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Ichthyofaunal Diversity of Kulsi River: Prime habitat of Dolphin

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ABSTRACT: North East India is very rich in faunal and floral diversity. It is the conjunction of Himalaya and In-Burma biodiversity hotspots. Kulsi, a river of Kamrup District originated from Meghalaya and fall into the River Brahmaputra. In Kulsi river, a good numbers of piscivorous Dolphin (*Platanista gangetica gangetica*) is present which is schedule-I species under the Wildlife Protection Act, 1972 once wide spread throughout the Kulsi as well as Brahmaputra River. Few studies have investigated that 29 Dolphin were present in Kulsi River in February, 2009 (Wakid). This paper highlights the list of fish species available inclusive of the causes which could be held accountable for growing decline of diversity. The study was carried out from March 2010 to April 2011. 63 species of fish belonging to 8 orders and 21 families were recorded. Out of these 6 are exotic and the rest are indigenous having ornamental as well as economic values. Cyprinids (family: Cyprinidae), Live fish (family: Anabantidae, Clariidae, Channidae, Heteropneustidae), Cat fish (family: Bagridae, Silurdae, Schilbeidae), Clupeids (family: Clupeidae), featherbacks (family: Notopteridae), Loaches (family: Cobitidae), Eels (family: Mastacembelidae), Glass fishes (family: Chandidae) and Gobies (family: Gobiidae) are the major groups of fishes which spotted in the river. Cyprinidae is the most dominant family throughout the river. In some places around Kulsi river people are highly dependent on fishing. Day by day the availability of fish is slowly declining due to anthropogenic stress. People use different types of gears for fishing which are the major threats for the fish population. Awareness among the people and the fisher is inevitable. At the breeding time fishing should be banned in Kulsi River to immediate take of action.

Key words: Ichthyofaunal diversity, Kulsi River, Fishing Gear, Dolphin, Awareness.

INTRODUCTION

Kulsi, the southern tributary of the River Brahmaputra earns worldwide fame. The abode of highly threatened aquatic predator, fresh-water river dolphin (*Platanista gangetica gangetica)* Kulsi is blessed with magnificent fish diversity. As far as the prey base of National and state aquatic animal is concerned, the tectonic wetland chandubi, solbeel and beeldora play a pivotal role. Survival of this cetacean species is dependent on the future well being of these three wetlands which maintain healthy connection with this 80 km long tributary. It is because of the plugging of Kulsi with the Brahmaputra at Gumi cut the role of these three wetlands has become vital as fish migration from these wetlands through the respective connecting channels have been continuing. Kulsi harbors fish species which are diverse. And the food requirement for the piscivorous dolphin is available. The diversity is attributed due to climatic conditions, physiography, topography as well as its drainage pattern. Kulsi is famous for one of the river dolphin viz. *Platanista gangetica gangetica*, which is listed as Threatened Species by IUCN (Smith *et al.,* 2004). The dolphin breeds only in Subansiri River and in Kulsi River of the entire Brahmaputra delta. The Government of Assam is planning to declare this area as a wildlife sanctuary for the conservation of dolphins.

So far, there are many published report in fish diversity of Assam. Few reports are also available on Dolphin of Kulsi River. But, there has been no study on ichthyofaunal diversity of the river Kulsi. Therefore, this paper investigates some objectives viz to determine the abundance and distribution of various fish species throughout the study area, anthropogenic impact on the river. Moreover, awareness programs are undertaken to aware the people about the status of various fish species as well as that of dolphin.

MATERIALS AND METHODS

Study Area

Kulsi river is of total length 80 km from Meghalaya. The Geographical coordinates of Meghalaya are $25^0 38'$ N, $91^0 38'$ E (Wakid and Braulik, 2009)**,** to Nagarbera (Fig 1). But our study area is of 76km exclusive of the Maghalayan segment.

For convenience of study the river is divided into three segments- (a) from Kulsi to Kukurmara, (b) from Kukurmara to Nagarbera, (c) Jaljali (kulsi-Brahmaputra confluence) at Nagarbera where Kulsi decharges to the River Brahmaputra.

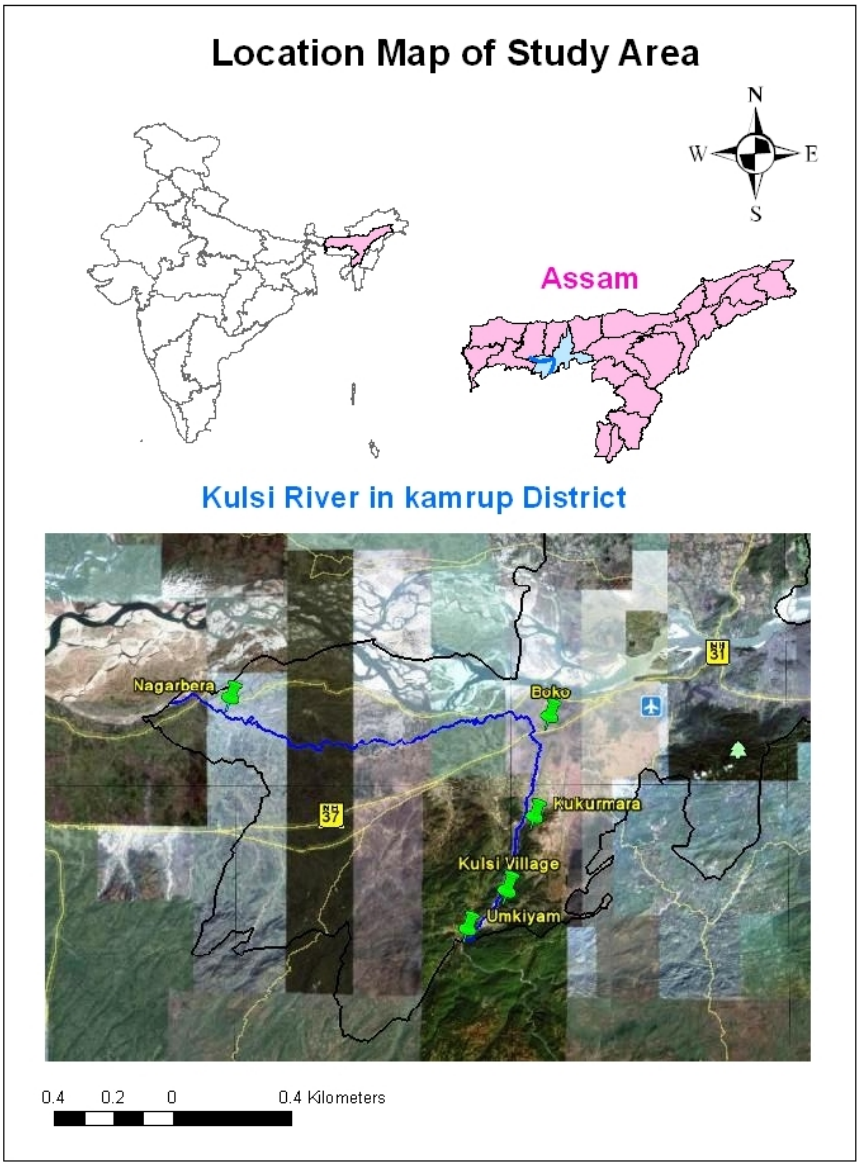

Fig. 1. Map of Study area.

Sampling

The study area of 76km contains 3 prominent bifurcation commonly known as 'dumukh' at Kulsi (village), Kukurmara and Jaljali (Nagarbera). These 3 sample points were choosen in order to cover all areas and habitat types. Sampling records were taken fortnightly from March 2010 to April 2011. Common fishes were recorded at landing sites and a sample collection was made for certain species for further laboratory confirmation.

Survey Method

Specimens were either collected from landing site or on the river by using various gears (nets, hooks etc), hand pricking etc. Landing sites were monitored at intervals for the stipulated period, covering pre-monsoon, monsoon and post-monsoon seasons. For identification and classification of various fish species Talwar & Jhingran (1991) and Jayaram (1999) were referred. These specimens were preserved in formalin. In addition, the nearby fishermen communities have been interviewed; as well as gears and methods used for capturing fishes were recorded.

RESULTS

About 4579 individuals were collected from the river within the study period. A total of 63 fish species (Table 1), that belongs to 8 orders and 21 families were recorded. Out of these, 6 are exotic (Table 2) and the rest are indigenous having ornamental as well as economic values.

Table 1: Ichthyologic Diversity of Kulsi River.

Assamese Name	**Scientific Name**	**Order**	**Family**	**Status[A]**
Arii	*Aorichthys seenghala*	Siluriformes	Bagridae	A
Arii	*Aorichthys aor*	Siluriformes	Bagridae	A
Balibotia	*Noemacheilus botia*	Cypriniformes	Balitoridae	LA
Bami	*Mastacembalus armatus armatus*	Synbranchiformes	Mastacembelidae	MA
Barali	*Wallago attu*	Siluriformes	Siluridae	A
Bhakua/Bahu	*Catla catla*	Cypriniformes	Cyprinidae	MA
Bhangone/ Nara	*Labeo bata*	Cypriniformes	Cyprinidae	MA
Boolla	*Barilius tileo*	Cypriniformes	Cyprinidae	R
Botia	*Botia dario*	Cypriniformes	Cobitidae	MA
Chanda	*Chanda nama*	Perciformes	Ambassidae	MA
Cheng garaka	*Channa barca*	Perciformes	Channidae	MA
Cheniputhi	*Puntius sarana sarana*	Cypriniformes	Cyprinidae	R
Chital	*Notopterus chitala*	Osteoglossiformes	Notopteridae	R
Darikana	*Esomus danricus*	Cypriniformes	Cyprinidae	A
Darikana	*Rasbora daniconius*	Cypriniformes	Cyprinidae	A
Darikana	*Rasbora bonensis*	Cypriniformes	Cyprinidae	A
Darikana	*Rasbora rasbora*	Cypriniformes	Cyprinidae	A

Table 1 cont…

Eleng	*Rasbora elanga*	Cypriniformes	Cyprinidae	R
Gagol	*Mystus menoda*	Siluriformes	Bagridae	R
Gangatope	*Tetradon kutkutia*	Tetradontiformes	Tetradontidae	R
Gedgedi/ Bhetki/ Khaloibhangi	*Nandus nandus*	Perciformes	Nandidae	LA
Gethu	*Botia histrionica*	Cypriniformes	Cobitidae	R
Goroi	*Channa punctatus*	Perciformes	Channidae	A
Ilish	*Hilsa ilisha*	Clupeiformes	Clupeidae	R
Kadali/BapatiBardaia	*Ailia coila*	Siluriformes	Schilbeidae	R
Kandhuli	*Notopterus notopterus*	Osteoglossiformes	Notopteridae	A
Karoti	*Gudusia variegata*	Clupeiformes	Clupeidae	A
Kholihona	*Ctenops nobilis*	Perciformes	Osphronemidae	A
Kholihona	*Colisa fasciata*	Perciformes	Belontiidae	A
Kokila	*Xenentodon cancila*	Beloniformes	Belonidae	R
Kuchia/ Cuchia	*Amphipnous cuchia*	Synbranchiformes	Synbranchidae	MA
Kurhi	*Labeo gonius*	Cypriniformes	Cyprinidae	LA
Laupati	*Danio devario*	Cypriniformes	Cyprinidae	LA
Magur	*Clarias magur*	Siluriformes	Clariidae	MA
Mali/ Kaliajora	*Labeo calbasu*	Cypriniformes	Cyprinidae	MA
Mirika	*Cirrhinus mrigala*	Cypriniformes	Cyprinidae	A
Moa	*Ambiypharyngodon mola*	Cypriniformes	Cyprinidae	A
Nandani/ Nadani	*Labeo nandina*	Cypriniformes	Cyprinidae	R
Neria	*Clupisoma garua*	Siluriformes	Schilbeidae	MA
Pabhoh	*Ompok pabo*	Siluriformes	Siluridae	R
Pabhoh	*Ompok pabda*	Siluriformes	Siluridae	R
Pabhoh	*Ompok bimaculatus*	Siluriformes	Siluridae	LA
Panimutura	*Glossogobius giuris*	Perciformes	Gobiidae	A
Puthi	*Puntius sophore*	Cypriniformes	Cyprinidae	A
Puthi	*Puntius conchonius*	Cypriniformes	Cyprinidae	A
Puthi/ Kenipotiah	*Puntius ticto*	Cypriniformes	Cyprinidae	A
Rashim/ Lachim/ Laseem	*Cirrhinus reba*	Cypriniformes	Cyprinidae	MA
Rau	*Labeo rohita*	Cypriniformes	Cyprinidae	MA
Ritha	*Rita rita*	Siluriformes	Bagridae	LA
Sal	*Channa marulius*	Perciformes	Channidae	MA

Table 1 cont…

Silgharia	*Labeo dero*	Cypriniformes	Cyprinidae	LA
Silgharia	*Labeo dyocheilus*	Cypriniformes	Cyprinidae	MA
Singhi	*Heteropneustus fossilis*	Siluriformes	Heteropneustedae	LA
Tingorah	*Mystus tengara*	Siluriformes	Bagridae	A
Tingorah/Singorah	*Mystus vittatus*	Siluriformes	Bagridae	R
Turi	*Macrognathus aral*	Synbranchiformes	Mastacembelidae	LA

[A] A- Abundant, MA- Moderately Abundant, LA- Less Abundant, R- Rare

Table 2: Exotic Fish Diversity of Kulsi River.

Common Name	Scientific Name	Order	Family	Status
Common carp	*Cyprinus carpio*	Cypriniformes	Cyprinidae	**A**
Grass carp	*Ctenopharyngodon idella*	Cypriniformes	Cyprinidae	**A**
Silver carp	*Hypophthalmichthys molitrix*	Cypriniformes	Cyprinidae	**A**
Big head carp	*Hypophthalmichthys nobilis*	Cypriniformes	Cyprinidae	**A**
Thiland magur	*Clarias garripinius*	Siluriformes	Clariidae	**A**
Japani kawai	*Oreochromis mossambica*	Perciformes	Cichlidae	**A**

Details of the species recorded from the Study Area

1) Order: Beloniformes (1 family, 1sp)
Family: Belonidae (1 sp.)
Xenentodon cancila (Hamilton, 1822)

2) Order: Clupeiformes (1 family, 2spp.)
Family: Clupeidae (2 spp.)
Hilsa ilisa
Gudusia variegate (Day, 1870)

3) Order: Cypriniformes (3 families, 29spp)
Family: Balitoridae (1 sp)
Noemacheilus botia (Hamilton, 1822)
Family: Cobitidae (2 spp)
Botia Dario (Hamilton, 1822)
Botia histrionic (Blyth, 1860)
Family: Cyprinidae (26 spp)
Catla catla (Hamilton, 1822)
Labeo bata (Hamilton, 1822)
Puntius sarana sarana (Hamilton, 1822)
Esomus danricus (Hamilton, 1822)
Rasbora daniconius (Hamilton, 1822)
Rasbora bonensis (Hamilton, 1822)
Rasbora rasbora (Hamilton, 1822)
Labeo gonius (Hamilton, 1822)
Danio devario (Hamilton, 1822)
Labeo calbasu (Hamilton, 1822)
Cirrhinus cirrhosus (Bloch, 1795*)*
Ambiypharyngodon mola (Hamilton, 1822)
Puntius sophore (Hamilton, 1822)
Pethia conchonia (Hamilton, 1822)
Pethia ticto (Hamilton, 1822)
Labeo rohita (Hamilton, 1822)
Labeo dero (Hamilton, 1822)
Labeo dyocheilus (McClelland, 1839)
Barilius tileo (Hamilton, 1822)
Rasbora elanga (Hamilton, 1822)
Labeo nandina (Hamilton, 1822)
Cirrhinus reba (Hamilton, 1822)
Cyprinus carpio (Linnaeus, 1758)
Ctenopharyngodon idella (Valenciennes, 1844)
Hypophthalmichthys molitrix (Valenciennes, 1844)
Hypophthalmichthys nobilis (J. Richardson, 1845)

4) Order: Osteoglossiformes (1 family, 2spp)
Family: Notopteridae (2 spp)
Chitala chitala (Hamilton, 1822)*)*
Notopterus notopterus (Pallas, 1769)

5) Order: Perciformes (8 families, 10spp)
Family: Ambassidae (1 sp)
Chanda nama (Hamilton, 1822)
Family: Anabantidae (1 sp)
Anabas testudineus (Bloch, 1792)
Family: Belontiidae (1 sp)
Colisa fasciata (Bloch and Schneider, 1801)
Family: Channidae (3 spp)
Channa barca (Hamilton, 1822)
Channa marulius (Hamilton, 1822)

6) Order: Siluriformes (5 families, 15spp)
Family: Bagridae (6 spp)
Rita rita (Hamilton, 1822)
Aorichthys seenghala (Sykes, 1841)
Sperata aor (Hamilton, 1822)
Hemibagrus menoda (Hamilton, 1822)
Mystus tengara (Hamilton, 1822)
Mystus vittatus (Bloch , 1794)
Family: Clariidae (2 spp)
Clarias magur (Hamilton, 1822)
Clarias magur (Common name: Thailand magur)
Family: Schilbeidae (2 spp)
Ailia coila (Hamilton, 1822)
Clupisoma garua (Hamilton, 1822)
Family: Siluridae (4 spp)
Wallago attu (Bloch & J. G. Schneider, 1801)
Ompok pabo (Hamilton, 1822)
Ompok pabda (Hamilton, 1822)
Ompok bimaculatus (Bloch , 1794)
Family: Heteropneustedae (1 sp)
Heteropneustus fossilis (Bloch , 1794)

7) Order: Synbranchiformes (1 family, 3 spp)
Family: Mastacembelidae (3 spp)
Mastacembalus armatus armatus (Lacepède, 1800)
Macrognathus aral (Bloch and Schneider, 1801)
Amphipnous cuchia (Hamilton, 1822)*)*

8) Order: Tetradontiformes (1 family, 1sp)
Family: Tetradontidae (1sp)
Tetradon kutkutia (Hamilton, 1822).
Channa punctatus (Bloch, 1792)
Family: Cichlidae (1 sp)
Oreochromis mossambica (Peters)
Family: Gobiidae (1 sp)
Glossogobius giuris (Hamilton, 1822)
Family: Nandidae (1 sp)
Nandus nandus (Hamilton, 1822)
Family: Osphronemidae (1 sp)
Ctenops nobilis (McClelland, 1845)

Cypriniformes is the most dominant group throughout the river (29 species) and Cyprinidae is the most species rich family (26 species). *Puntius sophore* is the most dominant species in kukurmara and kulsi village whereas *Wallago attu* density is highest at nagarbera. Nagarbera harbor mainly large fishes, in turn in kukurmara small fish population is abundant.

Effect of Anthropogenic stress on the river

It is said that wetlands are more precious than trees to maintain global warming. These are the heart of rivers. Kulsi is surrounded by a number of wetlands viz. Kulsi, Dorabeel, Kukurmara, Salsola, Barpith, Baweli, Chandubi etc which are now at deteriorating state.

The nearby fishers do some plantation like paddy, banana, areca-nuts, vegetables etc. to live life. As the neighboring area is a flood prone area hence paddy cultivation is not profitable. With the emergence of Chinese cultivation, problem is solved to some extent. But it affects the river. Again, one of the characteristic features of the river is water level of the river fluctuates depending mainly on rainfall in Meghalaya, not that of Assam.

Moreover, another major anthropogenic stress is industrialization. Hand some of people set up industry in the nearby wetlands e.g. brick industry in kukurmara ghat, on dora beel about 200 bigha land is occupied to construct a distillery industry. This physical habitat loss/degradation is one of the threats to indigenous fish diversity.

Heavy sand mining is also affecting the river resource a lot. In Kulsi River, as depth is low, hence sand mining up to a limit is necessary. But mining above threshold value stressed thereby population. Henceforth, it is beneficial and at the same time limiting factor for conservation and biodiversity.

Other threats are over exploitation, siltation (God & Goddess of Durga puja are thrown in the Kulsi River), destruction of outlet (gumi-cut) etc. Moreover, other anthropogenic stresses are over fishing, entry of exotic species, ignorance of fishermen etc. While the eco-tourism venture is gaining momentum at various potential sites of the fishes, in turn in kukurmara small fish population is abundant. This may be due to over fishing at kukurmara. Over fishing is also going on at nagarbera. But area of nagarbera is much larger in comparison to fishing community. Hence nagarbera is not affected. The highest numbers of varieties were obtained at Nagarbera (63 species). People of Nagarbera also used maximum varieties of fishing gears. As the abundance of fish is high, hand pricking of fish is also done and proved as a fruitful method. Various netting operation is done throughout the river. The main gears used are hook, line, net (Cast net, Gill net etc) Bamboo basket, Bamboo trap, duruk, dingora, chalani, etc. Nets are known among the local community as asra jal, lungi jal, jata jal, ghoka jal, mohori jal, boital, etc.

Kulsi river which is blessed with enormous tourism prospects, but yet to be fully exploited. Of the 72-km stretch from Ghoramara to Nagarbera, the downstream confluences of two wetlands – Sal and Beeldora posses highest fish density coupled with adequate depth of the river. In addition to these, now 'Kulsi multipurpose project' is proposed to have a 42 m high dam with installed capacity of 29 MW by Brahmaputra board, ministry of water resource. The Kulsi Multipurpose Project envisages construction of an earthen dam across the river Kulsi at about 1.5 km down stream of Umkium village in Assam. This dam construction will destroy all the resources including dolphin and fish of the river.

Conservation

Maintaining ichthyodiversity is too essential as it is not always possible to identify which individual species are critical to aquatic ecosystem's sustainability. Conservation programmes catalize fish production to be more sustainable and also maintain diversity. Diversity facilitates production by full utilization of the resource, encourage recovery from disturbance as well as decrease disease problem. Conservation may be practiced as in-situ or ex-situ. Govt of Assam if declare this area as a wildlife sanctuary for the conservation of dolphins that will be a great step conserve the recourses available on the river. On the other hand, dam construction will lead to the reverse situation. We have organized three awareness programmes to aware the people about the status of various fish species as well as that of dolphin and also to evoke the sense of people about the present ecological condition.

DISCUSSION

Though Kulsi river harbor various fish species in addition with Ganges river dolphin, Platanista gangetica (Roxburgh), but the society is not aware enough about it. Jayachandran et al. describes that the ecology of the river consisted of temperature fluctuating widely from 15 to 28 1C, depth from 0.8 to 10 m, turbidity of 11–19 cm, sand mining @ 12,500MT annually, and fish catch of 300–800 kg (from 1.5km area). All these factors pose a great threat to the fish and prawn wealth of the river (Jayachandran *et al.*, 2006). Biswas & Baruah (2000) investigated the habitat ecology of the Gangetic dolphin in the Brahmaputra river stretch within Eastern Assam and Bairagi (1999) reported the impact of the oil bait fishery on the dolphins of Brahmaputra River.

CONCLUSION

Kulsi is bestowed with immense resources of Nature. The fish diversity has suffered a lot due to heavy anthropogenic stress. What matters more at this hour are the well plan conservative measures to be undertaken to stem the rot-the alarming decline of fish diversity. Particularly the loaches fish including the commercial fish species which are the be all and end all both of the dolphin and the fisher.

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REFERENCES

Smith, B.D., Braulik, G. & Sinha, R.K., (2004). IUCN Red List of Threatened Species. Version 2010.4.

Bairagi, S.P., (1999). Oil bait fishery of catfishes in Brahmaputra River affecting river dolphin populations in Assam, India. *Journal of the Bombay Natural History Societ*., **96**: 424-426.

Biswas, S. P. and S. Baruah, (2000). Ecology of river dolphin (Platanista gangetica) in the Upper Brahmaputra. *Hydrobiologia*, **430**: 97 – 111.

Jayachandran K.V., Mohan R.S. Lal, Raji A.V., (2006). A new species of Macrobrachium Bate, 1868 (Decapoda, Palaemonidae) from the dolphin trenches of Kulsi River, N. India, possibly under threat.

Jayaram, K.C., (1999). The fresh water fish of the Indian region.

Jhingran, V.G., (1991). Fish and Fisheries of India. Third edition.

Wakid, A. And Braulik, G., (2009), Protection of endangered Ganges River dolphins in the Brahmaputra River, Assam, India, Final report to IUCN-Sir Peter Scott Fund, Rue Mauverney 28, 1196 Gland, Switzerland.