Behavioural Response of Some Migratory birds and Gangetic Dolphins to COVID-19 Induced Lockdown: A case study in the Vikramshila Gangetic Dolphin Sanctuary (VGDS), Bhagalpur, Bihar, India.

Abstract

Vikramshila Gangetic Dolphin Sanctuary (VGDS), Bhagalpur, Bihar is the only protected area in India for the endangered Gangetic Dolphins (*Platanista gangetica gangetica*). Besides, this sanctuary has been an important roosting, nesting, and foraging ground for a large number of resident and migratory birds ~~since~~ for the last many years. Birds are the Bio-indicators and play a major role to maintain the ecological balance being an important member of the different food chains. The imposition of complete lockdown in the country and abroad in 2020 and 2021 due to COVID-19 like pandemic severely affected the life of a human as well animals both. Many alterations were seen in the environmental parameters such as in the quality of air, water, and land due to complete lockdown ~~resulted~~ing ~~-~~resulting in unusual and uncommon ~~bevaviours~~ behaviors in birds and other wildlife. The present investigation was carried out to study the behavio~~u~~ral responses of some migratory birds and Gangetic Dolphins to CoVID -19 induced lockdown in the Vikramshila Gangetic Dolphin Sanctuary (VGDS), Bhagalpur, Bihar. Many migratory birds were recorded just after lockdown even in the month of last week of May (normal departure time is last week of March to the first week of April) in 2020 and 2021. These birds were showing their prolonged stay in the sanctuary area in comparison to previous years. ~~Detectibility~~ Detectability of Gangetic Dolphins was also observed significantly higher in comparison to other days. Gharials were sighted in both the years in 2020 and 2021 after a decade or more. All these uncommon behavio~~u~~ral changes as recorded in some migratory birds, Gangetic Dolphins and other aquatic fauna during and just after lockdown may be due to sudden and unexpected changes in the weather and climate or due to less human interferences and complete ban on fishing activity due to complete lockdown in the country and abroad. This study will be useful and informative for the birders, wild lifers and academicians too and may be a part of further research in the future.

Key words : COVID-19, lockdown, migratory birds, Gangetic dolphin, Gharial, VGDS.

Introduction

The outbreak of the novel Corona~~-~~virus or COVID-19, the biggest pandemic of the world spreaded from the human seafood market, Wuhan of ~~Hubai~~ Hubei province in China (Lu

et al.,2020 ; ~~shereen~~ Shereen *et al*., and Kaur,2020). The COVID-19 has hit the human race hard for over ten months in 2020 and 2021. It leads to the emergence of the global pandemic. The imposition of lockdown due to COVID-19 like pandemic stopped all the commercial, social, economical, industrial and urbanization activities and even the public movement ~~w~~here~~as~~as ~~was~~ shut off. That greatly affected the various important environmental parameters which are directly correlated to human and animal health (Mahto *et* al.,2020). Nature took ~~the~~ advantage ~~from~~ of these ~~anthropause~~ andropause and showed improvement in the quality of air and water, less noise pollution, change in weather and climate and undisturbed and calm wildlife (Coste,2020 ; Arora *et al*.,2020 and Science Daily,2020).

Unlike in the case of humans, the COVID-19 lockdown seems to have had a positive impact on animals and birds too. Limited human interference and reduced noise pollution level helped them to reclaim their space in the ecosystem to a certain extent (Narayani, 2020). There ~~has~~ have been countless posts on social media over the past few months (during and after lockdown) reporting unusual wildlife encounters. ~~Anectodal~~ Anecdotal observations, especially from metropolitan areas suggest that nature has reported well to lockdown. Not only birds but there are also some surprising visitors including fishes and mammals in an attempt to build a global picture of the lockdown effect (Rutz *et al*., 2020). Peahens were seen at M.N. marg during the lockdown in New Delhi, a ~~leopard~~ leopard-spotted at Hydrabad outskirt during the lockdown period (Mandal *et al*.,2021). Times of India reported on 25th April~~,~~ 2020 that after nearly three decades a fresh-water Ganges river dolphin was back at Kolkata, India. Many ~~evidences~~ pieces of evidence are found in various parts of the globe to indicate the use of man zone by wildlife (Loring, 2020). Global climate change affects the migratory behavio~~u~~r of many water birds (Crick, 2004 and Rushing *et al*., 2008). There are already evidences that changes in the weather pattern and climate- have impacted ~~bird's~~ birds' behavio~~u~~r including alteration in their migratory behavio~~u~~r, breeding time, breeding success and changes in population and their distribution (Both- *et al*.,2020 and Jonzen *et al*.,2006). According to Sekarcioglu *et al*,(2012) changes in avian community structure on global or regional scales are an important indicator of the effects of weather and climate change in tropical ecosystems. However, local diversity parameters especially for migratory water-birds are crucially dependent on habit quality. During and after the lockdown period many birds species which migrate from other parts of the country, known as partial migratory birds (like Painted storks, Spoonbills, Ibises, ~~Spot~~ Spot-billed pelicans and Grey herons) have extended their stay in different bird sanctuaries in Tamilnadu (Sathish, 2020).

In the present investigation we aimed to access the behavio~~u~~ral responses of certain migratory birds~~-~~, Gangetic dolphins and other aquatic fauna~~—~~ in Vikramshila Gangetic Dolphin Sanctuary (VGDS) , a lower part of the river Ganges in Bhagalpur, Bihar, India to the sudden and drastic changes occurring in the urban environment resulting from the COVID-19 induced lockdown- in the country and abroad.

Study Area : The present study was carried out in the Vikramshila Gangetic Dolphin Sanctuary (VGDS), a part of lower stretch of the river Ganga covering in Bihar. This sanctuary is a 60 kms stretch of the river Ganga between Sultanganj (25° 15' 15'' N & 86° 44' 17'') to Kahalgaon (25° 16' 54'' N & 87° 13' 44'' E) flowimg through Bhagalpur. It was established in 1991 by the Government of Bihar specially to protect the endangered Ganges river dolphins (Choudhary *et al*., 2006 and Kelkar *et al*.,2010).

VGDS has high density of Ganges river dolphins (*Platanista gangetica gangetica*), about six species of turtles, about 76 species of fishes, more than 200 species of birds and occasional sighting of Gharials and Otters (Choudhary *et al*., 2006 , Kelkar *et al*., 2010 and Kumar et al.,2019).

Map 1. : Showing the view of Vikramshila Gangetic Dolphin Sanctuary (VGDS) Bhagalpur, Bihar, a part of lower stretch of river Ganga and the study area (Bhagalpur to Sabour in red line).

Materials and Method

Boat trips were conducted in the Sanctuary area in the last week of May in 2020 and 2021 during and just after lockdown for watching birds and other animals. We covered about 12 km~~s~~ in ~~the~~ downstream between Bhagalpur and Sabour. Morning time (between 7 am to 11 am) was selected for better observation. Birds and their activities were recorded from the boat and sometimes from the river bank by using binocular<u>s</u> (Nikon 8x42).

Surfacing activities of the Gangetic dolphins were recorded by a visual method. ~~Number~~ The number of dolphins sighted beside and in front of the boat ~~were~~ was considered.

Birds were identified by using standard key books of Ali, 2002 ; Ali and Ripley, 1989 and Grimmett *et al*., 2011. Few photographs and videos were also taken by using a digital camera Nikon 820 (30 X) for evidence. Data are collected and summarized accordingly for scientific documentation.

Observation and Results

Vikramshila Gamgetic Dolphin Sanctuary (VGDS) Bhagalpur, Bihar~~-~~ has been a roosting, nesting and foraging ground for a large number of residents as well as migratory birds for many years (Choudhary and Mishra, 2006). The breeding of many water birds like Terns, Pratincoles, black winged stilts and Lapwings has already been reported by Choudhary *et al*. in 2007. Migratory birds start to visit in this sanctuary area of Bihar usually in the ~~mid -~~mid- December every year and after spending 3 - 4 months they usually depart from here between the end of March to the first week of April (Ali, 2002 ; Choudhary *et al*., 2006).

A. Observation on Migratory birds :

We documented a few flocks of migratory and winter visitor birds roosting on the sand deposits and small islands of the sanctuary in between Bhagalpur to Sabour (12 km~~s~~ approx.) just after a lockdown in the last week of May in two successive years 2020 and 2021. Though it was a part of our regular bird watching~~-~~ trip to river Ganga after lockdown ~~but~~ we became excited to see some migratory birds (listed in Table 1) which were still present even at the end of May. Birds were showing their prolonged stay just after a lockdown in this region of Bihar was certainly a matter of study .

Migratory birds which were recorded in the sanctuary area are mainly Common coot, Wood sandpiper, Eurasian curlew, ~~Black~~ Black-tailed godwit, Pied avocet, Spotted red shank, Common green-shank, Little stint, Common teal, Brahminy duck, Northern pintail, ~~Brown~~ Brown-headed gull, and the Osprey (Table – 1.). Out of ~~these~~ this Common teal, Brahminy duck and Northern pintail are members of the duck family whereas, ~~Euracian~~ Eurasian curlew, Pied avocet, Black tailed godwit and Shanks are marginal waders foraging on mudflats or shorelines. Coots are aquatic birds of rail family. They are good swimmers and divers and mostly feed on plant materials. The Osprey (fish hawk or river hawk) is a diurnal ~~fish~~ fish-eating bird of prey and~~-~~ member of raptor family hunting mainly on fish~~es~~ by hovering in the sky. Brown headed gull is a small aquatic migratory gull wintering on the coasts and large inland lakes and rivers of the Indian subcontinent. Out of these winter visiter birds~~-~~, Spotted redshank and ~~Black~~ Black-tailed godwit were not recorded in ~~the month of~~ May~~,~~ 2021.

Table-1. List of Migratory and winter visiter birds sighted in VGDS just after a lockdown in the last week of May, in 2020 and 2021.

S. No.	Local name	English name	Scientific name	IUCN status	Migratory status	Number recorded in 2020	~~Nunber~~ Number recorded in 2021
01	Tilakdasri or Kesrar	Common Coot	*Fulica atra*	LC	Resident migratory (RM)	22	17
02	Chupka	Wood sandpiper	*Tringa glareola*	LC	Migratory	05	03
03	Timtima or Harit jalrank	Common Green shank	*Tringa nebularias*	LC	Migratory	21	27
04	Chota batan	Spotted Red shank	*Tringa erythropus*	LC	Migratory	11	Not recorded
05.	Kasya chaha	Pied Avocet	*Recurvirostra avosetta*	LC	Resident migratory (RM)	65	73
06.	Runni	Little stint	*Calidris minuta*	LC	Migratory	05	07
07	Bara gulinda	Euracian curlew	*Numenius arquata*	LC	Migratory	06	11
08	Bara gudera	Black tailed godwit	*Limosa limosa*	LC	Migratory	08	Not recorded
09	Karra	Common teal	*Anas creca*	LC	Migratory	12	15
10.	Chakwa	Brahminy duck	*Tadorna feruginea*	LC	Resident migratory (RM)	16	22
11.	Seekper or Dighonch	Northern pintail	*Anas acula*	LC	Migratory	16	23
12.	Mach ranga	Osprey	*Pandion haliaetus*	LC	Migratory	03	02
13	Ghomra or Gangacheel	~~Brown~~ Brown-headed gull	*Larus brunicephalus*	LC	Resident migratory(RM)	07	O5

They usually visit from colder countries mainly from Russia, Alaska, ~~Mangolia~~Mongolia, ~~Tazakistan~~Tajikistan, Siberia, and Eurasia (Ali,2002). All these migratory and winter visiter birds start to visit this region of Bihar in ~~the mid~~ mid-December and depart from here usually at the end of March every year. The longer stay of the ~~above~~ above-mentioned migratory and winter visitor birds in the sanctuary area up to the end of May is certainly a matter of excitement and study.

Photo 1. & 2. : Flocks of migratory birds (Northern pintail ducks in left and Pied avocet in right) sighted in the sanctuary area just after lockdown (Photography by D N Choudhary)

B. Observation on Gangetic dolphins (*Platanista gangetica gangetica*) :

Vikramshila Gangetic Dolphin Sanctuary (VGDS) is the only protected area in India for endangered Gangetic dolphins. Approximately 200-250 dolphins have been recorded in the sanctuary and they are running under many threats in the river (Kelkar *et al*.,2012 ~~and~~ Kumar *et al*.,2019).

The Gangetic dolphins are usually seen in the main-stream of river Ganga but during and just after lockdown the detectability of their surfacing ~~were~~ was recorded significantly higher in comparison to other days. We sighted the surfacing of ~~twenty~~ twenty-seven (27) dolphins in 2020 and twenty (21) in 2021 in this 12 km~~s~~ downstream of river Ganga between Bhagalpur and Sabour. ~~In~~ On normal days the count does not reach up to this level. Few dolphins clustered near the bank (Barari ghat- to Meerachack ghat of Bhagalpur) for foraging and their surfacing were very distinctly observed in 2020. Two to three (2-3) juveniles were also recorded with adults at the confluence of a small channel containing shallow water in the river Ganga in 2021. They were indulged in active foraging and sometimes jumping over the water surface.

Photo 3 & 4. : Photographs of Gangetic dolphin (left) and Gharial (right) sighted in the sanctuary area just after lockdown (Photography by Mr. Jay kr Jay and Mr. B Chintapalli).

Conclusively their detectability, sighting frequency, surfacing as well as other behavio~~u~~ral activities were found much more during and after a lockdown in comparison to other normal days as recorded by us in the sanctuary.

C. Observation on other aquatic fauna :

We recorded two Gharials (*Gavialis gangeticus*) one near Sabour and another near Tintanga ghat in May~~,~~ 2020 and one near Jahnavi ghat in May~~,~~ 2021~~-~~, five ~~Smooth~~ Smooth-coated otters (*Lutrogale perspicillata*) in 2020 and two in 2021 on the sand deposit in the sanctuary near Vikramshila setu during our survey. As per previous ~~records~~ records, Gharials

could be sighted after a decade or more in this protected area of river Ganga (Kelkar et al.,2010)Though few fresh-water turtles were also seen basking on the sand deposit in May, 2021 but we could not identify them as they disappeared quickly into the water while approaching them.

Many resident birds were also documented but here we are mainly concerned with some migratory birds showing uncommon behaviour or alteration in their migratory behaviour (longer stay period) during and after a lockdown in this sanctuary area, certainly an exciting one and a matter of study and research.

Discussion

Birds are among the most vulnerable species to weather and climate change due to their high sensitivity to climate and weather (Sparks et al.,2002). They are also sensitive to landscape modifications as well as to the presence of persistent pollutants (Backer and Tingey, 1992 and Backhaus *et al*., 2012).

Alteration or prolonged stay of some migratory birds (listed in table 1.) up to the end of May in Vikramshila Gangetic Dolphin Sanctuary (VGDS) may be due to drastic changes in the weather pattern caused due to COVID-19 induced lockdown in the country and abroad affecting their migratory ~~behaviour~~ behavior (Crick, 2004 and Rushing *et al*.,2008) or may-be due to improvement in the quality of air and water, less noise pollution, undisturbed and calm wildlife (Arora et al.,2020).

The complete lockdown also helped in making the climate favourable for both residents as well as migratory birds and other wild animals as there was no emission, no traffic in the air, water and on the roads and less or negligible human interferences in the region caused them to stay longer in the warmer period so spotted at the end of May in both the years in 2020 and 2021 (Debas, 2020).

~~Unexpected~~ An unexpected reduction in human activity, low level of pollution, and sudden silence in the locality surprised the birds and other animals to show some uncommon behaviour (Rutz et al. 2020 ; Choudhary and Rohitashwa, 2022) as there is a certain correlation between atmospheric changes with the behavioural changes of natural creatures during the lockdown as observed by Narayani (2020) and Bar (2020).

Similarly, the detectability of Gangetic dolphins, Gharials and otters were found significantly higher during and after a lockdown in the sanctuary in between Bhagalpur to Sabour may be due to minimum human disturbances and low level of noise and water pollution (Choudhary and Rohitashwa, 2022) or due to complete ban on fishing and traffic activities in the river Ganga so dolphins came closer to the bank (Loring, 2020). The diet of the Gangetic dolphins ~~are~~ is mainly small fish~~es~~. The increased population of smaller fishes in the bank area

during lockdown attracting the predator dolphins for foraging may be ~~the~~ another reason as there are evidence~~s~~ that sometimes dolphins enter or migrate the channel with shallow and muddy water to forage the smaller fishes (Choudhary *et al*.,2006 and Kelkar *et al*.,2012).

Gharial sighting after a decade or more in the sanctuary near Sabour~~-~~, Tintanga ghat ~~and~~ and Jahnabi ghat might be due to less or negligible fishing practices, less human interferences, improved water quality, and much availability of fishes in the sanctuary, need further study and research of the ecological parameters of the Ganges river.

Conclusion :

~~On the basis of~~ Based on the above observations, we can conclude that nature has pressed the re~~s~~set button and rejuvenated its wildlife during and just after the lockdown. Though~~,~~ it is a ~~short~~ short-term improvement in ~~the~~ nature and environmental conditions yet, it is quite obvious that we can control or minimize the adverse changes occurring in the natural environment by proper management and public awareness.

The COVID-19 lockdown offered ~~a~~ scope for an experiment in animal behavio~~u~~r. ~~Unexpected~~ An unexpected reduction in human activities, low level of pollution and the sudden silence of locality certainly surprised the birds and other animals and pushed them to show some uncommon behavio~~u~~rs, which can not be ignored and it is a subject of further research.

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