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Abundance and Distribution of Chanda nama (Glass-perchlet) in Deepor Beel, Guwahati, Assam

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ABSTRACT

Deepor Beel is one of the richest biodiversity areas within the wetland ecosystem of Assam which support large numbers of plant and animal species. With this background, a preliminary survey was carried out to determine the abundance and distribution of *Chanda nama* (*Glass-perchlet*) in Deepor beel, Guwahati; Assam. Sampling method was divided into “catch per unit” and “catching % per day”. The Fish samples were collected by using mainly two gears (nets), *Ghoka jal* (dip net) and *Asara jal* (cast net). This study reveals that the conditions of the water body are still conducive to the growth of this fish species, yet in near future some conservation measures will have to be planned.

KEYWORDS: *Chanda nama*; Abundance; Distribution; Conservation; Deepor Beel

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INTRODUCTION

Fish constitutes almost half the total number of vertebrates. Of the total 39,000 species of vertebrates recognized in the world over, 28,000 are fish species. Hence, new survey, projects had been carried over on estimating fish diversity, population, abundance, status etc by biologists. Wetland ecosystems are fragile but vital ecosystems, recognized for their role in conservation of fish biodiversity and are designated as Ramsar sites (Internationally recognized Wetlands) on the number of threatened fish species they support. Wetlands of Assam are hotspots for fish biodiversity. Deepor Beel, Ramsar Wetland site on 19/8/02 as site No.1207 which is a permanent freshwater lake and a formal channel of River Brahmaputra and located south of the river in Kamrup District, Assam, is rich in fish fauna (Wikipedia, the free encyclopedia) hence several case studies are carried out in Deepor Beel to examine the diversity, distribution and abundance of fish species.

A wide array of fishes is recorded in this wetland. A total of 46 species belonging to 17 families viz; *Notopteridae*, *clupeidae*, *Anabantidae*, *Cyprinidae*, *Cobitidae*, *Bagridae*, *Siluridae*, *Schilbidae*, *Claridae*, *heteropneustidae*, *Amphipnoidae*, *Centropomidae*, *Gobidae*, *Belontidae*, *Channidae*, *Mastacembelidae* and *Tetradontidae*, have been recorded (Acharjee, Dutta and Sharma, 2010). Among the variety of fishes, *Chanda nama*, (Hamilton 1822, Rahman 2005, Bhuyan 1964) (Assamese name=*chanda*) is a freshwater ray-finned glassy fish, also known as “ELONGATE GLASSY PERCHLET” of the family Ambassidae, (Wikipedia, the free encyclopedia). The word *Chanda* is originated from the Greek word, “*Chandon*” meaning = with the mouth opened (www.fishbase.org). This particular fish inhabits in the wetland, Deepor Beel with particular abundance and distribution. Thus the aim of the present study is to determine the abundance and distribution of *Chanda nama* in Deepor beel, Guwahati; Assam

Systematic Position of Chanda nama

Systematic position of *Chanda nama* followed after Jayram, 2010 :

Domain: Eukaryote

Kingdom: Animalia

Phylum: Chordata

Subphylum: vertebrata

Super class: Gnathostomata

Class: Actinopterygii

Sub class: Neopterygii

Order: Perciformes

Sub order: Percoidei

Family: Ambassidae

Genus: *Chanda*

Species: *Chanda nama*

(Hamilton, 1822)

Morphological Description

Body of *Chanda nama* is strongly compressed and laterally almost flat. Dorsal and ventral profile of this fish is almost equally convex. Lateral line is partly distinct, partly absent, second dorsal spine is longest. Spines of first dorsal and rays of second dorsal gradually decrease in height. Scales are minute and rounded. Caudal fin forked. Body is transparent yellowish white with numerous tiny black dots. First dorsal and tip of second dorsal is deep black. Caudal fin is black and orange. A small black spot is found at the origin of the base of the anal fin (Rahman 2005 and Bhuyan 1964).



Fig 1: *Chanda nama* (Glass-Perchlet)

Habits and Habitat

This small fish is seen in the clear fresh water of rivers, streams, canals and beels. Especially in the rainy season these are abundantly found from the marginal area of jute and paddy fields (bdfish.org). It spends its time in small shoals, under the cover of marginal rods or floating vegetations (Daniels 2002). *Chanda* feeds at all layers of water, subsisting mainly on the minute entomostracans. They appear to be predominantly carnivorous, feeding in surface or column waters.

Importance of Chanda nama

This fish is well known as a small indigenous species (SIS) of fish of Bangladesh. People use it as the part of their delicious food. It provides a good source of nutrition but low price in market (Bhuiyan, 1964 and Talwar and Jhingran, 2001). The presence of these fishes checks mosquito breeding only to a small extent while it effectively reduces the density of Cyclops. So this species could effectively be used in the control of guinea worms and also for malarial control. Since, this fish is an ornamental fish; it is popular for aquarium purposes (Bhuyan, 1964).

REVIEW OF LITERATURE

A study of the Avifauna of Deepor Beel, a Potential Bird Sanctuary in Assam was carried out by P.K. Saikia and P. C. Bhattacharjee in 1987 where they recorded the actual diversity of birds near Deepor Beel and threw light to its conservation. Limnology of Deepor Beel with special reference to its biodiversity and pollution status was done by Chetry in 1991, *Gauhati University*.

Qualitative and quantitative study of lower and high organisms and their functional role in the Deepor Beel ecosystem was done by P.K. Saikia in 2005 at Gauhati University, in which he analyzed the diversity and richness of various phylogenetic groups of lower and higher organism and prepared a set of recommendation for creation of suitable environment for diversified variety of avian species with special reference to endangered, threatened and endemic species.

Fish and Fishery Status of Deepor Beel: A Ramsar site in Assam was carried out by Acharjee *et al.* in 2012. Their study reveals the conservation status of Deepor Beel with wide description and fish status of the beel.

Spatial, Temporal and Depth Profiles of Trace Metals in an Urban Wetland System: A Case Study with Respect to the Deepor Beel, Ramsar Site 1207, India was done by Nibedita Kapil & Krishna G. Bhattacharyya, Department of Chemistry, Gauhati University, Assam, India in 2013 in which they reported on monitoring of pH and 10 trace metals (As, Cd, Cr, Co, Cu, Ni, Mn, Pb, Hg, Zn) in the Deepor Beel water at 13 sites for three different depths consisting of surface layer, middle layer or euphotic zone, and bottom layer or euphotic zone x 1.5. The assessment was done bimonthly for a year.

A note on the systematic and bionomics of *Chanda* species (Centropomidae) was carried out by S. K. Gupta, Department of Zoology, Pt. J. N. College, Banda (U. P.) which showed the economy of *Chanda nama*.

Yet, no studies have been done on abundance of *Chanda nama* on Deepor Beel. Hence I have attempted for a survey on its abundance on Deepor Beel.

OBJECTIVES OF THE STUDY

In order to carry out the present study the following objectives were formulated:

1. To find out the abundance of *Chanda nama* in the wetland, Deepor Beel.
2. To determine the distributional pattern of *Chanda nama* in the wetland, Deepor Beel.
3. To throw light on the conservation status of *Chanda nama* encountered during the survey.

DESCRIPTION OF STUDY AREA

For the study of the abundance and distribution of *Chanda nama*, I have chosen our native wetland, Deepor Beel Located in Guwahati, Assam.

Deepor Beel is located within the coordination of 91°35'F to 91°43'F E. and 26°05' to 26°11'N. and lies on 165 -186 feet above MSL. It is situated on the Southern bank of the river Brahmaputra and Village Maj Jalukbari, Pachim Jalukbari, Dharapur and National Highway No.37 lie on the North; Dakhin Jalukbari, Tetelia and Pachim Baragoan to the East; Gorbhanga Reserve Forest, Chakardew Hill and Chilla Hill to the South West and the Village Azara and Kahikuchi to the west. The beel considered being of riverine origin, lies on the Southwestern fringe of Guwahati City, covering an area of about 40 km².

The water area of Deepor Beel itself offers a variety of habitats through the years as the water regime changes. During the summer, large parts of the beel are covered by aquatic vegetation like water hyacinth; aquatic grasses, water lilies and others submerged emergent and floating vegetation. Phytoplankton is one of the major components of the lowest level of the producers in the Beel ecosystem Deepor beel has a meso-thermal climate, characterized by high humidity and moderate temperature. The temperature ranges between 10.6°C to 30°C. The annual average precipitation is 3000 to 4000 mm. Most rainfall is occurring during monsoon period (May-September).

Deepor Beel is one of the richest biodiversity areas within the wetland ecosystem of Assam. Its partially deep water and partially shallow water as well as the presence of high land support large numbers of plant and animal species. Again, the presence of hilly terrain and natural forest adjoining the beel area support large numbers of endangered and threatened vertebrate species. Deepor Beel is one of the refueling sites on the migratory flyways and some of the largest congregations of aquatic birds in Assam can be seen here, particularly in winter. Apart from that, large numbers of terrestrial avifauna is also meet in this highly productive beel system (P. K. Saikia, 2005).

Deepor Beel has been serving since long as a storm water receptacle of the surrounding areas. It used to receive storm waters from the hills lying to the north, south and east during the rainy season. It is a unique wetland habitat for wild flora and fauna. Hence it was declared a wildlife sanctuary in 1989 and was included in the Directory of Asian wetlands.

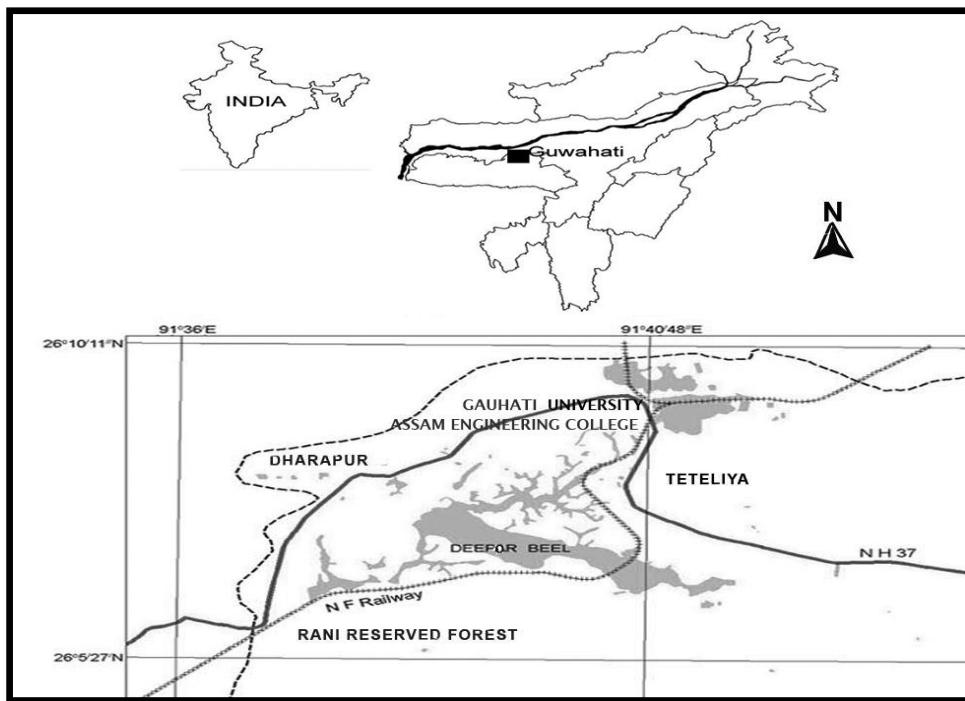


Fig 2: Map of Study Area, Deepor Beel, Assam



Fig 3: View of Deepor Beel

MATERIALS AND METHODS

Time of Survey

The study was carried out during February to July, 2018. The study tried to cover most of the area of Deepor Beel.

Sampling Materials

Following items were used during the survey- one still camera, measuring scale, notebook and writing equipments, vials to collect specimen and water, formaldehyde, fishing gears used by the fishermen, and boat to view and monitor each and every site of the Beel.

Sampling Methods

The investigation was based on data, comprehensive literature review and extracts of local knowledge and information. *Chanda nama* fish was collected from the beel along with various other *Chanda* sp. and other indigenous fishes like mola (*Amblypharyngodon mola*), *Puntius* species, *Labeo* species, catfishes etc by using mainly two gears (nets), *Ghoka jal* (dip net) and *Asara jal* (net). At most 6 fishermen helped me in collecting the fishes. After collection of the fishes on the first day, in the field itself, Talwar and Jhingran (2001) were referred for identification of *Chanda nana* among the other fishes. It was made separate and the amount was recorded in terms of grams or kilograms.

Sampling method was divided into “catch per unit” and “catching % per day”. Specific sites of the beel were selected for the former method. The survey was made in three sampling areas (three different directions of the beel). One sampling site was characterized by no aquatic vegetation (S_1); middle portion of the beel. Other sites however, were characterized by certain aquatic vegetation or semi aquatic vegetation (S_2 and S_3). In each sampling area, fishing was done once per day. Catch per day was recorded on the basis of total fish caught in a day. Firstly, total fish caught was recorded followed by separation of the amount of *Chanda nama* caught along with and the amount was recorded with the help of the fishermen. Along with the fishes, water sample was collected parallel from the beel and carried to the laboratory of Zoology Department for evaluation of the physicochemical parameters of the beel. The dissolved oxygen (DO) was analyzed by Winkler’s method or Odometric method (APHA, 1989), Carbon dioxide by Titremetric method (Trivedi and Goel, 1989; APHA, 1989), Total hardness by EDTA Titremetric method (APHA, 1989) and pH by (Digital water analyzer 371).

Photographs were taken of the fish species, various sites of Deepor Beel and of the various gears used for catching *Chanda nama* with a 6-megapixel digital camera.

I have interacted with the residents living at the fringe village nearby. Fishermen were personally interviewed during my study and taken help of for the completion of my report .

RESULTS AND DISCUSSION

Catch Unit per Effort

Catch per unit of the two nets, dip net and cast net, used by the fishermen showed a variation from 20 gms to 40 gms of *Chanda nama* per catch throughout the survey period on the selected sites of the beel. Among the records of 6 days with an interval of few weeks in between, the maximum amount gathered per catch was 40 gms on the month of April and may from the site characterized by aquatic vegetation while lowest record was 20 gms on the month February and March from the site with no vegetation. In between, the records obtained are given below in Table-1 and graphically represented below in figure 4.

Table -1: List of Amount of *Chanda nama* Recorded in Deepor Beel

Days	Sampling site characterized by no aquatic vegetation S ₁			Sampling site characterized by aquatic vegetation S ₂			Sampling site characterized by semi aquatic vegetation S ₃		
	Total fish (gms.)	<i>Chanda nama</i> (gms.)	%	Total fish (gms.)	<i>Chanda nama</i> (gms.)	%	Total fish (gms.)	<i>Chanda nama</i> (gms.)	%
11 th February	400	20	5	600	30	5	500	20	5
25 th March	400	20	5	600	30	5	500	20	5
20 th April	500	20	4	800	40	5	700	28	4
30th May	500	25	5	800	40	5	700	35	5
25th June	600	30	5	800	32	4	600	30	5
28 th July	600	30	5	900	36	4	650	32.5	5

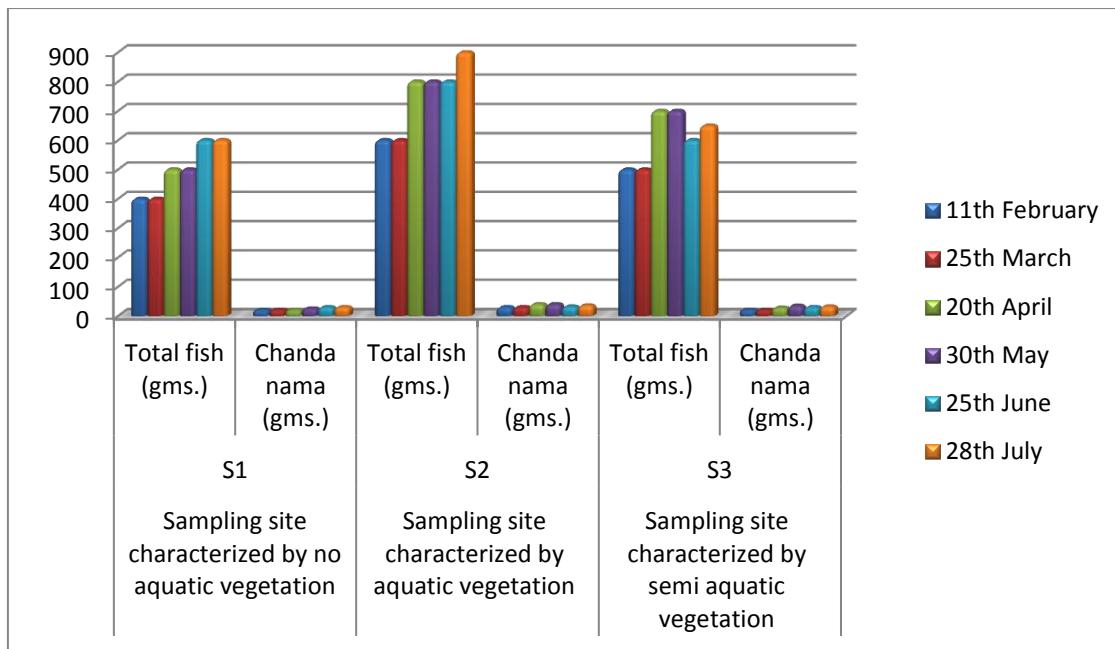


Fig-4: Chart Showing Catch per Unit of *Chanda nama* Species. against Total Fish Specie

Catching Percent per Day

Total amount of fish caught on a day was also recorded to get a more clear idea on the abundance of *Chanda nama*. A record of 6 days with the same interval as above was taken and a variation from 400 gms to 900 gms of total catch was observed. Among the total 400 gms of fishes, 20 gms was *Chanda nama* while among the total 900 gms of fishes, 36 gms was *Chanda nama*.

Physico-Chemical Parameters of the Beel

Table 2: Physico-Chemical Parameters of the Beel: (February – July, 2018)

SL. NO	PARAMETERS	RANGE
1	P ^H	7.0 – 7.2
2	Free CO ₂ (mg/l)	6.8 – 7.2
3	Dissolved oxygen (mg/l)	3.1 – 3.3
4	Total hardness (mg/l)	60 - 65
5	Total alkalinity (mg/l)	75 - 80
6	Chloride (Cl ⁻) (mg/l)	30- 32

Abundance and Distribution

From the above results, it can be estimated that the average catch percentage per unit of *C. nama* is 5 % and average catch percentage per day of *C. nama* is also found to be 5 %, among the total average fish catch Thus estimation can be made that *C. nama* has an abundance of 5% of the total fish of Deepor Beel. Catch per unit effort gave us an idea about its distribution. *C.nama* is more distributed towards aquatic vegetative region of the beel and the fish is found more on or near the bottom of the beel. The graphical representation is given below:

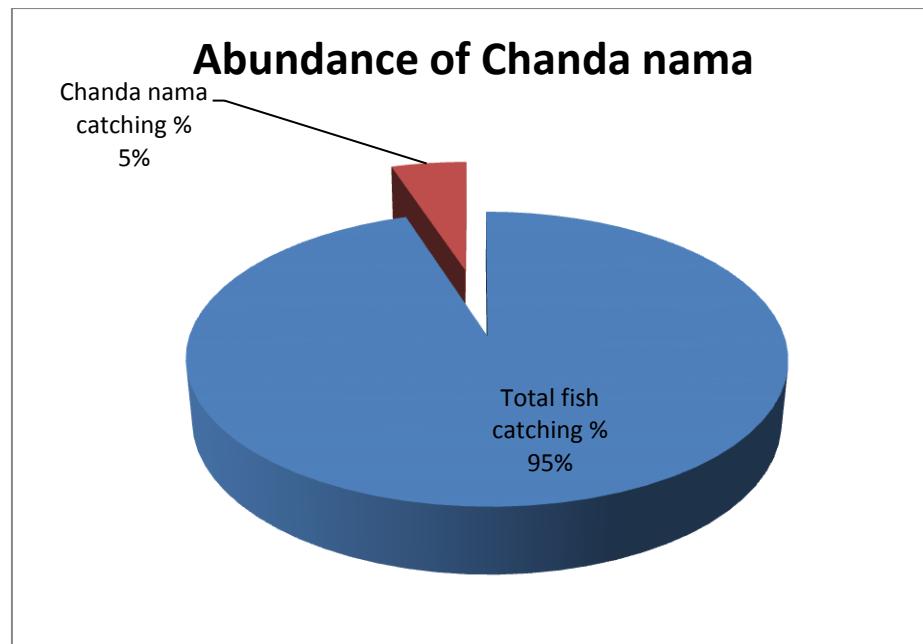


Fig-5: Pie Diagram Showing Abundance of *Chanda nama*

Fishing Gears Operated

A good no. of fishing gears was operated in the beel in different seasons. Among the fishing gears some are used in the beel almost all the times except monsoon i.e., in breeding season due to banned on fishing. The main fishing gears used in the beel and the gears used for *C. nama* are dip net, cast net, gill net, drift net, etc.

Discussion

Results obtained from the study reveals that *Chanda nama* is quite abundant in Deepor Beel. The IUCN Red list status (2012) of these species is (LC) i.e., least concern. However the population trend is decreasing due to deforestation, erosion, and wetland conversion etc. All the physic-chemical parameters were found to be satisfactory and beel seems to be productive one on the light of fisheries angle. According to Moyle, 1946, Total alkalinity above 50 mg/l can be considered productive and based on his observation, the beel is productive range conducive to fishes. This fish was abundant in the month of April of my study period due to rainfall. The fish mainly feeds on an aquatic sp. locally named “*Nigori or makhana*”.

This fish, along with other fishes is found sold maximum in a market named “*Godhuli bazaar*” in the month of January i.e.; during “*Magh Bihu (A festival)*”. A population of about 7000 resides in the fringe areas of Deepor beel and all are directly or indirectly dependent on Deepor beel for their sources of livelihood. The fishermen are busy in daylong fishing in the wetland; fisherwomen sell the fishes in “*Godhuli bazaar*”. The fisherwomen collect fishes from fishermen early in the morning.

Maximum earning of fisherwomen was Rs.50-100 per day. There is a different system of selling the fishes i.e., “Bhag system”. The fishermen are socio-economically poor but they are laborious and traverse long distances on foot from fish landing site from Deepor Beel to the marketing site.

CONCLUSION

It can be concluded from the present investigation that the Deepor Beel water body exhibits rich ichthyofaunal diversity. Reporting of *Chanda nama* shows that the conditions of the water body are still conducive to the growth of this fish species. The wetland which was once used to be richly dominated and populated with endemic fish species is experiencing decline in fish catch. The approach should be to allow recruitment of fishes by conserving and protecting the brooders and juveniles. Although there are no known wide spread threats for the species, no conservation efforts are currently in place, but in near future some conservation measures will have to be planned.

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