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Diversity, Ecological Guilds and Conservation Status of Avian Fauna at Kaliyaganj, Uttar Dinajpur, West Bengal

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ABSTRACT
A survey on diversity of avian fauna was conducted from January 2018 to December 2019atfour sampling sites of Kaliyaganj block, Uttar DinajPur, West Bengal. The point count method was adoptedfor study. A total of 49 numbers of birds species were recorded during thetwo year survey periodbelonged to 29 families and 11 orders. Among 49 birds species, dominant order was Passeriformes with 11 orders (59%). The maximum taxons recorded were 46 in May and Least (28) in January. According to IUCN categorization, 48 birds belonged to Least Concern category (LC) and schedule IV and only one bird *Gyps bengalensis* belonged to Critically Endangered category (CR) and schedule III. Avian faunal diversity decreased day by day due to anthropogenic activities.

Key words: avian fauna, Least Concern category (LC), Critically Endangered category (CR), schedule III, anthropogenic activities

INTRODUCTION

The study of avian diversity is an essential ecological tool which acts as an important indicator to evaluate different habitats both quantitatively and qualitatively (Bilgrami 1995). Density of avian faunal population depends on singular or interactive influence of a variety of factors such as habitat physiognomy, habitat availability, predation, intra-specific and inter-specific resources competition, parasites and diseases, and weather. Presently birds' population is decreasing rapidly due to both natural and anthropogenic disturbances such as floods, drought, deforestation, changes in land use, natural resources and seasonal climatic changes (Chang et al. 2013). Most of the birds require specific habitats from season to season for nesting, foraging, roosting and loss of such habitats may lead to their extinction (Chandel et al. 2014, Chavan et al. 2015). Urbanization is recognized as one of the six greatest threats to biodiversity throughout the world due to which native species tend to become rare and become extinct in a specific region (Grimmett et al. 2007). A lot of research works have been done on various aspects of avian diversity in different part of West Bengal (Ghose et al. 2003, Patra and Chakrabarti 2014, Dubey 2014, Datta 2014). Few researchers have explored the avian diversity of Uttar Dinajpur district of West Bengal (Pramanik et al. 2010, 2014, Roy et al. 2011, Das and Bandyopadhyay 2016). However, scanty information is available on the avian diversity of Kaliyaganj Block. Aims of the present study were to observe the avian diversity in the study area and to prepare a bird's check list along with conservation status.

MATERIAL AND METHODS

Study area

The survey on avian faunal diversity was conducted from January 2018 to December 2019 in Kaliyaganj Block, Uttardinajpur, West Bengal, India. Four sampling sites were selected for study, viz., Site I: Shreemoti River and adjoining area of Kalibari (25.64°N, 88.33°E), Site II: Adjoining area of School and College Para (25.65°N, 88.33°E), Site III: Adjoining area of Baghan Battali (25.64°N, 88.30°E) and Site IV: Adjoining area of Tarangapur (25.61°N, 88.37°E).

The survey was conducted by point count method for the study to know about the avian distribution of four selected study sites. In this method, we had to stand in a chosen point and record bird species seen and heard in a 500 m radius for 5 minutes. Next observation was recorded in another point at least 300 m from the previous point. In addition to this, opportunistic bird sightings was done while travelling within the study region. Survey and

observations was conducted for once in every week. The study was done when avifauna is usually most active (05:00 to 9.00 hrs and 15:00 to 17:00 hrs). Birds were observed with the help of an Olympus Binocular (8X42) and photographs were taken by a DSLR camera (Canon 1200D). Identification of birds was done by using standard references (Ali 1941, Ali and Ripley 1987, Grimmett et al. 1998). Shannon diversity index, Margalef's richness index and Pielou's evenness index were calculated using PAST 3.0 statistical software (Hammer et al. 2001).

RESULTS AND DISCUSSION

A total 2085 number of individual birds were recorded under 49 species, 29 families and 11 orders during the one year study. In site I (Shreemoti river and its adjoining area), a total of 40 birds species belonged to 11 orders and 21 families were reported. In site II a total of 36 birds species belonged to 17 orders and 9 families were reported. A total of 46 birdspecies belonged to 11 orders and 29 families were reported in site III. In site IV a total of 48 birdspecies belonged to 10 orders and 23 families were reported during the study period (Table 1). Site 4 is an agriculture based land like site III, but human inhabitation is more than sites III. So species diversity is more or less similar in this site IV and site III.

Throughout the survey period a total 49 bird species under11 orders and 29 Families were recorded. Percentage of total bird species in both order wise and family wise were recorded. Roy et al. (2012) recorded 117 bird species belonging to 42 families from Dooars region of North Bengal. Percentage of order Passeriformes was highest (59%) and lowest orders were Glliformes, Charadriiformes, Falaconiformes, Palacaniformes and psittaciformes (only 2%). Others orders such as Ciconiiformeswas (10%), Coraciiformes, Columbiformes, Piciformes (6%) and Cuculiformes (4%) were represented variously. Most dominant family was Corvidae and Ardeidae (8%). Others families such as Alaudidae, Laniidae, Psseride, Oriolidae, Leithrichidae, Aegithinidae, Megalaimidae, Upuppidae, Rallidae, Jacanidae, Acipitridae, Ciconiidae, Phalacrocoracidae, Psittaculidae, Rhipiduridae were represented by low composition (2%) (Fig. 1a,b,c,d). Pramanik et al. (2010) recorded 29 species of birds belonging to 20 families in Kulik Bird Sanctuary, Uttar Dinajpur and number of birds species are less than the present study. Roy and Sha (2013) studied on potentials threat to avian fauna of Kulik Bird Sanctuary. Datta (2011) surveyed avian diversity of two wetlands: Gajoldoba Beel and Domohani Beel and recorded a total of 86 bird species. Roy et al. (2012) recorded 117 bird species belonging to 42 families from the Dooars region of North Bengal.

The highest number of taxa was recorded 46 in May and Lowest 28 in January. Average Shannon diversity index, Margalef's richness index and Pielou's evenness index were 3.23, 6.66 and 0.903, respectively, during the study period. Roy et al. (2011) found the Shannon diversity index range from 0.360 to 0.963. Mahato et al. (2021) recorded Shannon diversity index of 3.66 in the Purulia town.

From feeding guild aspect it was observed that insectivore species were dominating (59%) all over the sampling sites followed by frugivores (26%), carnivores (24%), Granivores (20%), omnivores (6%) and nectarivores (2%). Similar findings were suggested by Singh et al. (2021). Most of the Passeriformes birds were insectivores (60%). Residential status of birds was enlisted in Table 1 from which we affirmed that the number of residential species was more common than others. Thirty nine residential species were recorded along with ten migrant birds among which two were winter migrants (White Wagtail, Open Billed Stork), one Resident Breeding Migrant (Streaked Fantail Warbler), one local migrant (Common Hoopoe) and six other migrants (Common Iora, Great Egret, Chest nut tailed starling, Brown Shrike, Foet Wagtail, Fire Tailed Sunbird). Residential birds play an important role in the avian faunal diversity in the study sites in comparison to migratory birds. Forty eight bird species were evaluated as Least Concern (LC) species (according to IUCN category) and under schedule IV. *Gyps bengalensis* belonged to under Critically Endangered (CR) and schedule III. *G. bengalensis* found very rarely during the study period.

CAUSES OF DECLINE

Anthropogenic activities directly or indirectly effect environment as well as the avian faunal diversity. Availability of food and shelter influences the avian faunal diversity in a particular area (Rajpar et al.

Table 1. Avian faunal diversity in different sites, their feeding habitat, residential status, IUCN and IWPC status

Family	SCIENTIFIC NAME	SITES				Feeding Habitat	Residential stautus	IUCN Conservation stautus	IWPC status
		I	II	III	IV				
Sturnidae	*Gracupica contra*	√	-	√	√	G, F & I	R	LC	IV
Accipitridae	*Gyps bengalensis*	√	-	√	√	C & O	R	CR	III
Aeigithinidae	*Aegithi na tiphia*	-	√	√	√	O	R-M	LC	IV
Alaudidae	*Mirafraery throptera*	-	-	√	√	G & I	R	LC	IV
Alecedinidae	*Halcyon smyrnensis*	√	√	√	√	C	R	LC	IV
Alecedinidae	*Alcedo atthis*	√	√	√	√	C	R	LC	IV
Ardeidae	*Ardea alba*	√	√	√	√	C	R-M	LC	IV
Ardeidae	*Egretta garzetta*	√	√	√	√	C	R	LC	IV
Ardeidae	*Bubulcus ibis*	√	√	√	√	I	R	LC	IV
Ardeidae	*Ardeola grayii*	√	√	√	√	C	R	LC	IV
Campephagidae	*Lalage melanoptera*	-	-	√	√	I & F	R	LC	IV
Campephagidae	*Pericrocotus speciosus*	-	√	-	√	I	R	LC	IV
Ciconiidae	*Anastomus oscitans*	√	√	√	√	C	W-M	LC	IV
Cisticolidae	*Cisticola juncidis*	√	√	√	√	I	R-B-M	LC	IV
Cisticolidae	*Orthotomus sutorius*	√	√	√	√	I	R	LC	IV
Columbidae	*Spilopelia chinensis*	√	√	√	√	F & G	R	LC	IV
Columbidae	*Treronphoe nicoptera*	√	√	√	√	F & G	R	LC	IV
Columbidae	*Columba livia*	√	√	√	√	F & G	R	LC	IV
Corvidae	*Corvus splendens*	√	√	√	√	O,C,F & I	R	LC	IV
Corvidae	*Dendrocitta vagabunda*	√	√	√	√	O,C & I	R	LC	IV
Cuculidae	*Centropus sinensis*	√	√	√	√	C & I	R	LC	IV
Cuculidae	*Eudynamys scolopaceus*	√	√	√	√	F	R	LC	IV
Dicruridae	*Dicrurus macrocercus*	√	√	√	√	I	R	LC	IV
Dicruridae	*Dicrurus aeneus*	-	√	√	√	I	R	LC	IV
Jacanidae	*Metopidius indicus*	√	-	√	√	I	R	LC	IV
Laniidae	*Lanius cristatus*	√	-	√	√	I	R	LC	IV
Leiothrichidae	*Argya striata*	√	√	√	√	I	R	LC	IV
Megalaimidae	*Psilopogon asiaticus*	√	√	√	√	F & I	R	LC	IV
Motocillidae	*Motacilla maderaspatensis*	√	-	√	√	I	R	LC	IV
Motocillidae	*Motacilla alba*	√	√	√	√	I	R-W-M	LC	IV
Motocillidae	*Dendronanthus indicus*	-	√	√	√	I	M	LC	IV
Muscicapidae	*Copsychus saularis*	√	√	√	√	I	R	LC	IV
Muscicapidae	*Oenanthe fusca*	-	-	√	√	I	R	LC	IV
Nectariniidae	*Cinnyrisa siaticus*	√	√	√	√	N & F	R	LC	IV
Nectariniidae	*Aethopy gaignicauda*	√	√	√	√	N & I	R-A-M	LC	IV
Oriolidae	*Oriolus xanthornus*	√	√	√	√	I & F	R	LC	IV
Passeridae	*Passer domesticus*	√	-	√	√	G & I	R	LC	IV
Phalacrocoracidae	*Phalacrocorax fuscicollis*	√	√	-	√	C	R	LC	IV
Picidae	*Dendrocopos atratus*	-	√	√	√	I	R	LC	IV
Picidae	*Dinopium benghalense*	√	√	√	√	I	R	LC	IV
Psittaculidae	*Psitta culakrameri*	√	√	√	√	G & F	R	LC	IV
Pycnonotidae	*Pycnonotus cafer*	√	√	√	√	G, F & N	R	LC	IV
Pycnonotidae	*Pycnonotus jocosus*	√	-	√	-	F	R	LC	IV
Rallidae	*Amaurornis phoenicurus*	√	-	√	√	C	R	LC	IV
Rhipiduridae	*Rhipidura albicollis*	√	√	-	√	I	R	LC	IV
Sturnidae	*Acridotheres fuscus*	-	√	√	√	G, F & I	R	LC	IV
Sturnidae	*Acridotheres tristis*	√	√	√	√	G & I	R	LC	IV
Sturnidae	*Sturnia malabarica*	√	-	√	√	G, F & I	R-M	LC	IV
Upupidae	*Upupa epops*	√	√	√	√	I	R-L-M	LC	IV

√= present, - = absent, C= Carnivore, G= Granivore, I= insectivore, F=Frugivore, O= Omnivore, N= Nectivore, R=Resident, M=Migrant, R-M= Resident-Migrant, R-A-M= Resident and Altitudinal Migrant, R-B-M= Resident-Breeding-Migrant, R-WM= Resident-Winter-Migrant, W-M=Winter-Migrant, R-L-M =Resident- Local Migrant, LC=Least Concern, IWPA= Indian Wildlife Protection Act., IUCN= International Union for Conservation of Nature

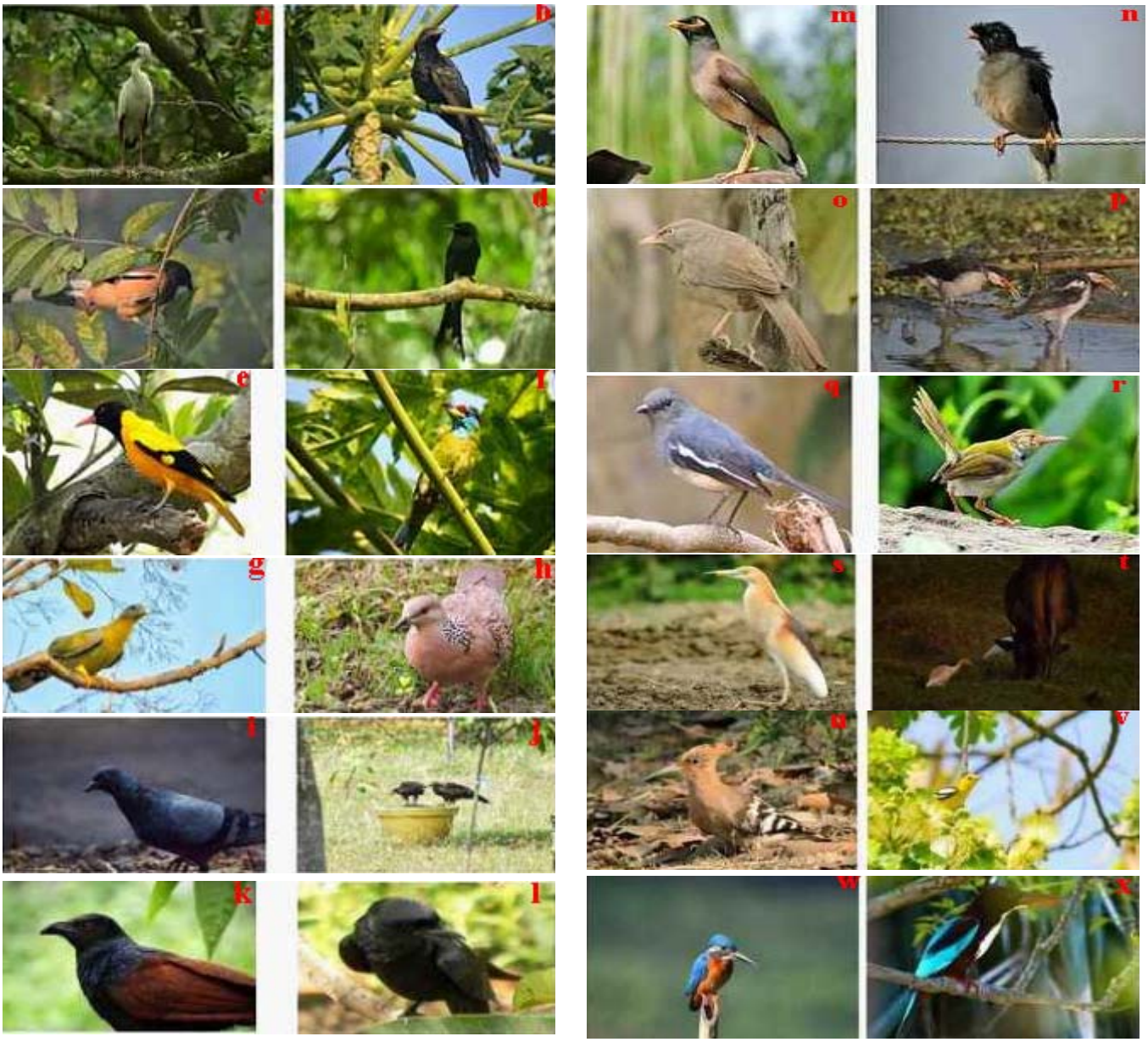

Figure 1. Birds found in the study area (a) Asian openbill stork (*Anastomus oscitans*), (b) Asian Koel (*Eudynamys scolopaeceus*), (c)Asian pied starling (*Gracupica contra*), (d)Black Dango (*Dicrurus macrocercus*), (e) Black-hooded criole (*Oriolus xanthornus*), (f) Blue throted barbet (*Psilopogon asiaticus*), (g) Yellow footed green pigeon (*Treron phoenicoptera*), (h) Spotted dove (*Spilopelia chinensis*), (i) Rock pigeon (*Columba livia*), (j) Black Kite (*Milvus migrans*), (k) Greater cocal (*Centropus sinensis*), (l) House crow (*Corvus splendens*), (m) Common myna (*Acridotheres tristis*), (n) Jungle myna (*Acridotheres fuscus*), (o) Jungle babbler (*Argya striata*), (p) Asian pied starling (*Gracupica contra*), (q) Oriental magpie-robin (*Copsychus saularis*), (r) common tailor bird (*Orthotomus sutorius*), (s) Indian pond heron (*Ardeola grayii*), (t) Cattle erget (*Bubulcus ibis*), (u) Common Hoopoe (*Upupa epops*), (v) Common lora (*Aegithina tiphia*), (w) Common kingfisher (*Alcedo atthis*), (x) White throated kingfisher (*Halcyon smyrnensis*)

2011). One of the most dangerous anthropogenic activities is used of huge amount of pesticides in agriculture. Increasing exposure of pesticides decline the insect abundance as well as diversity which become a threat to the insectivore birds. Other anthropogenic activities such as deforestation which causes decline the habitat, nesting place and also food for birds. Those birds that depend on aquatic food

sources such as small fishes and some invertebrates such as snail are faced threat of decline due to crisis of food. Number of aquatic bodies decreasing in high rate in Kaliyaganj which affectedthe avian faunal diversity. Different aquatic fishes and invertebrates population reduced due to anthropogenic activities. River Shreemati become dry in winter season so aquatic birds were facing the crisis of food. Illegal poaching of birds for their flesh and feather another important causes of declined of avian faunal diversity.

CONCLUSION

Moderate number of avian faunal diversity was recorded during the study. Out of forty nine bird species forty eight are Least Concern (LC) and one under Critically Endangered (CR). Most of the bird species belongs to order Passeriformes (59%) and are insectivore (60%). Residential birds contribute major portion of avian faunal diversity and only few migratory. Avian faunal diversity decreases day by day due to anthropogenic activities.

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