

# AVIAN-FAUNA OF GAUHATI UNIVERSITY CAMPUS, JALUKBARI, ASSAM

OINAM SUNANDA DEVI\*, MAZEDUL ISLAM, JYOTISMITA DAS<sup>1</sup> AND PRASANTA KUMAR SAIKIA<sup>2</sup>

<sup>1</sup>Department of Zoology, Research Scholars, Animal Ecology and Wildlife Biology Lab.

Gauhati University, Guwahati – 781 014, Assam

<sup>2</sup>Department of Zoology, Associate Professor, Animal Ecology and Wildlife Biology Lab.

Gauhati University, Guwahati - 781014, Assam

E-mail:oinamsd2009@gmail.com

## INTRODUCTION

Avian fauna are regarded as important indicators of a country's environmental health (Collar and Andrew, 1988) and their high and low diversities are directly related with the environmental condition of the area. Out of the 1200 species and subspecies of avian fauna recorded earlier in Indian subcontinent (Ali and Ripley, 1987), Assam harbors 946 species and subspecies (Choudhury, 1990). But due to complexity at the subspecies level and lack of recent data on many forms, it was stated in the new checklist that Assam harbors 820 species of birds including few doubtful species which are likely to occur in Assam (Choudhury, 2000). Information of avian species from lesser known important bird areas of the state will be very helpful for future conservation activities (Choudhury, 2000). The Gauhati University Campus harbors a wide and diverse avian population including globally threatened and migratory species. As the University Campus lies in between the mighty river Brahmaputra and the Deepor Beel Bird Sanctuary, it represents a very important area for avian fauna. Renowned scientists of the 1980s-90s report more than 100 species of birds in the University Campus including rare and threatened species such as Pheasant-tailed Jacana *Hydrophasianus chirurgus*, White backed Vulture *Gyps bengalensis*, Crested Serpent Eagle *Spilornis cheela*, Thick billed Green Pigeon *Treron curvirostra*, Stork billed Kingfisher *Halcyon capensis*, Grey headed Lapwing *Vanellus cinereus*, Chestnut headed Bee eater *Merops leschenaultia* and Black-rumped Woodpecker *Dinopium benghalense* etc (Borah and Bhattacharjee, 1985; Barman et al., 1996).

The scenario of the then varied habitats of the University Campus changes completely during the 2000s due to various developmental activities. Most of the important bird habitats within the University Campus are degrading rapidly due to many anthropogenic activities such as filling of wetlands for various construction works, encroachment in the nearby hillsides etc. The result of all these activities is that the rich avian diversity of the campus is decreasing and rare and threatened birds mentioned earlier such as *Hydrophasianus chirurgus*, *Gyps bengalensis*, *Spilornis cheela* and *Vanellus cinereus* etc were not encountered these days.

Therefore, the present study was conducted to gather recent up-to-date information of avian diversity of the University Campus and their feeding preferences. The study also aims to identify major avian groups suffering the most from the recent habitat disturbances, which will help in formulating conservative measures for the important threatened and migratory bird species of the University Campus and along with their specific habitats.

## MATERIALS AND METHODS

### Study area

The Gauhati University Campus is located 10Km from the Borjhar Airport,

## ABSTRACT

The Gauhati University Campus harbors a large variety of avian fauna as it is located very near to the Deepor Beel Ramsar site. We surveyed the Campus for a period of three years from January 2007 up to December 2009. Data were collected using distance sampling methods wherever appropriate. A total of 109 species of birds belonging to 44 families were identified during the study including 3 globally threatened species, 15 winter migrants, 1 summer migrant and 93 Resident species. Of these, 22 species were Frugivorous, 17 are Omnivorous, 9 are Carnivorous, 19 are Picivorous, 4 are Grainivorous and 38 were Insectivorous in their feeding guild. The study also shows variation in the diversity of avian fauna at different habitat categories. It was also observed that the on-going anthropogenic disturbances have greatly affected the Campus's once rich avian fauna assemblages. Therefore, keeping the above facts in mind, the study was conducted to list the important migratory and threatened bird species and the affects of habitat degradation on the surviving avian species of the Campus so that a long term conservative programmes can be adopted, in order to save both the University Campus and its rich avian fauna for our future generation.

## KEY WORDS

Avifauna  
Gauhati University Campus  
Globally Threatened Species  
Conservation.

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\*Corresponding author

Guwahati adjoining the Deepor Beel Bird Sanctuary which lies 3km South-West from the Campus. It lies in between the geographical location of 26°12' N latitude and 91°05' E longitude and is 45m above msl. The vegetation types found in the area are mixed-moist deciduous forests, semi-evergreen forests and scattered deciduous forests. Degraded and Shrub type of forests are also found here. The University Campus harbors varied natural habitats ranging from wetlands, grasslands, forests, paddy fields and many small and medium size ponds. On the south-east boundary of the Campus there are the Jalukbari hills comprising of teak plantations and natural moist deciduous habitat which provide refuge to a large number of terrestrial birds. There is also a botanical garden within the Campus itself which also provide a good habitat for many birds. Besides these, there are paddy-fields and scattered grassland patches within the campus which in spite of traffic and human disturbances surprisingly support a large number of grassland dwelling birds. The climate of the campus is sub-tropical with an average annual rainfall of around 2500mm. The overall climatic condition of the area could be divided into four seasons viz. Pre-Monsoon (March-May), Monsoon (June-September), Pre-heating Monsoon (October-November) and winter (December-February). The temperature varies from around 7°C in the winter up to 37°C in summer and the relative humidity ranges between 45-80%.

**Methods**

Field surveys were conducted for a period of three years starting from January 2007 up to December 2009 covering all the seasons' i.e. Summer (March – June), Monsoon (July- October) and Winter (November – February). The surveys followed Line transect method (Bibby *et al.*, 1992). Altogether 8

**Table1: Shannon Diversity Indices of birds recorded at Gauhati University Campus (Letter bold in parenthesis indicates significantly higher diversity than the rest at 5% level)**

Sample	Shannon Weiner Index (H)	Variance H	Lower 95%	Upper 95%
T1	3.974	0.0006647	3.874	3.978
T2	2.817	0.00286	2.689	2.885
T3	3.951	0.0007419	3.851	3.955
T4	3.688	0.001005	3.572	3.698
T5	3.51	0.001765	3.343	3.51
T6	3.184	0.001383	3.056	3.201
T7	3.554	0.001393	3.415	3.563
T8	3.57	0.001973	3.405	3.582

**Table 2: Abundance and diversity of birds sampled at three habitat categories (UD, MD and D). Shannon means followed by the same letter are not significantly different at the 5% level (pair wise randomized test based on 10,000 random samples). Rarefaction test was done for species richness based on present absent data of each transect of the habitat UD, MD and D.**

	Habitat category		
	UD	MD	D
Individuals	2692	2091	1715
Species (total = 109)	91	85	74
Shannon-Weiner (H')(Variance)	4.136(0.0006048)	3.953(0.004569)	3.85(0.006603)

UD = Undisturbed Habitat; MD = moderately disturbed Habitat; D = Disturbed Habitat

Permanent Line Transects of 2km length and 50m breadth were laid randomly, 2 transects each on all the major habitats of the area- Woodland, Grassland, Wetland and nearby degraded hillsides. All the surveys were carried out early morning, first three h after sunrise. Opportunistic observations were also added to the list so as not to miss any species during the survey period. Feeding guilds were classified as per direct observations and available literatures (Ali and Ripley, 1987). Birds were identified using field guide books (Ali and Ripley, 1987; Grimmett *et al.*, 2000). The common and scientific names of the birds given in the checklist followed the Birds of the World, recommended English Names (Gill *et al.*, 2006). The threatened status of the birds given in the checklist is per IUCN List of Threatened Taxa (Birdlife International, 2001). The Common-Rare, Resident- Migratory Status of the birds are classified as per available literature (Saikia and Saikia, 2000). C-Common, species which are encountered frequently about 8 times during 10 survey trips; r- Rare, species which are encountered less frequently about 1-2 times during 10 survey trips; R- Residents, species found in the study area throughout the year; WM- Winter Migrants, species found in the study area only during the winter and LM- Local Migrants, species which migrate locally within the area.

**RESULTS**

**Species Assemblages**

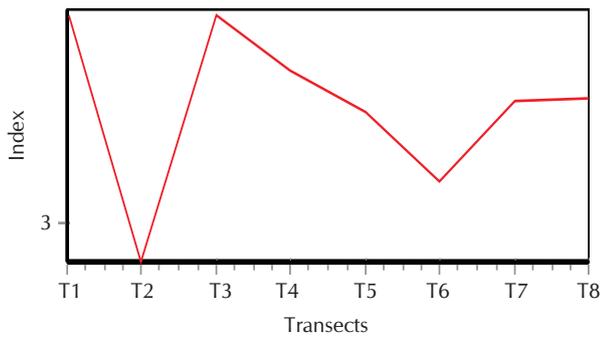
A total of 109 species of birds belonging to 44 families were identified during the study including 3 globally threatened species, 15 winter migrants, 1 summer migrant and 93 Resident species (Appendix I). Of the total, 20.2% were Frugivorous (22), 15.6 are Omnivorous (17), 8.25% are Carnivorous (9), 17.4% are Picivorous (19), 3.7% are Grainivorous (4) and 34.8% were Insectivorous (38) in their feeding guild. The three globally threatened species are *Gyps indicus* (CREN), *Leptoptilos dubius* (EN) and *Leptoptilos javanicus* (VU). Some of the notable migratory bird species of the University campus include Red crested Pochard *Netta rufina*, Common Pochard *Aythya ferina*, Ferruginous Duck *Aythya nyroca*, Garganey *Anas querquedula*, Fulvous Whistling Duck *Dendrocygna bicolor*, Common Coot *Fulica atra*, Common Moorhen *Gallinula chloropus*, Great Cormorant *Phalacrocorax carbo*, Purple Heron *Ardea purpurea*, Common Snipe *Gallinago gallinago*, Common Sandpiper *Actitis hypoleucos*, Brown Shrike *Lanius cristatus*, White Wagtail *Motacilla alba* and Citrine Wagtail *Motacilla citreola*.

**Diversity Indices**

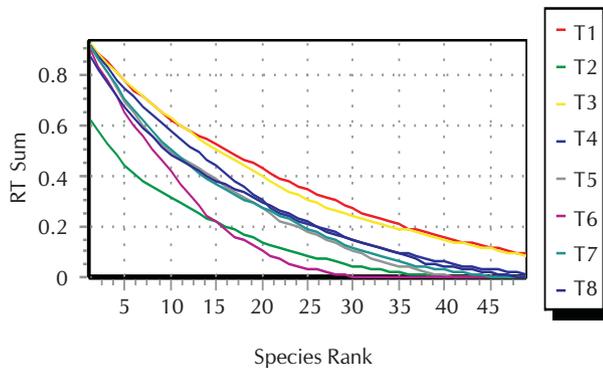
**Diversity variations at the sampled transects**

The analysis of Shannon Wiener diversity indices at all the study samples shows that the indices were ranged between 3.974 and 2.817 (Table 1). Comparison of diversity between samples (transect data) shows that, the diversity indices were higher in T<sub>1</sub>, T<sub>3</sub>, T<sub>4</sub> and T<sub>8</sub> than T<sub>7</sub>, T<sub>5</sub>, T<sub>6</sub> and T<sub>2</sub> at 5% level (Fig. 1; Table 1). The analysis of diversity ordering (using right tailed sum methods) at different sample sites shows that, the diversity was different at each sample site in which the highest diversity was found at sample T<sub>1</sub> and T<sub>3</sub> (Fig. 2).

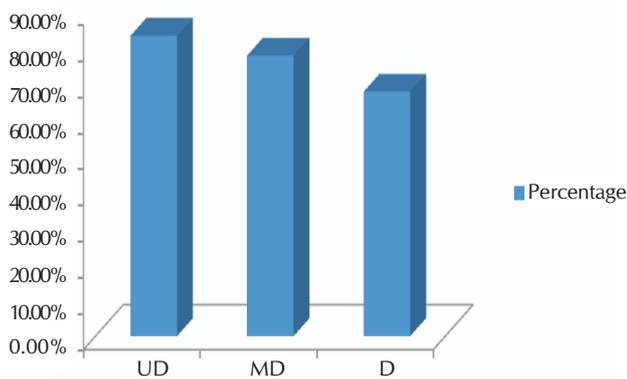
**Diversity Variations at different habitat categories**



**Figure 1: Diversity indices of birds sampled at different study Transects of Gauhati University Campus**



**Figure 2: Transact-wise Diversity Ordering in Right Tailed Sum against Species Rank of abundance (highest diversity = upper line; lowest diversity = lower line)**



**Figure 3: Percentage accumulation of species for comparing diversity among Undisturbed (UD), Moderately Disturbed (MD) and Disturbed (D) habitat categories**

A total of 6498 individuals from 109 species belonging to 44 families were recorded at the undisturbed (UD), moderately disturbed (MD) and disturbed (D) habitat categories (Appendix I). The number of species was highest at undisturbed forest (n = 91) than moderately disturbed (n = 85) and disturbed (n =

74) habitat (Table 2). The Shannon Weiner estimate of diversity was significantly higher at the undisturbed ( $\Delta = -0.285, P = 0.01$ ; Table 2) and moderately disturbed ( $\Delta = 0.103, P = 0.01$ ; Table 2) habitat than the disturbed habitat after randomization test among them, but it was not significant between undisturbed (UD) and moderately disturbed (MD) habitat ( $\Delta = -0.182, P = 0.01$ ; Table 2). The percentage accumulation of species abundance plotted for comparing diversity between samples of Undisturbed, Moderately Disturbed and Disturbed habitat categories showed that diversity of UD was higher than the MD and D habitat categories (Fig. 3).

**DISCUSSION**

As it has always been said that nothing lasts forever, this today stands true for the rich biodiversity of Gauhati University Campus which had once homed many rare species of birds. But owing to the on going anthropogenic causes (be it the rapid constructive works or the other developmental activities) in the University, these activities have greatly affected the diversified habitats of the Campus affecting its once varied avian diversity. The present study records 109 species belonging to 44 families which shows that the campus still has some hope for these winged species. Of the total birds species recorded 34.8% were insectivorous, 20.2% were frugivorous, 17.4% were picivorous, 15.6% were omnivorous, 8.25% were carnivorous and only 3.7% were grainivorous. The percentage composition of different bird groups shows the rich and diversified habitats the campus harbors. High percentage of frugivorous birds shows that the campus still has sufficient fruiting trees to support them. Earlier naturalists and conservationists of the 1980-1990’s have already described in their papers how rich was the diversity then (Borah and Bhattacharjee, 1985; Barman et al., 1996). Although many wetlands and ponds have been filled up for the expansion and development of the University campus still 17.4% of water birds were encountered within the campus. Similarly the insectivorous birds composition are also high accounting 34.8% of the total, though many forest areas along the periphery of the campus have been encroached and cleared up for cultivation and plantation of commercial timber species. Even though the species composition is still high, some notable rare birds such as the Pheasant tailed Jacana *Hydrophasianus chirurgus*, White backed Vulture *Gyps bengalensis*, Crested Serpent Eagle *Spilornis cheela*, Thick billed Green Pigeon *Treron curvirostra*, Stork billed Kingfisher *Halcyon capensis*, Grey headed Lapwing *Vanellus cinereus* etc found during 1980-1990’s (Borah and Bhattacharjee, 1985) were, now, not encountered within the campus which is very unfortunate of us. The study also shows high diversity of avian fauna at the undisturbed habitats compare to the moderately disturbed and disturbed habitats. Therefore, keeping the above facts in mind, the study has presented some recent facts and an up-to-date list of important migratory and threatened bird species of the campus. The affects of habitat degradation on the surviving avian species of the Campus was also addressed so that a long term conservative programmes can be adopted in order to save both the varied habitat of University Campus and its rich avian fauna for our future generation.

**Appendix I: Checklist of avian fauna found in Gauhati University Campus during the study period**

Sl. No	Family	Scientific name	UD	MD	D	Status	Feeding Guild
1	Anatidae	<i>Anas querquedula</i>	46	20	0	WM, C	P
2		<i>Dendrocygna bicolor</i>	532	0	0	R, r	P
3		<i>Dendrocygna javanica</i>	932	554	0	R, C	P
4		<i>Netta rufina</i>	12	0	0	WM, r	P
5		<i>Aythya ferina</i>	16	0	0	WM, r	P
6		<i>Aythya nyroca</i>	42	0	0	WM, r	P
7	Ciconiidae	<i>Leptoptilos dubius</i>	6	0	0	R, C, EN	O
8		<i>Leptoptilos javanicus</i>	8	16	10	R, C, VU	O
9		<i>Anastomus oscitans</i>	24	38	6	R, C	P
10	Ardeidae	<i>Ardea purpurea</i>	0	12	4	R, r	P
11		<i>Egretta garzetta</i>	2	10	5	R, C	P
12		<i>Ardea alba</i>	6	0	0	R, C	P
13		<i>Egretta intermedia</i>	12	14	15	R, C	P
14		<i>Bulbulcus ibis</i>	0	10	18	R, C	O
15		<i>Ardeola grayii</i>	12	10	10	R, r	P
16		<i>Nycticorax nycticorax</i>	8	0	0	R, r	P
17		<i>Ixobrychus cinnamomeus</i>	8	12	4	R, C	P
18	Phalacrocoracidae	<i>Microcarbo niger</i>	15	15	6	R, C	P
19		<i>Phalacrocorax carbo</i>	8	0	0	WM, C	P
20	Accipitridae	<i>Milvus migrans</i>	6	0	2	R, C	C
21		<i>Haliastur indus</i>	4	7	8	R, C	C
22		<i>Circus melanoleucos</i>	2	0	4	WM, r	C
23		<i>Accipiter nisus</i>	0	4	5	R, r	C
24		<i>Gyps indicus</i>	0	0	4	R, r, CREN	C
25	Rallidae	<i>Rallus aquaticus</i>	6	10	0	R, C	O
26		<i>Gallinula chloropus</i>	36	10	8	R, C	O
27		<i>Amaurornis phoenicurus</i>	15	24	10	R, C	O
28		<i>Fulica atra</i>	36	20	0	WM, C	O
29	Jacaniidae	<i>Metopidius indicus</i>	12	14	25	R, C	O
30	Charadriidae	<i>Vanellus indicus</i>	0	8	5	R, C	O
31	Scolopacidae	<i>Gallinago gallinago</i>	4	0	0	WM, r	O
32	Columbidae	<i>Treron phoenicoptera</i>	20	80	58	R, C	F
33		<i>Chalcophaps indica</i>	16	10	0	R, C	F
34		<i>Streptopelia chinensis</i>	24	36	34	R, C	F
35		<i>Streptopelia orientalis</i>	8	10	7	R, C	F
36		<i>Streptopelia decaocto</i>	0	5	3	R, r	F
37	Psittacidae	<i>Psittacula krameri</i>	18	38	22	R, C	F
38		<i>Psittacula eupatria</i>	20	34	0	R, C	F
39		<i>Psittacula alexandri</i>	10	24	12	R, C	F
40	Cuculidae	<i>Centropus bengalensis</i>	14	0	4	R, C	I
41		<i>Centropus sinensis</i>	4	10	0	R, C	I
42		<i>Heirococcyx varius</i>	0	7	15	R, r	I
43		<i>Phaenicophaeus tristis</i>	14	10	0	R, C	I
44		<i>Eudynamis scolopaceus</i>	34	25	39	R, C	O
45		<i>Cacomantis merulinus</i>	2	12	18	R, r	I
46		<i>Cuculus canorus</i>	8	10	8	SM, r	I
47	Tytonidae	<i>Tyto alba</i>	10	8	0	R, r	C
48	Strigidae	<i>Ninox scutulata</i>	6	6	0	R, C	C
49		<i>Bubo bubo</i>	8	0	0	R, r	C
50		<i>Athene brama</i>	18	36	24	R, C	C
51	Apodidae	<i>Cypsiurus balasiensis</i>	0	30	16	R, C	I
52	Coraciidae	<i>Coracias benghalensis</i>	8	10	3	R, C	I
53	Alcedinidae	<i>Halcyon smyrensis</i>	2	12	29	R, C	P
54		<i>Alcedo atthis</i>	0	10	0	R, C	P
55		<i>Alcedo meninting</i>	4	0	0	R, C	P
56	Meropidae	<i>Merops philippinus</i>	8	18	10	R, C	I
57		<i>Merops orientalis</i>	14	20	18	R, C	I
58	Upupidae	<i>Upupa epops</i>	10	3	0	R, C	I
59	Megalaimidae	<i>Megalaima haemacephala</i>	30	40	20	R, C	F
60		<i>Megalaima asiatica</i>	50	40	24	R, C	F
61		<i>Megalaima lineata</i>	14	8	0	R, C	F
62	Picidae	<i>Dendrocopos macei</i>	16	4	8	R, r	I
63		<i>Picus canus</i>	10	6	0	R, r	I
64		<i>Chrysocolaptes lucidus</i>	10	10	5	R, r	I

**Appendix I: Checklist of avian fauna found in Gauhati University Campus during the study period**

Sl. No	Family	Scientific name	UD	MD	D	Status	Feeding Guild
65	Campephagidae	<i>Coracina macei</i>	0	15	0	R, C	I
66	Lanidae	<i>Lanius schach</i>	10	6	6	WM, r	I
67		<i>Lanius cristatus</i>	12	10	10	WM, r	I
68		<i>Lanius tephronotus</i>	12	23	34	WM, C	I
69	Oriolidae	<i>Oriolus xanthornus</i>	17	31	15	R, C	O
70	Dicruridae	<i>Dicrurus macrocercus</i>	14	23	17	R, C	I
71		<i>Dicrurus hottentottus</i>	18	16	0	R, C	I
72		<i>Dicrurus aeneus</i>	0	14	28	R, C	I
73	Corvidae	<i>Corvus macrorhynchus</i>	22	15	15	R, C	O
74		<i>Corvus splendens</i>	12	40	60	R, C	O
75		<i>Dendrocitta vagabunda</i>	13	20	10	R, r	F
76	Paridae	<i>Parus major</i>	11	34	43	R, r	I
77	Pycnonotidae	<i>Pycnonotus cafer</i>	18	34	55	R, C	F
78		<i>Pycnonotus jocosus</i>	14	16	10	R, C	F
79		<i>Hypsipetes leucocephalus</i>	18	10	0	R, r	F
80	Hirundinidae	<i>Hirundo rustica</i>	0	0	13	R, C	I
81	Motacillidae	<i>Motacilla alba</i>	8	18	24	WM, C	I
82		<i>Motacilla citreola</i>	0	10	6	WM, C	I
83		<i>Anthus rufulus</i>	5	15	26	R, C	I
84	Irenidae	<i>Aegithina tiphia</i>	6	0	0	R, r	I
85	Chloropseidae	<i>Chloropsis aurifrons</i>	10	7	0	R, C	F
86	Sylviidae	<i>Orthotomus sutorius</i>	5	15	24	R, C	I
87		<i>Megalurus palustris</i>	0	0	7	R, C	I
88		<i>Turdoides striata</i>	18	30	60	R, C	I
89	Phylloscopidae	<i>Phylloscopus trochiloides</i>	10	6	6	WM, r	I
90		<i>Seicercus xanthoschistos</i>	13	0	13	R, C	I
91	Turdidae	<i>Myiophonus caeruleus</i>	6	4	8	R, r	I
92	Muscicapidae	<i>Culicicapa ceylonensis</i>	10	0	0	R, r	I
93		<i>Copsychus saularis</i>	15	15	30	R, C	I
94		<i>Saxicola torquata</i>	0	10	25	WM, r	I
95	Cisticolidae	<i>Prinia inornata</i>	0	0	14	R, C	I
96	Dicaeidae	<i>Dicaeum cruentatum</i>	10	8	0	R, C	F
97		<i>Dicaeum concolor</i>	8	12	6	R, C	F
98	Nectariniidae	<i>Leptocoma zeylonica</i>	10	0	14	R, r	F
99		<i>Aethopyga siparaja</i>	8	0	0	R, C	F
100	Passeridae	<i>Passer domesticus</i>	14	20	30	R, C	G
101	Zosteropidae	<i>Zosterops palpebrosus</i>	5	15	10	R, C	I
102	Estrildidae	<i>Lonchura punctulata</i>	0	17	25	R, C	G
103		<i>Lonchura striata</i>	0	21	64	R, C	G
104	Ploceidae	<i>Plocus philippinus</i>	12	10	0	R, r	G
105	Sturnidae	<i>Acridotheres tristis</i>	20	60	163	R, C	O
106		<i>Acridotheres fuscus</i>	30	56	144	R, C	O
107		<i>Gracula religiosa</i>	10	0	0	R, C	F
108		<i>Sturnia malabarica</i>	14	30	68	R, C	F
109		<i>Gracupica contra</i>	34	25	106	R, C	O
Total No. of Individuals encountered			2692	2091	1715		

**Abbreviations:** R- Resident; C- Common; r- Rare; WM- Winter Migrant; SM- Summer Migrant; EN- Endangered; VU- Vulnerable; CREN- Critically Endangered; P- Picivorous; O- Omnivorous; F- Frugivorous; I- Insectivorous; G- Grainivorous; UD- Undisturbed; MD- Moderately disturbed; D-Disturbed

**Appendix II: Description of the Transects**

Transects	Location within the Campus	Description
Transect No. 1 (T1)	Front of Girls hostel till Satmile	Wetlands, Open fields, Shrubs, Woodlands etc.
Transect No. 2 (T2)	Jalukbari wetlands till Satmile	All the wetlands from Jalukbari to Satmile
Transect No. 3 (T3)	Old state Bank up to Ayurvedic hostels	Open fields, Woodlands, Shrubs, etc.
Transect No. 4 (T4)	Satmile to AEC entrance	Hillsides, open fields, Shrubs, hedges etc
Transect No. 5 (T5)	hills/Observatory	Woodlands, Shrubs and Hedges
Transect No. 6 (T6)	Main Road (Jalukbari to Satmile)	Open fields, wetlands, Shrubs and Hedges
Transect No. 7 (T7)	Botanical garden and hill sides	Woodlands, Shrubs and Wetlands
Transect No. 8 (T8)	Hills back side of professor's colony	Woodlands, Shrubs and Hedges

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