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Occurrence of Ganges River dolphin *(Platanista gangetica)*, a cetacean mega fauna in the Mahananda river system in Purnea district, Bihar, India

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Abstract

The Ganges River Dolphin *(Platanista gangetica*) is a mammalian mega fauna belong to the order Cetacea, inhabiting mostly in the perennial rivers of India, Nepal and Bangladesh. It is one of the most threatened cetacean species and has been categorized as endangered by IUCN. The present study was carried out mainly to observe the occurrence of Ganges river dolphins in Mahananda river near Marua village under Baishi block in Purnea district, Bihar and also to estimate their population. Monthly survey was conducted in 03 kms stretch in the downstream of the river from January to December, 2021. The surfacing of dolphins was recorded by direct observation. Total 64 dolphins were recorded in the 03 kms stretch in the downstream of Mahananda river throughout the year. Maximum detectability of dolphins (07) were recorded in the month of July to September, six (6) in October to November, (5) were recorded during month of January to March, whereas only four (4) *(P. gangetica*) were observed in April, May and December. The sighting of dolphins in this river may be due to presence of large no of small fishes in the Mahananda river, attracting these animals for foraging. Altogether 40 riverine fish species belong to orders Cypriniformes, Perciformes, Siluriformes, Clupeiformes, Beloniformes, Anabantiformes, Gobiiformes, Osteoglossiformes, and Mugiliformes were also recorded. Occurrence of Gangetic dolphins *(P. gangetica*) and Ichthyo-faunal diversity in Mahananda river, may be due to low level of water pollution and complete ban on transport and trafficking during and after COVID-19 induced lockdown in 2020 and 2021, may be another important reason. As per local information, the population of Gangetic dolphins and their habitat is decreasing alarmingly in this region as compare to previous years. The dolphins are now confined to certain pockets of the Mahananda river so occasionally seen. Thus, there is an urgent need for the conservation of these endangered aquatic cetacean mega fauna in its natural habitat and a systematic survey of Mahananda river is recommended to estimate the dolphin population.

Keywords: Mahananda river, Gangetic dolphin, Surfacing, Fish fauna, water pollution, Purnea.

Introduction

The Mahananda river is a trans-boundary river that flows through the Indian states of Bihar, West Bengal and Bangladesh (Sharad et al. 2007). It originates from the Himalaya near Chimli, east of Kurseong in Darjeeling district at an elevation of 2100 meters (Sharad et al.2007; Kumar et al.2020).The river Mahananda is one of the large tributaries of the Ganges river in India and flows in the eastern part of Purnea district in Bihar. It flows through Mahananda Wildlife Sanctuary and descends to the plains near Siliguri (W.B.). While flowing through Utter Dinajpur district in West Bengal and Kishanganj, Purnea, Katihar districts in Bihar it enters in Malda district in West Bengal and finally joins the river Ganges at Godagiri in Bangladesh (Rana 2018 and Momin et al. 2022). The total length of the Mahananda river is about 360 kms, out of which the river covers about 324 kms in India and rest about 36 kms flows in the part of Bangladesh (Encyclopedia 2010).

So far as the Gangetic dolphin (*Platanista gangetica*) is concerned, it is an aquatic mammalian mega fauna belong to the order cetacean inhabiting in the rivers of India, Nepal and Bangladesh. It is one of the most threatened cetacean species and has been categorized as endangered on the IUCN Red List due to decline in both of its range and population size (Choudhary et al. 2006; Bardoloi and Sahara 2021). The Gangetic dolphin is locally known as “Sons” in Bihar (Sisumach in Bengal) and is discontinuously distributed in the Ganga-Brahmputra-Meghna rivers (India), Karnfuli river (Nepal) and Sangu (Bangladesh) river system of South Asia from the base of the Himalayan foothills to the Bay of Bengal (Smith et al.1998; Sinha2000; Choudhary et al.2006). Asia is the most suitable residence of riverine dolphins. As matter of facts, the majority of the world’s dolphins live in salt water habitats, however, some are obligate fresh water species i.e. they can survive only in fresh water. These three obligate fresh water dolphins are :(i) The blind river dolphin (*Platanista gangetica*) inhabiting in the Ganges, Brahmputra and Meghna river system of India, Nepal and Bangladesh (ii) The Yantze river dolphin or Baiji (*Lipotes vexillifer*) of China which is now extinct (in Dec, 2006) and (iii) The Amezan river dolphin or Botto (*Iniageo francis*) largely distributed in American river system of North South America (Sinha 2013). Currently the distribution range of the Gangetic dolphins (*P. gangetica*) have shrunk both in the main channel of river Ganges and most of the rivers and tributaries due to insufficiency of water and construction of dams and barrages (Choudhary et al.2006 ; Kelkar et al. 2010 and Sinha 2013) and habitat destruction (Mitra and Choudhari 2018). Gangetic dolphins were also reported from different rivers and tributaries of Bihar. Besides main channel of river Ganges, dolphins were also reported from Kosi, Son, Gandak and Ghagra rivers (Sinha 2000; Sinha and Sharma2003 Sinha et al.2010). It is estimated that almost half of the dolphin population in Indian territory resides in the rivers of Bihar (Sinha 2013). In March, 2013 two dolphins (*P. gangetica*) were successfully rescued from the river Donk and translocated in Mahananda river near Taiyabpur in Kishanganj district, Bihar by Dr. Gopal Sharma, dolphin expert and Scientist of ZSI, Patna and his team (Sinha 2013). But there is no any documentary report of this species from Mahananda river up till now. Considering its decreasing population and its importance in the riverine ecosystem, the Ganges river dolphin (*P. gangetica*) has been declared as “National Aquatic Animal” in the meeting of National river Basin Authority, held in New Delhi on 5th October, 2009 and the day 5th October was decided to celebrate as “National Dolphin Day” every year (Sharma 2010; Govt. of India 2010).

In this context of background, we aimed to assess the occurrence and natural habitat of Ganges river dolphins in the Mahananda river in district Purnea, Bihar and also to estimate their population in the year 2021 from January to December in different seasons. We also assessed the available fish fauna of Mahananda river which are the food items of Gangetic dolphins.

Materials and Methods

Study Area: The present study was carried out in the 03 kms stretch in the downstream of Mahananda river near Marua village ($25^0$48'08.69 N Longitude and 83^0 46'47.61 E Latitude) under Baishi block in Purnea district, Bihar, India. The number of surveys were executed under the state non plan research project code: BAU/SNP/NRM/Rabi/2019-23 in different blocks of Purnea district and another socio-economic status extension project. This river segment was selected for dolphin survey as per local information, considering the higher frequency of dolphin sightings in that area (Map 1 & 2).

Map 1 & 2: Showing Geographical location of study sites (Red star mark in map 2) and Mahananda river in Purnea district, Bihar

Methodology

Survey method was followed as recommended by Smith and Reeves (2000). Monthwise land based surveys were conducted. Certain observation points were selected on the river bank. Sometimes boat trips were also organized in that river segment for dolphin sighting. Morning (between 7-9 am) and evening (between 3 to 4 pm) hours was selected for better observation. Surfacing activities of dolphins in the Mahananda river Purnea district Bihar were recorded by visual method. The number of surfacing dolphins sighted beside and in front of boat moving in the downstream were considered (Choudhary et al. 2022).For the study of ichthyo-fauna of Mahananda river, local fish markets in Purnea and Kishanganj districts were surveyed regularly. Local fishermen were directly interviewed about the occurrence of both fish fauna and Gangetic dolphins in the river. Online google earth imaging was used for geo-referencing and plotting of the ground observational points recorded from the field.

The primary data were generated from direct observation and occurrence records. The secondary data were collected by conducting direct interviews with local people, villagers and local fishermen living in nearby areas. The depth of water was also measured with the help of bamboo stick to estimate the average depth, the dolphin prefers. Besides, other behavioral activities of *P. gangetica* were also noted down during field survey. It was very difficult to take photographs of dolphins due to its unpredictable surfacing and movement. However, some photographs were also taken for evidence. Respective data were collected, tables and graphs were prepared accordingly for analysis.

Results and Discussion

During the survey of lentic and lotic water bodies in Purnea district, Bihar, we came across the Mahananda river flowing in the eastern part of this district. As per local information we visited Marua village located at the bank of Mahananda river under Baishi block in Purnea district. We encountered the surfacing of Ganges river dolphins or Gangetic dolphins in the river for the first time. Surfacing is a breathing event when dolphin comes to the water surface for taking oxygen from the air every after 2-3 minutes (Sinha, 2013).

Considering the importance of Gangetic dolphin in the riverine ecosystem and having no any documentary report of this endangered mega fauna from Mahananda river in Bihar, we decided to survey this river segment for their possible availability and also to estimate their population. During our monthly survey we recorded their presence in the river. In total 64 dolphins were recorded from January to December in 2021 in the downstream in 03 kms river stretch near Marua village. Maximum detectability of dolphins (07) were recorded in the month of July to September, whereas 06 number of dolphin were found in October and November, besides 05 in January, February and March and 04 in rest of the months (Table 1).

Table 1. Showing the month wise sighting of Gangetic dolphins and average depths of Mahananda river near Marua village in district Purnea, Bihar in 2021.

Month	Number of dolphin sighted	Average water depth in meters	Date of observation
Jan.	05	2.5	10-01-21
Feb.	05	2.5	08 -2-21
Mar.	05	2.5	08-3-21
Apr.	04	2	10-4-21
May	04	2	08-5-21
Jun.	04	1.5	12-06-21
Jul.	07	4.0	10-07-21
Aug.	07	4.0	12-8-21
Sep,	07	3.5	10-9-21
Oct.	06	03	10-10-21
Nov.	06	2.5	15-11-21
Dec.	04	2.5	12-12-21
	Total = 64		

Few dolphins came near the bank for foraging and their surfacing activities were distinctly observed in the month of July and August during flood season. Two juveniles were also recorded in the month of October. They were indulged in active foraging along with adults (in pod) and sometimes seen jumping over the water surface. Their detectability were significantly higher in morning hours. During flood season surfacing activities were maximum near the bank where there was less water current. The depth of the river was randomly measured from the boat with the help of thin bamboo stick. It was varying between 1.5 to 4 meters (rainy season) and maximum detectability was recorded at 3.5 to 4 meters (Table 1 & Graph 1).The presence of Gangetic dolphins (*P. gangetica*) in the Mahananda river indicates its healthy phisico-chemical condition and low level of water pollution (Choudhary et al. 2006; Kelkar et al. 2010). The frequent sighting of dolphins in that river segment of Mahananda may be due higher availability of small fishes as the main diet of Gangetic dolphins are small fishes and crabs (Sinha and Sharma 2003; Basir et al.2010; Kelkar et al. 2010). Complete ban of boating and fishing activities, and low level of water pollution during and after lockdown in 2020 and 2021 may be another important reason (Choudhary et al. 2022).

The increased population of small fishes in the bank area during flood season attracted the predator dolphins for foraging as there are evidences that sometimes dolphins enter or migrate the narrow channel with shallow and muddy water to forage the smaller fishes (Kelkar et al. 2010; Sinha 2013;Choudhary et al. 2022). Two types of surfacing of dolphins were observed (Photographs 1-4).

Active surfacing in which dolphins were raising their head and long snout above the water surface with producing specific sound (sus- sus), clearly visible from the bank or boat (Photographs 3 & 4). In passive surfacing dolphins came to the surface for breathing but their visibility were comparatively less and sometimes only few dorsal body parts were seen (Photographs (5 & 6).

An unexpected reduction in human activity, low level of water and air pollution along with sudden silence in the terrestrial and aquatic environment during and after lockdown surprised the animals to show uncommon behaviors as there are certain correlation between the atmospheric changes with the behavioral changes of natural creatures as observed by Loring 2000; Narayani, 2020 ; Bar 2021; Choudhary et al. 2022).


Photo -1&2 : Left - Authors interacting with local villagers and fishermen of Marua village in district Purnea, Bihar. Right - showing the Survey site and a view of river Mahananda flowing near the village Marua.




Photographs: Upper two, showing the active surfacing of dolphins. Lower two, showing the passive surfacing of dolphins, (Photography by Mr. Jay Kumar Jay & Dr. D. N. Choudhary).

Table 2.Following riverine fishes were recorded from Mahananda river.

S. N.	Local Name	Scientific Name	Order	Occurrence
1.	Rehu	*Labeo rohita*	**Cypriniforms**	VC
2.	Bata	*L. bata*	Cypriniformes	VC
3.	Kursa	*L .gonius*	Cypriniformes	OS
4.	Katla	*Catla catla*	Cypriniformes	VC
5.	Naini/ Mirka	*Cirrhina mrigala*	Cypriniformes	VC
6.	Rai/ Reba	*C. reba*	Cypriniformes	VC
7.	Bhagna	*Labeo boga*	Cypriniformes	OS
8.	Bhoul	*Barilius bola*	Cypriniformes	C
9.	Gohma	*Crossocheilis latius*	Cypriniformes	C
10.	Bheda/ Dhalo	*Nandus nandus*	**Perciformes**	OS
11.	Murhol/Morla	*Amblypheryngodon mola*	Cypriniformes	VC
12.	Chela/ Chelwa	*Oxygaster bacaila*	Cypriniformes	VC
13.	Bachua	*Eutropichthys vacha*	**Siluriformes**	VC
14.	Bachua	*Clupisoma garua*	Siluriformes	VC
15.	Tengra	*Mystus seenghala*	Siluriformes	VC
16.	Ritha	*Rita rita*	Siluriformes	OS
17.	Pothia/ Darahi	*Punteus sophore*	Cypriniforms	VC
18	Buari/ Bual	*Wallago attu*	Siluriformes	VC
19.	Aria/ Ariathi	*Mystus aor*	Siluriformes	C
20	Chapri	*Gadusia chapra*	**Clupeiformes**	C
21	Darangi	*Barilius bendelisis*	Cypriniforms	VC
22.	Kankaniya	*Gagata caenia*	Siluriformes	C
23	Phasa/ Faswa	*Setipinna phasa*	Clupeiformes	C
24.	Kaua	*Xenantodon cancila*	**Beloniformes**	C
25.	Pihora	*Aspidiparia morar*	Cypriniforms	VC
26.	Chanda	*Ambasis nama*	Perciformes	VC
27.	Kholsa	*Colisa fasciatus*	**Anabantiformes**	VC
28.	Tinkathi/Patasi	*Pseudotropius etherinoides*	Siluriformes	OS
29.	Baghar	*Bagarius bagarius*	Siluriformes	OS
30.	Patharchatta	*Glossogobius guiris*	**Gobiiformes**	C
31.	Chital/ Moy	*Notopterus chitala*	**Osteoglossiformes**	C
32.	Falli	*N. notopterus*	Osteoglossiformes	C
33.	Arwari	*Rhinomugil corsula*	**Mugiliformes**	C
34.	Sutri	*Alia coila*	Siluriformes	C
35.	Papta	*Ompok bimaculatus*	Siluriformes	OS
36.	Piya/ Nakti	*Lepidocephalichthys guntea*	Cypriniformes	C
37.	Dera/ Derwa	*Labeo dero*	Cypriniformes	C
38.	Balumach/Baluari	*Nemacheilus botia*	Cypriniformes	C
39	Bag mach/ Baghi	*Botea lohachatta*	Cypriniformes	OS
40.	Silan	*Silonia silondia*	Siluriformes	OS

Abbreviations : C- common, VC- Very common and OS – Occasionally seen

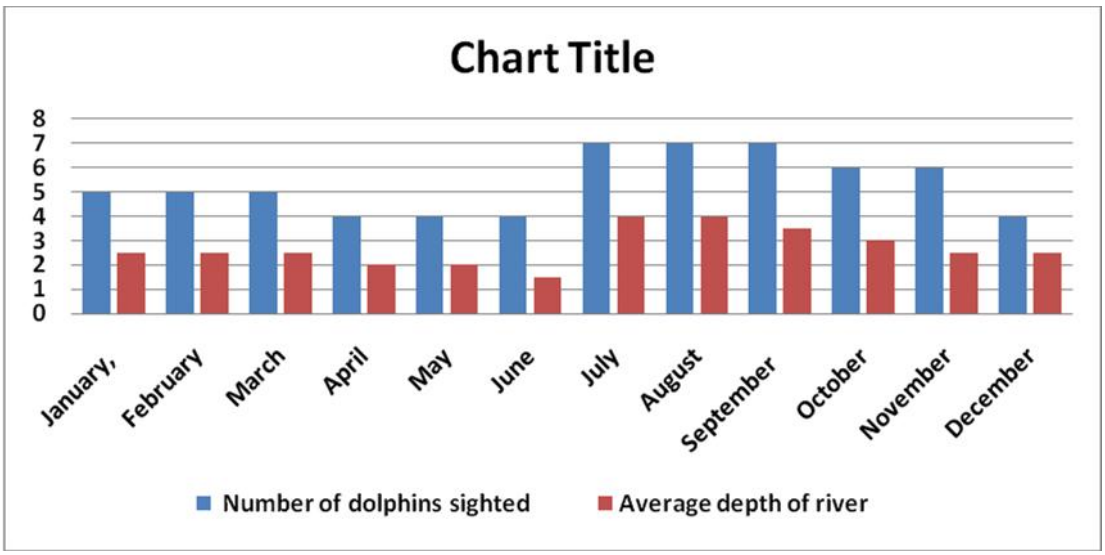

Chart 1. Showing relationship between No of dolphins sighted in different months in 2021 and depth of water in Mahananda river near Marua village in Purnea district, Bihar.

Photographs of Small fishes --First row, left to right - Reba, Bata and Pihora.
Second row, left to right - Balumach, Gohma and mix fishes of Chital, Rehu, catla, Mirka, Bata and shrimp of Mahananda river .(Photography by Dr. D. N. Choudhary).

As matter of fact, Mahananda is very rich in its ichthyo-faunal diversity. In addition to large fishes, many small fishes are found in Mahananda river including some hill stream fishes (Galib et al. 2016). These fishes were sold indifferent local fish markets in Purnea and Kishanganj districts of Bihar and Darjeeling district in West Bengal as observed by our team members (Table-2) which provide suitable foraging ground for their predator birds and dolphins, may be one of the important reasons, cannot be ignored. Gradual decrease in dolphin population in Mahananda river as reported by local fishermen and villagers may be due to insufficient water volume and habitat destruction (Sinha 2013; Mitra and Choudhari 2018; Bordoloi and Sahara 2021).

Threats to dolphin population: Overfishing, poaching of dolphins for oil and excessive sand lifting from the river are the local threats recorded from that area causing this mammalian species nearly to local extinction or to confined in certain pockets of the river.

Conclusion

The occurrence of Ganges river dolphins (*P. gangetica*) in the Mahananda river is a positive sign in respect of its biodiversity. Their presence revealed the low level of water pollution and enriched ichthyo-fauna in that river segment in Purnea district. A detailed survey of this river is needed. Due to steep decline of this endangered mammalian megafauna, there is an urgent need for the conservation of this species in its natural habitats.

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Author's contributions

First author designed the original idea of the work and prepared the manuscript. Second author collected and analysed the data about the dolphins and prepared tables and charts. Third author surveyed the local fish markets in Purnea district and collected data and available informations about the ichthyo-fauna of Mahananda river. Photographs were taken by first author.

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