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BIRD ECOLOGY FROM THE RAVI RIVER OF LAHORE: HABITAT DEGRADATION

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ABSTRACT

The habitat degradation of the birds is determined from the five sites of the Ravi River near Lahore in this paper. The studied sites were surveyed from mid March to mid September in 2008 and found 22 species of the birds. Water samples were taken from the sites and the different selected parameters were used for water analysis including pH, Biological Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Total Dissolved Solids (TDS), Total Suspended Solids (TSS), Chloride and Sulphate. The results revealed that all the values of pH, BOD, COD, TDS, TSS, Chloride and Sulphate exceeded the national environmental quality standard (NEQS) limits in the studied sites of the Ravi River near Lahore. The threats for the birds and the recommendations are discussed in this paper.

Key words: Hadiara drain, Habitat degradation, Birds, Lahore, River Ravi.

INTRODUCTION

Various scientists have reported the bird fauna from Lahore (Currie, 1916; Mirza, 1965, 2005; Ali and Ripley, 1983; Roberts, 1991, 1992; Chaudhry *et al*., 1992; Mahmood, 2000; Hussain and Afzal, 2005; Grimmett and Inskipp, 2006). A checklist of the Lahore birds comprising 240 species was published by Mirza (1997). The urban avian habitats of Lahore (confined to the Walled city) were studied by Mahmood (2000). Mirza (2007) ascribed the bird fauna of Lahore cantonment area. More recently, Masood (2008) observed the ecological linkages and behavior of the Lahore canal bank birds.

The present study was carried out in the vicinity of the Hadiara drain of the Ravi River, Lahore (Fig. 1). Regionally the area is situated in the north of Lahore. The Hadiara drain (from Ganga wala Dera to Maraka quarter) is one of the main tributaries of the Ravi River. This drain basically originates in Batala in Gurdaspur district, India and enters Pakistan near Lalloo village in Lahore district, Pakistan. In addition, wastewater of some areas of Lahore city and of other small villages also enters this drain. The site was covered by fields and factories on both sides. The second site was near Motorway (Babu Sabo Toll Plaza). The Motorway-2 is situated on one side of the drain while the residential area is on the other one. The site area was totally covered by garbage. The third site was Sagian Bridge (near out Fall Road). The fourth site was Kamran Bara Dari in the Ravi River near old Ravi Bridge. The fifth site was Mehmood booty at Bund road near the Ravi River. The residential area is situated on one side of the site and housing scheme plots and fields are on the other one (Fig. 1). The primary goal of this paper is to present a new data from the Hadiara drain, Lahore and its vicinity (Fig. 1). The unpublished data could greatly improve our knowledge of the bird ecology.

MATERIALS AND METHODS

Birds were observed with the help of binocular (8x to 32x). Expected number of birds at each study site was calculated by taking average of each species and then obtained %age abundance.

Relative abundance was calculated by dividing individual numbers of birds counted to the total population of birds of all species and multiplied by hundred following Bull (1964) and McCaskle (1970).

Percentage abundance = total population of single species/total population of all species x 100.

Total samples collected were 10, 2 samples from each single site. Water was sampled from the studied sites to measure the habitat degradation. The analysis of the water samples was done as per the standard methods of American Public Health Association APHA, 1992. A pH meter was used to determine pH of water; total suspended solids, and total dissolved solids were determined using gravimetric method. Chlorides were estimated using argentometric method; sulphates were determined by using turbidimetric method with Spectrophotometer at 420 nm. Biological Oxygen Demand was measured by bioassay procedure and Chemical Oxygen Demand by open reflux method.

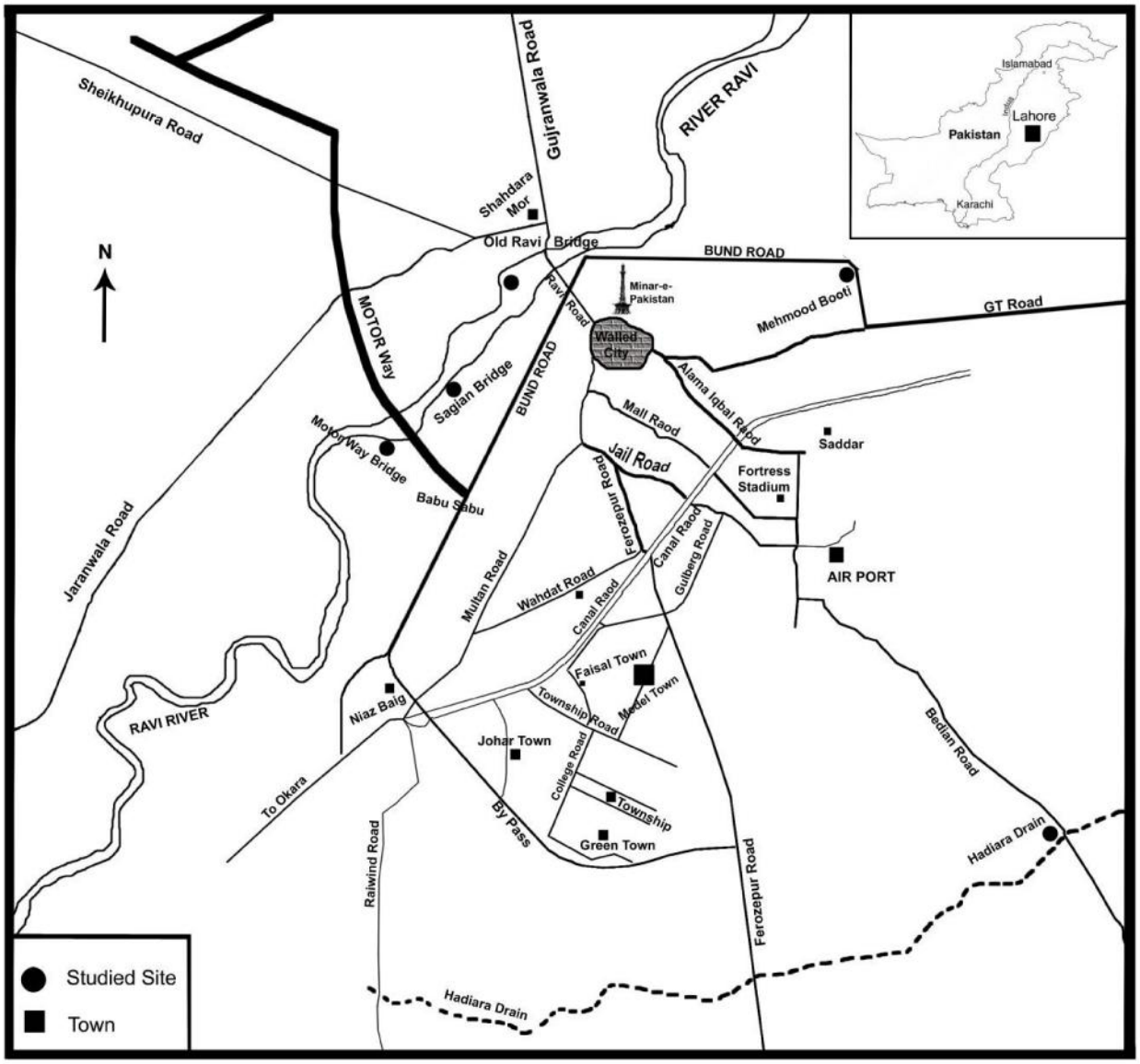

FIG. 1. – Map of Lahore showing the studied sites.

RESULTS AND DISCUSSION

Birds were observed at five different sites near the Ravi River and their population and vegetations were also studied. Twenty two bird species were observed during this studied period (Table 1). The birds were identified by studying their characteristic features in accordance with the identification keys evolved by Whistler (1922), Ali (1979), Roberts (1991, 1992) and Grimmitt *et al* (2001). Birds were mostly seen sitting on electric wires, trees and on nearby fields and on margins of drains.

Hadiara drain: Fifteen bird species are found at this site. Bank Myna (*Acridotheres ginginianus*) constitutes 37.3% of the recovered bird species showing maximum concentration. The minimum percentage of White-breasted Kingfisher (*Halcyon smyrnensis*) is 0.6 %. The maximum pH at Hadiara drain is 7.5. The BOD and COD values are 120-140 mg/l and 336 mg/l respectively. The TDS and TSS are 1250-1290 mg/l and 70-120 mg/l (Table 2). The common trees of this site were Kikar (*Acacia Arabica*), Shisham (*Dalbergia sissoo*), Jaman (*Syzigium jambolamun*), Sumbal (*Bombax ceiba*).

Motorway Bridge at the Ravi river: Eighteen bird species are recorded at this site. The maximum percentage of Black Drongo (*Dicrurus macrocersus vieillot*) is 20.82 % while minimum of little green bee-eater (*Merops orientalis*) and Purple sunbird (*Nectarinia asiatica*) that was 0.86 %. The maximum pH at this site is 7.1. The BOD and COD values are 130-225 mg/l and 280-464 mg/l

respectively. The TDS and TSS are 670-710 mg/l and 80-230 mg/l. The Chloride and Sulphate contents are 105-135 mg/l and 308-341 mg/l respectively. The site trees are Pipal (*Ficus religiosa*), Kikar (*Acacia Arabica*), Arind (*Ricinus communis*) and Aak (*Calotropis procera*).

Sagian Bridge at the Ravi River: Thirteen bird species are identified from this site. Bank Myna (*Acridotheres ginginianus*) constitutes 23.6 %, little green bee-eater (*Merops orientalis*) are 1.2 % and red-vented bulbul (*pycnonotus cafer*) are 1.0 %. The maximum pH at this site is 7.2. The BOD and COD values are 180-225 mg/l and 368-464 mg/l respectively. The TDS and TSS are 450-550 mg/l and 290-300 mg/l. The Chloride and Sulphate contents are 65-70 mg/l and 267-329 mg/l respectively. The trees include Kikar (*Acacia arabica*), Aak (*Calotropis procera*) Sumbal (*Bombax ceiba*), Shisham (*Dalbergia sisso*) and Tun (*Cedrela toona*).

Old Ravi Bridge at the Ravi River: Eleven species are identified at this site. Bank Myna (*Acridotheres ginginianus*) dominated as prominent member of this site constituting 57.07 %, Hoopoe (*Upopa epops*) and Golden-backed Woodpecker (*Dinopium benghalense*) are 0.52 % of the recorded species. The pH is 7.4 at this site. The BOD and COD values are 25.5-90mg/l and 64-192 mg/l respectively. The TDS and TSS are 200-290 mg/l and 10-290 mg/l. The Chloride and Sulphate contents are 10-25 mg/l and 320-333mg/l respectively.

Table 1. Bird list from the studied sites of the Ravi River.

Orders	Families	Name of species	Common name	Status	Habitat
Ciconiiformes	Ardeidae	*Egretta intermedia*	Intermediate Egret	Not very common	Nearby planted-trees & fields of the Ravi river and drains
		Ardeola grayii	Indian-Pond Heron	Common	Trees nearby drain and along the margin of drains
	Burhinidae	*Hoplopterus indicus*	Red-Wattled Lapwing	Common	Grass under the trees and along the margin of drains
	Scolopacidae	*Actitis hypoleucos*	Common Sandpiper	Common	Mostly seen near bank of Ravi river
Passeriformes	Motacillidae	*Motacilla alba*	White Wagtail	Not	Bank of drain and garbage present inside the drains
		Motacilla flava	Yellow Wagtail	Not	Bank of drain and garbage prese inside the drains
	Pycnonotidae	*Pycnonotus cafer*	Red-vented Bulbul	Not	Urban gardens, and in well vegetated regions.
	Passeridae	*Passer domesticus*	House Sparrow	Common	House walls, on ground and trees
	Sturnidae	*Acridotheres tristis*	Common Myna	More abundant	Mostly seen sitting on wires, on ground & walls
		Acridotheres ginginianus	Bank Myna	More Abundant	Mostly seen sitting on wires, on ground & walls
		Sturnus contra	Pied Myna	Rare	Mostly seen sitting on wires, on ground & walls
	Corvidae	*Corvus splendens*	House Crow	Common & Abundant	Mostly seen sitting on wires & on ground
	Dicaeidae	*Nectarinia asiatica*	Purple sunbird	Rare	On electric wires and nearby bushes
	Dicruridae	*Dicrurus macrocersus vieillot*	Black Drongo	Rare	On electric wires, and the ranches of trees
Falconiformes	Accipitridae	*Milvus migrans migrans*	Black kite	Abundant	Mostly seen sitting on wires & on ground
Columbiformes	Pterocilididae	*Columba livia*	Blue rocky pigeon	Rare	On electric wires, and on the branches of trees
		Streptopelia senegalensis	Little brown dove	Abundant	Trees and along the margin of drain
Coraciiformes	Alcedinidae	*Halcyon smyrnensis*	White-breasted Kingfisher	Rare	Mostly seen sitting on wires & on ground
	Meropidae	*Merops orientalis*	Little Green Bee eater	Rare	Mostly seen sitting on electric wires
	Picidae	*Dinopium benghalense*	Golden-backed woodpecker	Rare	Trees nearby the river
	Upupidae	*Upopa epops*	Hoopoe	Not	Along the margin of drains
Charadriiformes	Jacanidae	*Hydrophasianus chirurgus*	Pheasant-tailed jacana	Rare	Under the bushes and shrubs

Table 2. Chemical analysis report of waste samples collected from the studied sites of the Ravi river, Lahore. (Abbreviations: BOD-Biochemical Oxygen demand, COD-Chemical Oxygen Demand, TDS-Total Dissolved Solids, TSS-Total Suspended Solids).

Description	pH	BOD5	COD	TDS	TSS	Chloride	Sulphate	Remarks
N.E.Q.S	6-9	80 mg/l	150 mg/l	3500 mg/l	200 mg/l	1000 mg/l	600 mg/l	
Old Ravi Bridge Sample No. 1	7.4	90	192	290	290	25	333	The value of BOD, COD and TSS exceed the NEQS limits.
Old Ravi Bridge Sample No. 2	7.4	25.5	64	200	10	10	320	The parameters analyzed are within the NEQS limits.
Motor way at Ravi sample No-1	7.1	168	320	670	230	105	341	The value of BOD, COD and TSS exceed the NEQS limits.
Motor way at Ravi sample No-2	7.1	130	280	710	80	135	308	The value of BOD, COD and TSS exceed the NEQS limits.
Sugiyan at Ravi sample No-1	7.1	225	464	550	300	70	329	The value of BOD, COD and TSS exceed the NEQS limits.
Sugiyan at Ravi sample No-2	7.2	180	368	450	290	65	267	The value of BOD, COD and TSS exceed the NEQS limits.
Mahmood Booti sample No-1	7.1	162	496	1020	180	80	41	The value of BOD, COD and TSS exceed the NEQS limits.
Mahmood Booti sample No-2	7.1	228	816	980	430	85	57	The value of BOD, COD and TSS exceed the NEQS limits.
Huydara drain sample No-1	7.2	120	336	1250	120	150	124	The value of BOD, COD and TSS exceed the NEQS limits.
Huydara drain sample No-2	7.5	140	336	1290	70	145	143	The value of BOD, COD and TSS exceed the NEQS limits.

***Threats**:* The potential threats to birds are discussed below:

Mehmood booty near the Ravi River: Twelve bird species are recorded from this site. Common Myna (*Acridotheres tristis*) constitutes 22.6 %, White-breasted Kingfisher (*Halcyon smyrnensis*) are 0.6 % and little green bee-eater *(Merops orientalis)* are 1.0 %. The pH is 7.1 at this site. The BOD and COD values are 162-228 mg/l and 496-816 mg/l respectively. The TDS and TSS are 980-1020 mg/l and 180-430 mg/l. The Chloride and Sulphate contents are 80-85 mg/l and 41-57 mg/l respectively. The common trees are Bamboo (*Dendrocalamus strictus*), Banana (*Musa accuminata*), Kikar (*Acacia Arabica*) and Aak (*Calotropis procera*) of this site.

Finally, the range of the BOD and the COD from the sites were 90 mg/l to 228 mg/l and 64-816 mg/l respectively. The high BOD and COD values observed at the Mehmood booty site and the minimum values were at the Old Ravi Bridge site. Similarly the range of TDS and TSS values were 200-1290 mg/l and 10-430 mg/l respectively. The high TDS and TSS values obtained at the Hadiara drain site and the Mehmood booty site respectively and minimum values obtained at the Old Ravi Bridge site. The range of the Chloride and the Sulphate are 10-150 mg/l and 41-341 mg/l respectively. The high values of Chloride and the Sulphate are at the Hadiara drain site and the Old Ravi Bridge site respectively and the minimum values are at the Mehmood booty. The pH range is from 7.1 to 7.5 that are under controlled according to NEQS limits. The relative percentage of the bird species shows in the figure 2.

Water pollution: Water pollution is the major threat to the habitats (Saeed, 2004). The studied parameters PH, BOD, COD, TSS, TDS, Chloride and Sulphide contents, are found to be out of the limits of NEQS at all the visited sites. Industries are the major threat to the habitats in polluting water by adding vulnerable amount of metallic water and other industrial wastes. Along the Hadiara drain a lot of industries are located that are putting their wastes into the drain directly. Secondly, pouching is a great threat that with the passage of time may cause birds near to the extinction. At least two bird species: common myna and crow are facing serious threat as the Punjab Wild Life Department has failed to check the business of capturing these birds from rural and sub-urban areas and selling them in almost all big cities of the country. Caging domestic birds like sparrows, mynas and crows is a common act that is the major threat for the survival of the birds. Even after release, it is feared that these birds will not be able to reach their nests. Deplantation is a universal threat. A large number of trees have been cutting at the old Ravi Bridge near Kamran Bara Dari that killing the habitat of birds rapidly.

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