

Ornamental aquaculture

An alternative avenue for livelihood support

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Ornamental aquaculture is among hobbyist farming types where aesthetic sense of human prevails. This can be taken as an addition to other farming practices like beekeeping, mushroom cultivation, etc. It can be taken up in small range of initial capital or in a large scale also. Thus, there is an ample scope for livelihood development through ornamental fish farming in villages. Ornamental fisheries involve wide area of business including culture and breeding of fishes, aquarium construction and design, culture of aquatic plants, live food culture, etc.

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THE Food and Agriculture Organization (FAO) estimated the world trade of ornamental fish around US \$ 20 billion. The top exporting country is Singapore followed by Hong Kong, Malaysia, Thailand, Philippines, Sri Lanka, Taiwan, Indonesia and India. The largest importer of ornamental fish is the USA followed by Europe and Japan. The emerging markets are China, South Africa and gulf countries.

Domestic trade of ornamental fisheries valued around ₹ 600 crores mainly contributing from local aquarium shops across the country. The trade is mainly concentrated at major metro cities like Kolkata, Chennai, Mumbai, Delhi, Hyderabad, Bangalore and Cochin. The key production is from small scale production units within 1 acre of land and investment within ₹ 3 lakhs. Around 50% of this trade value is mainly of imported accessories for use in urban aquariums.

Commercially important ornamental fishes

There are around 30 important fish families which constitute as

ornamental fish varieties which are traded worldwide. Live bearers belonging to poeciliidae is one among commercial fishes, which are easy to culture and breed in small tanks. Koi carp and gold fish belonging to cyprinidae are one of the oldest domesticated fishes and are seen with

number of varieties. Tetra, angel fish, discus fish, fighter fish, gourami, barbs, catfishes, etc. are other groups which are most preferred in freshwater. Dozens of varieties of these fishes have been developed by the fish breeders in the sector. Certain varieties fetch higher price than the



Fig. 1. A mini backyard model ornamental hatchery in 400 sq. ft. area at ICAR-Central Institute of Freshwater Aquaculture for the beginners who wants to venture in ornamental fish farming.

normal fish, this is due to variation in fish colour within the species. Most of the important varieties are imported from countries like Singapore, Malaysia, Indonesia and Sri Lanka where ornamental fish breeding and culture is more than in India. There are indigenous fishes mainly from two biodiversity hotspots which are collected from the wild and exported. This has caused decline in fish stocks and threat to the natural biodiversity. Therefore, in order to conserve such important fish varieties breeding and culture of important indigenous fishes the study has to be carried out.

Backyard ornamental unit in rural areas

The major hitch among small scale farmers is the availability of land for farming. The increasing land price makes it difficult for new farmer to venture into agriculture. A minimum space of 400-600 sq.ft is needed to start the ornamental fish culture in the backyard on mini commercial scale (Fig. 1). Small rectangular or circular tanks are better for the unit because of the space constraint. Tanks made of ferrocement will last longer and is efficient to use. Tanks should be arranged in a manner that better utilizes the space and covers maximum tanks in minimum area. Such models are successful in Kerala and West Bengal, where women in their backyard venture in ornamental fish farming. Even polylining sheets can be used for preparation of backyard tanks for the culture and breeding of fishes.

During the initial days, farmers can take up production of live bearers as its breeding and rearing are relatively easy. Among live bearers, guppy (*Peocilia reticulata*) is simplest to start with as it tolerates greater variation in water quality and accept all types of foods. There are many guppy varieties available in market like, round-tail, spear-tail, fan-tail, veil-tail, pin-tail, cobra guppies, Singapore guppies, etc. Another popular live-bearer is molly of various types such as sail-fin molly, black molly, moon-tail, round-tail, chocolate molly, white molly, orange molly, balloon molly, etc. Another magnificent group of live-bearers is



Fig. 2. Ornamental Fish village in Deogarh District where women SHG involved in fish farming

sword tail (*Xiphophorus helleri*) with varieties like red sword tail, green sword tail, sunset sword tail, tuxedo tail, double-sword tail etc. Yet another common fish is Platy (*Xiphophorus maculatus*) with varieties like round tail, veil tail, fringe tail, lyre tail, pin tail, etc. (Fig. 3). A sound knowledge on biology, feeding behaviour and ambient condition of a fish is a prerequisite before going ahead with breeding and culture. Production of fish food, brood stock diet and larval diet needs special attention. The broodfish needs live food like tubifex worms and larvae during early stages. This necessitates a unit for continuous production of live food. Generally, breeding is easy

but larval rearing needs special care.

A small space in the backyard of a home can be converted into a small breeding and rearing unit. Such backyard unit needs low investment and a farmer can avail an agricultural loan to develop such units. Basic training on the subject will be helpful before starting an ornamental fish farming. It is good to begin from small fishes like bearers or cyprinids, koi carp and gold fish (Fig. 4). Good quality and highly colour variants fish to be procured from reliable source. Good quality feed with 30-35 % protein with carotenoid pigments has to be procured and to be fed twice daily @ 3-5% body weight. Water exchange to be done @10-20% weekly. After breeding, the young

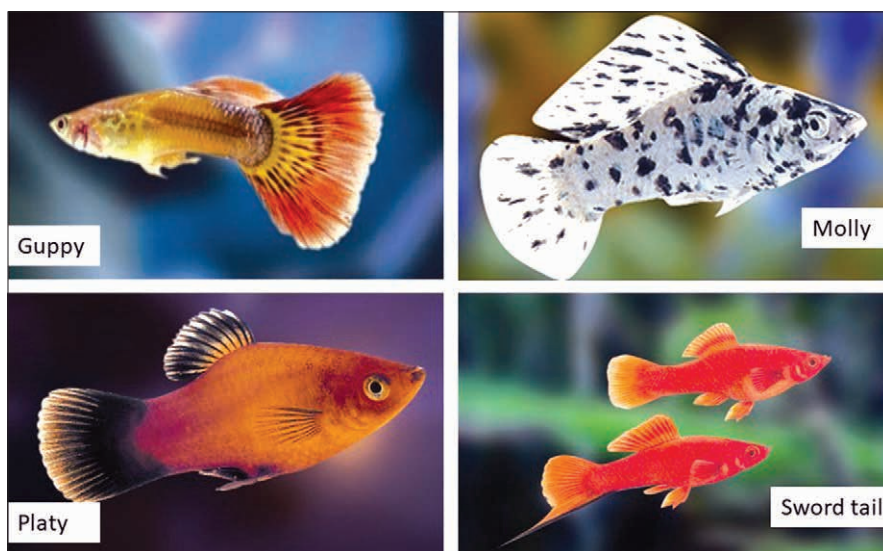


Fig. 3. Commercially important live bearers



Fig. 4. Commercially important egg layers

ones need to be separated, reared to market size for sale. Routine care and necessary management will ensure a constant business. Links should be developed with nearby pet shops for the sale of the fish. If farmer desires he can start rearing varieties like fighter fish, angel fish, rosy barb, tetras, etc. for better income.

The estimated returns of ₹ 2,500-5,000 per month can be obtained by having a backyard ornamental fish culture unit. A farmer can improve his activity as he gains experience by breeding and rearing. There is scope for venturing into egg layers also if a farmer is keenly interested to go further with additional facility. This model can also be used in urban areas for production of live bearers or rearing of small egg layers (Fig 4).

Concept of Ornamental fish village

Ornamental fish village model revolves around production of ornamental fishes in 80% of the households in a hamlet or village. This will form a large number of backyard units producing quantity equal to one large scale unit. The prototype was tested by ICAR-

Central Institute of freshwater aquaculture, Bhubaneswar under National Agricultural Innovation Programme (NAIP) in Odisha where three ornamental fish villages were developed at Landijhari, Saruli and Nuagaon of Barkot block, Deogarh District. Such models will improve the market and ensure livelihood in rural areas. The villages will have facilities for providing accessories, electric supply and live food production. Basically women SHG's can co-ordinate such activities in villages where women can involve in farming along with household activities (Fig. 2). This will help in strengthening women empowerment in rural areas and also earn additional income in every household.

Ornamental fish villages can be also developed in a cluster model by identifying suitable sites and involving local community in fish culture. The cluster can be developed as public private partnership leased to the interested entrepreneurs by local governing body. This type of model can be seen in Chennai Aqua Rainbow park, where number of small ornamental units are developed

and maintained by different fish breeders. Such enterprises will cater not only for domestic trade but also for export market.

Role of ICAR-CIFA to popularize ornamental fish farming

Being the premier institute in freshwater aquaculture, ICAR-Central Institute of Freshwater Aquaculture (CIFA), Bhubaneswar contributes significantly in aquaculture sector with its various promising technologies and products. ICAR-CIFA has developed captive breeding and culture of many indigenous ornamental fishes including many barb species from Western Ghats. The work for commercial level breeding and culture of these barb species is under process to popularize them. The training on ornamental fish farming to different stake holders is provided from time to time. Model ornamental fish rearing unit of different scale is developed for demonstration and training purpose. Scientists are involved in committee's of different policy matters and expert advice for national level projects in this sector. A new variety of rosy barb named 'Shining barb' was developed

by this institute through mass selection technology, which was probably first improved variety of ornamental fish in India.

Contribution in blue revolution and PMMSY

Ornamental fish culture will be a boon for farmers with available water resources and are keen for expansion of their farming practices. The financial boost will help in adding up the trade value of the sector including production of accessories in India. Developmental schemes by NFDB and MPEDA in last decade has given

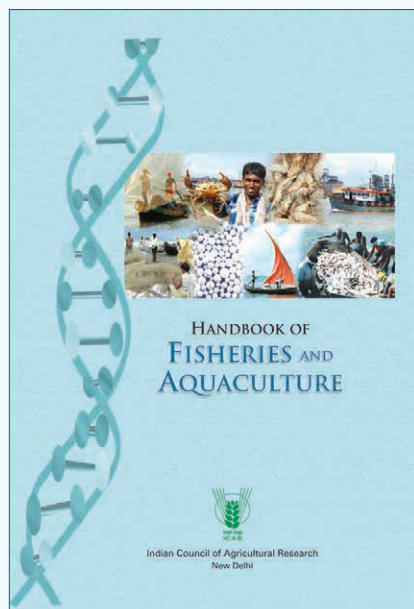
a better shape to this industry. This was mainly focused in states like Kerala, West Bengal, and Tamil Nadu on backyard units with minimal investment. A targeted investment of ₹ 576 crores to generate 7 lakh employment for upgrading the ornamental aquaculture sector is presently set under Pradhan Mantri Matsya Sampada Yojana (PMMSY). Also additional investment of ₹ 500 crore under World Bank scheme is proposed for catering this sector. This will surely help financial needs of the sector to lift up the farming.

Conclusion

Ornamental fishery helps small entrepreneurs in ensuring their livelihood in regions like Kolkata, Chennai and Mumbai. This can be replicated in many urban cities for upbringing this industry and also to ensure employment among youths. As this sector is developing we need to attract many people towards this business and strengthen the domestic trade.

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In 2006, the Indian Council of Agricultural Research, brought out the First Edition of 'Handbook of Fisheries and Aquaculture'. The present revised edition comprises 42 updated and six new chapters, viz. Fish physiology; Aquaculture engineering, Fisheries development in India; Fisheries cooperatives; Demand and supply of fish; and Climate change – impact and mitigation. The Handbook would be of great value to students, researchers, planners, farmers, young entrepreneurs and all stakeholders in fisheries and aquaculture.

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