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Current status of Ornamental Fish Trade in Kolkata

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Abstract

Kolkata serves as a major hub for the ornamental fish trade in eastern India, facilitating distribution across regional, national, as well as international markets. The present study evaluates the current status of this sector with emphasis on species composition, trade structure, market channels, and stakeholder interactions. The analysis is primarily based on secondary data sources, supported by field observations conducted in key trading centres, particularly the Galiff Street market in Kolkata. The findings indicate that the trade is largely dominated by freshwater ornamental fish, with a high prevalence of exotic species and comparatively lower representation of indigenous varieties. Commonly traded species include Goldfish (Carassius auratus), Guppies (Poecilia reticulata), Mollies (Poecilia spp.), and Platies (Xiphophorus maculatus), along with Barbs, Gouramis, and Cichlids. Certain varieties such as Albino Oscar, Black Oscar, Silver Shark, Discus, and Apache Oranda Goldfish are considered expensive. The marketing system is characterized by a multi-tiered structure involving breeders, rearers, collectors, wholesalers, and retailers. Collectors act as key intermediaries, often influencing supply and pricing. However, the trade remains largely unorganized and faces constraints such as rising production costs, unequal profit distribution, and ecological concerns. The study highlights the need for sustainable practices and improved management strategies to ensure long-term growth.

Keywords: Ornamental fish trade, Market structure, Supply chain, Sustainability

Introduction

Ornamental fish are often described as "living jewels" owing to their vibrant colouration, diverse body forms, intricate patterns, and distinctive, playful behaviour (Jayasankar, 1998; Das *et al.*, 2005). Originating around 1805, the practice of ornamental fish keeping represents one of the earliest and most widely admired hobbies worldwide. With an estimated 100 million hobbyists globally, aquarium fish keeping is considered the second most popular leisure activity after photography (Das *et al*., 2005; Singh & Ahmed, 2005). These fish are commonly maintained for aesthetic and recreational purposes in garden ponds, aquaria, and plastic tanks (Mukherjee *et al*., 2000; Singh & Ahmed, 2005).

The rising demand for ornamental fish has facilitated the growth of the international ornamental fish market (Singh & Ahmed, 2005), and the sector has emerged as a significant trade by the late twentieth century (Mukherjee *et al*., 2000). The ornamental fish industry, with an average annual growth rate of around 10%, operates in approximately 128 countries worldwide and was projected to reach USD 5.88 billion by 2022 (Willis & Bakuwel, 2018). In fact, the total value of the industry is much higher, estimated at around USD 18–20 billion when aquatic plants, aquariums, fish feed, medications, and other associated accessories are included (Ghosh *et al*., 2025).

Developed regions, particularly Western countries and Japan, represent the primary markets for ornamental fish, whereas the majority of supply originates from developing tropical nations (Tissera, 2012). Among these, Asian countries such as Singapore, Indonesia, and Thailand play a dominant role, collectively meeting nearly 56–60% of the global demand for both freshwater and marine ornamental fish (Nair, 2006; Ahilan & Walkhom, 2007; Ajith Kumar *et al*., 2007; Kurup & Antony, 2010; Tissera, 2010). Contributing USD 1.06 million to the global ornamental fish trade, India ranked 31st worldwide (Murty, 1995).

In India, West Bengal is a pioneer in the ornamental fish trade (Mukherjee *et al*., 2000) and has contributed nearly 90% of the country's total export earnings from ornamental fishes through Kolkata port, followed by Mumbai (8%) and Chennai (2%) (Patel *et al*., 2023). Situated on the east coast of India, West Bengal benefits from favourable climatic conditions and abundant water resources, enabling it to hold a leading position in fisheries (Ghosh *et al*., 2003). The state is significant not only in food fish production but also in the farming,

domestic trade, and export of ornamental fish, with approximately 1.2% of its population engaged in fisheries and related activities (Korakandy, 2008).

The ornamental fish sector provides livelihood opportunities to nearly 20,000 families across several peri-urban districts of West Bengal, including Howrah, Hooghly, Birbhum, Jalpaiguri, Purba Medinipur, South 24 Parganas, North 24 Parganas, and Nadia. These families are involved in activities such as breeding and rearing ornamental fish, live feed culture, feed preparation, aquarium plant propagation, and trading of aquarium-related products (Sinha *et al*., 2012, 2019). Due to favourable climatic conditions, Kolkata and its neighbouring districts have developed into important centres for ornamental fish breeding, with active participation from small-scale farmers and hobbyists.

Globally, more than 2,500 ornamental fish species are traded, of which 60% are freshwater and 40% are marine (Sharma *et al.*, 2023a, 2023b). In India, the trade is largely dominated by cultured freshwater species, accounting for nearly 90% of total production, while only about 2% are sourced from the wild. In contrast, marine ornamental fishes constitute about 10% of the trade, of which approximately 98% are collected from natural environments and only 2% are cultured (Ghosh *et al*., 2025). India, with its rich biodiversity, has reported over 217 ornamental fish species in the north eastern region alone, of which around 150 species have commercial value.

Despite its rich natural resources, India has not yet fully capitalized on its potential in the global ornamental fish trade. The sector remains in a developing stage due to constraints such as overexploitation of wild varieties, disease outbreaks, and habitat degradation. Furthermore, the market chain is highly unorganized, resulting in lower returns for producers, while intermediaries often gain higher profits. Considering the increasing demand and growing interest in ornamental fish farming, the present study aims to assess the current status of the ornamental fish trade in Kolkata, with reference to commonly traded species, trading patterns, market channels, and business opportunities, thereby highlighting its potential as a sustainable livelihood option for farmers, entrepreneurs, and aquarium hobbyists.

Materials and Methods

In West Bengal, the ornamental fish trade is predominantly concentrated in the districts of Howrah and North and South 24 Parganas. CIT Dasnagar Bazar in Howrah is

recognized as one of the largest wholesale markets for ornamental fishes in India, whereas Kolkata functions as a major distribution hub for the ornamental fish and aquarium trade in eastern India. A substantial proportion of ornamental fish produced across the state is channelled through Kolkata for distribution to both domestic and international markets.

Primary data for the present investigation were collected from the Galiff Street Market located in Bagbazar, Kolkata, which represents a key trading centre for ornamental fishes. The market operates on a weekly basis (every Sunday), from early morning to evening, near the Shyambazar five-point crossing and adjacent to the canal known as the 'Marhatta Ditch'. It serves as a significant aggregation point for traders, breeders, and consumers, and is characterized by a diverse assemblage of ornamental fish species along with associated aquarium commodities.

Historically, the market functioned at HathiBagan for nearly a century before being relocated to its present site due to spatial constraints. At present, the market encompasses a wide range of biotic and abiotic components, including ornamental fishes, live feed organisms, aquatic plants, and aquarium accessories such as tanks, substrates, feed, medicines, and decorative materials.

Data pertaining to species diversity, demand trends, pricing structure, and supply sources were collected through direct interactions with traders, aquarium retailers, and fish breeders. Secondary data were compiled from peer-reviewed scientific literature, government publications, and relevant institutional reports to supplement and validate field observations.

Results

The present study reveals a wide diversity of both indigenous and exotic freshwater ornamental fish species are actively traded in the Kolkata markets. These species can be broadly categorized into two reproductive groups: oviparous (egg-laying) and ovoviviparous (live-bearing) forms.

Among the commonly traded ornamental fishes, oviparous species such as Goldfish, Barbs, Angelfish, Gouramis, Koi, Catfishes, and Oscars, along with live-bearing species including Mollies, Swordtails, Guppies, and Platies, constitute the dominant components of the market. Goldfish (*Carassius auratus*) were observed to be the most prevalent species, accounting for approximately 50% of the total trade volume, followed by Mollies, Tetras, Guppies, Barbs, and Catfishes.

Certain high-value ornamental varieties, including Albino Oscar, Black Oscar, Silver Shark, Discus, and Apache Oranda Goldfish, were identified as premium species due to their higher market demand and price.

Based on the collected data, the commonly available ornamental fish species and their varieties recorded during the study are presented in the following Table 1 & 2.

Table 1: Some important exotic ornamental fish traded in Kolkata

Family	Scientific Name	Common name (variety)
Cyprinidae	*Carassius auratus* (Linnaeus, 1758)	Goldfish (Comet, Black Moor, Red calico, Red cap,Oranda, Telescope Eye, Ryukin, Apache Oranda etc.)
	Puntigrus tetrazona (Bleeker, 1855)	Tiger Barb (Green, Five banded and Albino)
	Pethia conchonius (Hamilton, 1822)	Rosy Barb
	Barbonymus schwanefeldii (Bleeker, 1854)	Tinfoil Barb
	Epalzeorhynchos bicolour (Smith, 1931)	Red-tailed black shark
	Balantiocheilos melanopterus (Bleeker, 1850)	Bala Shark, Silver Shark
	Cyprinus rubrofuscus Lacepède, 1803	Koi carp
	Danio rerio (Hamilton, 1822)	Zebra danio
Botiidae	*Chromobotia macracanthus* (Bleeker, 1852)	Clown Loach
	Syncrossus hymenophysa (Bleeker, 1852)	Tiger Loach or Banded Loach
Poeciliidae	*Xiphophorus hellerii* Heckel, 1848	Swordtail (Pineapple Wag, Hi-fin, Red Wag Lyretail, Red Velvet etc.)
	Xiphophorus maculatus (Günther, 1866)	Platy (Red Platy, Sunset Platy, Red Crescent Platy etc.)
	Poecilia sp.	Molly (Sailfin Molly, Balloon Molly, Marble molly, Black Molly, Silver Sailfin Molly)
	Poecilia reticulata Peters, 1859	Guppy (Red Cobra, Blue Cobra, Red Mosaic, Leopard, Albino Red-eye etc.)
Acestrorhamphidae	*Paracheirodon innesi* (Myers, 1936)	Neon Tetra
	Paracheirodon axelrodi (Schultz, 1956)	Cardinal Tetra
	Nematobrycon lacortei Weitzman & Fink, 1971	Rainbow Tetra
Acestrorhamphidae	*Megalamphodus eques* (Steindachner, *1882)*	Serpae Tetra
Cichlidae	*Pterophyllum scalare* (Schultze, 1823)	Angelfish (Veil-tail, Diamond cap, Silver scratch, Marble etc.)
	Astronotus ocellatus (Agassiz, 1831)	Oscar (Tiger Oscar, Albino Oscar)
	Symphysodon sp.	Discus
	Rubricatochromis bimaculatus (Gill, 1862)	Jewel Cichlid
Osphronemidae	*Trichopodus trichopterus* (Pallas, 1770)	Gourami (Blue, three spot etc.)
	Betta splendens Regan, 1910	Betta (Siamese fighting fish)
Callichthyidae	*Corydoras aeneus* (Gill, 1858)	Albino Cory

Table 2: Some of the popular indigenous ornamental fishes in trade in Kolkata

Family	Scientific Name	Common Name
Danionidae	*Amblypharyngodon mola* (Hamilton, 1822)	Mola carplet
Cyprinidae	*Devario devario* (Hamilton, 1822)	Bengal danio
	Opsarius bendelisis (Hamilton, 1807)	Indian hill trout
	Pethia ticto (Hamilton, 1822)	Two-spot barb
	Puntius sophore (Hamilton, 1822)	Pool barb
Botiidae	*Botia dario (*Hamilton, 1822)	Bengal loach/Queen loach
	Botia striata Narayan Rao, 1920	Zebra loach
Channidae	*Channa punctata* (Bloch, 1793)	Spotted Snakehead
	Channa striata (Bloch, 1793)	Striped snakehead
	Channa marulias (Hamilton, 1822)	Great snakehead
Channidae	*Channa gachua* (Hamilton, 1822)	Dwarf snakehead
Osphronemidae	*Trichogaster fasciata* Bloch & Schneider, 1801	Banded gourami
	Trichogaster labiosa Day, 1877	Thick-lipped gourami
Badidae	*Badis badis* (Hamilton, 1822)	Blue badis/Dwarf Chameleon fish
Nandidae	*Nandus nandus* (Hamilton, 1822)	Gangetic leaf fish
Mastacembelidae	*Mastacembelus armatus* (Lacepède, 1800)	Zig-zag eel
	Macrognathus pancalus Hamilton, 1822	Striped spiny eel
Scatophagidae	*Scatophagus argus* (Linnaeus,1766)	Spotted scat/ Argus fish/Butterfish
Teraponidae	*Terapon jarbua* (Forsskål, 1775)	Crescent grunte / Jarbua terapon
Gobiidae	*Glossogobius giuris* (Hamilton, 1822)	Tank goby
Ambassidae	*Chanda nama* Hamilton, 1822	Elongate glass-perchlet
	Parambassis ranga (Hamilton, 1822)	Indian glassy fish
Bagridae	*Mystus vittatus* (Bloch, 1794)	striped dwarf catfish
	Mystus tengara (Hamilton, 1822)	Tengara catfish
Siluridae	*Ompok bimaculatus* (Bloch, 1794)	Butter catfish
Anguillidae	*Anguilla bengalensis* (Gray, 1831)	Indian mottled eel
Notopteridae	*Notopterus notopterus* (Pallas, 1769)	Asian knife fish
	Chitala chitala (Hamilton, 1822)	Humped featherback / Indian knifefish
Synbranchidae	*Ophichthys cuchia (*Hamilton, 1822)	Gangetic mud eel/ cuchia
Mastacembeloidei	*Macrognathus aral* (Bloch & Schneider, 1801)	One-stripe spinyeel/ Bami
Tetraodontidae	*Dichotomyctere fluviatilis* (Hamilton, 1822)	Green pufferfish
	Leiodon cutcutia (Hamilton, 1822)	Gangatop

In addition to a wide variety of ornamental fishes, freshwater crabs such as *Sartoriana spinigera* (Wood-Mason, 1871), as well as certain ornamental shrimp and lobster species, were also observed to be traded in the market. Furthermore, several shops were found to offer a diverse range of aquarium-related products, including aquatic plants, aquasoil substrates, aquarium tanks and covers, filtration and aeration equipment, decorative materials, gravel and rocks, formulated fish feed, and live feed organisms such as Tubifex.

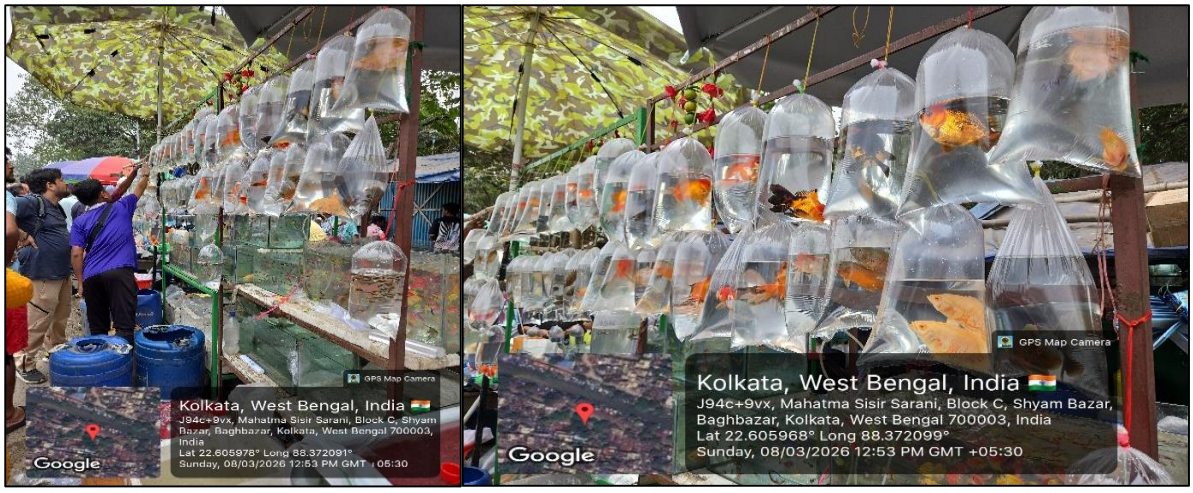

Figure 1: Ornamental fish being sold in plastic bags at Gallif Street market

Figure 2: Selected ornamental fish varieties – Guppies, Fighter fish, Silver Shark (from left to right)

Figure 3: Trader selling Tubifex live feed

Figure 4: Trader selling aquarium plants and accessories

The market structure of the ornamental fish trade in Kolkata comprises multiple stakeholders, including breeders, rearers, collectors, wholesalers, retailers, and exporters. Farm-produced ornamental fishes typically move through a multi-tiered marketing chain, ultimately reaching consumers via retail outlets. Although a proportion of breeders directly supply wholesalers or retailers, the majority of the trade is mediated through intermediaries.

Collectors play a pivotal role within this supply chain, functioning as key intermediaries in the procurement and distribution of ornamental fishes. Wild collectors source fishes from natural habitats based on demand from suppliers or agents and market them on a per-unit basis. In addition, they are occasionally involved in the collection of live feed organisms in response to market requirements. Collectors generally possess substantial knowledge regarding the availability, quantity, and quality of fishes at the farm level. Following procurement, fishes are transported in oxygenated polythene bags to the market during trading hours, ensuring minimal stress and mortality.

Empirical observations indicate that an individual collector handles approximately 3,000–4,000 fishes per day, generating an average daily income of around ₹3,000. It is estimated that nearly 1,500–1,800 collectors are engaged in this trade across West Bengal, with a significant concentration in the Howrah district. Farmers, however, tend to receive higher returns when directly supplying wholesalers, as compared to sales mediated through collectors. This disparity arises because collectors procure fishes at lower prices from farmers and subsequently sell them at higher rates in wholesale markets, thereby capturing a larger share of the profit margin. Limited access to market information—particularly regarding demand trends and pricing—further exacerbates this imbalance for primary producers.

Consequently, collectors exert considerable influence over the marketing system due to their operational efficiency, control over downstream distribution, and superior access to market intelligence. In addition to structural factors, seasonal variations significantly affect the pricing dynamics of ornamental fish. Eurythermal species, such as Goldfish, exhibit tolerance to a broad range of temperatures and therefore show relatively stable price patterns. In contrast, stenothermal species, including Tiger Barbs and Angelfish, are more sensitive to temperature fluctuations, particularly during winter months. This results in higher mortality rates and reduced growth under suboptimal conditions, leading to decreased supply and consequent price escalation.

Discussion

The present study highlights that ornamental fish farming and the aquarium trade constitute a significant component of economic development by contributing to national GDP, export earnings, and livelihood generation (Ghosh *et al.*, 2022). The sector provides substantial employment opportunities and supports income diversification, particularly in

peri-urban and rural areas. Importantly, the inclusion of marginalized groups and women in ornamental fisheries represents a viable pathway for promoting social inclusion and socioeconomic empowerment.

For economically disadvantaged communities, ornamental fish farming serves as an accessible and low-investment enterprise, offering diverse livelihood opportunities across the value chain, including breeding, rearing, feed preparation, and marketing. The sector is particularly conducive to women's participation, as it requires relatively low capital investment and can be operated at a household level. In several rural areas, women have increasingly adopted ornamental fish culture as a backyard activity, while also engaging in skill development related to feed preparation, disease management, larval care, and participation in local marketing networks.

In recognition of the sector's potential, the Government of West Bengal has undertaken initiatives to promote ornamental fish culture through the establishment of cooperative societies. A total of 17 cooperatives have been formed across districts such as South 24 Parganas, North Dinajpur, and Howrah, each receiving financial assistance averaging ₹70,000. Furthermore, institutional support from national agencies, including the National Fisheries Development Board (NFDB), Marine Products Export Development Authority (MPEDA), National Cooperative Development Corporation (NCDC), and research institutes under the Indian Council of Agricultural Research (ICAR), has played a critical role in strengthening the sector. These organizations have implemented various schemes aimed at enhancing domestic trade, promoting export potential, and building technical capacity through training programmes and workshops.

Under the Pradhan Mantri Matsya Sampada Yojana (PMMSY) (2020–2021), a total of 345 ornamental fish production units were established in West Bengal, comprising 193 backyard units, 118 medium-scale units, 32 integrated units, and 2 brood bank units. Brood banks are particularly important for ensuring the availability of high-quality broodstock of commercially valuable indigenous and exotic ornamental fish species. In addition to primary production, the sector also supports a range of ancillary industries, including feed manufacturing, aquarium equipment production, and transportation services, thereby contributing to a broader economic framework.

Despite these positive developments, several challenges persist within the sector. Field observations indicate that the cost of production has increased substantially in recent years, while the selling price of ornamental fishes has not risen proportionately. This has disproportionately affected small- and medium-scale farmers, leading to a significant decline in profit margins and, in some cases, the discontinuation of operations. Furthermore, the multi-layered marketing structure contributes to disparities in income distribution among stakeholders, with intermediaries often capturing a larger share of the profits.

These findings underscore the need for strengthening direct market linkages, enhancing farmers' access to real-time market information, and promoting organized marketing systems. Such interventions are essential to ensure equitable profit distribution and to improve the overall sustainability and resilience of the ornamental fish trade.

Conclusion

West Bengal, endowed with abundant natural water resources such as rivers, lakes, ponds, and extensive estuarine systems, supports a high diversity of fish species. A wide range of small indigenous fish fauna, although often unsuitable for conventional aquaculture, possess significant potential for utilization in the ornamental fish trade due to their attractive colouration, unique morphology, and behavioural traits.

The ornamental fish trade in Kolkata represents a vital economic sector, contributing substantially to livelihood generation, employment opportunities, income diversification, and regional economic stability. Despite its potential, the sector faces several challenges, including habitat degradation, inadequate regulatory frameworks, and the risk of overexploitation of natural resources. Rapid agricultural expansion and urbanization have resulted in the degradation of aquatic habitats, particularly wetlands and other critical ecosystems that serve as natural habitats for ornamental fish species.

Unsustainable harvesting practices, such as indiscriminate collection of wild fishes for the ornamental trade, exert significant ecological pressure by threatening native biodiversity, disrupting population dynamics, and destabilizing aquatic ecosystems. Additionally, pollution from industrial discharge, domestic sewage, and agricultural runoff further degrades water quality, adversely affecting the survival and health of ornamental fish populations.

To ensure the long-term sustainability of ornamental fisheries, the adoption of environmentally responsible practices is essential. The promotion of captive breeding and the use of sustainably sourced fish can significantly reduce pressure on wild populations while ensuring a consistent supply for trade. Implementation of effective pollution control measures and habitat conservation strategies is also critical for maintaining ecosystem integrity.

Future research should focus on genetic improvement, disease resistance, and the development of eco-friendly and cost-effective rearing technologies. With appropriate policy interventions, infrastructure development, and targeted investment, India can effectively harness its rich aquatic biodiversity and strengthen its position in the global ornamental fish trade. Furthermore, expanding education and capacity-building programmes for stakeholders, including farmers, traders, and hobbyists, will play a crucial role in fostering innovation, sustainability, and long-term growth of the sector.

Declarations

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Competing Interests

The authors declare that they have no known competing financial or non-financial interests that could have influenced the work reported in this paper.

Human and Animal related Study

All procedures in this study were conducted in accordance with applicable guiding principles and regulations of the committee.

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