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Ornamental Fish Diversity with Special Reference to the Conservation Status of *Channa barca* in Assam

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Abstract: Ornamental fish are also known as living jewels due to their attractive body coloration and pattern. Assam is known for diverse ornamental fishes. Different species of ornamental fishes are found in the wetlands of Assam. These wetlands locally known as Beel, plays an important role in maintaining the ornamental fish diversity. But recently there is a drastic reduction in the number of different indigenous ornamental fish species in Assam due to various natural and anthropogenic factors. *Channa barca*, one of the rare ornamental fish from the Channidae family is at the brink of extinction. Present review is an attempt to analyze the ornamental fish diversity of Assam along with the conservation status of *Channa barca*.

Keywords: Ornamental fish, Conservation Status, Brahmaputra Basin, *Channa barca*

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Introduction

Ornamental fish are frequently referred to as "living jewels" because of their colour, shape, behaviour, and origin. They are often small and peaceful. Available in colourful patterns and able to withstand confined areas (Jaysankar, 1998). One of the vital elements of fisheries that contributes to the aesthetic beauty and maintenance of the environment is ornamental fish. These fish have distinctive colour patterns and are vivid and beautiful. Aquaria are where

ornamental fish are mostly housed, and they are now a major source of income for many individuals (Chetia *et al.*, 2018). The floodplains wetlands which are locally known as "Beels" in Assam plays an important role in the diversity of locally available indigenous ornamentals fishes because beels are biologically sensitive and provide nursery ground and ideal habitat for many ornamental and other fishes (Biswas *et al.* 1999). Srivastava *et al.* (2001) reported 115 ornamental

fishes from Assam. According to a study, total 87 ornamental fish species are available in the state of Assam (Bhattachrya *et al.*, 2000). Out of 217 fish species recorded in Assam 150 fish species have good ornamental value (Bhattachrya *et al.*, 2003). Another study recorded 70 different species of ornamental fish in the beels of upper Assam, the majority of which are highly valuable both domestically and internationally (Das and Biswas, 2005).

Trichogaster spp., *Botia* spp., *Channa* spp., *Lepidocephalichthys* spp., *Badis* spp., *Nandus nandus*, *Amblypharyngodon mola*, and *Puntius* spp. are the most likely ornamental fishes to be found in beels in upper Assam. Other fish species including *Badis*, *Batasio*, *Glossogobius*, *Macragnathus*, *Mastacembelus*, *Olyra*, *Pseudoambassis*, *Rasbora*, and *Tetraodon* may be considered as ornamental fish. Primary habitat for native ornamental fishes is a pond, paddy field, channel, wetland or river. The resident fauna, which is mostly dominated by colourful murrels (*Channa* spp.) and other air-breathing organisms capable of withstanding high water temperatures, low oxygen levels, and severely murky water, accounts for the majority of the catch recorded from closed beels (Biswas *et al.*, 2015). Different varieties of *Channa* species are recorded from the beels and rivers of Assam. The predatory fish genus *Channa*, also referred to as snakehead fish and native to Asia's freshwater ecosystems, belongs to the channidae family. 50 species in this genus have been scientifically characterised. Some *Channa* species may be useful as ornamental. But recently, the population of some *Channa* species has drastically decreased (Debnath *et al.* 2021). The present study is an attempt to analyse the diversity of ornamental fishes in Assam with the conservation status of *Channa barca*.

Materials and Methods

Literature survey was done by using keywords such as Ornamental Fish, Ornamental Fish Diversity in Assam, *Channa barca*. Databases like Google Scholar, Scopus, Web of Science, Research

Gate etc. were used for performing the review study.

Ornamental fish diversity in Assam:

Numerous works have been conducted to study the diversity of ornamental fishes in different parts of Assam. A study from the beels of upper Assam recorded 70 species of ornamental fishes (Das and Biswas, 2005). Another study across the Brahmaputra valley recorded a total of 81 species (Goswami and Zade, 2015). A study recorded 61 ornamental fish species from central Brahmaputra valley zone (Sharma *et al.*, 2013). Another study from the flood plain wetlands of lower Brahmaputra Basin recorded 62 ornamental fishes including both classified and non-classified ornamental fishes (Kalita and Deka, 2013). Extensive survey for ornamental fishes of Sonkosh River, Kokrajhar District was conducted from April, 2012 to March, 2013. It is a tributary of the Brahmaputra River in north-west bank. During the survey period, a total of 49 ornamental fish species were identified (Baro *et al.*, 2014).

Ornamental fish diversity in the Jiadhhal/Kumotiya river of Dhemaji district, Assam, India was conducted during monsoon period from May 2018 to July 2018. A total of 44 species was recorded during the period of the study (Chetia *et al.* 2018). There have been 28 fish species documented from North Guwahati, of which 16 have been classified as having "excellent ornamental value" and 9 as having "high ornamental fish" value (Rahman *et al.*, 2014). Table 1 illustrates the various ornamental fishes recorded from different parts of Assam.

Results and Discussion

Channa barca and its conservation status:

Channa barca, a rare species of snakehead fish that is indigenous to the upper Brahmaputra river basin in northeastern India and Bangladesh is known locally as the "Cheng Garaka" or "Pipli Cheng" fish. It was initially reported in 1822 by Scottish doctor Francis Hamilton. He identified it as *Ophiocephalus barca*, a species that was initially

Table 1: List of ornamental fishes recorded from different parts of Assam

S. No.	Scientific name	S. No.	Scientific name	S. No.	Scientific name
1	<i>Catla catla</i>	2	<i>Cirrhinus cirrhosus</i>	3	<i>Cyprinus carpio carpio</i>
4	<i>Ctenopharyngodon idella</i>	5	<i>Hypophthalmichthys molitrix</i>	6	<i>Labeo rohita</i>
7	<i>Wallago attu</i>	8	<i>Sperata aor (Mystus aor)</i>	9	<i>Sperata seenghala</i>
10	<i>Pangasius pangasius</i>	11	<i>Mastacembalus armatus</i>	12	<i>Labeo nandina</i>
13	<i>Labeo calbasu</i>	14	<i>Labeo gonius</i>	15	<i>Channa orientalis</i>
16	<i>Clupisoma garua</i>	17	<i>Heteropneustes fossilis</i>	18	<i>Labeo bata</i>
19	<i>Monopterusuchia</i>	20	<i>Nandus nandus</i>	21	<i>Puntius sarana</i>
22	<i>Paracanthocobitis botia</i>	23	<i>Amblypharyngodon mola</i>	24	<i>Aspidoparia morar</i>
25	<i>Aspidoparia joya</i>	26	<i>Batasio batasio</i>	27	<i>Botia histrionic</i>
28	<i>Botia derio</i>	29	<i>Laubuka laubuca</i>	30	<i>Danio rerio</i>
31	<i>Badis badis</i>	32	<i>Colisa lalia</i>	33	<i>Colisa sota</i>
34	<i>Colisa labius/Trichogaster labius</i>	35	<i>Chela laubuca</i>	36	<i>Chela cachus</i>
37	<i>Devario devario</i>	38	<i>Danio rario</i>	39	<i>Esomus danricus</i>
40	<i>Gudusia chapra</i>	41	<i>Mystus bleekeri</i>	42	<i>Channa gachua</i>
43	<i>Clarias magur</i>	44	<i>Cirrhinus reba</i>	45	<i>Anabas testudineus</i>
46	<i>Ailia punctata</i>	47	<i>Channa marulius</i>	48	<i>Macrognathus aculeatus</i>
49	<i>Macrognathus pancalus</i>	50	<i>Osteobrama cotio</i>	51	<i>Puntius ticto</i>
52	<i>Puntius phutunio</i>	53	<i>Puntius gelius</i>	54	<i>Puntius conchonius</i>
55	<i>Rasbora deniconius</i>	56	<i>Rasbora rasbora</i>	57	<i>Clarias batrachus</i>
58	<i>Parambassis ranga</i>	59	<i>Trichogaster fasciatus</i>	60	<i>Lepidocephalus guntea</i>
61	<i>Aplocheilus panchax</i>	62	<i>Pseudambassis ranga</i>	63	<i>Trigonostigma heteromorpha</i>
64	<i>Poecilia reticulata</i>	65	<i>Barilius barna</i>	66	<i>Megarasbora elanga</i>
67	<i>Oreochthys sp</i>	68	<i>Ostreobrama cotio cotio</i>	69	<i>Barilius barila</i>
70	<i>Chitala chitala</i>	71	<i>Notopterus notopterus</i>	72	<i>Barilius bendelisis</i>
73	<i>Polyacanthus labiosus</i>	74	<i>Polyacanthus fasciata</i>	75	<i>Pseudambassis lala</i>
76	<i>Pseudeutropius atherinoides</i>	77	<i>Devario aequipinnatus</i>	78	<i>Mystus vittatus</i>
79	<i>Pseudambassis baculis</i>	80	<i>Salmophasia bacaila</i>	81	<i>Mystus menoda</i>
82	<i>Parluciosoma dandriconus</i>	83	<i>Canthophrys gongota</i>	84	<i>Lepidocephalichthys guntea</i>
85	<i>Hemibagrus menoda</i>	86	<i>Mystus cavasius</i>	87	<i>Mystus tengara</i>
88	<i>Rita rita</i>	89	<i>Ompok bimaculatus</i>	90	<i>Ompok pabda</i>
91	<i>Ompok pabo</i>	92	<i>Ailia coila</i>	93	<i>Neotropius atherinoides</i>
94	<i>Gangata centia</i>	95	<i>Xenentodon cancila</i>	96	<i>Macrognathus pancalus</i>
97	<i>Chanda nama</i>	98	<i>Glossogobius giuris</i>	99	<i>Polyacanthus fasciatus</i>
100	<i>Mystus gulio</i>	101	<i>Colisa sota</i>	102	<i>Channa aurantimaculata</i>
103	<i>Channa punctata</i>	104	<i>Channa strita</i>	105	<i>Tetraodon cutcutia</i>
106	<i>Cyprinion semiplotum</i>	107	<i>Oreochthys crenuchoides</i>	108	<i>Neolissochilus hexagonolepis</i>
109	<i>Tor putitora</i>	110	<i>Tor progeneius</i>	111	<i>Danio dangila</i>
112	<i>Pethia ticto</i>	113	<i>Puntius chola</i>	114	<i>Cabdio morar</i>
115	<i>Puntius denisonii</i>	116	<i>Barilius vagra</i>	117	<i>Danio devario</i>
118	<i>Aborichthys elongatus</i>	119	<i>Botia rostrata</i>	120	<i>Somileptis gongota</i>
121	<i>Amblyceps cerenium</i>	122	<i>Amblyceps mangois</i>	123	<i>Amplyceps arunachalensis</i>
124	<i>Channa barca</i>	125	<i>Gagata cenia</i>	126	<i>Glyptothorax cavia</i>
127	<i>Glyptothorax telchita</i>	128	<i>Olyra kempii</i>	129	<i>Macrognathus aral</i>
130	<i>Dario dario</i>	131	<i>Ctenops nobilis</i>	132	<i>Puntius sophore</i>
133	<i>Channa stewartii</i>	134	<i>Channa bleheri</i>	135	<i>Chanda ranga</i>

discovered in Assam's Brahmaputra River near Golpara (india.mongabay.com 2021)

Additionally, local names for the fish vary from region to region, which contributes to the confusion. For instance, Noga cheng in Tinsukia and Dibrugarh, Chenga in Jorhat and Sibsagar, Garkaa (Garka cheng and Garkasol) in Kamrup and Nalbari, Gatoa in Nagoan, and Barkaa (Cheng Barka) in the Darrang district of Assam are some examples (Goswami *et al.*, 2003).

Taxonomic position:

Kingdom: Animalia; Phylum: Chordata; Class: Actinopterygii; Order: Perciformes; Family: Channidae; Genus: *Channa*; Species: *barca*

Morphological characteristics:

Body is elongated. It can be distinguished from other *Channa* sp. by the following combination of characters: 62-63 lateral line scales; 50-51 dorsal-fin rays; 33-34 anal-fin rays; 56 total vertebrae; two large cycloid scales on each side of lower jaw under surface; dorsal-fin and flanks covered in numerous black spots; pectoral-fin reddish with black bars comprised of spots (www.seriouslyfish.com).

Habitat:

It has been seen to reside in vertical burrows near the edges of marshes, which normally dry out in the winter. These burrows often reach a depth of one metre and have one or more entrance tunnels that lead to larger chambers below the ground water table. They serve as refuges for the fish throughout the dry winter months, and when the habitat is flooded, they come out to hunt and breed. It is advised as a concern for conservation because it is less of an ecological generalist than many *Channa* species, requires a particular kind of microhabitat, has a limited distribution, and is seldom seen in great numbers (Goswami *et al.*, 2003).

Reason behind high demand:

This snakehead fish is attractive to look at and has high ornamental value amongst specialist

aquarists, in national and international markets. Since it is rarely available and restricted to only a particular region of the Brahmaputra basin, it has become extremely expensive over the years and now counted as one of the most expensive fish in the world. Overall, it has been assessed as data deficient by the IUCN. During 2017-2019, 15 number of this species were caught being smuggled near Orang National Park (india.mongabay.com 2021).

Result and Discussion

This review report enlisted 135 ornamental fish species belonging to different genus. These fishes were reported from different region of Assam. The conservation status of many ornamental fishes are found to be Endangered. It is a serious issue. The main factor contributing to the decline in ornamental fish populations is the employment of illegal fishing techniques for food fish. A number of artificial and natural factors affect the beels' ecological balance of the wetlands. Numerous issues that the beels are currently dealing with, including siltation, eutrophication, the introduction of exotic fish, the emergence of water hyacinth and other macrophytes, human settlement, and agricultural runoff from nearby paddy fields, have been contributing to the gradual decline of most ornamental fishes in recent years. The sole pathway for fish migration from the surrounding river is the feeding canal of the beels, which is being critically blocked day by day by siltation. As a result, the variety of decorative fishes in the concerned beels is declining. Additionally, siltation raises the turbidity of water systems. The coloration of ornamental fish is negatively impacted by water turbidity (Kalita and Deka, 2013). The significance of fish diversity and aquatic environments should be adequately communicated to fishermen on a regular basis. Additionally, they should be given vocational training to help them find alternative sources of income during the "closed season" and heavy flood events. By understanding their detrimental effects on fish resources, poor fishing practises can be significantly reduced.

Breeding regions in major tributaries and wetlands should be marked off, and these places should be continuously monitored. During the months of June through September, all shallow-water fishing should be prohibited (Biswas *et al.*, 2015).

According to recent media reports from Assam, the ornamental fish *Channa barca* is being smuggled to outside Assam. It has high demand in the global market and open for illegal trading. But there is no legal protection for it. Some experts suggest that if the government wishes to take advantage on the commercial worth of the ornamental fish, it should do so through captive breeding and monoculture. Some proposed to include it as a scheduled animal in India's wildlife laws (india.mongabay.com 2021).

Conclusion

The number of these beautiful aquatic creatures are day by day decreasing. A long-term and efficient management strategy should be established to prevent illegal fishing and exports in order to preserve these aquatic resources. Additionally, human interference has progressively deteriorated wetlands habitat, posing a serious threat to the biodiversity of the wetland. Government along with Ichthyologists from Assam should take necessary steps to prevent the illegal trading of ornamental fishes and organize awareness program among the fishermen of Assam.

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