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Ornamental Fish Farming – Successful Small Scale Aqua business in India

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Ornamental fish keeping is becoming popular as an easy and stress relieving hobby. About 7.2 million houses in the USA and 3.2 million in the European Union have an aquarium and the number is increasing day by day through out the world. Ornamental fish farming is also growing to meet this demand. The fact is that USA, Europe and Japan are the largest markets for ornamental fish but more than 65% of the exports come from Asia. It is encouraging news for developing countries that more than 60% of the total world trade goes to their economies. Although India is still in a marginal position its trade is developing rapidly. An estimate carried out by Marine Products Export Development Authority of India shows that there are one million fish hobbyists in India. The internal trade is estimated to be about U.S.$ 3.26 million and the export trade is in the vicinity of U.S.$ 0.38 million. The annual growth rate of this trade is 14%.

A rich diversity of species and favorable climate, cheap labor and easy distribution make India, and West Bengal in particular, suitable for ornamental fish culture. With Kolkata as a distribution and export center the adjoining districts have become the major ornamental fish-producing zones of India. About 90% of Indian exports go from Kolkata followed by 8% from Mumbai and 2% from Chennai. In the state of West Bengal there are more than 2000 people involved in this trade including ornamental fish breeders, growers, seed and live food collectors, traders and exporters (Fig. 1). About 150 families are involved in ornamental fish farming to maintain their livelihood. More than 500 families use it as an additional income generating business.

Series of cement cisterns are made in the backyard for ornamental fish farming.

Small-scale farmers use round portable earthen pots for rearing of juveniles

Some low-income suburban fisher folk have successfully established ornamental fish farming as a small-scale business. The general management practices followed by the small-scale ornamental fish farming of West Bengal are discussed.

Main producing districts

Most of the ornamental fish farms are located in North and South 24 Parganas, Nadia, Hoogly, Howrah districts around Kolkata so it is easy for the farmers to market their fish. The largest wholesale ornamental fish market in India is located here. Most of the fish are distributed to different states of India via train, bus or air. Some are sent abroad also.

No aerator and thermostat is used for outdoor rearing of common ornamental fish

Small-scale farmers

The distribution of the population, size of the family, education and job status of 110 families of Howrah and South 24 Parganas are given in table 1. Most of these families run small home units to earn additional monthly income of Rs. 2500- 5000 (US$ 50-100). Generally the men have other professions and they only look after the seed collection and marketing. The women and children do the everyday care like water exchange, feeding.

Fish Species

Two categories of ornamental fish are being marketed - exotic ornamental fish and native fish of India, which have ornamental value for coloration or behavior. Exotic fish dominate the domestic market. Already 288 exotic varieties have been recorded in Indian market. More than 200 species of these freshwater fish are bred in different parts of India and others still have to be imported as fry[1].

According to availability, demand, and climatic conditions the ornamental fish farmers of West Bengal are mainly engaged in breeding and rearing of common exotic live bearers and egg layers[2]. The egg layers lay sticky or non-sticky eggs on the glass wall or

Table 1: Family size, education and job status of 110 families

Population	No.	Education up to secondary	Have other job
Men	150	60%	120
Women	180	40%	25
Boys	85	70%	School education
Girls	60	60%	School education

Artificial breeding mops made up of nylon thread is used to collect the sticky eggs from cisterns

aquarium plants. Some parents show parental care and some destroy their eggs so different breeding setups are needed. Live bearers release young in batches and are easy to breed.

Among the preferred fish, there are common exotic live bearers like guppy, *Poecilia reticulata*; molly, *Poecilia latipinna*; swordtail, *Xiphophorus helleri*; platy, *Xiphophorus maculatus* and egg layers like gold fish, *Carrassius auratus*; koi, *Cyprinus carpio*; tiger barb, *Puntius tetrazona*, Siamese fighter, *Betta splendens*; serpae tetra, *Hyphessobrycon serpae* and on-growing of some imported fish like silver shark, *Balatocheilus melanopterus*; angel, *Pterophyllum scalare*, red – tailed black shark, *Labeo bicolor*; red finned shark, *Labeo erythurus*. Sometimes they are collecting the fry of native ornamental fish and selling them after rearing and domesticating them. The native ornamental fish include honey gourami, *Colisa chuna*; rosy barb, *Puntius conchonius*; zebra fish, *Brachydanio rerio*; glass fish, *Chanda nama*; Reticulate loach, *Botia lohachata*. Presently only about 52 native fish species from West Bengal have been earmarked as aquarium fish[3].

Farmers use their facilities to breed a range of species shifting with the season.

Culture tank

Cement cisterns, all glass aquaria, earthen ponds, even earthen pots are being used as culture tanks. The urban and suburban landless farmers generally use cement cistern in the backyard or on the roof. Two or three cement cistern are sufficient for a small rearing unit (around 3m x 2m x 1m). The cisterns are built above ground level for easy drainage. Indoors, all-glass aquaria are preferred for breeding purposes as heaters and aerators can be used. Farmers with small earthen tanks can use them for rearing juveniles with the food fish. Marginal farmers even use large earthen pots of 1.5m diameter for rearing the larvae and juveniles.

Aquaria are used for bath treatment of fish with medicines

Generally the area of the tank depends on the type and size of the candidate species. In the case of fresh water tropical species, generally the farmers consider that for each 1cm of fish length, 20cm^2 of surface area is sufficient.

Culture water

In the municipal areas the farmers use normal tap for farming. Before use it is aerated for few days for de-chlorination. Tube well water is also used directly in the rural areas. The average temperature of the rearing water in the area is 15- 28C and the pH is slightly alkaline. Other parameters are not so crucial. Most of the species cultured prefer soft to medium hard water.

Food and feeding

Food, especially the first food of larvae is vital for achieving good survival rates. The small-scale farmers cannot afford different readymade pellet feed or brine shrimp larvae. However, they have successfully substituted low cost alternative live feeds. Green water, water fleas, *Tubifex* or sludge worm, mosquito larvae and chopped earthworm are used. Different homemade feed like whole-wheat bread, vegetable peelings and rice are also fed. However, most farms depend on *Daphnia*, tubificid worms and mosquito larvae. The farmers collect *Daphnia* from the near by ponds by sieving through fine mesh in the early morning. Tubicid warms and mosquito larvae are generally collected from the sewage water channels. In fact there are quite a few people whose profession is to collect these live foods and sell them to the farmers.

Generally the farmers dispense the feed once daily, preferably in morning. The rate of feeding depends on species, size and season. Overfeeding is more harmful than under feeding as the excess feed destroy the water quality.

Table 2: Easily available chemicals and medicines for health management

Chemicals/ Medicines and dose	Method of use	Purpose
Common salt @ 15-30 gm/lt.	Bath treatment for 30 min	As disinfectant
Methyline blue @ 2.5 gm/lt.	Added in aquarium water	For water purification
Copper sulfate or Potassium permanganate @ 0.5-1 gm/l	Bath treatment for 1 min	As disinfectant

Health management

In ornamental fish farming, proper water quality maintenance is the primary preventive measures as they are very sensitive to temperature and pH. The common health hazards of the ornamental fish are white spot, mouth fungus, tail and fin rot. The farmers use some easily available and economic chemicals and medicines as preventive measures. These are in Table 2.

Marketing

Kolkata, the capital of West Bengal is the main distribution centre. From here the fish are sent to different states of India by air or road. A fair amount is also exported. Two parallel marketing procedures exist for exotic and native fish. In the case of exotic species, more than 99% is consumed by the domestic market and a few species like gold fish and angelfish are exported. On the other hand, 90% native ornamental species are collected and reared to meet export demand. The amount of marine ornamental fish trade is negligible in this area.

The marketing process is generally being done through the following channels:

- Firstly, the producers directly sell the ornamental fish directly to the wholesalers, but the amount is very negligible
- Secondly, there are some big middle tired men who buy large volumes of fish at very low prices from the producers, rearing the fish for 2-3 months before selling at the wholesale markets again for increased profit.
- Lastly from the wholesale markets, retailers and others purchase the ornamental fish.

For export, the Marine Products Export Development Authority has 20 registered exporters. They either have their own farm or collect the fish from different areas for export. The USA, Japan and Singapore are the main markets.

Economics

An ornamental fish production unit may be of three types – a breeding unit, rearing unit or combined breeding and rearing unit. The profit depends on the carrying capacity, candidate species and infrastructure. The marginal farmers who breed or rear the fish have to sell them earlier due to the lack of proper equipment and get less profit. On the other hand better-off farmers rear the fish to an optimum size and get more profit.

The average cost and return of a minimal breeding and rearing unit of live bearers is in Table 3.

Outlook

Ornamental fish farming can be a promising alternative for many people. It requires little space and less initial investment than most other forms of aquaculture. At the first stage of starting of an ornamental fish farm, very sophisticated or complicated equipment is not necessary. Only a clear understanding of habits and biology of the fishes basic needs is required so it can be practiced even in urban areas with little alteration of backyard or even the roof of a dwelling. As less manpower is needed, the women or the elders can run small home units. With slightly more sophisticated equipment such as heaters, aerators and power filters, and practices such as selective breeding, stock manipulation and proper feeding, large units can be maintained in urban areas also.

References

1. Mahapatra, B.K., Dutta, A., Basu, A., Dey, U.K., and Sengupta, K.K., 1999. Observation on the spawning and rearing of Angel fish, Pterophyllum scalare(Lichenstein). In: M. Sinha, Dhirendra Kumar and P. K. Kathia (eds.), Eco- friendly Management of Resources for Doubling Fish Production Strategies for 21st century. Proceedings of the National Seminar, December 22 and 23, 1999, Inland Fish. Soc. of India, Barrackpore; 102-106.
2. Mahapatra, B.K., Ghosh, A. and Datta, N.C. 2000. Breeding and rearing of ornamental fishes, Guppy, Poecilia reticulata, Peter and Gold fish, Carassius auratus (Linnaeus) for prospective entrepreneurship development. Green Technology. Vol.3. PP 26-33.
3. Ghosh, A., Mahapatra, B.K. and Datta, N.C.2000. Ornamental fish farming- an additional income generating programme for women folk with a note on its constraints and prospects, the Fifth Indian Fisheries Forum, Asian Fisheries Society, January 17-20, 2000. Central Institute of Freshwater Aquaculture (ICAR), Bhubaneswer.

Table 3: Average cost and return of a breeding and rearing unit of live bearers

Capital cost (Rs.)		
2 glass aquarium (2.5 x 2 x 1) m each with lids and fittings	@1400.00	2,800.00
3 cement cistern (5 x 3 x 2) m	@1200.00	3,600.00
3 aerator	@200.00	600.00
Other equipments like hand net, buckets, pipes		1000.00
		8000.00
Culture cost (Rs.)		
200 hundreds female	@1.00	200.00
50 male	@3.00	150.00
Feed for one year		3,600.00
Others		1,000.00
		4,950.00
Total cost (Rs.)		**12950.00**
Production Monthly production of 5,000young Yearly production of 60,000 young 40% male = 24,000 60% female = 36,000		
Sale		
24,000 male	@1.25	30,000.00
36,000 female	@0.30	10,800.00
Total sale		40,800.00
Annual profit = (40,800.00 - 12,950.00) = 27,850.00 **Monthly profit = Rs. 2,320.83**		