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Research Article

PRESENT STATUS OF PRELIMINARY SURVEY ON AVIFAUNA DIVERSITY AND DISTRIBUTION IN THE MOST POLLUTED RIVER BURIGANGA, DHAKA, BANGLADESH

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ABSTRACT

The survey of avifauna diversity in the Buriganga river was carried out between December 2012 and November 2013. Direct observations were made to watch the birds using binocular in the river by boat. A total of 38 species of birds belonging to 21 families 8 orders in the river baseline were recorded from Amin Bazar Bridge (90°20´12 " E and 23°46´25 " N) to China Bangladesh friendship Bridge (90°26´12 " E and 23°40´25 " N) which is almost 18 km long. Of the total birds, 7 birds were migratory, 8 aquatic birds in the River area. Among the birds, 16 (42%) species passeriformes and 22 (58%) were non-passeriformes from the taxonomic view point of avifauna. Species diversity was significantly more in site B than that recorded in site A and C due to human intervention. Due to its unique and diversified habitats, Baseline area of Buriganga river may be considered as a potential conservation site in terms of avifauna diversity.

Keywords: Diversity, Conservation, Population distribution, Buriganga river.

INTRODUCTION

The bird population of Bangladesh is decreasing at an alarming rate like elsewhere in the world, mainly due tohabitat destruction with the subsequent effect on food and shelter (Hussain, 2008). Among the total 1200 species of birds recorded in the Indian subcontinent (Ali and Ripley, 1983), Bangladesh represents 628 species, of which 41 were threatened (Anonymus, 2000). Although, a total of 718 bird species under 64 families were reported by Khan (2010). Diversity of avifauna is one of the most important ecological indicators to evaluate the quality of habitats. There are reports on avifauna in different regions of Bangladesh. These reports include: Islam (1969) in Rangpur district; Husain (1969, 1975) in Chittagong Hill Tracts and Pablakhali Wildlife Sanctuary; Banerjee (1978) and Das (1975) in Curzan hall area, Ramna Park; Khan (1982) and Sarker *et al*. (2001) in St. Martin Island; Sarker and Sarker (1986) in Sundarban; Haque and Rahman (1993) in Raman and Suhrawardy parks and Akhter (1997) in Boldha garden. However, bird populations around the globe are declining at an alarming rate, and that does not exclude Bangladesh. IUCN's (2000) Red List revealed that among 388 species of resident birds, 41 species are threatened in the country. According to encyclopedia of flora and fauna of Bangladesh, birds, (Volume 26), 650 species of birds belong to 295 genera and 64 families have been recorded in Bangladesh. These include at the Rajshahi University Campus (Khan, 1982), at Bagkhali range, Cox's Bazar and Moheskhali island (Sarker *et al.*, 2000a, b) and at two sites of the Uttara Model Town, Dhaka (Sarker *et al*., 2009). Birds are very important wild creatures, as they help in pest control, pollination, cleaning the environment as scavenger as well as an important ecological indicator (Ali and Ripley, 1983). Birds are among the best monitors of environmental changes and have been used to evaluate the environment throughout the history as "biomonitors" and; the changes in their population, behavior patterns and reproductive ability have most often been used to examine the long term affects of habitat fragmentation. Hence they are the good indicators of ecological status of any given ecosystem (Harisha and Hosetti, 2009). Fifty-five grassland bird species have been listed as threatened or endangered in the United States (Samson and Knopf, 1996). Grassland and shrubland-dependent bird species have declined in eastern and central North

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America, with greater numbers of species designated as endangered or threatened compared to their woodland counterparts (Wood *et al.* 2013). Aquatic environments in the river can provide critical habitat to a wide variety of bird species. Some aquatic birds divide their time between aquatic and terrestrial environments, while others spend most of their lives in water, returning to land only to breed and feed. Many familiar bird groups are aquatic such as Gull. Aquatic bird species are at risk on many fronts in the Buriganga river. Many have declined due to the large-scale loss of wetland habitats. But no research on avifauna was carried out in the Buriganga river and its adjacent areas. Study site has been representing many species of birds that need to be documented for their protection. This study is an attempt to prepare a baseline data on avifaunal diversity with their relative abundance and species richness for Buriganga river.

MATERIALS AND METHODS

Study area

The study was carried out in the Buriganga river starting from Amin Bazar Bridge (90°20´12" E and 23°46´25" N) to China Bangladesh friendship Bridge (90° 26´ 12" E and 23°40´25" N) which was approximately 18 km in length (Figure 1). The data was collected for a year period from December 2012 to November 2013.

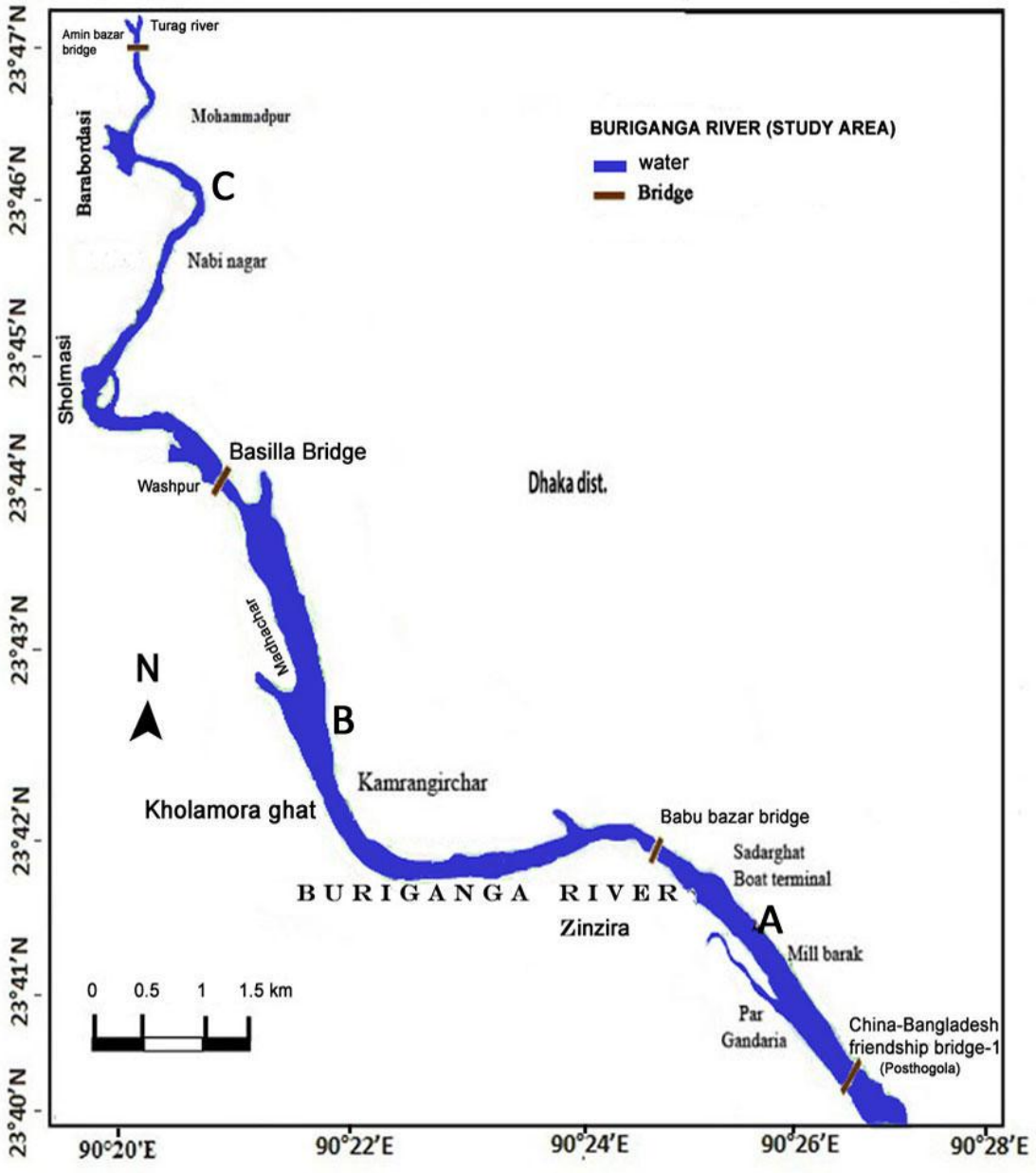

Figure 1. Study area of avifauna in the Buriganga River.

Methods

Mainly eye observations were made to watch the birds. A digital camera (Nikon and Sony) was used to take photographs of the birds. Observations are made two days per month through walking transects of 18 km by boat in the river.

Species identification

The birds were mainly identified using books by Ali (1996) and Hussain (2008). The english, scientific and local names of the birds have been taken from Ali (1996), Grewal *et al.* (2002), Harvey (1990) and Khan (2008a, b). The following three characteristics were applied to identify the bird species. 1. external morphology (Colour, shape, size, beak, leg and Tail), 2. song and calls and 3. habitats.

RESULTS

During study period a total of 38 species belonging to 21 families and 8 orders have been identified in the Buriganga River (Table 1). A total of 7 migratory birds and 8 aquatic bird species have been identified out of 38 species in the Buriganga river. Among 38 species, 16 (42%) species were passeriformes and 22 (58%) non-passeriformes in the River. Out of 22 species, 10 (26%) species were ciconiiformes, 4 (11%) coraciiformes, 2 (5%) piciformes, 2 (5%) apodiformes, 2 (5%) columbiformes, and 1 (3%) cuculiformes and psittaciformes each in Buriganga river (Figure 2). Of those, 30 species were resident, 7 winter visitors and 1 summer visitor species.

Species diversity was significantly more in site B than that recorded in site A and C. Maximums numbers of birds were observed at site B which was 32 (52%) and minimums number of birds were observed at site A which was 18 (19%) in the Buriganga river (Figure 3).

The relative abundance of individual species, 6 (16%) species was very common, 13(34%) common and 19(50 %) species fairly common in number (Figure 4).

Many birds population migrate a long distance flyways among them and *Gallinago gallinago, Actitis hypoleucos, Motacilla flava, Motacilla alba, Motacilla madaraspatensis, Larus brunnicephalus, Larus ichthyaetus* and *Hirundo rustica* migrate in the river.

Streptopelia chinensis is a fairly common bird that feeds on buds, fruits, vegetables, nuts, berries and seeds and breeds throughout the year (Table 2). *Motacilla flava* and *Bubulcus ibis* group comes in winter season in the river in a group of 20-25, while *Merops orientalis* is a summer visitor and resident bird of the study area. Common bird *Phalacrocorax carbo* breeds throughout the year and feed on crustaceans, fish, eggs and mollusca in the river baseline area and nest type cup size can conserve the bird in the area. Very common bird *Milvus migrans* was found throughout the year in the area while aquatic birds such as *Actitis hypoleucos, Ardeola grayii, Bubulcus ibis, Larus brunnicephalus, Larus ridibundus, Alcedo atthis, Halcyon smyrnensis* and *Phalacrocorax carbo* were found in the Buriganga river area. *Merops orientalis* is a Resident, summer visitor and *Gallinago gallinago, Actitis hypoleucos, Larus brunnicephalus, Larus ridibundus, Hirundo rustica, Motacilla alba, Motacilla flava* is Winter visitor birds.

Table 1. List of avifauna in the river Buriganga.

Order	Family	Scientific name	English name	Local name	Status	L/S	L
Piciformes	Picidae	*Dinopium benghalense*	Black-rumped Flame back	Kaththokra	Resident	FC	B
		Megalaima haenacephala	Coppersmith Barbet	Choto Basanta Bauri	Resident	FC	B
Coraciiformes	Alcedinidae	*Alcedo atthis*	Common Kingfisher	Choto Maachranga	Resident	C	B, C
		Halcyon smyrnensis	White-throated Kingfisher	Dholagola Machranga	Resident	VC	A, B, C
	Cerylidae	*Ceryle rudis*	Pied Kingfisher	Pakra Machranga	Resident	FC	B

	Meropidae	*Merops orientalis*	Green Bee-eater	Shobuj Shuichora	Resident, summer visitor	FC	B
Cuculiformes	Cuculidae	*Cacomantis merulinus*	Plaintive Cuckoo	Koroon Papia/Chatak	Resident	FC	C
Psittaciformes	Psittacidae	*Psittacula krameri*	Rose-ringed Parakeet	Shobuj Tia/Tiya	Resident	FC	B
Apodiformes	Apodidae	*Apus affinis*	House Swift	Ababil	Resident	C	B, C
		Cypsiurus balasiensis	Asian Palm swift	Nakkati	Resident	FC	B
Columbiformes	Columbidae	*Columba livia*	Rock Pigeon	JalaliKabutor/ paira	Resident	FC	B
		Streptopelia chinensis	Spotted Dove	Tila Ghughu	Resident	FC	C
Ciconiiformes	Scolopacidae	*Gallinago gallinago**	Common Snipe	Pati Chega	Winter visitor	FC	B
		*Actitis hypoleucos**	Common Sandpiper	Pati Batan	Winter visitor	FC	B
	Laridae	*Larus brunnicephalus**	Brown-headed Gull	Gongakoitar	Winter visitor	FC	A
		*Larus ridibundus**	Black-headed Gull	Palasi Gangchil	Winter visitor	FC	A
	Accipitridae	*Haliastur indus*	Brahminy kite	ShankhoChil/ Lalchil	Resident	C	B, C
		Elanus caeruleus	Black-Shouldered kite	Sada Chil	Resident	C	B, C
		Milvus migrans	Black Kite	Bhubon Cheel	Resident	VC	A, B, C
	Phalacrocoracidae	*Phalacrocorax carbo*	Great Cormorant	Boro Pankouri	Resident	C	B, C
	Ardeidae	*Bubulcus ibis*	Cattle Egret	Go Bok	Resident	C	B, C
		Ardeola grayii	Indian Pond Heron	Kani Bok	Resident	C	B, C
Passeriformes	Corvidae	*Corvus macrorhynchos*	Large-billed Crow	Dar kak	Resident	VC	A, B,C
		Corvuss plendens	House Crow	Patikak	Resident	VC	A, B, C
		Dicrurus macrocerus	Black Drongo	Kala Fingey	Resident	C	A, B
	Muscicapidae	*Copsychus saularis*	Oriental Magpie Robin	Doel	Resident	C	A, B
	Sturnidae	*Acridotheres fuscus*	Jungle Myna	Jhuti Shalik	Resident	FC	B
		Acridotheres tristis	Common myna	Bhat Shalik	Resident	C	B, C
		Sturnus contra	Asisn Pied Starling	GuShalik	Resident	VC	A, B, C
	Hirundinidae	*Hirundo rustica**	Barn Swallow	Ababil	Winter visitor	FC	B
	Pycnonotidae	*Pycnonotus cafer*	Red-vented Bulbul	Bulbuli	Resident	C	A, B
	Cisticolidae	*Cisticola juncidis*	Zitting Cisticola	Bhomra Soton	Resident	FC	C
	Slviidae	*Orthotomus sutorius*	Common Tailorbird	Pati Tuntuni	Resident	C	B, C
	Passeridae	*Passer domesticus*	House Sparrow	Pati Chorui	Resident	VC	A, B, C

	*Motacilla alba**	White Wagtail	Dhola Khonjon	Winter visitor	FC	B
	*Motacilla flava**	Western Yellow Wagtail	Poshchina Holdeykhonjon	Winter visitor	FC	B
	Motacilla madaraspatensis	White-browed wagtail	Dholavrukhonjon	Resident	FC	B
	Anthus similis	Long-billed Pipit	Lombathot Tulika	Resident	C	B, C

Notes: Migratory birds*; FC= Fairly Common; C=Common; VC= Very Common; L/S= Local status; L= Location; A=China-Bangladesh friendship bridge-1 to Babu bazar bridge; B=Babu bazar bridge to Basilla bridge; C= Basilla bridge to Amin bazar bridge.

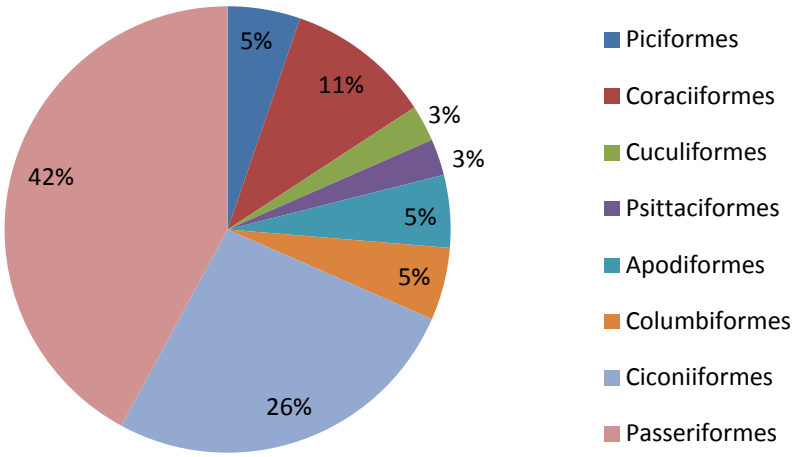

Figure 2. Species composition of avifauna under different order in river Buriganga

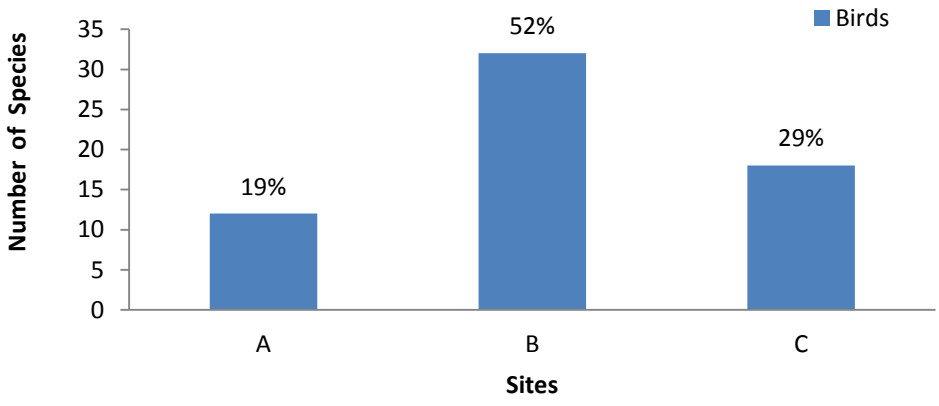

Figure 3. Diversity of birds at different sites in Buriganga River

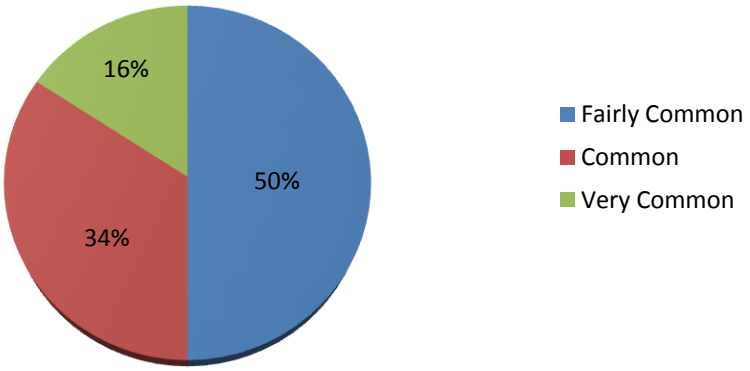

Figure 4. Relative abundance of birds in the study area**.**

Actitis hypoleucos

Motacilla flava

Motacilla alba

Merops orientalis

Cacomantis merulinus

Motacilla madaraspatensis

Halcyon smyrnensis

Ardeola grayii

Haliastur Indus


Corvus macrorhynchos


Elamus caeruleus


Bubulcus ibis


Milvus migrans


Alcedo atthis

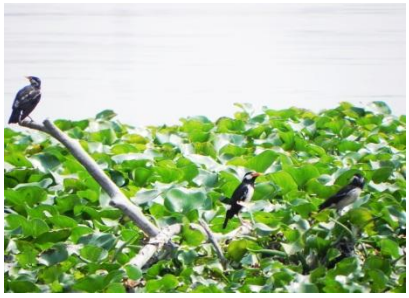
Sturnus contra

Figure 5. Different types of Bird in the Buriganga River baseline area, Dhaka, Bangladesh.

Table 2. Feeding habits, Breeding season and Nest types of Birds. (Notes: LC = Least Concern).

Scientific name	Feeding Habits	Breeding Season	Nest types	IUCN Status 2014
Dinopium benghalense	Insectivore	Feb - Jul	Hole nest	LC
Megalaima haenacephala	Fruits, ants and small caterpillars	Feb - Apr	Hole nest	-
Alcedo atthis	small fish and prawns	Apr - Oct	Hole nest	LC
Halcyon smyrnensis	Crustaceans, Insects, earthworms, rodents, snakes, fish and frogs	Jan - Aug	Tunnel nest	LC
Ceryle rudis	Crustaceans, Insects, earthworms, rodents, snakes, fish and frogs	Jan - Aug	Tunnel nest	LC
Merops orientalis	Insects, bees, wasps and ants	Mar - Jun	Tunnel nest	LC
Cacomantis merulinus	Insects, caterpillars, beetles, bugs, termite soldiers	Jul - Oct	Host nest	LC
Psittacula krameri	Buds, fruits, vegetables, nuts, berries and seeds	Dec - May	Hole nest	LC
Apus affinis	Insects: ants, termites, bees, wasps and beetles	Oct - Jul	Twig nest	LC
Cypsiurus balasiensis	Insects: ants, termites, bees, wasps and beetles	Oct - Apr	Twig nest	LC
Columba livia	Seeds, popcorn, cake, peanuts, bread, and currants	Jul - Oct	Flimsy platform	LC

Streptopelia chinensis	Buds, fruits, vegetables, nuts, berries and seeds	All year	Twig nest	-
*Gallinago gallinago**	Insects, crustaceans, mollusks, earthworms, seeds	Apr - Aug	Scrape	LC
*Actitis hypoleucos**	Insects, spiders, molluscs, crustaceans, annelid worms	May - Jun	scattered	LC
*Larus brunnicephalus**	Insects and earthworms, rodents, eggs, carrion, offal, reptiles, amphibians, fruits and seeds	May - Jul	Cup nest	LC
*Larus ridibundus **	Insects, earthworms, molluscs, crustaceans, fish, eggs.	Mar - Apr	shallow Scrape	LC
Haliastur indus	Fish, crabs, shellfish, frogs, rodents, reptiles, insects	Dec - Apr	Untidy nest	LC
Elanus caeruleus	small rodents, reptiles, insects	Aug - Jan	-	LC
Milvus migrans	lizards, small mammals, insects, grasshoppers.	Nov - Jan	Bulky cup nest	LC
Phalacrocorax carbo	Crustaceans, fish, eggs, mollusca	All year	Cup nest	LC
Bubulcus ibis	Insects, grasshoppers, crickets, flies, earthworms, frog, spider.	May - Jul	Shallow bowls	LC
Ardeola grayii	crustaceans, aquatic insects, fishes, tadpoles	Apr - Sep	Platform of sticks	LC
Corvus macrorhynchos	edible, alive or dead, plant or animal	Mar - May	Platform of twigs	LC
Corvus splendens	Insects, eggs, nestlings, grain and fruits.	Apr - Jun	Twig nest	LC
Dicrurus macrocerus	Insects: grasshoppers, cicadas, termites, wasps, bees, ants, moths, beetles and dragonflies	Apr - Aug	Cup nest	-
Copsychus saularis	Insects: grasshoppers, cicadas, termites, wasps, bees, ants, moths, beetles and dragonflies	Apr - Jul	Hole nest	LC
Acridotheres fuscus	Insects, fruit, seeds and nectar.	Feb - May	Hole nest	LC
Acridotheres tristis	Insects, fruits, vegetables, scraps, pets	Apr-Aug	Twig nest	LC
Sturnus contra	Insects, worms, spiders, fruits	Mar - Oct	Hole nest	LC
*Hirundo rustica**	Insectivores	May -Aug	Cup nest	LC
Pycnonotus cafer	Fruits, petals of flowers, nectar, insects and occasionally geckos.	Jun - Sep	Cup nest	LC
Cisticola juncidis	Insects: grasshoppers, cicadas, termites, wasps, bees, ants, moths	Apr - Oct	Cup nest	LC
Orthotomus sutorius	Insects: both adults and larvae, fruits, nectar, seeds	Jun - Aug	Hole nest	LC
Passer domesticus	Seeds of grains and weeds	All year	Hole nest	LC
*Motacilla alba**	Snails, spiders, worms, crustaceans, insects	Apr - Aug	Cup nest	LC

*Motacilla flava**	---			LC
Motacilla madaraspatensis	Insects, orthopterans, caterpillars and spiders.	Mar - Oct	Cup nest	LC
Anthus similis	Insects, seeds, centipedes, millipedes	Aug - Dec	Cup nest	LC

* Migratory birds

DISCUSSION

The diversity of avifauna at the BARD (Bangladesh Academy for Rural Development), Comilla total 41 species of birds (20 non-passerines and 21passerines) was identified during March, 2010 to March, 2011(Jaman *et al.,* 2011) but we have recorded 38 species of bird in the most polluted river Buriganga. Total 27 species of birds were recorded from two urban sites (Sectors 7 and 9) in Uttara area of Dhaka city during August 2004 to July 2005 (Jaman *et al.,* 2009). Species diversity in Uttara area of Dhaka cityin Sector 7 was 25 (58%) significantly higher than that of Sector 9 was 18(42%) (Jaman *et al.,* 2009). Migratory Birds that visit the Bangladesh territory periodically, specially in winter. Buriganga River is the most polluted river in Bangladesh but some birds were migrated in winter season 2012-13 in the river basin which is the regular seasonal movement in the world. Every winter the haor is home to about 200 types of migratory birds in Bangladesh. But many migratory bird species are threatened by unsustainable hunting and poaching in many parts of the world, especially in Africa, South America and Central Asia. Since these birds are shared by all nations along the flyways, these practices affect migrating birds and people on a global scale. Migratory birds play an important part in the ecosystem. Common sandpiper, White Wagtail, Western Yellow Wagtail were found at Basilla, Madhochar in the Buriganga River. They eat insects and rodents which saves farmers money they would otherwise spend on pesticides and crop protection measures. By acting as natural controls, birds help regulate pests by reducing populations of potentially harmful insects such as caterpillars, weevils, cutworms, beetles and flies. We were found fish, crabs, shellfish, frogs, rodents, reptiles, insects, crustaceans, mollusks, earthworms**,** seeds in the study area.

Conservation issues threats and problems

Among all trees in the Buriganga River side most of them are of medium sized trees. Beside in Buriganga River there are much bushes or grass like vegetation. The aquatic resources the bushes or trees are the sources for birds' nests and shelter in Buriganga River baseline area (Figure 4). Madhochar, Kholamor, kamrangichar, basilla have medium sized trees for birds' nests and shelter but it's not richer. Most of the birds feed on small fish, tadpoles, aquatic insects and mollusks. Avifauna of the study area has been reducing rapidly mainly due to illegal exploitation of trees, cutting of tree branches and destroying the natural habitats e.g., bushes, jungles, thickets, etc. Number of birds has been decreasing in the river baseline area due to fruit trees, bushes and forest trees a lot of human interference, constructional activities, noise due to vehicles and peoples are making threat to the species of avifauna in the Buriganga River baseline area.

CONCLUSION

The main threats to birds and river ecosystem are human disturbance, high grazing pressure, poaching, and hunting. The river is the most polluted river. If the river is conserved, not only the bio-diversity will be conserved but also the door for other better earning opportunities like development of bird watching, hiking area to the urban tourists, park establishment etc. can be created. It is sure that only positive impacts will be aroused by conserving the Buriganga River and again it is our choice that, whether we want benefit by conserving the Buriganga River or we are ready to loose the nature's finest creation by neglecting it. This is especially true in the light of documented impacts of habitat loss, fragmentation, degradation and other anthropogenic factors on river area avifauna across the globe. Our study was carried out in part to document the occurrence of such bird species to facilitate their conservation.

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