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Waterbirds Diversity at Sainthal Reservoir in Dausa District, Rajasthan, Northwest India

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Abstract
An attempt was made to survey waterbirds at Sainthal Reservoir in Dausa district of Rajasthan in northwest India during 2006 and 2007. There were recorded 34 waterbird species belonging to 27 genera and 17 families. The study added 14 new species to the both migratory and resident waterbird species frequently visited the reservoir. The number of waterbird species was high during the winter (n = 23). There were four globally threatened species recorded; Painted Stork *Mycteria leucocephala*, Lesser Flamingo *Phoenicopterus minor,* Black-tailed Godwit *Limosa limosa* and Sarus Crane *Grus antigone*. The Sarus Crane was recorded to be breeding here. Conservation issues at the reservoir and its potential as ecotourist site are discussed in the paper.

1. Introduction

Waterbodies are crucial habitats for waterbirds. Proper management of waterbodies not only supplies waterbirds populations, both resident and migratory, but also are important for the conservation of associated flora and fauna. The number of waterbirds using a particular habitat is related to the type and quality of habitats, abundance and availability of food and the level of disturbances. Monitoring of waterbirds can provide valuable information on status of wetlands, and can act as a key tool for increasing the awareness of the importance of wetlands and their conservation values (Anonymous 1996).

2. Materials and Methods

The Sainthal Reservoir (27°01'456"N, 76°15'177"E, 314 m a.s.l.), near Borda village in Sainthal, is located about 25 km from Dausa on the Dausa-Tehla road. This wetland lies about 30 km east of Jaipur and about 300 km south of Delhi. The reservoir is protected as closed area and managed by Department of Fisheries, Government of Rajasthan, and therefore, shooting of wildlife is prohibited here. The waterbody, a perennial body with the deepest point about 7 m, is extended over an area of 300 ha. However, the waterlevel goes down to 2 m during hot seasons, when waterspread is less than 100 ha.

Aquatic vegetation at the reservoir is mainly consisted of *Typha* sp., *Eleocharis* sp., *Scirpus* sp., *Cyperus* sp., *Nymphoides* sp., *Ipomea aquatica*, *Hydrilla sp.*, *Vallisneria* sp., *Spirodella* sp., *Wolffia* sp., *Azolla* sp. and *Echinochloa* sp. A few grass species such as *Saccharum spontaneum*, *Erianthus munja*, *Cynodon dactylon*, *Sorghum halepense* and *Desmostachya bipinnata* are found along water edges.

About 25 species of fish have been reported from the study area (Gazetteers, Dausa 2001). These included *Labeo rohita, Catla catla, Cirrahinus mrigala, Labeo calbasu, Labeo bata, Puntius* sp., *Wallago attu, Mystus seenghala, M. cavasius, Channa punctata, C. striata, Ompok bimaculatus, Bagarius bagarius, Mugil carsula, Rita rita, Notopterus notopterus, Cyprinus carpio* and *Ctenopharyngodon idella*.

The climate of this area is semiarid. After cold season, December to February, hot season commences and continues untill about June, when the southwest monsoon sets in. The average annual rainfall in the district is 594.3 mm. The rainfall during the period from June to September constitutes nearly 90% of the annual rainfall. The period from March to June shows continuous rise in temperature; May and the first half of June being the hottest part of the year. The mean daily maximum temperature in May is

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40.6°C and the mean daily minimum is 25.8°C. In May and June, the maximum temperature may sometimes go up to 47°C. In the hot season, dust storms also occur.

The waterbird data were collected on three occasions (*i.e.* 23 October 2006, 13 January and 31 August 2007). The counts were conducted by a team of two persons from 2–3 elevated positions so as to have a wide and clear view of the wetland. The birds were counted in clear weather up to 1200 hrs using binoculars and a telescope. One member of the team counted birds species while the other one was taking notes. Grimmett *et al.* (1998) was used for the bird identification.

3. Results

A total of 34 species of waterbirds belonging to 27 genera and 17 families were recorded at the Sainthal Reservoir (Table 1). Of these, 14 species were new additions to the previous checklist of 43 waterbird species (Table 1). The waterbirds species comprised of 1 Podicipedidae, 2 Phalacrocoracidae, 5 Ardeidae, 3 Ciconiidae, 2 Phoenicopteridae, 6 Anatidae, 1 Accipitridae, 1 Gruidae, 1 Rallidae, 2 Charadriidae, 6 Scolopacidae, 1 Recurvirostridae, 1 Burhinidae, 1 Laridae and 1 Alcedinidae. Little Cormorant *Phalacrocorax niger*, Great Egret *Ardea alba*, Painted Stork *Mycteria leucocephala*, Asian Openbill *Anastomus oscitans*, Eurasian Spoonbill *Platalea leucorodia*, Bar-headed Goose *Anser indicus*, Eurasian Teal *Anas crecca*, Black-tailed Godwit *Limosa limosa*, Ruff *Calidris pugnax* and River Tern *Sterna aurantia* comprised 85% of the total waterbirds counts. The only raptor species observed at the reservoir was Western Marsh Harrier *Circus aeruginosus*.

The resident waterbirds comprised 18 species (53%) and migrants 16 species (47%) (Table 1). The reservoir has provided habitat for various groups of waterbirds. The open waters of the reservoir was utilized by 13 species, shallow waters by 10 species and shores by the remaining 11 waterbird species (Table 1). Various food guilds were represented at the Sainthal Reservoir. The fish resource of the waterbody was exploited by 11 waterbird species, vegetable resources by 8 species, and invertebrates (especially crustaceans, insects, molluscs and larvae) by 15 species (Table 1).

During October 2006, a total of 18 waterbird species were observed. Two migratory species of Ruff (*n*= 500) and Eurasian Teal (*n*= 210) dominated the bird community. Seven species, consisted of four migratory and three residents, could only be recorded in this month. Residents were Little Grebe *Tachybaptus ruficollis*, Great Cormorant *Phalacrocorax carbo*, Lesser Whistling Duck *Dendrocygna javanica*, while Western Marsh Harrier, Lesser Sand Plover *Charadrius mongolus*, Common Redshank *Tringa totanus* and Ruff were migrants.

During January 2007, a total of 23 waterbird species were recorded. Two migratory species, *i.e.* the Bar-headed Goose (*n*= 40) and Black-tailed Godwit (*n*= 36) dominated the bird community. Twelve species of waterbirds were recorded in this month. These were the Lesser *Phoenicopterus minor* and Greater Flamingos *Phoenicopterus ruber*, Bar-headed Geese, Ruddy Shelduck *Tadorna ferruginea*, Northern Shoveler *Spatula clypeata*, Northern Pintail *Anas acuta*, Eurasian Coot *Fulica atra*, Common Snipe *Gallinago gallinago*, Black-tailed Godwit, Eurasian Curlew *Numenius arquata* (migrants), Black-winged Stilt *Himantopus himantopus*, Great Stone-curlew *Esacus recurvirostris* (residents).

During August 2007, a total of nine species were recorded. The Little Cormorant (*n*= 50), Cattle Egret *Bubulcus ibis* (*n*= 20) and Red-wattled Lapwing *Vanellus indicus* (*n*= 10), were the resident species dominated the bird community in this month. Green Sandpiper *Tringa ochropus* was the only migratory waterbird species recorded during this month.

Of 1,340 individuals of waterbirds recorded during three surveys in the present study, 914 individuals (68%) were observed in October 2006, 323 individuals (24%) in January 2007 and 103 individuals (8%) in August 2007.

Table. 1. List of waterbirds encountered at Sainthal Reservoir during 2006–2007.
** denotes Vulnerable and * Near-threatened species and # new species recorded only in the present study

SN	English name	Species	Family	Feeding guilds	Habitat types	Oct-06	Jan-07	Aug-07	Total	%
	Resident waterbirds									
1	Little Grebe	*Tachybaptus ruficollis*	Podicipedidae	Invertebrates	Open water	2	0	0	2	0.4
2	Little Cormorant	*Phalacrocorax niger*	Phalacrocoracidae	Piscivorous	Open water	7	15	50	72	15.9
3	Great Cormorant	*Phalacrocorax carbo*		Piscivorous	Open water	7	0	0	7	1.5
4	Little Egret	*Egretta garzetta*	Ardeidae	Piscivorous	Shallow water	7	6	1	14	3.1
5	Grey Heron	*Ardea cinerea*		Piscivorous	Shallow water	7	10	7	24	5.3
6	Great Egret	*Ardea alba*		Piscivorous	Shallow water	16	18	2	36	8.0
7	Intermediate Egret#	*Ardea intermedia*		Piscivorous	Shallow water	12	3	0	15	3.3
8	Cattle Egret	*Bubulcus ibis*		Invertebrates (Chiefly grasshoppers)	Shallow water	0	0	20	20	4.4
9	Painted Stork * #	*Mycteria leucocephala*	Ciconiidae	Piscivorous	Shallow water	15	15	0	30	6.6
10	Asian Openbill#	*Anastomus oscitans*		Invertebrates (Chiefly molluscs)	Shallow water	8	20	0	28	6.2
11	Eurasian Spoonbill #	*Platalea leucorodia*		Piscivorous	Shallow water	6	30	0	36	8.0
12	Lesser Whistling-Duck #	*Dendrocygna javanica*	Anatidae	Aquatic vegetation	Open water	12	0	0	12	2.7
13	Sarus Crane **	*Grus antigone*	Gruidae	Chiefly Aquatic vegetation	shore	3	3	0	6	1.3
14	Red-wattled Lapwing	*Vanellus indicus*	Charadriidae	Invertebrates	Shore	0	0	10	10	2.2
15	Black-winged Stilt	*Himantopus himantopus*	Recurvirostridae	Invertebrates	Shore	0	15	0	15	3.3
16	Great Stone-curlew #	*Esacus recurvirostris*	Burhinidae	Invertebrates	Shore	0	2	0	2	0.4
17	River Tern	*Sterna aurantia*	Laridae	Piscivorous	Open water	100	15	7	122	27.0
18	White-breasted Kingfisher	*Halcyon smyrnensis*	Alcedinidae	Piscivorous	Open water	0	0	1	1	0.2
	Total					**202**	**152**	**98**	**452**	
	Migratory waterbirds									
1	Greater Flamingo #	*Phoenicopterus ruber*	Phoenicopteridae	Invertebrates (Molluscs, crustaceans)	Shallow water	0	2	0	2	0.2
2	Lesser Flamingo * #	*Phoenicopterus minor*		Aquatic vegetation (Algae and diatoms	Shallow water	0	4	0	4	0.5
3	Bar-headed Goose#	*Anser indicus*	Anatidae	Aquatic vegetation	Open water	0	40	0	40	4.5
4	Ruddy Shelduck	*Tadorna ferruginea*		Mainly aquatic vegetation	Open water	0	11	0	11	1.2
5	Northern Shoveller	*Anas clypeata*		Invertebrates (Crustaceans, mollusks, insects)	Open water	0	10	0	10	1.1
6	Northern Pintail	*Anas acuta*		Aquatic vegetation	Open water	0	20	0	20	2.3
7	Eurasian Teal	*Anas crecca*		Aquatic vegetation	Open water	210	30	0	240	27.0
8	Eurasian Coot	*Fulica atra*	Rallidae	Aquatic vegetation	Open water	0	15	0	15	1.7
9	Lesser Sand Plover#	*Charadrius mongolus*	Charadriidae	Invertebrates	Shore	1	0	0	1	0.1
10	Common Snipe#	*Gallinago gallinago*	Scolopacidae	Invertebrates	Shore	0	2	0	2	0.2
11	Black-tailed Godwit *	*Limosa limosa*		Invertebrates	Shore	0	36	0	36	4.1
12	Eurasian Curlew #	*Numenius arquata*		Invertebrates	Shore	0	1	0	1	0.1
13	Common Redshank	*Tringa totanus*		Invertebrates	Shore	1	0	0	1	0.1

SN	English name	Species	Family	Feeding guilds	Habitat types	Oct-06	Jan-07	Aug-07	Total	%
14	Green Sandpiper	*Tringa ochropus*		Invertebrates	Shore	0	0	5	5	0.6
15	Ruff #	*Philomachus pugnax*		Invertebrates	Shore	500	0	0	500	56.3
16	Western Marsh Harrier #	*Circus aeruginosus*	Accipitridae	Fish and waterbirds	Open water	1	0	0	1	0.1
	Total					**712**	**171**	**5**	**888**	

4. Discussion

This wetland provides habitats for both resident and migratory waterbird species. It acts as a stopover, wintering and breeding ground for waterbirds. The globally threatened Sarus Crane *Grus antigone* has also been observed breeding here. Apart from a list of 43 waterbird species (The Gazetteer of Dausa 2001) recorded here in the past, 14 species were added during the present study (see Table 1). Twenty three species were recorded in the past, including Gadwall *Anas strepera*, Eurasian Wigeon *Anas penelope*, Red-crested Pochard *Netta rufina*, Common Pochard *Aythya ferina*, Gray-lag Goose *Anser anser*, Cotton Teal *Nettapus coromandelianus*, Indian Spot-bill Duck *Anas poecilorhyncha*, Oriental Darter *Anhinga melanogaster*, Purple Heron *Ardea purpurea*, Pond Heron *Ardeola grayii*, Water Rail *Rallus aquaticus*, Brown Crake *Zapornia akool*, White-breasted Waterhen *Amaurornis phoenicurus*, Common (Indian) Moorhen *Gallinago chloropus*, Pheasant-tailed Jacana *Hydrophasianus chirurgus*, Bronze-winged Jacana *Metopidius indicus*, Little Ringed Plover *Charadrius dubius*, Spotted Redshank *Tringa erythropus*, Common Greenshank *Tringa nebularia*, Common Sandpiper *Actitis hypoleucos*, Curlew Sandpiper *Calidris ferruginea*, Pied Kingfisher *Ceryle rudis* and Common Kingfisher *Alcedo atthis*. There is an urgent need for a detailed study to obtain information on the status of wild fauna, including waterbirds and flora of the reservoir.

An increase in the number of species of waterbirds in January is due to the influx of migratory waterbirds at the reservoir. These are probably migrating from the Himalayas and Siberia. After monsoon, water is collected at the reservoir and various resident species start congregating here to meet their food requirements. There was a scanty rain in the year 2007. That was the reason for the low number of individuals in January 2007.

The reservoir is also being utilized on contract for hatching commercial fish every year for human consumption by professional fishermen. However the impact of this on the population of waterbirds is not known. A year-round study may contribute towards a more satisfactory conclusion on conservation concerns about the impact of commercial fishing on waterbirds and other taxa, including native fish species. The water is pumped out from the reservoir to irrigate surrounding agricultural fields. The time of the water release and the amount of water being taken from the reservoir for irrigation should follow a strategy which should not be detrimental to the avifauna and other wild organisms of the area.

The reservoir is a good hotspot for tourists especially birdwatchers from both within the state, country and abroad. The government should highlight this site as a tourist hotspot. The participation of local community may be sought by declaring this area as a Community Reserve, which will benefit both the government and local community. It is highly recommended to monitor the reservoir during both summer and winter to keep track status of birds in this area.

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