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Late winter study on Avifaunal Diversity from two different regions of North Bengal in India

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Abstract

A rapid avifaunal diversity was carried out at two different places of North Bengal, West Bengal. These two sites were Teesta Barage, Gajoldoba and Jayanti range of Buxa Tiger Researve (BTR), Alipurduar from 12th February to 17th February 2017. The habitat structure was different in those two places. Teesta Barrage was predominantly water body and Jayanti range comprises mainly of Canopy cover and a mountain riverbed. During the field tour a total of 151 avian species were observed and most of them were photographed. Among the study sites BTR was rich in avian diversity which having 113 different species. In Teesta Barage, Gajoldoba, 69 species were documented. In Gajoldoba, 41% of the total birds were winter migrants where only 11% of the birds were of this category observed in BTR. There were only 34% similarities in avian populations in these two locations. Study recorded BTR as for Passerine birds and Teesta Barage is a good place for both Anseriformes and Passeriformes.

Study of avifaunal diversity is an essential ecological tool and an important indicator to evaluate different habitats both qualitatively and quantitatively[5]. India is a mega-diversity centre harbor about 1301 species of birds that amount to 13% of the total birds of the world[2]. Globally, the bird populations are facing serious threats primarily from anthropogenic activities[18] and climatic changes[7,20]. The geographic location of a wetland may determine how and when birds will use it or use adjacent habitat[15]. In India, waterbirds and their wetland habitats are under extreme threat resulting from a combination of rapid economic development and increasing human population. But, hopefully it was seen previously that during the last decade as mainly the hunting of these waterbirds diminishes so the number of Ferruginous Duck (*Aythya nyroca*) increased steadily in recent past in Gajoldoba wetland[9]. Eighty bird species have been previously reported from Gajoldoba wetland[8] out of which most of the birds were winter migrants and Anatidae being the dominant family. This particular wetland came with some surprises in past, such as in February

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2013, one Long-tailed Duck (*Clangula hyemalis*) was sighted here, which was till date the only record from Eastern Himalaya[17]. Adhurya *et al.*[1] has already reported 45 bird species in BTR during early winter. When mid winter data were calculated it was observed that 68 avian species were identified in the Jayanti range of BTR[19]. In another study, Naaz *et al.*[16] reported only 39 species from the same area at the same time of the year. Allen *et al.*,[4] extensively studied this region and they mentioned a total of 227 species from this region. The objective of the study was to prepare a checklist of birds in those two habitats during late winter season. The study was also designed to compare the bird diversity in these two different habitats that are subjected to various degrees of human disturbances.

Study Area :

Gajoldoba is a perennial cut-off meanders by the left side of Teesta River in Jalpaiguri District of West Bengal. Gajoldoba bill (26.76'N & 88.59'E) with an area of about 148 ha is situated by the side of the Gajoldoba barrage. The state-owned Teesta Barrage Division, Odlabari, manages the Gajoldoba wetland. The region experiences only 0.98% rainfall during winter (December to February), however, Gajoldoba wetland experiences the highest water level during the winter season because during that period most of the gates of the barrage remain closed (Fig. 1).

Jayanti in Buxa Tiger Reserve (BTR) (26.39'N & 89.34'E) is also located in Northern part of West Bengal in Alipurduar District. It was set up as 15th Tiger Reserve in our country in 1983. The area of BTR encompasses 760.87 Km^2 having a sanctuary of 269 Km^2 and a National park of 117.01 km^2 of pristine forest and is situated between a transition zone between Biome-8 and Biome 12 Indo-Gangetic Plain[12].

Bird species were observed using Sutherland, 2006, point count method[20], where observer remaining in one point and records the birds around. As Gajodoba and Jayanti are two different kind of habitat, accordingly the means of observing birds were different. In Gajoldoba wetland man driven wooden boat was used, running at a speed of 1-2 km/ hour. In Jayanti, walking was the only means to cover the different forest trails and Jayanti river bed at an average speed of 2 km/hour. For observation of wild life two binoculars were used. The specifications are given below:

1) Olympus 10X50, PORO prism,
2) NIKON acculon 10X50.

For documentation CANON SX 530 point and shoot camera was used.

The water quality of Teestabarage was measured using Multi-parameter PCSTestr^{TM}35, EUTEOH instruments, OKATON. The birds seen and photographed were identified using the field guidebooks of Ali and Ripley[3], Kazmierczak and Perlo[13] and Grewal *et al.*[10]. The scientific names, common names and IUCN status were ascertained as per Bird Life international[6] and Grimmett *et al.*,[11]. The relative diversity (RDi) of families was calculated by using following formula[14].

$$RDi = \frac{\text{No. of bird species in the family}}{\text{Total no. of species}} X\ 100$$

Fig 1. Map of study region encircled in pink circles.

During the 4 days spent in the field 151 avian species were seen and identified. The first day of the field study was spent in Teesta Barage, Gajoldoba, where a total of 69 birds' species were observed. Second day on wards time was spent in the fields of Jayanti range of BTR and a total of 113 bird species were observed there. Out of the 69 bird, observed in Gajoldoba, 28 were winter migrants and remaining 41 were resident species (Fig.2a). Majority of the winter migrants were from Anatidae family.

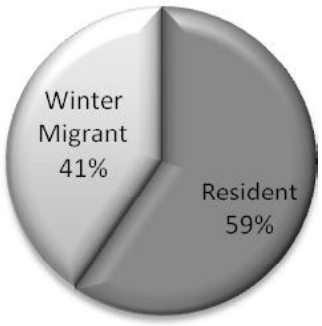

Fig 2a; Percent wise distribution of Resident and Migratory birds from Gajoldoba.

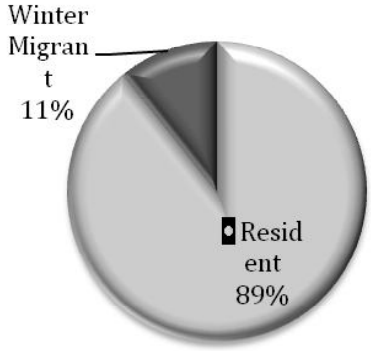

Fig 2b; Percent wise distribution of Resident and Migratory birds from BTR.

The pH of the water of the Teesta Barrage was highly alkaline, which was measured 9.3, at 9-30 in the morning. This alkalinity may be due to large assemblage of ducks and geese in more or less stagnant water, because most of the gates were closed. Average water temperature of the site was 18°C. The 69 different bird species from Gajoldoba distributed to 14 Orders and 29 Families, of which Order Passeriformes was dominant having 21 different species contributing 30% in relative diversity index (Table 1). Order Anseriformes was second most dominant with 12 species (17% in relative diversity index) (Fig. 3, Table 1).

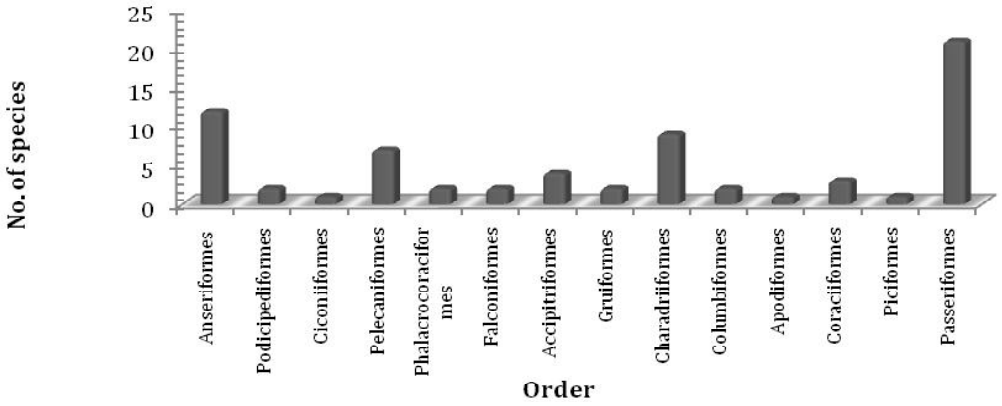

Fig. 3; Avian species load in different Orders observed in Gajoldoba.

Table-1. Relative Diversity (RDi) of various families at TeestaBarage, Gajoldoba

Sl. No.	Order	RDi
1	Anseriformes	17.39
2	Podicipediformes	2.90
3	Ciconiiformes	1.45
4	Pelecaniformes	10.14
5	Phalacrocoraciformes	2.90
6	Falconiformes	2.90
7	Accipitriformes	5.80
8	Gruiformes	2.90
9	Charadriiformes	13.04
10	Columbiformes	2.90
11	Apodiformes	1.45
12	Coraciiformes	4.35
13	Piciformes	1.45
14	Passeriformes	30.43

Table 2: Relative Diversity (RDi) of various families at Jayanti range, BTR.

Sl. No.	Order	RDi
1	Galliformes	0.88
2	Pelecaniformes	1.77
3	Phalacrocoraciformes	0.88
4	Falconiformes	0.88
5	Accipitriformes	3.54
6	Charadriiformes	3.54
7	Columbiformes	3.54
8	Psittaciformes	3.54
9	Cuculiformes	1.77
10	Strigiformes	0.88
11	Apodiformes	1.77
12	Bucerotiformes	0.88
13	Coraciiformes	6.19
14	Bucerotiformes	2.65
15	Piciformes	6.19
16	Passeriformes	61.06

When the data related to families were checked, it was found that family Anatidae was the major one having 12 numbers of species. Family Ardeidae being the second with only 6 different species (Fig 4). So far as comparison of species composition and sharing with other habitat is concerned, it was found that 38 avian species out of 69, comprising 55% of total population of that region, were exclusively present in that location and remaining 31 (45%) shared habitat with BTR (Table 3).

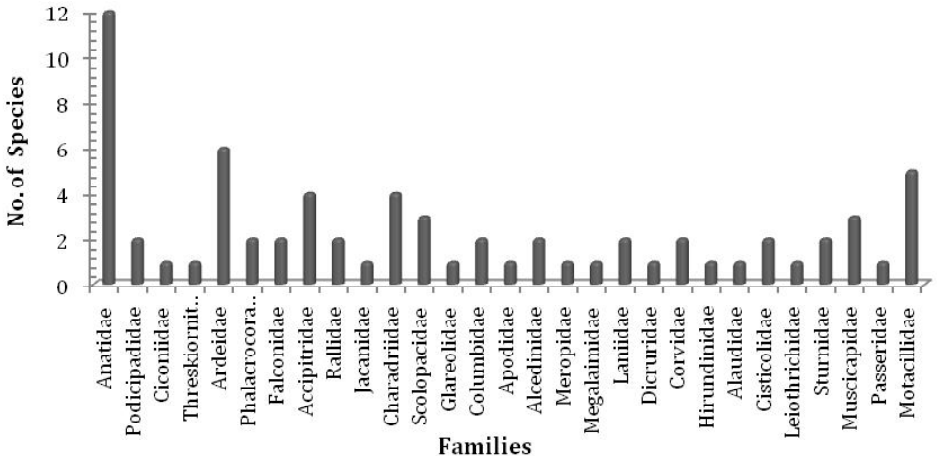

Fig. 4 Avian species load in different families observed in Gajoldoba.

Table-3. Habitat wise species comparison.

	Gajoldoaba	BTR
Total species	69	113
Exclusive species	38 (55%)	82 (73%)
Shared species	31 (45%)	31 (27%)

Table-4. Sorensen's Similarity index of bird community composition

Habitat	Gajoldoba	BTR
Gajoldoba	100	34
BTR	34	100

The avian checklist showed that the bird composition in BTR was completely different from that of Teesta Barage, Gajoldoba, comprising of 16 Orders (Figure 5). These 16 orders were comprised of total of 49 families (Figure 6). Among the 16 Orders Passeriformes was the dominant one having contributed more than 60% of the total species load (Table-2).

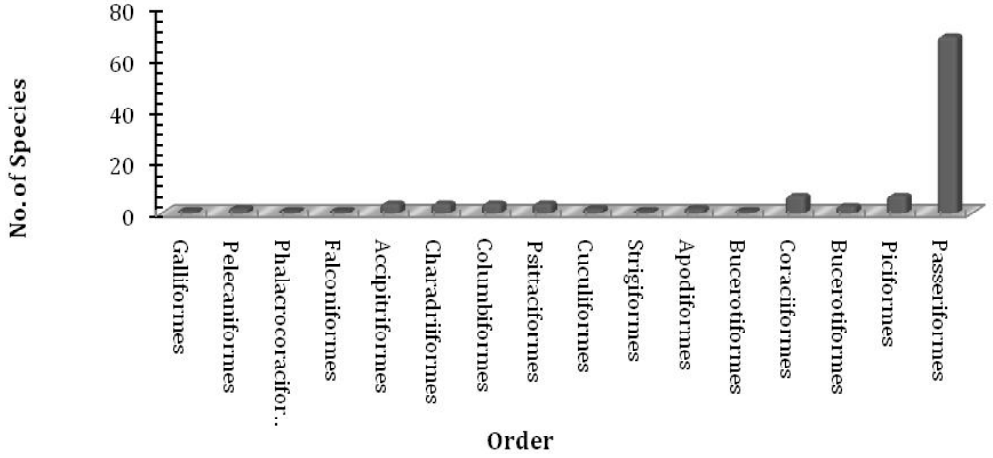

Fig. 5 Avian species load in different Orders observed in BTR.

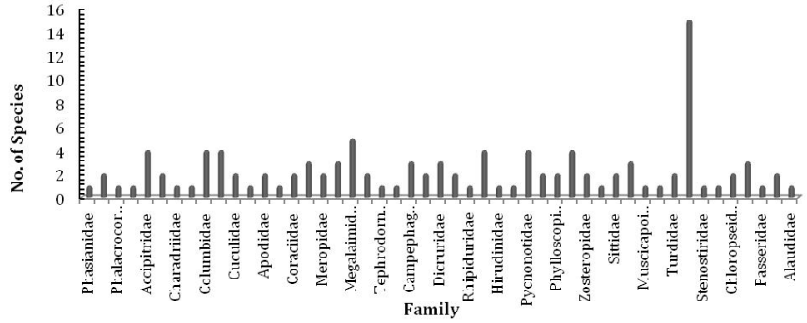

Fig. 6 Avian species load in different families observed in BTR.

This very Order having birds species of 28 families. Out of which Muscicapidae being the major contributor with 15 species. To my view, the complete absence of Family Anatidae in the study region is because of the absence of large water bodies. Allen *et al.*[4] found 20 avian species belonged to Anatidae family, but their complete absence from this region indicates their drastic population decline so far as the study area is concerned, possibly due to habitat loss and extensive human interferences. On the contrary to the data of Anatidae family, this study produced a commendable checklist of 113 bird species in just 3 days field study in Jayanti range, BTR. Most interestingly, previously researchers have documented fewer numbers of birds in this location even with more days' studies[16,19]. These data clearly indicates that though the number of water birds, mainly winter migrants declined in this region, but overall ornithological activities increased in previous years. Only 27% of the birds of BTR shared their habitat with that of Gajoldoba, remaining 73% were found exclusively in that region (Table 3). The Sorensen's index of bird community comparison data revealed that there is 34% similarity between these two habitats (Table 4). The shorter span of the study period gave only a baseline data of the avian population of these two regions. A more intensive study is recommended to identifying many more avifaunal species. The reason behind the complete absence of ducks and Geese from Jayanti range of BTR needs intensive studies.

From this study tour it can be clearly concluded that Teesta Barrage, Gajoldoba, is a favourable place to winter migrants mainly members of Anatidae family. Large assemblage of flocks of different ducks and geese were seen during visit. A vagrant report of Tundra Bean Goose (*Anser serrirostris*) was the hallmark of that location as this species is not a regular visitor to our country. It was found that BTR as a place for Passerine birds. Bird movement was satisfactory in this region. A more detailed study spanning the whole year will certainly help us to understand the situation of avian population there.

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