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A study on avifaunal diversity and their conservation status of PDAUM, Amjonga and its surrounding areas

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Abstract

The study area Pandit Deendayal Upadhya Adarsha Mahabidyalaya (PDUAM), Amjonga a very beautiful and mesmerising tiny hamlet is located about the 7 kms form Dudhnoi in the Goalpara district of western Assam. The present study recorded 73 birds species in the study area indicating high diversity of avifauna in the site. The study was carried out in different season of the year i.e. premonsoon, monsoon, retreating monsoon and winter season. Analysis of Shanon –Weinner diversity index showed significant diversity at 5% level. The maximum numbers of avifauna were recorded during winter season along with 3 vulnerable species. The avifaunas of the study area are under threat due to rapid urbanization and other anthropogenic problems.

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Introduction

The birds have always fascinated man for their exquisite coloration and courtship. They have their functional role in the ecosystem as potential pollinators and scavengers, indeed rightly called bioindicators (Dayananda, 2009). Assam is come under the indo-malayan zoo-geographic region which supports 950 birds' species (53.5%) of birds found in Indian sub-continent out of which 17 species of birds are endemic to Assam. This richness and diversity in bird species is due to fact that it is a meeting place of two zoogeographic sub regions, the Indian and the Indo –Chinese, within the framework of the Oriental Zoogeographic region (Choudhury, 2000). The study area Pandit Deendayal Upadhya Adarsha Mahabidyalaya (PDUAM), Amjonga a very beautiful and mesmerising tiny hamlet is located about the 7 kms form Dudhnoi in the Goalpara district of western Assam. The college has a sprawling campus spreading over 25 bighas of land.

The study area PDUAM is surrounded by hills and many marshy lands which provide unique habitat for the avifauna. As data of avifauna of a particular area plays a significant role in providing the baseline data regarding distribution of a particular species in a particular area and also offer useful information for identifying priority areas for conservation (Daniels *et al*., 1991; Peterson *et al*., 2000; Colin *et al*., 2000) and the study area has no base line data for the avifauna therefore the present study is initiated to collect the information of birds species which will help in the conservation of them.

Materials and methods

For the study line and point transacts, flush count techniques and total counts of bird species were made on the basis of habitat characteristics and birds congregations pattern in sample sites in various months of the year for qualitative and quantitative data of residential and migratory birds (Bibby *et al*., 2000). The observations were carried out with the help of 8x40 binoculars and field characteristics were noted down during the study. Birds sighted during the study period were categorised according to their status as residents (R), local migrants (LM), and winter migrants (WM). Winter visitors from central Asian countries are included in winter migrant and the visitors from other parts of the Indian subcontinent is included in local migrant and those breed in the site as resident. The identification of the birds species was carried out as per Ali & Ripley (1983) and Grimmett *et al*. (1999). The sampling was carried out once in a week. The annual cycle was divided into four seasons as Pre-monsoon (March-May), Monsoon (June-August), Retreating Monsoon (September-November) and winter (December-february). The diversity of birds species were estimated in terms of species evenness using Margalef's D index, Shannon Wienner and Simpson's D index and bootstrap method was used to calculate 95% confidence intervals. In order to test for different seasons of the year pair wise randomization test were carried out following Solow (1993). The analysis was performed as per the methods of May (1975) using species diversity and Richness software and Microsoft Excel sheet.

Result and discussion

The study sampled altogether 2526 individuals belonging to 73 species of bird in the study area. Amongst the species recorded at the study site, 3 species were vulnerable categories under wildlife protection act 1972, viz: *Haliaectus leucoryphus, Dendrocygna bicolor, Leptoptilos javanicus* (Table-2). Analysis of Shannon –Weinner (SI), Margalef's D (MD), Simpson's D (SIM) index of diversity showed that the species diversity of avian fauna in different seasons significantly varies at 5% level (Table-1). The total individuals sampled in all four seasons showed that the largest number of individuals were counted during the winter season (1070) followed by retreating monsoon (616), pre-monsoon (388) and monsoon (452) (Table-1). Comparison of Shannon –Weinner diversity index among the study seasons showed that winter season was more diverse than the other three seasons at 5% level (SI, H = 2.377; MD, D =2.6156; SIM, D = 0.1709; Table- 1). Of all the species recorded, the highest number (73) was during the winter season and the lowest number (30) during monsoon (Table-1).

Table 1. Overall diversity indices of Avian fauna of PDUAM, AMJONGA (Results Bold in parenthesis were significantly higher than other at 5% level).

Diversity indices	PRM	MON	RMON	WIN
Species	39	30	47	73
Individuals	616	388	452	1070
Shannon_H	1.236	1.272	1.337	2.377
Simpson_1-D	0.281	0.427	0.719	0.1709
Evenness_e^H/S	0.6331	0.6564	0.6981	0.2080
Margalef	1.1557	1.1678	1.1636	2.6156

Table 2. List of vulnerable avian species of PDUAM, AMJONGA.

SL	Order	Family	Common Name	Scientific Name
1	Ciconiformes	Ciconiidae	Lesser Adjatant Stork	*Leptoptilos javanicus*
2	Anseriformes	Anatidae	Greater Whistling	*Dendrocygna bicolour*
3	Falconiformes	Accipitridae	Palas's Sea Eagle	*Haliaectus leucoryphus*

Table 3. Systematic list with abundance and status of avifauna of PDUAM, Amjonga, Goalpara (Abundance is depicted by "+++" –Abundant, "++" –Normal and "+"-Rare; Status is depicted by "R"-Resident, "LM"-Local Migrant and "WM"-Winter Migrant).

SL	Family	Scientific Name	English Name	Abundance	Status
1.	Anatidae	*Dendrocygna javanica*	Lesser Whistling Duck	+++	LM
2.	Anatidae	*Dendrocygna bicolor*	Large Whistling Duck	+++	LM
3.	Picidae	*Dinopium javanense*	Golden backed Wood pecker	++	R
4.	Picidae	*Chrysocolaptes festivus*	Black shouldered Wood pecker	++	R
5.	Megalaimidae	*Megalaima asiatica*	Blue throated Barbet	+++	R
6.	Megalaimidae	*Megalaima lineata*	Lineated Barbet	+++	R
7.	Upupidae	*Upupa epops*	Common Hoope	++	LM
8.	Coraciidae	*Coracias bengalensis*	Indian Roller	+++	R
9.	Alcedinidae	*Alcido athis*	Small blue Kinfisher	+++	R
10.	Dacelonidae	*Halcyon smymensis*	White breasted Kingfisher	+++	R
11.	Meropidae	*Nyctyomis athertoni*	Blue beared bee eater	++	R
12.	Meropidae	*Merops phillippinus*	Blue tailed bee eater	++	R
13.	Cuculidae	*Cuculus micropterus*	Indian Cuckoo	++	R
14.	Cuculidae	*Eudynamys scolopacea*	Asian Koel	+++	LM
15.	Psittacidae	*Psittacula eupatria*	Alexandrine Parakeet	++	LM
16.	Psittacidae	*Psittacula krameri*	Rose-ring Parakeet	++	L M
17.	Apodidae	*Cypsiurus balasiensis*	Asian palm swift	++	R
18.	Tytonidae	*Tyto alba*	Barn Owl	++	R
19.	Columbidae	*Treron bicincta*	Orange–breasted Green Pigeon	+++	R
20.	Columbidae	*Streptopelia chinensis*	Spotted dove	+++	R
21.	Columbidae	*Streptopelia tranquebarica*	Red –collared Dove	++	LM
22.	Columbidae	*Chalcophuaps indica*	Emarald Dove	++	R
23.	Rallidae	*Amaurornis phoenicoptera*	White breasted Waterhen	+++	R
24.	Rallidae	*Gallinula chloropus*	Common Moorhen	+++	R
25.	Rallidae	*Gallicrex cinera*	Water Cock	++	R
26.	Scolopacidae	*Tringa stagnatilis*	Marsh Sand-piper	+++	WM
27.	Scolopacidae	*Tringa glariola*	Wood Sand-piper	++	WM
28.	Jacanidae	*Metopidius indicus*	Brownze Winged Jacana	+++	R
29.	Jacanidae	*Hydrophasianus chirurgus*	Pheasant tailed Jacana	++	R
30.	Charadiidae	*Vanellus indicus*	Red-wattled Lapwing	+++	R
31.	Accipitridae	*Accipiter badis*	Brahmin kite	++	R
32.	Podicipedidae	*Tachybaptus ruficollis*	Little Grebe	+++	R
33.	Phalacrocoracidae	*Phalacrocorax niger*	Little cormorant	+++	R
34.	Phalacrocoracidae	*Phalacrocorax carbo*	Great cormorant	++	LM
35.	Phalacrocoracidae	*Phalacrocorax fuscicollis*	Indian cormorant	+++	LM
36.	Anhingidae	*Anhinga melanogaster*	Darter	+++	LM
37.	Ardeidae	*Ardea alba*	Large egret	+++	LM
38.	Ardeidae	*Ardea purpurea*	Purple heron	+++	R
39.	Ardeidae	*Bubulcus ibis*	Cattle egret	+++	R
40.	Ardeidae	*Egretta garzetta*	Little egret	+++	R
41.	Ardeidae	*Mesophoyx intermedia*	Median egret	+++	R
42.	Ardeidae	*Nycticorax nycticorax*	Black-crowned night heron	++	R
43.	Ardeidae	*Ardeola bacchus*	Chinese pond heron	++	R
44.	Ardeidae	*Ardeola grayii*	Indian pond heron	+++	R
45.	Ciconiidae	*Anastomus oscitans*	*Openbill stork*	+++	R
46.	Ciconiidae	*Mycteria leucocephala*	*Painted stork*	+++	WM
47.	Ciconiidae	*Leptoptilos javanicus*	*Lesser adjutant stork*	+++	LM
48.	Laniidae	*Lanius schach*	*Long tailed shrike*	+++	R

SL	Family	Scientific Name	English Name	Abundance	Status
49.	Laniidae	*Lanius cristatus*	*Brown shrike*	+++	WM
50.	Corvidae	*Oriolus xanthornus*	*Black headed oriole*	+++	WM
51.	Corvidae	*Dicrurus macrocercus*	*Black drongo*	+++	R
52.	Corvidae	*Dicrurus paradiseus*	*Racket tailed drongo*	++	R
53.	Corvidae	*Dendrocitta vagabunda*	*Indian tree pie*	+++	R
54.	Corvidae	*Corvus splendens*	*House crow*	+++	R
55.	Corvidae	*Corvus macrorhynchos*	*Jungle crow*	++	R
56.	Cisticolidae	*Orthotomus sutorius*	Common tailor bird	+++	R
57.	Muscicapidae	*Copsychus saularis*	Magpie robin	+++	LM
58.	Sturnidae	*Sturnus contra*	Pied myna	+++	R
59.	Sturnidae	*Acridotheres ginginianus*	Bank myna	+++	R
60.	Sturnidae	*Acridotheres fuscus*	Jungle myna	+++	R
61.	Sturnidae	*Acridotheres tristis*	Common myna	+++	R
62.	Pycnonotidae	*Pycnonotus cafer*	Red-vented bulbul	+++	R
63.	Pycnonotidae	*Pycnonotus jocosus*	Red-whiskered bulbul	+++	R
64.	Silvidae	*Megalurus palustris*	Striated marsh warbler	++	R
65.	Silvidae	*Turdoides striata*	Jungle babbler	+++	R
66.	Nectarinidae	*Nectarinia zeylonica*	Purple rumped sunbird	++	R
67.	Nectarinidae	*Aethopyga siparaja*	Crimson sunbird	++	R
68.	Passaridae	*Dendronanthus indicus*	Forest wagtail	++	WM
69.	Passaridae	*Motacilla flava*	Yellow wagtail	++	WM
70.	Passaridae	*Passer domesticus*	House sparrow	+++	R
71.	Passaridae	*Ploceus benghalensis*	Black-throated Weaver	+++	R
72.	Passaridae	*Lonchura punctulata*	Spotted munia	++	R
73.	Passaridae	*Amandava amandava*	Red munia	++	R

Thus the present study revealed that PDAUM and its surrounding area is very rich in bird diversity, but this diversity is under great threat due to different environmental pollutions and anthropogenic problems. During the winter season the open brick industries of the nearby area causes pollution of air, soil, water. Various anthropogenic problems such as agricultural activities, permanent closure of outlet, non-implementation of fishery acts and legislation, festival fishing, fishing of fries, fingerlings and gravid fishes etc. decrease the food resources of avifauna thereby affecting their diversity (Nath, B. and Deka, C, 2012) and killing of birds by using various bird traps. Therefore proper conservation measures such as development of eco-tourism by involving local people of the area, strong implementation of conservation laws is necessary for the conservation of birds' species.

Conclusion

Birds occupy almost all habitat types and diversity of birds often serves as a good indication of overall diversity of a given area (Furness R. W. and Greenwood J. J. D, 1993). Birds are also known to be responsive to any kind of changes to their ambient conditions hence can be used as bio-indicator (Schwartz C. W. and Schwartz E.R., 1951). The present study revealed that the rich avifaunal diversity of the study area is under tremendous pressure due to various problems. Therefore by taking immediate conservation measures we can maintain not only the rich avian diversity but also the overall diversity of the PDUAM and its surrounding areas.

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