



# Ornamental fisheries in Northeast India

## State of the art and future directions

N. Sharma,  
S.Yengkokpam  
P. Das  
D. Bordoloi ...✍️

ICAR-CIFRI Regional Centre, Guwahati

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### Introduction

Ornamental fish keeping is a growing sector in aquaculture and still the 2nd most popular hobby comprising of 100 million of hobbyist in the world. The global ornamental fish market has been expanding in its trade in more than 125 countries and valued at USD 5.88 billion in 2022 with an average annual growth

rate of over 10%. The ornamental fisheries industry also includes plants, accessories, aquarium, feed, and drugs is estimated to be worth more than US\$18-20 billion. The top global importers of ornamental fishes are the United States of America (USA) and European Union (EU), followed by UK and Singapore. Globally, USA, Europe, and Japan are the largest markets for ornamental

fishes, but more than 65% of the exports come from Asia encouraging economic development. India's share to global ornamental fish export 0.4% (US\$ 1.4 million) of the total world. More than 100 million ornamental fish are kept as pets in aquariums and ponds in the United Kingdom. Around 4 million families own a pet fish in UK, which is 14% of their population. An aquarium can be

found in approximately 7.2 million homes in the United States and 3.2 million homes in the European Union, a number that is steadily rising worldwide. Ornamental fisheries are gaining rapid importance in earning foreign exchange and as a source of employment.

More than 2500 fish species are involved in the global ornamental fish industry, where over 60% are of freshwater origin and 40% of marine origin. Over thirty freshwater fish species dominate the global market, such as gold fish, angel fish, live bearers, neon tetra, zebra danio and discus. The guppy and neon tetra species alone represent more than 25% and 14% of the market by volume and value. Most (85-90%) of the ornamental fish trade is in freshwater species which are farm-bred and rest constitute of marine species are predominantly wild-caught.

### Criteria for selection of ornamental fish

Ornamental fishes are also known as living jewels, where in a confined aquatic system, attractive and colourful fishes of various characteristics are reared. The criteria for selection of fish species for keeping as an ornamental are:

- ◆ attractive look with beautiful coloration
- ◆ adaptability to live in small confined areas
- ◆ peaceful nature and compatibility to live with other fish
- ◆ ready acceptability of artificial feed
- ◆ peculiar nature (colour change in chameleon fish, *Badis badis*).
- ◆ unique/ unusual appearance (e.g., the Devil catfish, *Chaca chaca*)
- ◆ rare species (e.g., the coloring snakeheads, *C. barca*, *C. stewartii*, *C. bleheri*)

In recent years, ornamental hobbyists are liking for unique or unusual fishes. These fishes are fetching high demands in the ornamental market such as the indigenous snakeheads (*C. aurantimaculata*, *C. stewartii* and *C.*

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*bleheri*) from Northeast India. Figure 1 showing some of the potential native ornamental fishes of Northeast India caught from the wild.

### Ornamental fisheries in Northeast India: State of the art

Ornamental fishes of India are contributing about 1% of the total ornamental fish trade. Due to its unique geographical and hydro-biological circumstances, and rich biodiversity, India has enormous potential for producing ornamental fish. The abundance of native species has made it possible for the country's ornamental fish sector to grow dramatically. North-eastern region are blessed with potential indigenous and endemic fish species, as a bliss for a variety of ornamental fish species. About 90% of native species (85% are from northeast India) are collected and reared to meet export demand. Presently, about 100 native species are reared as aquarium fish. 90% of India's exports comes from Kolkata, where Northeast India accounts for the lion's share, followed by 8% from Mumbai and 2% from Chennai. Almost 80% of the fish species present in Northeast region considered as of ornamental valued, among them are Loaches, Eels, Barbs, Catfish, snakeheads, Goby etc.

Out of the 422 fish species that have been reported for the Northeast region, 250 have the potential to be

ornamental, with Assam having the largest number of ornamental fish species (187 species) recorded. Several species of fish can be considered as potential ornamental fish, at least during their early juvenile phase or during their breeding season. Wetlands/lakes of Assam and other Northeast states contribute a major portion in Ornamental fish diversity of Northeast India. Along with beel fishes, various small hill stream fishes of other northeast states possess interesting morphological characters. Some of these fishes like *Devario* spp., *Garra* spp., *Barilius* spp., *Pangio pangia*, *Balitora brucei*, *B. tileo*, *Batasio tengana*, *Erethistes pussilus* which augment the species diversity of north eastern region. However, the maintenance of hill stream ornamental fishes in aquarium needs special care and relatively high cost due to the sensitivity of these fishes to low oxygen level and different temperature factors. In terms of comfortable maintenance, several fishes such as eels, tank goby, rasboras, barbs, chameleon fish, small catfishes, nemachelids, etc. can be considered as potential fishes for aquarium. A variety of microhabitats are found in the hill streams of Arunachal Pradesh, Meghalaya and Nagaland, these unique habitats harbour qualitatively rich fauna. The small size, strange shape, body colouration and peculiar patterns make the hill stream fishes as decent ornamental species. There are many such fishes





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from this region with very high value in the global ornamental fish trade, mostly dominated by the attractive snakeheads (Figure 2). Snakeheads are most valued but rare ornamental fish species from this region which made its mark globally. There are around 17 snakehead species till discovered and a lot to explore, yet few are in danger of disappearing (*Channa barca*) due to uncontrolled exploitation.

### Importance of Ornamental fisheries

Ornamental fisheries occupied an important position in commercial trade mainly in earning foreign exchange. Ornamental fish farming is one of the most favourite hobby in the world and the number of ornamental fish-keeping enthusiasts is increasing day by day. Ornamental

fisheries not only plays important role in global trade but also have importance in communicating science. Ornamental fisheries as a hobby gives pleasure to young and old people, provides relaxation to the mind, keeps blood pressure under control and helps in prevention of other diseases. During Covid-19 pandemic, the number of aquarium keeping has increases in many countries. It was reported that over 80% of the respondents, irrespective of age, gender, employment status confirmed that aquariums have produced stress-relieving benefits during the COVID-19 pandemic. Children could acquire new knowledge and skills, by observing the fish's behaviour, colour and fin shape. They could develop sense of attachment with nature. Ornamental



fish keeping is easy over other pets as they don't make noise and tank cleaning once in a while is enough. Ornamental fishes like Goldfish, Arowana are believed to bring good luck, wealth and prosperity.

The ornamental fisheries business has been recognized as an avenue of employment, especially for women in various countries, contributing to women empowerment. Because it provides a great opportunity for entrepreneurship development and income generation for livelihood secure for future. It has enormous opportunities, low investment, less time and water requirement. The Ornamental fish farming can be realized at every stages of activities, namely at production, marketing and export. In the north east India, Ornamental fish production was observed to be financially as well as economically viable and investment friendly. With the initiatives by the Govt. as the key institutions, ornamental fisheries can be developed substantially in the region, which in turn can gradually gain a larger share in the world market. To make the ornamental fishery sector more vibrant and lucrative, public-private partnerships can be encouraged by establishing ornamental fish production facilities in different locations throughout the region.

### Future directions

The ornamental fish have recently taken on a larger role in the commercial world especially in terms of foreign exchange. Indian domestic trade in this area is growing @ 20% annually and demand at domestic level is higher than supply. The ornamental fish market is expected to gain market growth in coming years. The primary reason of ornamental market expansion is the customer choice for a high-end lifestyle, rise in disposable money and due to rising knowledge of the psychological benefits of keeping ornamental fish in homes, as doing so can lower stress levels and increase comfort, which in turn encourages many people to buy these kinds of ornamental fish. To



basically match the interior decors and improve the aesthetics, a number of businesses are providing ornamental species with aquariums in a variety of shapes, including rimless, half land, half water, pentagon, square, and hexagon. Popularization of aquarium accessories and development in packing techniques will uplift the existing market.

As the demand of the native ornamental fishes are increasing in domestic as well as global ornamental fish trade, to meet the high demand, few native fish species are getting endangered because of unregulated and illegal ways of fishing from nature. Some of the key threats are identified as overexploitation (destructive fishing methods/ wild catch/ over fishing), water pollution (deforestation/ industrial

release/ chemical contamination), flow modification (hydropower generation/ diversion and withdrawal of water for irrigation or urban or industrial use), destruction or degradation of habitat, exotic species invasion and Climate change etc. There are various conservation measures and management strategies to be adopt for development and improvement of ornamental fisheries in the region, such as conservation of spawning ground, regulation of illegal fishing or wild catch, captive breeding, ranching of fish seed in their natural habitat, strengthening the indigenous fish population, prohibition of bio piracy (illegal export of high valued fish to foreign market), development of proper database on indigenous ornamental species and creating awareness among people etc.

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P2C Communications,  
J-10, Green Park Main, 110016  
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+91-8882667803  
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aquapostnews@gmail.com, www.aquapost.in

Printed, Published and Owned by Pravash Chandra Pradhan, Printed at ISKAAR ART PRESS,  
B-145 DDA, OKHLA PHASE 2, DELHI-110020 and Published at 111/9, 3rd Floor, Ali Apartment,  
Kishangarh, Vasantkunj, New Delhi-110070,

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## Fisheries and Aquaculture Potential in Northeast India

The Northeastern region of India comprising of eight landlocked states viz., Arunachal Pradesh, Assam, Manipur, Meghalaya, Nagaland, Sikkim and Tripura is one of India's richest regions in terms of natural resources and biodiversity. The region has vast and varied fisheries resources in the form of reservoirs, tanks and ponds, beels, oxbow lakes and other derelict waters covering 4.18 lakh ha water-spread area, excluding rivers and streams which is estimated at 20,875 km.

The two main river systems in the region are the Brahmaputra in the north and the Barak, running through the southern edges, together with their numerous tributaries. The region is rich in freshwater fish species and is regarded as one of the world's

hotspots for freshwater fish biodiversity. As many as 422 fish species from northeast India, belonging to 133 genera and 38 families, including indigenous and exotic species, have been reported. These beautiful resources make tremendous contributions towards overall fish production in the region.

Fisheries and Aquaculture sub-sector has immense potential for providing employment opportunities to youth, livelihood to rural masses and economic development as a whole for the region. There is a growing demand for fish and fishery products in the region due to increasing population, per capita income, urbanization and changes in food habits. There is a tremendous scope for development of fisheries and aquaculture in the region, but lags behind the rest of the country in fully harnessing its potential.

The region is deficient in fish production; it depends on others to fulfil its demand. Hence, there is an urgent need to increase fish production from these available resources to fill the gap. To achieve this goal, there is a need to utilize these fisheries resources of the region in a sustainable manner.

The articles in this special issue of the magazine cover different aspects of fisheries and aquaculture development in the North Eastern Region.

*Prakash Pradhan*

[aquapostnews@gmail.com](mailto:aquapostnews@gmail.com)