



Status of ornamental fish diversity of Silsakho wetland in Kamrup district, Assam, India

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Abstract

Silsakho wetland located in South-east direction of greater Guwahati, Assam, is a natural wetland and performs as a water storage basin, holding storm water and flood water. Silsakho wetland has the potential to be developed into a site of tourist interest and can also serve in controlling artificial floods in rapidly developing Guwahati city. There is also a great prospect for ornamental fishery in this wetland which in recent years has become the second most popular hobby of the world. The Silsakho wetland has been a viable abode for a variety of ornamental fishes. *Circa* 24 ornamental fish species have been estimated in the wetland during the study. The wetland also harbours a great variety of aquatic plants and provides food, shelter and breeding ground for a large number of aquatic fauna. But, recently the existence of many such valuable ornamental fish species has depleted due to considerable changes in the wetland ecosystem. The two most important aspects of degradation of Silsakho wetland are recorded, one being the shrinkage of the wetland due to natural and anthropogenic activities, and the other being degradation of the quality of the wetland environment thereby bringing change among the biotic components of the wetland. It is observed that there is a tremendous anthropogenic influence, particularly in changing the land use pattern and increased built up land within the wetland area, which play a pivotal role in transforming and degrading the wetland, thereby threatening the physico-chemical and biological conditions for spawning of these aquatic denizens.

Keywords : Silsakho wetland, ornamental fish, anthropogenic influence.

1. Introduction

India is fortunate to possess a varied and vast fish germplasm resource consisting about 11% of the total fish biodiversity of 20,000 species in the world. The NE region is rich in both aquatic resources and species diversity. The region harbours valuable fish germplasm resources. So far, 267 fish species belonging to 114 genera under 38 families and 10 orders have been reported from this region. This is approximately 33.13% of the total Indian fresh water fishes (Sen, 2000). Sarkar and Ponniah (2000) evaluated that out of 186 fish species, 62 species (33.16%) appear to be endemic to this region. Sarkar and Ponniah (2000) also reported that out of the 186 fish species, 63 (33.85%) are considered only as

food fish, followed by 53 (28.44%) as ornamental fish. Thus the occurrence of ornamental fishes in this part of India is quite high.

Floodplain wetlands, by virtue of their productivity potential as well as magnitude, constitute one of the frontline areas capable of contributing substantially to fish production. In the recent years, fish production from the Silsakho wetland has been in the decline due to number of natural and manmade environmental changes in the wetland ecosystem. The present investigation has been undertaken to identify the ornamental fish status of Silsakho wetland. The problems of depletion of natural stock of ornamental fishes and also the prospects relating to the wetland have been studied.

2. Methodology

Extensive field study was done from the month of July 2010 to June 2012. Traverses were made along the fringe area of the wetland and also along the inlet and outlet channels. Different areas which are vulnerable to the environmental hazards were closely studied. Traverses were also made across the wetland by boat. Physico-chemical parameters were studied after APHA, 1989. For taxonomic study, fish samples were preserved in 5% formalin solution and brought to the laboratory. The taxonomic study is done after Jayaram (1981), Talwar and Jhingran (1991), Dey (1992), Nath and Dey (2000). Pertinent data were also collected from various office sources.

3. Study Area

Geographical location of Silsakho wetland

Silsakho wetland is located in the eastern most part of Guwahati. The wetland lies between 91°48'

50" E to 91°50' 12" E Longitude and 26°06' 53" N to 26°08' 14" N Latitude. It is at a height of 180 ft. from the sea level. It is the part of the Silsakho basin which is about 9.2 sq. km. Silsakho wetland is the low lying, water logging part of the Silsakho basin and covers an area of 4.2 sq km. Silsakho wetland is a natural wetland and works as a water storage basin holding water flowing from in and around Guwahati and also from the neighbouring state of Meghalaya. The rain water flowing from the Japorigog hill on the west also accumulates in the wetland. It is a floodplain wetland. The tributary Bundajan arises from the wetland and mingles with the Brahmaputra. Thus, the tributary acts both as the inlet and the outlet channel for the wetland. Another inlet channel makes its way from the Amsing-Jorabat hills on its south western side. This inlet channel brings in rain water from the Amsing hills bordering Assam and Meghalaya and also from the large residential area in the foothills.



Fig-1 : Study area : Silsakho wetland.

Silsakho wetland is a prime wetland of Guwahati, but is in a deplorable state. Although located in the heart of the city, the wetland has not got its due recognition. Some of the activities responsible for the deterioration of the wetland are carried out in the surrounding area affecting indirectly, whereas some activities occur within the

wetland proper, thereby affecting the wetland ecosystem directly.

4. Results and Discussion

The present investigation is a comprehensive account of the systematics of the ornamental fishes of Silsakho wetland which hitherto remained

unattended. The diversity of ornamental ichthyofauna provides crucial information about the status of ornamental fish diversity. 24 species of ornamental

fish species were recorded during the present study. Among these 18 are classified ornamental fish and 6 are non-classified ornamental fishes.

Table - 1 : List of ornamental fish species of Silsakho wetland depicting the present status of occurrence (after MPEDA and NBFGR).

Sl No	Name of the Fish Species	Category	Conservation Status
1	<i>Labeo calbasu</i> (Hamilton-Buchanan)	NCOFS	LR-nt
2	<i>Puntius conchonius</i> (Hamilton-Buchanan)	COFS	Vu
3	<i>Puntius gelius</i> (Hamilton-Buchanan)	COFS	NE
4	<i>Puntius sophore</i> (Hamilton-Buchanan)	COFS	LR-nt
5	<i>Puntius ticto</i> (Hamilton-Buchanan)	COFS	LR-nt
6	<i>Chela laubuca</i> (Hamilton-Buchanan)	COFS	LR-lc
7	<i>Amblypharyngodon mola</i> (Hamilton-Buchanan)	COFS	LR-lc
8	<i>Danio rerio</i> (Hamilton-Buchanan)	COFS	LR-nt
9	<i>Esomus danricus</i> (Hamilton-Buchanan)	COFS	LR-lc
10	<i>Rasbora daniconius</i> (Hamilton-Buchanan)	COFS	LR-nt
11	<i>Lepidocephalus guntea</i> (Hamilton-Buchanan)	COFS	NE
12	<i>Botia dario</i> (Hamilton-Buchanan)	COFS	NE
13	<i>Mystus vitattus</i> (Hamilton-Buchanan)	COFS	Vu
14	<i>Xenentodon cancila</i> (Hamilton-Buchanan)	NCOFS	LR-nt
15	<i>Aplocheilichthys panchax</i> (Hamilton-Buchanan)	COFS	DD
16	<i>Pseudambassis ranga</i> (Hamilton-Buchanan)	COFS	NE
17	<i>Badis badis</i> (Hamilton-Buchanan)	COFS	NE
18	<i>Glossogobius giuris</i> (Hamilton-Buchanan)	NCOFS	NE
19	<i>Anabus testudineus</i> (Bloch)	NCOFS	Vu
20	<i>Colisa lalia</i> (Hamilton-Buchanan)	COFS	NE
21	<i>Colisa sota</i> (Hamilton-Buchanan)	COFS	NE
22	<i>Channa orientalis</i> (Bloch & Schneider)	COFS	Vu
23	<i>Channa striatus</i> (Bloch)	NCOFS	LR-lc
24	<i>Tetraodon cutcutia</i> (Hamilton-Buchanan)	NCOFS	LR-nt

EN-Endangered; LRnt-Lowerriskthreatened; LRlc-Lowerriskleastconcerned;Vu-Vulnerable;

DD-Datadeficient; NE-Notevaluated; COFS-Classified ornamental fish species;

NOFS- Non-Classified ornamental fish species.

Some of the species such as *Cirrhinus reba*, *Channa marulius*, *Mastacembelus armatus*, which were once present, have become very rare and could not be recorded.

Problems of degradation faced by Silsakho wetland

Wetlands are often described as “kidneys of the landscape” (Mitsch & Gosselink 1986). Hydrologic conditions can directly modify or change the

chemical and physical properties such as nutrient availability, degree of substrate anoxia, soil salinity, sediment properties and pH. These modifications of the physiochemical environment, in turn, have a direct impact on the biotic response in the wetland (Gosselink & Turner 1978). When hydrologic conditions in wetlands change even slightly, the biota may respond with massive changes in species composition and richness and in ecosystem productivity. The rapidly expanding human population, large scale changes in land use/land cover, burgeoning development projects and improper use of watersheds has all caused a

substantial decline of the Silsakho wetland resources. The major problems relating to the degradation of Silsakho wetland studied during the present investigation were reduction of size of the water body, garbage dumping, soil erosion, over-exploitation of natural resources, agricultural conversion, direct deforestation in the wetland, hydrologic alteration, use of pesticides in cultivation on the fringes of the wetland, introduction of exotic species, eutrophication, use of unscientific devices for fishing and indifferent attitude of the people.

Different aspects of degradation of the quality of water were noticed in the present findings.

Table - 2 : Some of the water quality parameters of Silsakho wetland

Parameters	Pre-monsoon	Monsoon	Post-monsoon
pH	6.5	7.4	6.8
Turbidity (in cm)	10	15	12
Dissolved oxygen	6.6	7.8	6.8
Total alkalinity	106	80	95
Free CO ₂ (in mg/l)	5.8	7.0	6.2
Total hardness (in ppm)	44	40	40
Rainfall recorded (in mm)	224.2	1221.6	269.9

Besides the different abiotic factors that were studied, the status of various biotic components of the wetland were also investigated. Silsakho wetland houses many aquatic macrophytes and macroinvertebrates. Major vegetation of the wetland is shown in Table-3. Nearly 21 aquatic plant species were recorded during the study. However, many of

these are in the verge of disappearance from the studied area. Among these plants *Nelumbonucifera* which was once abundant and was also sighted during a pilot study that was conducted two years earlier, has now disappeared from the wetland. However, the abundant growth of water hyacinth has become a menace to the wetland.

Table - 3 : List of aquatic plants of Silsakho wetland

Vegetation type	Species name	Vegetation type	Species name
Free floating	<i>Azolla pinnata</i>	Submerged	<i>Hydrilla verticillata</i>
	<i>Eichhornia crassipes</i>		<i>Vallisneriaspiralis</i>
	<i>Lemna minor</i>		<i>Cerratophyllum demeeerssum</i>
	<i>Pistia stratiotes</i>		<i>Limnophyla indica</i>
	<i>Salvinia sp.</i>		<i>Utriculariaflexuosa</i>
Rooted floating	<i>Nelumbo nucifera</i> (rare)		<i>U. stellaris</i>
	<i>Nymphaea sp.</i>		Emergent
	<i>Trapa sp.</i>	<i>Cynodon sp.</i>	
		<i>Cyperus sp.</i>	
		<i>Enhydra fluctuans</i>	
		<i>Ipomoea aquatic</i>	
		<i>Jussiaea sp.</i>	
		<i>Polygonum sp.</i>	
		<i>Scirpus sp.</i>	

Macro invertebrates represents an extremely diverse group of aquatic animals, and the large numbers of species possess a wide range of response to stressors such as organic pollutants, sediments and toxicants. However, under influence of anthropogenic stress drastic changes in community structure of the macro-invertebrates in lentic system occur (Chakraborty and Das, 2006). The macro invertebrates identified in the present study includes crustaceans such as larvae, pupa, nymph and adult of caddis flies, beetles, diptera, mosquito, cyclops, daphnia, fresh water shrimps, crabs etc., molluscans such as pond snails, pila, annelids such as leech, earthworms and nematodes, and turbellaria. In some earlier works, there were reports of 54 species of birds in Silsakho wetland (Baruah, 2005). However in the present investigation 50 species of birds belonging to 27 families have been recorded. The Arseidae numbers dominated (9 species) and were common. However Black Britten, Black crown, Great egret, and grey headed fishing eagle showed a decreasing trend while the population of Lesser Adjutant stork (*Leptoptilos javanicus*) has increased mainly due to the dumping of garbage.

It is of great concern that most of the freshwater diversity are in crisis (Revinga *et al.*, 2000). Some of the recorded macrophytes are under the verge of extinction due to shrinkage of the wetland and thus need conservation measures. On the other hand, the dumped garbage is causing eutrophication of the water body which has led to an increase in growth of algae and has resulted in plankton bloom and algal mats, which is not desirable. The rich organic content in municipal

wastes degrades over time to release highly acidic leachates. Such conditions are conducive for the release of some of the most toxic environmental pollutants there by polluting the ground water. The probability of inclusion of toxic substances into food chain by bio magnifications has increased considerably.

5. Recommendations

The Silsakho wetland is located in the middle of Guwahati city. If the potentialities of the wetland are properly utilized, it can be a source of income generation for the Government. The wetland can be developed into a site for eco-tourism. The wetland can also be developed into a bird sanctuary as many resident and migratory birds use the wetland as a breeding and nesting ground. Fishing activity can also be allowed in some parts of the wetland for the local residents. Thus it is imperative that some form of co-management with local communities be established for Silsakho wetland. For the above causes the following measures can be taken :

- 1) Protection of the vegetation of the catchment.
- 2) Development of the catchment area.
- 3) Encroachment control
- 4) Restoration of the water body
- 5) Control of pollution
- 6) Control of dumping of municipal sewage.
- 7) Active cooperation & participation of the local people for the development of the wetland.
- 8) Master Plan of Sanitation for the local residents needs to be drawn and executed meticulously.

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