

# Avifaunal Diversity and Abundance of Jalikhara and Etila Beel (wetland) of Kamrup (metro) District, Assam, India

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**Abstract:** Avifaunal diversity is very common in wetland ecosystem. Wetlands like river, beels, marshes provide a significant habitat for incalculable species of birds. The purpose of this study was to find out the diversity and abundance of avifauna in two selected wetlands of Dimoria region namely Jalikhara and Etila. The study was conducted between March 2016 to April 2017. The line transect method was used to collect data on bird diversity and abundance. And to determine the species diversity Shannon-Weiner diversity index ( $H'$ ) was used. A total of 45 bird species belonging to 23 families were recorded. Both the Jalikhara and Etila beel are rich in avifaunal diversity. But the diversity of Etila is found to be comparatively lower (3.17) than the Jalikhara (3.68). And the family Ardeidae is found abundantly in Jalikhara beel while Sturnidae is the most abundant family in Etila beel. The main reason behind it is the avoidance of Etila beel by water birds is due to high effluent discharge by Hindustan Paper Corporation (Nogoan Paper Mill).

**Keywords:** Abundance, Avifauna, Diversity, Line-transect, Shannon-weiner index, Wetland

## 1. Introduction

A wetland is an any kind of land area that is submerged by water. Systematic study of wetlands started just after the International Convention for Wetlands held in Ramsar or Iran in 1971 which is known as Ramsar Convention. In India, diverse wetlands are seen and some of them are unique. They occupy 1-5 percent of the total geographical area of the country [1]. Under the Ramsar international wetland conservation treaty, wetlands are defined as areas of marsh, fen, peat land or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed 6 meters (Article 1.1) [2]. The North-East region of India is blessed and glorified with excessive and varied types of water resources in the form of rivers (19,150 km), reservoirs (23,792 ha); beels, lakes and swamps(143,740 ha);ponds and mini barrage (40,808 ha) and low laying paddy cum fish culture systems (2,780 ha) [3].

Ecologically wetlands are of great significance for an area as they perform a number of vital functions in maintaining the overall balancing of nature, flood and soil erosion control, water storage and purification etc. [4]. Wetland supports congregation of large number of migratory and resident species of birds as it has high nutritional value as well as productivity [5]. As per Ali and Repley (1983), 273 species of birds in India can be considered as water-fowls, the birds that depend on wetland ecosystem. The bird assemblages are affected by various factors like the food availability, the size of the wetland [5]. Wetlands are favored habitats for diverse, abundant and large invertebrates, seeds, tubers and vertebrates which are important foods of birds [7]. Birds use wetlands for breeding, nesting and rearing young. Thus, wetlands are ideal habitats for birds serving as roosting and for thermoregulation [8]. The objectives of the study are: (i) To prepare a checklist of wetland birds in and around

Jalikhara and Etila beel (wetland), (ii) To calculate the Diversity and Abundance of the avifauna recorded in the study, (iii) To make a comparative analysis of the diversity and abundance of the recorded avifauna.

## 2. The Study Area

Dimoria is a Tehsil in kamrup Metro District of Assam, India. It is located 46 km towards East from District headquarters Guwahati. Dimoria is bounded by Meghalaya on the South, by Morigaon District on North-East and by greater Guwahati city on the West upto Jorabat Amrigong. Dimoria lies between 26°N and 26°14'N latitudes and 91°51'E and 92°10'E longitude. The climate of this region is extensively influenced by the monsoon climate. The average annual temperature is 27°C and the average annual rainfall is about 200 cm [9]. Dimoria has some of the most impressive hills and hillocks like Dhoomara pahar in the south, Mata pahar, Nalgedera pahar etc. scattered throughout the region lying mostly in the north-south and east-west direction.

## 3. Methodology

This study was carried out from March 2016 to April 2017. Line transects were used to record birds within or around the study sites [10] [8] [11]. Birds count was from 7:00-10:59 (morning), 11:00-1:59 (midday), and 2:00-4:30 (Late afternoon). The identification of birds was confirmed by the help of "Books of Birds of the Indian subcontinent (Grimmett *et al.*, 1998). Data was analyzed for

(i) Species diversity by Shannon-Weiner Diversity Index

$$H' = -\sum (p_i) (\ln p_i), \quad [10] [11] [12]$$

Where  $H'$  = Shannon diversity index,  $P_i$  = Proportion of population in species  $i$  to the total sample.

(ii) Relative Abundance (RA)

$$RA = \frac{\text{No. of individuals of the species}}{\text{No. of individuals of all species}} \times 100 \quad [10] [11] [12].$$

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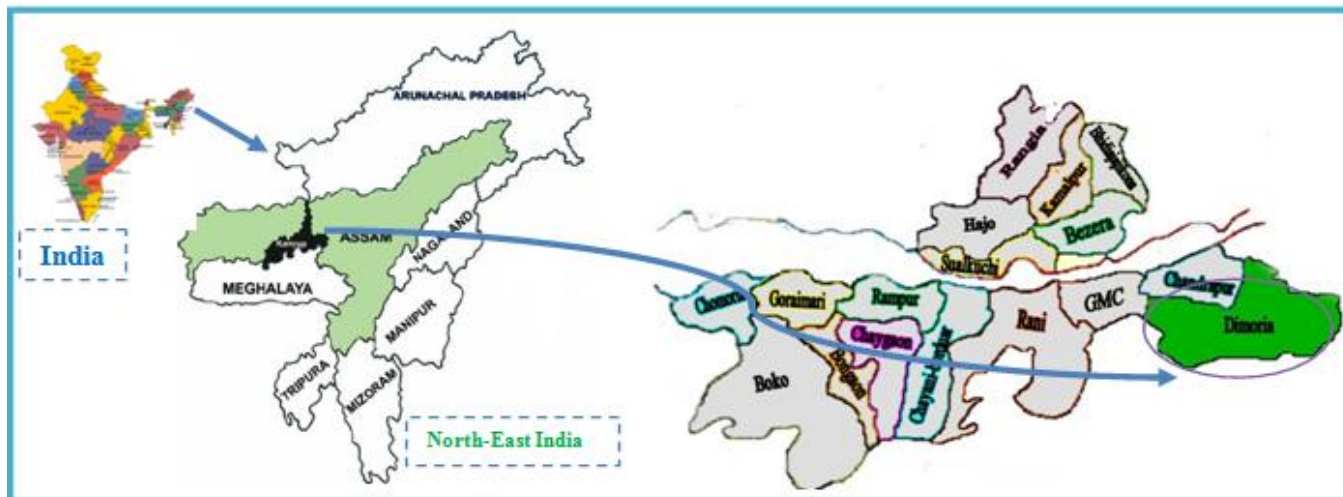


Figure 1: Map of Study Area

#### 4. Results and Discussion

A total of 45 species belonging to 23 families were recorded. Species diversity of Jalikhara is found to be 3.68 while 3.17 in Etila (Fig. 2). The study reveals that the area is rich in avifaunal diversity as the value of the index ranges from 1.5 (low species richness) to 5.0 (high species richness), which is also supported by Gloria Bideberi, 2013<sup>[13]</sup>. Although the climatic and geophysical conditions of these two wetlands are almost identical, there is a considerable difference in relative abundance of water birds. Birds belonging to the family Ardeidae are found abundantly in Jalikhara while Sturnidae is the most abundant family in Etila (Fig. 3). It is because of the discharged effluents of Nagaon Paper Mill (NPM) and some direct human interference including community fishing and agricultural practices, agreement with the data found by Tanmay Dutta (2011)<sup>[14]</sup>. Some Species that is difficult to detect due to their behavior and mode of life. For example the winter migratory bird *Threskiornis melanocephalus* found to occur in low abundance<sup>[15]</sup>. Etila is avoided by water birds (mainly storks, egrets, herons) due to its highly polluted water and intensive farming practices around it, which is also supported by Tanmay Dutta (2011)<sup>[14]</sup>. The Species richness of an anthropogenically or naturally disturbed ecosystem is seemed to be lower than an undisturbed natural ecosystem which is also reported by Z. Girma *et. al*, 2017<sup>[16]</sup>. The beel Jalikhara is the habitat for many residential as well as migratory birds. The common problems in this regard are hunting of these birds, increasing agriculture practices and overfishing. Jalikhara is the important source of income for the local people. Unscientific fishing methods and gears, lack of scientific technical guidance for the use of wetlands more economically or sustainably may also the cause of degradation of wetland environment of Dimoria region which is also supported by Sheikh and Goswami, 2013<sup>[17]</sup>.

#### 5. Conclusion

Any activities that change the habitat structure effect avifaunal diversity, abundance and distribution. The study suggest that the Jalikhara is a vital water-submerged ground to both terrestrial and water birds. In spite of being polluted the Etila beel also holds a high species of terrestrial bird. All living organisms depend on water chemistry either directly or indirectly. Although in this study the water parameters of the selected wetlands were not considered, it is recommended that the industrial effluents should be treated well planned before discharge into the water channels that may be harmful to the ecosystem.

#### 6. Future Scope

The area has good potential for bird's habitat. Hence, urgent conservation plan, including these wetlands, is needed and further detail research is recommended which can integrate economic gain and biodiversity conservation in future.

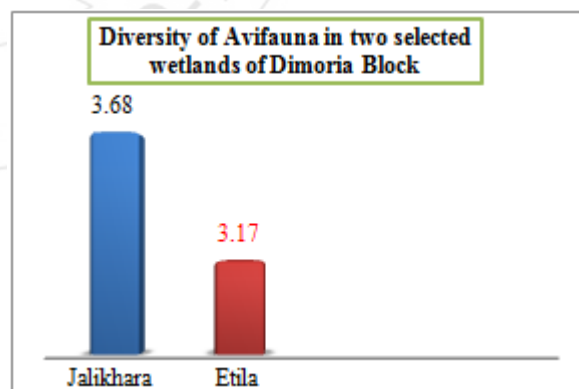


Figure 2: Avifaunal Diversity of Jalikhara and Etila Beel

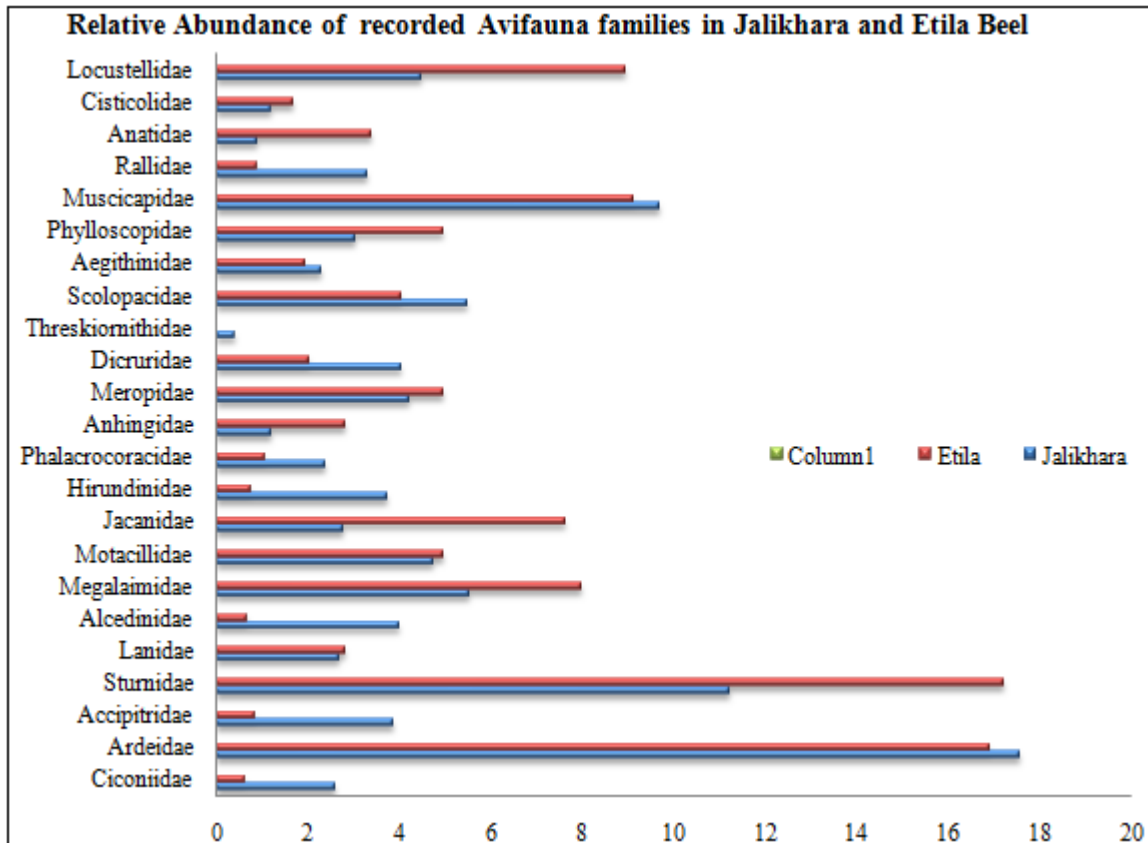


Figure 3: Relative abundance of recorded Avifaunal families of Jalikhara and Etila Beel

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**Table 1: Checklist of Avifauna found in Jalikhara and Etila with their Relative abundance**

Sl No.	Common Name	Scientific Name	Family	Abundance	
				Jalikhara	Etila
1	Asian open bill stork	<i>Anastomus oscitans</i>	Ciconiidae	0.85	0.19
2	Lesser adjutant	<i>Leptoptilos javanicus</i>	Ciconiidae	1.29	0.29
3	Greater adjutant	<i>Leptoptilos dubius</i>	Ciconiidae	0.46	0.14
4	Great egret	<i>Ardea alba</i>	Ardeidae	2.27	3.35
5	Cattle egret	<i>Bubulcus ibis</i>	Ardeidae	4.31	4.12
6	Little egret	<i>Egretta garzetta</i>	Ardeidae	4.11	5.02
7	Intermediate egret	<i>Ardea intermedia</i>	Ardeidae	2.59	3.75
8	Indian pond heron	<i>Ardeola grayii</i>	Ardeidae	1.46	0.29
9	Purple heron	<i>Ardea purpurea</i>	Ardeidae	0.74	0.22
10	Grey heron	<i>Ardea cineræ</i>	Ardeidae	0.64	0.14
11	Black-kite	<i>Milvus migrans</i>	Accipitridae	0.75	0.34
12	Black-eared kite	<i>Milvus lineatus</i>	Accipitridae	0.98	0.12
13	Black-shouldered kite	<i>Elanus axillaris</i>	Acciptiidae	1.24	0.12
14	Common myna	<i>Acridotheres tristis</i>	Sturnidae	2.83	5.72
15	Jungle myna	<i>Acridotheres fuscus</i>	Sturnidae	4.81	7.56
16	Asian pied starling	<i>Gracupica contra</i>	Sturnidae	3.57	3.92
17	Long-tailed shrike	<i>Lanius schach</i>	Laniidae	1.48	2.45
18	Brown shrike	<i>Lanius cristatus</i>	Laniidae	1.20	0.34
19	White-throated kingfisher	<i>Halcyon smyrnensis</i>	Alcedinidae	1.57	0.12
20	Pied kingfisher	<i>Ceryle rudis</i>	Alcedinidae	0.74	0.12
21	Common kingfisher	<i>Alcedo atthis</i>	Alcedinidae	1.70	0.41
22	Lineated barbet	<i>Psilopogon lineata</i>	Megalaimidae	2.51	3.90
23	Copper smith barbet	<i>Psilopogon haemacephala</i>	Megalaimidae	1.37	1.28
24	Blue-throated barbet	<i>Psilopogon asiatica</i>	Megalaimidae	1.64	0.53
25	White wagtail	<i>Motacilla alba</i>	Motacillidae	3.09	4.78
26	Citrine wagtail	<i>Motacilla citreola</i>	Motacillidae	1.66	2.86
27	Bronze-winged jacana	<i>Metopidius indicus</i>	Jacanidae	1.66	0.58
28	Pheasant-tailed jacana	<i>Hydrophasianus chirurgus</i>	Jacanidae	1.09	0.14
29	Crested serpent eagle	<i>Spilornis cheela</i>	Accipitridae	0.53	0.12
30	Steppe eagle	<i>Aquila nipalensis</i>	Accipitridae	0.37	0.12
31	Barn swallow	<i>Hirundo rustica</i>	Hirundinidae	3.74	4.10
32	Little cormorant	<i>Microcarbo niger</i>	Phalacrocoracidae	2.38	1.04
33	Darter(snake bird)	<i>Anhinga melanogaster</i>	Anhingidae	1.20	2.81
34	Green bee-eater	<i>Merops orientalis</i>	Meropidae	4.22	4.97
35	Black drongo	<i>Dicurus macrocerus</i>	Dicuridae	4.03	2.04
36	Black-headed ibis	<i>Threskiornis melanocephalus</i>	Threskiornithidae	0.38	-
37	Common sandpiper	<i>Actitis hypoleucos</i>	Scolopacidae	5.49	4.05
38	Common iora	<i>Aegithina tiphia</i>	Aegithinidae	2.29	1.92
39	Dusky warbler	<i>Phylloscopus fuscatus</i>	Phylloscopidae	3.01	4.97
40	Stone chat	<i>Saxicola rubicola</i>	Muscicapidae	6.38	5.79
41	White-breasted water hen	<i>Amauornis phoenicurus</i>	Rallidae	3.31	0.87
42	Lesser whistling duck	<i>Dendrocygna javanica</i>	Anatidae	0.90	0.39
43	Zitting cisticola	<i>Cisticola juncidis</i>	Cisticolidae	1.18	1.69
44	Oriental magpie-robin	<i>Copsychus saularis</i>	Muscicapidae	3.31	3.32
45	Striated grass bird	<i>Megalurus palustris</i>	Locustellidae	4.48	8.92

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