawns in appropriate quantities. Feeding rates are decided on the basis of size and number of prawn, water quality parameters as well as on the nature of feed. It is better to use check trays to monitor the demand of prawns. Tray feeding is the best method of feeding, as there is no wastage and water pollution using this method. Broadcasting can also be employed as feeding method but should only be done either in the edges of the pond or at the fixed locations. The feeding should be done in morning and evening hours since the metabolic rate and other activities of prawn are reduced during the day.

Guidelines for water quality management

Monitoring water quality parameters is a vital aspect of prawn farming. Changes in water quality parameters occur on the basis of stocking density, feeding rate and water exchange. Oxygen depletion is the most common hazard in prawn farms, which can be caused by heavy organic load, over-feeding and presence of algal blooms. The level of oxygen can be raised by using aerators or water exchange. A list of water parameters with optimum ranges is given underneath.

Table 1: Optimum parameters for freshwater prawn culture

Parameters	Optimum range
pH	7.5-8.5
Temperature	29-31 °C
Hardness	100-150 ppm
Alkalinity	>50 ppm
Ammonia	0.1 ppm
CaCO ₃	>40 ppm
DO	4 ppm

The growth rate reduces with high values of hardness in water. Heavy fertilization with manure and organic fertilizers is not preferred in prawn farming since it leads to oxygen depletion due to decomposition of excess organic material by microbes. Water exchange should be done at appropriate rate and at fixed intervals to maintain water quality.

Guidelines for control and prevention of the prawn diseases

There are a number of agents including bacteria, viruses, fungi, parasites, microbial toxins and adverse factors, which can cause harmful diseases in prawns and cause the entire culture system to suddenly collapse. Therefore, proper care and attention should be paid towards the diagnosis, control and prevention of disease. Care should be taken in testing the seeds before stocking for any dangerous disease. The seed should also be examined carefully for any symptoms or signs of weakness

indicating the onset of disease. This helps to ensure that quality seed is stocked, reducing the risk of disease problems on the farm. It is generally observed that in adverse environmental conditions such as low dissolved oxygen and high fluctuation in temperature, pH or hardness of water that some microbes start secreting toxins, which can initiate many hazardous diseases and can cause depletion of yield. To control and minimize microbial disease outbreaks, farmers should maintain the water quality parameters in a good range, observe a sound feeding strategy and keep other environmental factors and stocking density at appropriate levels.

There are a lot of diseases caused by viral infections in prawn culture systems. No effective drug or vaccine is available to control these since viruses are not sensitive to antibiotics. However, the incidence and spread of viral diseases can be minimized to some extent through use of good management techniques to maintain water quality, appropriate feed management and health care management.

Guidelines for harvest and post-harvest handling of prawns

Harvesting of prawns is a critical point in successful prawn farming. The shell condition of the prawns should be checked before harvesting to minimize the catch of soft-shelled prawns. The best harvesting period has been suggested to be during morning and evening hours because the high intensity of sun light can be an inducing agent for molting, leading to a greater proportion of soft-shelled prawns. It is better to harvest only marketable sized prawns and allow the smaller ones to gain more weight. Through this batch harvesting, the reduced density of prawns can increase the growth rate of prawns remaining in the pond.

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After harvesting, the prawns should be washed in potable & pressurized ice water to remove dirt and other unwanted matter. Before selling or transferring the prawns to processing plants, the prawns should be chilled with ice to minimize bacterial, autolytic and chemical spoilage. The ice to be used for chilling should be made from potable water. The best way to chill prawns is to use ice in the proportion of 1:1 ice to prawn by weight as this controls the temperature and slows down the action of enzymes which reduce prawn quality. Flake ice should be used for chilling of prawns because it is softer and does not damage the prawns, as may happen if crushed or block ice is used.

Conclusion

Bearing enormous resources of inland & brackish waters, India has immense scope for fresh water farming but still has not realized its full potential. This is mainly due to limitations on the supply of quality seed, the extensive farming methods used and the lack of awareness of better management practices among farmers. With proper farm and water quality management and intensive attention to the health of stock fresh water prawns can become a major food commodity and source of income for rural people. I hope that the guidelines provided in this article will be helpful for the farmers of India in enhancing their production and in making it sustainable.

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