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Diversity and Abundance of Wetland Birds around Kurukshetra, India

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Abstract
Kurukshrtra is a place of great historical and religious importance in India and is dotted with a number of holy water bodies and ponds. These wetlands support a rich avian diversity and serve as winter sojourn. A total of 54 species of wetland birds belonging to 36 genera and 15 families distributed in 5 orders have been recorded around Kurukshrtra .These wetlands are under pressure from diverse anthropogenic activities. This paper provides an overview of status of wetland birds and threats to them in the study area.

***Key words*:** Wetland birds, diversity, abundance, Kurukshetra

Introduction

Wetlands are defined as lands transitional between terrestrial and aquatic eco-systems where the water table is usually at or near the surface or the land is covered by shallow water (Mitsch and Gosselink, 1986). Wetlands are among the most productive ecosystems in the world and play vital role in flood control, aquifer recharge, nutrient absorption and erosion control. . In addition, wetlands provide home for a huge diversity of wildlife such as birds, mammals, fish, frogs, insects and plants (Buckton, 2007).Thus wetlands help in maintaining biodiversity of flora and fauna. Wetlands in India cover an area of 58.2 million hectares (Prasad *et al*., 2002). Of 1340 bird species found in India (Ali and Ripley, 1987; Manakandan and Pittie, 2001), 310 species are known to be dependent on wetlands (Kumar *et al*., 2005). Wetlands in India, as elsewhere, are facing tremendous anthropogenic pressures (Prasad *et al*., 2002), which can greatly influence the structure of bird community (Kler, 2002; Verma *et al*., 2004; Reginald *et al*., 2007). Water birds have long attracted the attention of the public and scientists because of their beauty, abundance, visibility and social behavior, as well as for their recreational and economic importance. Recently, water birds have become of interest as indicators of wetland quality and as parameters of restoration success and regional biodiversity.

Kurukshrtra is a place of great historical and religious importance in India and is situated 160 km north of Delhi on National Highway1. It is dotted with a number of holy water bodies and ponds. Brahma Sarovar is a vast man made holy water tank, located in the heart of the city. The eastern section of the tank is 1800 ft long and 1500 ft wide while the western section is a square of 1500 ft in length and 1500 ft in breadth. The tank is 15 ft deep. This large water body is edged with 20 ft wide platforms. To add scenic beauty the Sarovar is decorated on the periphery with lush green lawns,

floral beds and huge trees with thick and dense canopy, which serve as roosting and nesting sites for birds. Another important wetland in the fringe of Kurukshetra city is Bhor Sainda Crocodile Sanctuary located at a distance of 16 km on Kurukshetra-Pehowa road. It was gazetted as crocodile sanctuary by the Govt. of Haryana in 1982.The sanctuary provides a good habitat for avifauna in the form of water body with marshy plant growth, terrestrial platforms and a central earth mound having scattered trees and bushy vegetation. National Fish breeding Centre at Jyotisar is also an important aquatic habitat at a distance of 7 km from Kurukshetra. The cultivated lands around Kurukshetra have paddy and wheat as main crops. With their capacity to support different aquatic life forms paddy fields provide suitable habitat type for wetland birds. Village ponds which profusely dot the landscape around Kurukshetra perform many ecological and socio-economic functions. These wetlands are used for nesting, feeding, breeding and wintering grounds by different species of both local as well as migratory birds. Keeping this in view, a survey of wetland birds was carried out in different wetlands around Kurukshetra from January 2004 to December 2008.

Materials and methods

The study was carried out in six wetland habitats namely Brahma Sarovar, Bohar Saidan Crocodile Sauntary, National Fish Breeding Centre, Jyotisar, paddy fields and village ponds situated around Kurukshetra (30°N, 76.45°E). Observations were made over a period of four years i.e. during January, 2004 to December, 2008. Regular surveys were done by systematically walking on fixed routes through the study area. Birds were mostly observed during the most active period of the day, i.e., from 600 to 1000 hr and from 1600 to 1800 hr. However, observations were also made during other timings according to convenience. Observations were carried out with the aid of 7×35 and 10×50 Nikon binoculars. Birds seen were recorded along with habitat type, season and frequency of occurrence. Identification of birds was done using field guides (Ali and Ripley, 1987; Grimmet *et al.*, 1999) and only those species with confirmed identity are reported in this paper. The checklist was prepared using standardized common and scientific names of the birds following Manakadan and Pittie (2001). Abundance of the recorded bird was established upon the following criteria: Common- recorded 9-10 times out of 10 visits, fairly common- recorded 6 -8 times out of 10 visits, uncommon- recorded 3 -5 times out of 10 visits, rare- recorded 0 -2 times out of 10 visits.

Results and discussion

A total of 54 species of wetland birds belonging to36 genera and 15 families distributed in 5 orders have been recorded from the study area. Details such as common and scientific names, status and abundance of the wetland birds are presented in Table 1. Cicconiformes appeared to be the most crowded order represented by 7 families. Of all, family Anatidae dominated the list with 11 species. It represented 20.37% of the total number of water bird species surviving under wetland conditions of Kurukshetra (Table 2). Out of total 54 species, 29 were resident and 25 were migrant species. Most of the migratory species were winter visitors except Cotton Teal and Lesser Whistling Duck which were

summer visitors. Based on the frequency of sightings, Northern Shoveller (*Anas clypeata*), Northern Pintail (*Anas acuta),* White-Breasted Kingfisher (*Halcyon smyrnensis*),White-Breasted Water Hen (*Amaurornis phoenicurus*), Common Moorhen (*Gallinula chloropus*), Black-Winged Stilt (*Himantopus himantopus*), Red-Wattled Lapwing (*Vanellus indicus*), Cattle Egret (*Bubulcus ibis)* and Indian Pond-Heron (*Ardeola grayii*) were the common species inhabiting these ponds/ water bodies, while Purple Heron (*Ardea purpurea*) and Lesser Pied Kingfisher (*Ceryle rudis*) were rarely sighted. These water birds were found to utilize different wetland habitats extensively for foraging, nesting and roosting on the emergent and fringed vegetation. Water birds, being generally at or near the top of most wetland food chains are highly susceptible to habitat disturbances and are therefore good indicators of general condition of aquatic habitats (Kushlan, 1992; Jayson and Mathew, 2002; Kler, 2002).The rich diversity of the wetland birds documented during the present study may be because of availability of varied sources of feed as well as foraging. The wetland birds are in general being heterogeneous in their feeding habits (Ali and Ripley, 1987). Thus wetland birds exploit a variety of habitats and depend upon a mosaic of microhabitats for their survival. Paddy fields with stray trees and scattered vegetation cover might have extended comfortable shelter and suitable foraging grounds for the wetland birds. This habitat by supporting different food sources like fish, crustaceans, invertebrates, water plants and planktons further add to the diversity of wetland birds (Basavarajappa, 2004).

Threats and conservation

The wetland avian diversity of Kurukshetra could be due to the presence of a mosaic of different types of wetland habitats .But this heritage is today threatened by the increased human interference, direct and indirect, resulting in habitat destruction and fragmentation. Study has also revealed that anthropogenic activities like mass bathing in holy ponds, cutting of emergent and fringed vegetation, draining of water, release of sewage, throwing of domestic garbage, weeds, developmental activities like construction of roads and retaining walls are some major threats to the bird diversities of these aquatic habitats. Water Hyacinth (*Eichhornia crassipes*) has rapidly covered the water surface in village ponds and crocodile sanctuary reducing the feeding areas for water birds. Local community has periodically removed the water hyacinth manually from these water bodies. But the extracted Water Hyacinth has been deposited at the banks of these water bodies and it again flows back to the water bodies in the rainy season resulting in choking of these wetlands. Thus proper scientific methodology is required for upkeep of these water bodies.

Water birds require a cluster of platforms within the water bodies in order to sit there for basking during the winters. There are no platforms available within the village ponds observed during present study. Hence the suitable measures should be taken, to ensure that artificial platforms are made available within the ponds with thick cover of vegetation. It is also recommended that profuse green belt to be created in and around each and every pond to facilitate easy means of roosting and perching. The holy pond Brahmsarover is visited by

Table1. Wetland birds recorded around Kurukhetra, India.

Order	Family	Common Name	Scientific Name	Status	Abundance
Podicipediformes	Podicipedidae	Little Grebe	*Tachybaptus ruficollis*	R	FC
Anseriformes	Anatidae	Lesser Whistling-Duck	Dendrocygna javanica	SM	UC
		Gadwall	*Anas strepera*	WM	FC
		Eurasian Wigeon	*Anas penelope*	WM	FC
		Cotton Teal	*Nettapus coromandelianus*	SM	UC
		Mallard	*Anas platyrhynchos*	WM	UC
		Spot- Billed Duck	*Anas poecilorhyncha*	R	FC
		Northern Shoveller	*Anas clypeata*	WM	C
		Northern Pintail	*Anas acuta*	WM	C
		Red-Crested Pochard	*Rhodonessa rufina*	WM	FC
		Common Pochard	*Aythya ferina*	WM	UC
		Tufted Pochard	*Aythya fuligula*	WM	UC
Coraciiformes	Alcedinidae	White-Breasted Kingfisher	*Halcyon smyrnensis*	R	C
		Lesser Pied Kingfisher	*Ceryle rudis*	R	RA
Appodiformes	Apodidae	House Swift	*Apus affinis*	R	FC
Gruiformes	Rallidae	White-Breasted Water Hen	*Amaurornis phoenicurus*	R	C
		Purple Moorhen	*Porphyrio porphyrio*	R	UC
		Common Moorhen	*Gallinula chloropus*	R	C
		Common Coot	*Fulica atra*	WM	FC
Ciconiiformes	Scolopacidae	Common Snipe	*Gallinago gallinago*	WM	UC
		Spotted Redshank	*Tringa erythropus*	WM	FC
		Common Redshank	*Tringa totanus*	WM	FC
		Common Greenshank	*Tringa nebularia*	WM	FC
		Wood Sandpiper	*Tringa glareola*	WM	FC
		Common Sandpiper	*Actitis hypoleucos*	WM	UC
		Little Stint	*Calidris minuta*	WM	FC
		Temminck's Stint	*Calidris temminckii*	WM	FC
		Curlew Sandpiper	*Calidris ferruginea*	WM	UC
	Laridae	River Tern	*Sterna aurantia*	R	FC
	Jacanidae	Pheasant-Tailed Jacana	*Hydrophasianus chirurgus*	R	UC
		Bronze-Winged Jacana	*Metopidius indicus*	R	UC
	Recurvirostridae	Black-Winged Stilt	*Himantopus himantopus*	R	C
	Charadriidae	Little Ringed Plover	*Charadrius dubius*	WM	FC
		Red-Wattled Lapwing	*Vanellus indicus*	R	C
	Accipitridae	Brahminy Kite	*Haliastur Indus*	WM	FC
	Phalacrocoracidae	Little Cormorant	*Phalacrocorax niger*	R	FC
		Indian Shag	*Phalacrocorax fuscicollis*	R	FC
		Great Cormorant	*Phalacrocorax carbo*	R	UC
	Ardeidae	Little Egret	*Egretta garzetta*	R	FC
		Grey Heron	*Ardea cinerea*	R	FC
		Purple Heron	*Ardea purpurea*	R	RA
		Large Egret	*Casmerodius albus*	R	UC
		Median Egret	*Mesophoyx intermedia*	R	UC
		Cattle Egret	*Bubulcus ibis*	R	C
		Indian Pond- Heron	*Ardeola grayii*	R	C
		Little Green Heron	*Butorides striatus*	R	UC
		Black-Crowned Night Heron	*Nycticorax nycticorax*	R	UC

Passeriformes	Hirundinidae	Plain Martin	*Riparia paludicola*	R	FC
		Common Swallow	*Hirundo rustica*	R	FC
		Wire-Tailed Swallow	*Hirundo smithii*	R	FC
	Motacillidae	White Wagtail	*Motacilla alba*	WM	FC
		Large Pied Wagtail	*Motacilla maderaspatensis*	R	FC
		Citrine Wagtail	*Motacilla citreola*	WM	UN
		Yellow Wagtail	*Motacilla flava*	WM	UN

R= Resident, SM= Summer migrant, WM= Winter migrant, C= Common, FC= Fairly common, UN= Un common, Ra= Rare.

Table 2. Status of bird families recorded in wetlands around Kurukshetra

Sr.No.	Family	No. of species	Percent occurrence
1	Podicipedidae	1	1.85%
2	Anatidae	11	20.37%
3	Alcedinidae	2	3.70%
4	*Apodidae*	1	1.85%
5	Rallidae	4	7.41%
6	Scolopacidae	9	16.67%
7	Laridae	1	1.85%
8	Jacanidae	2	3.70%
9	Recurvirostridae	1	1.85%
10	Charadriidae	2	3.70%
11	Accipitridae	1	1.85%
12	Phalacrocoracidae	3	5.56%
13	Ardeidae	9	16.67%
14	Hirundinidae	3	5.56%
15	*Motacillidae*	4	7.41%

number of people for the dip. This mass bathing not only disturbs the natural activities of water birds but also leads to deterioration of water quality affecting the flora and fauna. The large number of people and cattle visiting the fringes of wetlands increases the risk of eggs and chicks being trampled. Wetland need to be patrolled to minimize disturbance in the more sensitive areas, particularly during the breeding season. For sustainable upkeep of the water bodies it is important to involve local people and sensitize them about the role of these wetlands in the welfare of humans. Regular surveys related to diversity and awareness of the people should be conducted for real assessment of environmental conditions prevailing in the area.

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