

Abundance and Diversity of Plants and Animals in the Kulik Bird Sanctuary, Raiganj, West Bengal, India

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ABSTRACT Abundance and diversity of plants and animals were studied in the Kulik bird sanctuary, Raiganj, West Bengal, India in the year 2007 to 2008. The sanctuary was declared as a wildlife sanctuary in 1985. There was a great diversity of plants and animals, such as major plants (34 species; 21 families), mammals (2 species; 2 families) birds (29 species; 20 families) reptiles (4 species; 4 families) amphibian (2 species; 2 families) fishes (18 species; 11 families) and molluscs (5 species; 5 families) species were observed and collected in the study period. In this sanctuary *Lagerstoemia speciosa*, *Barringtonia acutangula*, *Trewia nudiflora*, *Terminalia arjuna* and *Alstonia scholaris* are the major plant species. A large number of birds species such as Open billed stork (*Anastomus oscitans*), Little cormorant (*Phalacrocorax niger*), Night heron (*Nycticorax nycticorax*), Gray heron (*Ardea cinera*), Cattle egret (*Bulbulcus ibis*) and Little egret (*Egretta garzetta*) breeds together every year. Among the birds species maximum number of Open billed stork (*Anastomus oscitans*) was found in the breeding season. Diversity of molluscs, fishes, amphibians, reptiles and mammals are also described here.

INTRODUCTION

The Kulik bird sanctuary, Raiganj (25° 37'N to 25° 62'N and 88° 07'E to 88° 12'E), West Bengal, India, is an artificial planted forest of West Bengal forest department which had begun in 1970. The forest was declared as a wild life sanctuary in the year 1985. They constitute 60% "Jarul" trees (*Lagerstoemia speciosa*) including several other valuable trees (*Anthocephalus indicus*, *Barringtonia acutangula*, *Terminalia arjuna*, *Eucalyptus citriodora* etc.) and herbaceous species. The area of the sanctuary is around 1.30 km². The core area is about 0.14 km² and the rest is the buffer area. The broad-leaved deciduous trees provide the nesting place of many migratory and resident birds species. The river Kulik flows round a part of the sanctuary and acts as the boundary in its eastern and southern parts. The sanctuary has a network of artificial canals connected with the river Kulik (Sharma 2007). Annual rain fall varies from 1,200 mm to 1,550 mm, mean winter temperature varies from 09° C to 23° C and summer temperature from 21° C to 25° C, and humidity is 75. It has wet monsoonic climate. This sanctuary is the home of 164 species of birds (Sharma 2007). In this sanctuary Open billed stork species, *Anastomus oscitans*, breeds together with five other members of the Order: Ciconiiformes (Datta and Pal 1993). The

ecology of this species in Kulik bird sanctuary, Raiganj, India has been described in few studies focusing on its population status, feeding habits as well as its conservation (Datta 1992) but relevant information is completely lacking in the flora and faunal diversity of this sanctuary.

The objectives of the study were to record and assess the present situation of animals and plants species to identify (mammals, birds, reptiles, amphibian, fishes, molluscs and major plants) the constraints and content of the sanctuary. Hope, this will create a new way towards biological sciences to protect many of the flora and fauna from extinction.

MATERIALS AND METHODS

An extensive survey of the plants and animals of Kulik bird sanctuary and its adjoining area was conducted in the year 2007-2008. The collected major plant specimens (trees) were critically examined and identified with the help of available literature (Hooker 1872-1897; Haines 1924; Grierson and Long 1983; Mabberley 1987; Davis and Cullen 1988 and Matthew 1991). Herbarium specimens of cited species are deposited in the University of Kalyani, Department of Zoology. Monthly census of birds was done in order to know their population. Data were collected at daytime (06:00 hr -18:00hr) in the year 2007-

2008. 10x50 binocular, 30 x telescopes and Kodak easy share digital camera (C713) were used at the time of field study. The field books of Ali and Ripley (1986), Fleming et al. (2000) were used in the field for bird identification. The collected Molluscs (Subba Rao 1989; Preston 1915) reptiles and amphibian (Gunther, 1864; Murry, 1884; Boulenger, 1890; Smith, 1943; 1935; 1931; Mertens, 1974) and fishes (Hora 1921, 1937; Jayaram 1999; Menon 1999; Sen 1985, 2000; Talwar and Jhingram, 1991; Prasad 1962; Chinery 1966) were identified with the help of mentioned standard books and scientific literatures.

RESULTS AND DISCUSSION

A total of 34 species of trees belonging to 21 families (Table 1) were noted and collected from the Kulik bird sanctuary. On the basis of species number of the family Lythraceae, Lecythidaceae, Euphorbiaceae, Apocynaceae and Moraceae are most dominant. The mammals (2 species; 2 families), birds (29 species, 20 families), reptiles (4 species; 4 families), amphibian (2 species; 2 families) and fishes (19 species; 11 families) were recorded during the survey are presented in tables 2, 3, and 5. The area acquires the atmosphere of a bird sanctuary due to congregation of Open-billed stork (*Anastomus oscitans*), Heron (*Nycticorax nycticorax*, *Ardeola grayii*), Egret (*Bulbulcus ibis*, *Egretta garzetta*) and Cormorant (*Phalacrocorax fuscicollis*, *Phalacrocorax niger*) in large number (Fig. 1). The most common amphibia were *Bufo melanostictus* and *Rana trigina*. About reptiles the Bengal monitor (*Varanus bengalensis*), calotes (*Calotes versicolor*), *Natrix piscator* were most common. As for mammals, jackal (*Canis aureus*) and small Indian civet (*Viverricula indica*) can be seen sometimes coming out from outside to the sanctuary. Among the fishes, *Esomus danricus*, *Amblypharyngodon mola*, *Puntius punti*, *Puntius ticto*, *Labeo rohita*, *Cirrhinus mrigala*, *Chanda nama*, *Trichogaster fasciatus*, *Monopterus albus*, *Heteropneustes fossilis*, *Clarius batracus*, *Channa striatus*, *Channa gachua* were dominant fishes in the water bodies of this sanctuary. In the present study, 5 species of molluscs belonging to 5 families (Table 4) were collected and identified. *Bellamya*, *Pila* and *Lamellidens* are some of the edible molluscan genera of this area. Sustainable utilization of

molluscs and fishes are also essential because these serve as food for many birds inhabiting the sanctuary area.

Table 1: Major plants (trees) species within the Kulik bird sanctuary, Raiganj, India.

Scientific name	Family
<i>Lagerstroemia speciosa</i>	Lythraceae
<i>Barringtonia acutangula</i>	Lecythidaceae
<i>Trewia nudiflora</i>	Euphorbiaceae
<i>Terminalia arjuna</i>	Combretaceae
<i>Alstonia scholaris</i>	Apocynaceae
<i>Streblus asper</i>	Moraceae
<i>Bambusa tulda</i>	Poaceae
<i>Eucalyptus citriodora</i>	Myrtaceae
<i>Acacia auriculiformis</i>	Liguminosae
<i>Anthocephalus indicus</i>	Rubiaceae
<i>Dalbergia sisoo</i>	Papilionaceae
<i>Ficus glomerata</i>	Moraceae
<i>Swietenia mahagoni</i>	Meliaceae
<i>Ficus bengalensis</i>	Moraceae
<i>Syzgium cumini</i>	Myrtaceae
<i>Tectona grandis</i>	Verbinaceae
<i>Artocarpus heterophyllus</i>	Moraceae
<i>Polyalthia longifolia</i>	Annonaceae
<i>Caesalpinia pulcherima</i>	Caesalpinaceae
<i>Gmelina arborea</i>	Verbinaceae
<i>Mangifera indica</i>	Anacardiaceae
<i>Bombax ceiba</i>	Bombacaceae
<i>Terminalia belerica</i>	Combretaceae
<i>Albizia procera</i>	Mimosaceae
<i>Embica officinalis</i>	Euphorbiaceae
<i>Ailanthes grandis</i>	Simarubaceae
<i>Melia azadirachta</i>	Meliaceae
<i>Azadirachta indica</i>	Meliaceae
<i>Lagerstroemia parviflora</i>	Lythraceae
<i>Carissa carandus</i>	Apocynaceae
<i>Delonix regia</i>	Caesalpinaceae
<i>Eichhornia crassipes</i>	Pontedriaceae
<i>Pandanus fascicularis</i>	Pandanaceae
<i>Psidium guajava</i>	Myrtaceae

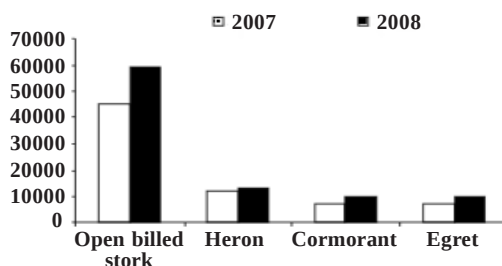


Fig. 1. Number of four most dominant birds species recorded during the study period (2007-2008) in the Kulik bird sanctuary.

In this study maximum effort was made to understand the dynamics of the bird community. Species composition of birds in an area is related to the type of vegetation, height above the sea level, availability of microhabitats and various

Table 2: Name and number of bird species that were spotted in the Kulik bird sanctuary, Raiganj, India.

English name	Scientific name	Family	Number (2007)	Number (2008)
Open-billed stork	<i>Anastomus oscitans</i>	Ciconiidae	44816	58920
Night heron	<i>Nycticorax nycticorax</i>	Ardeidae	5245	5527
Gray heron	<i>Ardea cinera</i>	Ardeidae	3709	3725
Pond heron	<i>Ardeola grayii</i>	Ardeidae	3098	3552
Little cormorant	<i>Phalacrocorax niger</i>	Phalacrocoracidae	5036	7259
Indian cormorant	<i>Phalacrocorax fuscicillis</i>	Phalacrocoracidae	2312	2849
Cattle egret	<i>Bulbulcus ibis</i>	Ardeidae	2367	3537
Little egret	<i>Egretta garzetta</i>	Ardeidae	2143	2678
Intermediate egret	<i>Mesophoyx intermedia</i>	Ardeidae	1989	2170
Large egret	<i>Casmerodius albus</i>	Ardeidae	893	1323
Common myna	<i>Acridotheres tristis</i>	Sturnidae	367	356
House crow	<i>Corvus splendens</i>	Corvidae	281	235
Red-vented bulbul	<i>Pycnonotus cafer</i>	Pycnonotidae	207	210
House sparrow	<i>Passer domestica</i>	Passeridae	189	192
Black drongo	<i>Dicrurus macrocercus</i>	Dicuridae	156	140
Oriental magpie robin	<i>Copsychus saularis</i>	Muscicapidae	127	117
Jungle babbler	<i>Turdoides striatus</i>	Sylviidae	119	113
Spotted dove	<i>Streptopelia chinensis</i>	Columbidae	113	87
Purple sunbird	<i>Nectarinia asiatica</i>	Nectariniidae	89	70
Small blue kingfisher	<i>Alcedo atthis</i>	Alcedinidae	87	93
Asian koel	<i>Eudynamis scolopacea</i>	Cuculidae	60	54
Bronze winged jacana	<i>Metopidius indicus</i>	Jacanidae	53	67
Lesser golden-backed woodpecker	<i>Dinopium benghalense</i>	Indicatoridae	51	50
Black headed oriole	<i>Oriolus xanthornus</i>	Oriolidae	47	34
Jungle crow	<i>Corvus macrorhynchos</i>	Corvidae	23	31
Common hoopoe	<i>Upupa epops</i>	Upipidae	21	19
White breasted water-hen	<i>Amaurornis phoenicurus</i>	Rallidae	19	15
Rose-ringed parakeet	<i>Psittacula krameri</i>	Psittacidae	12	19
Asian pied starling	<i>Sturnus contra</i>	Sturnidae	9	5

Table 3: Abundance of fishes recorded in the water body of the Kulik bird sanctuary, Raiganj, India.

Scientific name	Family
<i>Esomus danricus</i> (Ham)	Cyprinidae
<i>Amblypharyngodon mola</i> (Ham)	Cyprinidae
<i>Puntius puntii</i> (Ham)	Cyprinidae
<i>Puntius ticto</i> (Ham)	Cyprinidae
<i>Chanda nama</i> (Ham)	Chandidae
<i>Chanda ranga</i> (Ham)	Chandidae
<i>Labeo rohita</i> (Ham)	Cyprinidae
<i>Cirrhinus mrigala</i> (Ham)	Cyprinidae
<i>Channa punctatus</i> (Bloch)	Ophiocephalidae
<i>Mystus tengara</i> (Ham)	Bagridae
<i>Channa striatus</i> (Bloch)	Ophiocephalidae
<i>Heteropneustes fossilis</i> (Bloch)	Heteropneustidae
<i>Clarius batracus</i> (Linn)	Claridae
<i>Trichogaster fasciatus</i>	Osphronemidae
<i>Glossogobius giurus</i> (Ham)	Gobiidae
<i>Monopterus albus</i> (Ham)	Synbranchidae
<i>Anabas testudineus</i> (Bloch)	Anabantidae
<i>Channa gachua</i> (Ham)	Ophiocephalidae

Table 4: Abundance of molluscs that were spotted in the study spots along with their family names.

Scientific name	Family
<i>Bellamya bengalensis</i>	Viviparidae
<i>Lymnaea acuminata</i>	Lymnaeidae
<i>Pila globosa</i>	Pilidae
<i>Lamellidens marginalis</i>	Unionidae
<i>Achatina fulica</i>	Stenogyridae

Table 5: Amphibians, reptiles and mammals recorded in the study spots.

Amphibians	Family
<i>Bufo melanostictus</i>	Bufonidae
<i>Rana trigina</i>	Ranidae
Reptiles	Family
<i>Calotes versicolor</i>	Aganidae
<i>Varanus bengalensis</i>	Varanidae
<i>Naja naja</i>	Elapidae
<i>Natrix piscator</i>	Colubridae
Mammals	Family
<i>Canis aureus</i>	Canidae
<i>Viverricula indica</i>	viverridae

other factors. The number of avian species recorded in the present study was far less than the species recorded by Sharma (2007) probably due to destruction of birds habitat (Surana et al. 2007). This type of decreasing trend in species were observed in fishes (Mohsin and Haque 2009) and birds (Surana et al. 2007). The number of species declines with increasing urbanization and that the remaining group of species is dominated by highly abundant species (Lancaster and Rees 1979; Edgar and Kershaw 1994). Large numbers of open-billed stork were seen from the last week of June to mid of January of the next year. Common myna, house sparrow, king fisher,

red-vented bulbul, spotted dove, oriental magpie rabin, jacana and house crow were seen in all the month (2007-2008). The migratory birds were coming mainly for nesting and breeding purpose. Open billed stork, pond heron, egret and cormorant utilized the water bodies to feed on fish and mollusca. As open-billed storks are chiefly mollusca eater and heron, egret, cormorants are predominantly fish eater. During heavy rain, many nestlings fell down and were easy prey to the ground predators. House crow and Bengal monitor (*Varanus bengalensis*) was the main predator of the eggs and nestling of the bird species. Small branches of 12 plant species (*Ficus bengalensis*, *Anthocephalus indicus*, *Barringtonia acurangua*, *Ficus glomerata*, *Terminalia arjuna*, *Dalbergia sisoo*, *Bambusa tulda*, *Bombax ceiba*, *Alstonia scholaris*, *Streblus asper*, *Lagerstoemia speciosa*, *Trewia nudiflora*) were used by the birds to construct the nest. Among these plants species Open-billed stork mainly built their nests on the tree *Lagerstoemia speciosa*, because this trees are branched, hard and bushy type, helps to construct the nest properly (Pramanik et al. 2009). Though Egret preferred mainly *Bambusa tulda* tree, herons and cormorants built their nest mainly on *Barringtonia acurangua*, *Lagerstoemia speciosa*, *Bambusa tulda* trees. Open-billed stork sometimes built their nest together with other birds like egrets, herons and cormorants in the core region of the sanctuary. It was noticed that the population of egrets, herons and cormorants were more in abundance in the core region than the buffer but the stork population were seen both in the core region as well as buffer region as they can tolerate human interference. It is surprising that the populations of open-billed stork, heron, cormorant and egrets are now increasing year after year than the other birds species. It may be due to availability of nesting trees and food preferred by these particular species in the sanctuary. Kulik bird sanctuary is a flood plain area and main rice growing area of the region dotted with many large water bodies, river beds and marshy areas which are full of main food diet, *Pila globosa* of the open-billed stork (Sharma 2007). This area constitutes a promising region for experiments and watching the behaviour of birds also. However, it is essential to take immediate action for habitat improvement in this sanctuary to save the avian diversity.

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