

Coastal Pond Farming Technology: Indian pompano Culture in Earthen Pond

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Introduction

Indian pompano (*Trachinotus mookalee*) is a marine fish, considered to be one of the good candidate species for coastal aquaculture and suitable for species diversification. The fish found to be suitable for farming in coastal pond at variable densities. Among, different farming systems, the coastal pond farming practice can utilize wet and saline soils and degraded and unutilized lands. Also, the unused coastal ponds (shrimp) can be reused for new culture operation or in crop rotation with shrimp. Understanding the culture potential of the species, the pond culture technology was developed under the All India Network Project on Mariculture (AINP- Mariculture). The standardized package of practices for the coastal pond farming method for Indian pompano is given below. Various steps involved in the culture method are pond preparation, water treatment, nursery rearing, grow-out culture and harvesting.

Pond preparation

New pond or existing pond can be used for the farming of the species. Pond should be prepared with an average water depth of 1.5 m in the entire pond area with sufficient free board space and strong bund walls. The soils with increased seepage can use plastic linings on side bunds. When old pond is used, then the top layer of the soil containing accumulated waste has to be removed and ploughing has to be done. The preferred pH of water should be in the range of 7.5-8.5. The level of lime application during pond preparation depends on the pH of the soil. Hence, the dosage has to be calculated accordingly.

Water treatment

Water filling from direct canal or reservoir can be followed. While filling water, filter bags with less than 100 μ m mesh should be used to filter the water in order to avoid the entry of weed fishes into the pond. All animalcules in the pond should be killed

by chlorination of the pond at 10 ppm. Pond fertilization can be done with either organic or inorganic fertilizers to stimulate the plankton bloom. The plankton bloom in the pond is used for conditioning and maintaining the water quality. After four days, the chlorinated water can be applied with urea (2.5 ppm) and TSP (3 ppm) to condition the pond water quality. The optimal salinity range for the better growth performance of Indian Pompano is found to be 15-35 ppt, while the fishes do tolerate a wide range of salinity from 5 to 40 ppt.

Nursery rearing

After receipt of the transported fish fry or fingerlings they are acclimatized in hapas or nursery facilities within the rearing earthen ponds or adjacent ponds without delay. It is suggested to maintain the separate nursery rearing unit for better management. Nursery rearing prior to grow-out culture is highly recommended for, better survival of stocked fry/fingerlings, proper health and feed management, better growth and to reduce cost of production of the fish in grow-out culture. If the grow-out farming operations are in larger scale/area, then separate nursery pond is recommended, whereas for small scale operation, hapa based nursery culture is ideal. The ideal hapa size for stocking of the advanced fry is 2 x 2 x 1.5 to 4 x 4 x 1.5 m with 0.5 to 1.0 cm mesh size, and the mesh size depends on the stocked individuals. As the fingerlings grow the hapas with bigger mesh sizes are exchanged. The installed hapa net should be attached with zero mesh size net or mosquito mesh of one feet height at water



Fig1: Nursery rearing of Indian pompano in pond based hapa system

interface for avoiding feed wastage through hapa mesh, due to wind action. Nylon net is preferred material for hapa in nursery rearing since it is softer than HDPE net, which prevent skin damage to the growing fish. The ideal stocking density of the fry in the hapa is 200 to 250 nos/m³. The fish at the nursery rearing stage accepts formulated feeds, and the feed with high nutrient content (Crude Protein 45% and Crude Fat 10%) is suggested. Feeding frequency of 4-5 times/day at 8-10% of body weight is recommended during the initial phase. The expected survival for the fish during hapa based nursery rearing is around 90-95%.

Grow-out culture of Indian pompano in coastal ponds

After reaching an optimum size of 25 to 35 g, the nursery reared fingerlings should be released to the open pond. The optimum stocking density recommended for open pond is 1 to 1.25 numbers/m², i.e., average of maximum 5000 nos/acre can be stocked for better management and optimum growth. The fish is more sensitive for dissolved oxygen, thus aerators should be installed in the four sides of open pond. The water quality in grow out culture should be maintained well by applying fertilizer periodically. Formulated pellet feed with high protein is recommended for the fish in grow out systems and thus feed with 40% crude protein and 10 % crude fat is recommended for grow-out farming. While applying feed, broadcasting feed in the feeding zone is suggested to avoid feed wastage by drifting due to wind action. Feeding zone can be created by fencing the particular area in the pond with the help



Fig. 2: -Sampling of Indian pompano in grow-out ponds

of PVC pipes or small mesh. For better feed digestion and assimilation, a minimum time gap of 3 hrs should be given between two feed intervals, thus the feeding frequency should be decided accordingly. In grow out culture, fish growth should be monitored fortnightly and feeding rate is adjusted based on the weight gain after every sampling. Based on several demonstrations, the fish fingerlings of 20 to 30 g stocked at 1 to 1.25 nos/m³, takes nearly 11-12 months to reach the size of 1000 g, and if stocked at 100g size, it takes 6 to 7 months to reach the same size.



Fig3: Feeding for Indian pompano in grow-out pond

Table. 1: Days of culture, growth and feeding in grow-out culture of Indian pompano

DOC	Size (g)	Feed Size (mm)	Feeding Rate (%)	Feeding Frequency (times/day)
0	10	1.2 & 1.8	8	4-5
30-120	50-100	1.8 & 3.0	6-5	4-5
120-180	100-300	3.0 & 4.0	5-4	4
180-210	300-500	4.0 & 6.0	4-3	4
210-300	500-750	6.0 & 7.0	3-2.5	4-3
300-360	750-1100	7.0 & 10.0	2	3

Water quality management in grow-out farming

Unlike shrimp culture, fish culture is a long duration crop and thus periodic monitoring of water quality is foremost important. One of the important critical parameters in grow-out farming of the fish is the dissolved oxygen content, and that all the time the oxygen concentration should be >4.0 ppm, and critical limit is 1.5 ppm. The range of other water quality parameters includes; Salinity: 15-35 ppt; water pH: 7.5 to 8.5; Total ammonia: <1.0 ppm, hydrogen sulphide (H_2S): $<5 \mu g/lit$. Since, the duration of culture is longer and if the culture period exceed more than a year for any reason, the slurry from pond bottom should be periodically removed to avoid impact of hydrogen sulphide gas to the fish due to pond bottom deterioration. The fish is carnivorous, thus adequate zooplankton content, reduces the intake of formulated feed, and feeding of zooplankton and small crustacean enhances fish body colour, which eventually attract better price for the fish. The optimum zooplankton content should be 5-10 individuals/ml of water.

Fish Health

Following proper husbandry management including optimum stocking density, feeding and water management maintain the fish in good health condition. However, in the coastal pond culture system the fish are prone for bacterial infections due to different stress factors and increasing water temperature during summer month. Vibriosis is the common bacterial disease noticed in nursery phase and initial grow-out phase due to handling stress. This can be controlled by application of probiotics and medicated feed with approved antibiotics; Oxy tetracycline of 2.5 to 3.0 g/kg of feed for the continuously three days is suggested when symptoms are visible.

Fish harvest and marketing

Indian pompano is a pelagic fish, and thus the harvesting could be easily performed by using drag net. Immediately after harvest, washing in clean water and chill killing is suggested to maintain the freshness and quality of harvested fish. Harvested fishes can be packed in plastic trays or thermocole boxes by adding layers of ice in equal quantities at the bottom and top of the fish. It is suggested to harvest the fish in the morning to maintain the freshness. The cultured fish can be harvested based on the market demand, and most preferably during the lean fishing periods. The most potential states for marketing the fish are Kerala, West Bengal, Goa, and selected

pockets in Andhra Pradesh, Tamil Nadu, Karnataka and Maharashtra. Some of the selected buyers are Maxwell exporters, Kochi, Kerala; MATSYAFED, Kerala; West Bengal Fisheries Development Corporation, Kolkata.



Fig.4: Harvesting of Indian pompano from coastal pond



Fig. 5: Marketing of coastal pond cultured Indian pompano

Economics

The total operational expenditure and profit for culture of the fish in 1 acre water spread area is given in the table. Coastal pond farming of Indian pompano with the stocking of 5000 nos/acre for one year period will support the farmer with net profit of approximately Rs 2.25 lakhs with price realization of Rs 325/kg fish.

Table. 3: Economic analysis of Indian pompano in coastal pond

Sl. No.	Particulars	Cost in (INR) (Rs.)
1	Pond preparation (Existing pond)& water treatment	40,000.00
2	Seed cost - 5000 nos @ Rs 10/seed	50,000.00
3	Seed transportation @ Rs 4/seed	20,000.00
4	Nursery rearing (Hapa& accessories)	25,000.00
5	Feed @ FCR 1:1.75, with survival 90% (Approx. 8 tonnes of feed @ Rs 110/kg)	880,000.00
6	Labour cost @ Rs 12,000/labour/month	1,20,000.00
7	Electricity	50,000.00
8	Miscellaneous expenditure	50,000.00
9	Expenditure (Sl no: 1-8)	12,35,000.00
10	Production: 4500 kg @ 90% survival with selling price @ Rs 325/kg	14,62,500.00
11	Net profit : (8-9)	2, 27, 500.00

Best Management practices to be adopted for grow out culture of Indian Pompano

1. Fish fingerlings of > 30 g should be stocked to obtain maximum survival, and stocking bigger seed size will reduce the grow-out period to six months.
2. Suggested optimum stocking density should be of 5000nos/acre for good economic return.



3. Pond should be fertilized at every fortnight to maintain water quality and water productivity (colour). Maintaining more zooplanktons and small crustaceans in the pond will help to reduce the use of formulated feed, increase the feed conversion efficiency, and also helps in the overall improvement of the fish pigmentation offering a better price at harvest.
4. The fish is active and fast moving fish, oxygen consumption by the fish is very high and thus, dissolved oxygen content should be always > 4 ppm for better survival. Thus, one acre water spread area of the pond should have minimum of 4 aerators and with minimum of 8-10 hours per day, especially late evening and early morning.
5. Creation of feeding zone in the pond will help to conditioning the fish for feeding to a particular area, and also will reduce feed wastage by dispersal over the entire pond area due to wind action.
6. Except for the first few months (3-4 months) of operation, the subsequently water exchange of 25% should be done in every month to maintain water quality. This practice may help in reducing the use of probiotics and water conditioners.

Suggested readings

Ranjan, R., Megarajan, S., Xavier, B., Ghosh, S., Santosh, B., Gopalakrishnan, A., 2018. Broodstock development, induced breeding and larval rearing of Indian pompano, *Trachinotus mookalee*, (Cuvier, 1832) – A new candidate species for aquaculture. *Aquaculture* 495, 550-557

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