

Studies of Birds Fauna of Sambhar Salt Lake

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Abstract: *Sambhar lake is the largest inland saline wetland of India which is situated in the state of Rajasthan and spread over 190 square km, it has been recognized by government of India as a wetland of international importance and has been accordingly designated a Ramsar site. About avifauna of lake little information is available which is related to impacts of algal growth on salt quality.*

Keywords: Faunal avian diversity, Flamingos, Sambhar, Salt lake

1. Introduction

In Rajasthan, salt lakes and depressions are common in particular area of the Thar desert namely Pachpadra, Sambhar, Didwana, Kanod, Lawan and Thob (Tiwari 1994). The only important river system is Luni.

Sambhar lake is referred in the epic Mahabharata that Raja Yayati of Bharatvansh, descendent of Lord Brahma, the creator, married Devyani, daughter of Shukracharya, (guru of demons) who lived by this lake. Another legend says that the goddess Shakambhari bestowed that lake upon the people of the area some 2500 years ago. A small glimmering white temple in her honor stands under a rocky outcrop that intrudes into the lake. Sambhar lake was a sweet water lake just 2000 years back according to pollen studies made by Birbal Sahani Institute of Palaeobotany, Lucknow. Conversion of Sambhar lake from fresh water into the salt lake has a parallel with that of the formation of Iranian deserts Dast-e-Kavir and Dast-e-Lut, both having their extensive saline stretches.

It is an important wintering area for tens of thousands of pink flamingos and other birds that migrate from northern Asia and Siberia. It is known for its unique faunal diversity: endemic brine shrimp *Artemiasalina* and *Sambharensis* and characteristic flora: alga *Dunaliellalina* and *Bacterium serratiasambhariana*. It is the source of most of Rajasthan's salt production. It produces 196,000 tonnes of clean salt every year.

EARLY AVIAN STUDIES

The lake has received very little attention from ornithologists. R.M. Adam, who was assistant commissioner at Sambhar, was the first to publish ornithological records of the lake and its surrounding area including Kuchaman and Nava (Adam 1873, 1874a-b). His detailed notes on the bird life of the lake still remain the only authentic source of information and provide an invaluable benchmark against which changes in population size and bird diversity can be compared today. Worldwide fund for Nature-India's booklet on the lake, authored by Gopal & Sharma (1994), contains a brief account of its avifauna. Save for a checklist of waterfowl prepared mainly for foreign birdwatchers (Sangha 1998b), other published accounts relate only to the two species of flamingos (Alam 1981; Sangha 1998a).

Bhatnagar & Shukla (2005) is rife with erroneous and doubtful records such as describing the Great white pelican,

Pelecanus onocrotalus and Black-bellied Tern *Sterna acuticauda*, which are both locally rare, as common and the Black stork *Ciconia nigra*, a winter migrant, as resident and common similarly, another recent publication on birdlife of Sambhar lake by Zoological Survey of India (Anonymous 2005) contains several dubious records like stating that the Ibis *Billardorhynchus struthersii* winters in Sambhar lake.

2. Material and Method

Faunistic surveys were undertaken during Oct 2016-Oct 2017 to collect and identify the avian fauna of the Sambhar lake. Only direct sightings in the field were recorded and birds identified with the help of Ali and Ripley (1983) and Woodcock (1983). Specific details were observed with the help of 10*50 binoculars.

Geography

The lake receives water from five rivers: Medtha, Samod, Mantha, Rupangarh, Khari and Khandela. Lake has 5700 square km catchment area. The lake is an extensive saline wetland with water depth fluctuating from as few as 60 centimeters during the dry season to about 3 meters at the end of the monsoon season. It occupies an area of 190 to 230 square kms based on the season. The lake is elliptically shaped with a length of approximately 35.5 km and a breadth varying between 3 km and 11 km. The lake straddles Nagaur and Jaipur districts and borders on the Ajmer districts. The circumference of the lake is 96 km and it is surrounded by the Aravali hills on all sides.

The Sambhar lake basin is divided by a 5.1 km long dam made of sandstone. After the salt water reaches a certain concentration, it is released from the west side to the east side by lifting dam gates. To the east of the dam are salt evaporation ponds where salt has been formed for a thousand years. This eastern area is 80 square km and comprises salt reservoirs, canals and salt pans separated by narrow ridges. To the east of the dam is also a railroad, built by the British (before India's independence) to provide access from Sambhar lake city to the salt works.

The nearest airport is the Jaipur International Airport and the nearest railway station is Sambhar station. Temperatures reach 40 degrees Celsius in summer and go as low as 10 degrees Celsius in winter.

3. Result and Discussion

Sambharlake being a unique saline wetland has a very little faunal background that too worked out meagerly. The lake has been exploited for salt extraction for centuries. In earlier study some attempts were made which just touched upon the biodiversity of this lake (Kumar2005).

The major biotic components are phytoplankton, zooplankton, benthic invertebrates and waterfowls. In every winter season a large number of wetland avian species are come here. The algal blooms of spirulina and variety of zooplankton fauna provide a good opportunity to these water birds to stay here without any disturbance.

In our present attempts to study the avian fauna of sambhar lake, the birds were mostly observed in open waters and different sub-habitat of the lake during morning, day, evening and at night. The birds associated with the water or wetland territory were only recorded.

Some of the species though not solely depended on the wetland habitat but were taking refuge during some part of the day and locally migrating to nearby ponds and smaller wetland for feeding etc. were also recorded. Since the sambhar lake area is too large and interiors of the lake margins remains undisturbed, the birds were mostly found resting in the desolate locations for long. The frequency of their sighting, diversity at one point of time, species density and groups abundance were recorded and based on these data, their status at sambhar lake have been mentioned.

Though most of species were observed for their whole time activities, the two species of flamingoes: *Phoenicopterus ruber* (Linnaeus, 1758), Greater flamingo and *Phoenicopterus minor* (Geoffroy, 1798) Lesser flamingo were observed more closely due to their large population and major dependence on the wetland. The avian diversity recorded during different seasons twice every year. A total of 43 species of wetland birds have been recorded. Only direct sightings in the field were recorded and birds identified with the help of Ali and Ripley (1983) and Woodcock (1983). Systematic account of Aves along with their status is given below in (Table1):

Table 1: Avian fauna of sambhar salt lake

Scientific name	Common name	Habitat	Status
<i>Family: Podicipedidae</i>	<i>Grebes</i>		
<i>Tachybaptus ruficollis</i> (Pallas, 1764)	Little Grebes	Ow	S, M
<i>Podiceps cristatus</i> (Linnaeus, 1758)*	Great Crested Grebe	Ow	S, M
<i>Scientific name</i>	<i>Common name</i>	<i>Habitat</i>	<i>Status</i>
<i>Family: Pelecanidae</i>	<i>Pelicans</i>		
<i>Pelecanus onocrotalus</i> Linnaeus, 1758	Great white Pelican	Ow, Lm	S, M
<i>Family: Phalacrocoracidae</i>	<i>Cormorants</i>		
<i>Phalacrocorax niger</i> (Vieillot, 1817)	Little Cormorant	Ow, Lm	A, Re
<i>Phalacrocorax carbo</i> (Linnaeus, 1758)	Great cormorant	Ow, Lm	S, Re
<i>Family: Anhingidae</i>	<i>Daters</i>		
<i>Anhinga melanogaster</i> Pennat, 1769	Daters	Ow	Vr
<i>Family: Ardeidae</i>	<i>Herons and Egrets</i>		
<i>Egretta garzetta</i> (Linnaeus, 1766)	Liittle Egret	Lm, H	A, Re
<i>Ardeacinerea</i> Linnaeus, 1758	Grey Heron	Lm, H	R, Re
<i>Ardea purpurea</i> Linnaeus, 1766	Purple Heron	Sw, Lm	S, M
<i>Casmerodius albus</i> (Linnaeus, 1758)*	Large Egret	Lm, Sw	A, Re
<i>Mesophoyx intermedia</i> (Wagler, 1829)*	Median Egret	Lm	S, Re
<i>Bubulcus ibis</i> (Linnaeus, 1758)	Cattle Egret	Lm, H	A, Re
<i>Ardeola grayii</i> (Sykes, 1832)	Indian Pond Heron	Lm, H	R, M
<i>Nycticorax nycticorax</i> (Linnaeus, 1758)*	Night Heron	Lm, H	Vr, M
<i>Scientific name</i>	<i>Common name</i>	<i>Habitat</i>	<i>Status</i>
<i>Family: Ciconiidae</i>	<i>Storks</i>		
<i>Mycteria leucocephala</i> (Pennat, 1769)	Painted Stork	H	R, M
<i>Ciconia nigra</i> (Linnaeus, 1758)	Black Stork	Lm	R, M
<i>Family: Threskiornithidae</i>	<i>Ibises and Spoonbills</i>		
<i>Plegadis falcinellus</i> (Linnaeus, 1788)*	Glossy Ibis	Lm	R, M
<i>Platalealeucorodia</i> Linnaeus, 1758*	Eurasian Spoonbill	Lm, H	R, M
<i>Family: Phoenicopteridae</i>	<i>Flamingos</i>		
<i>Phoenicopterus ruber</i> Linnaeus, 1758	Greater Flamingo	Sw, Lm	A, M
<i>Phoenicopterus minor</i> (Geoffroy, 1798)	Lesser Flamingo	Sw, Lm	A, M
<i>Family: Anatidae</i>	<i>Geese and Ducks</i>		
<i>Anser anser</i> (Linnaeus, 1758)	Greylag Goose	Ow, Sw	Vr, M
<i>Anser indicus</i> (Latham, 1790)	Bar-headed Goose	Ow, Sw	Vr, M
<i>Tadorna ferruginea</i> (Pallas, 1764)*	Brahminy Shelduck	Ow, Sw	Vr, M
<i>Nettion scotlandianus</i> (Gmelin, 1789)*	Cotton Teal	Ow	S, M
<i>Anas strepera</i> Linnaeus, 1758*	Gadwall	Ow	R, M
<i>Anas penelope</i> Linnaeus, 1758*	Eurasian Wigeon	Ow	R, M
<i>Scientific name</i>	<i>Common name</i>	<i>Habitat</i>	<i>Status</i>
<i>Anas platyrhynchos</i> Linnaeus, 1758*	Mallard	Ow	Vr, M

<i>Anaspoecilorhyncha</i> J.R. Forester, 1781	Spot-billed Duck	Ow, Lm	Vr, M
<i>Anasclypeata</i> Linnaeus, 1758	Northern shoveler	Ow	R, M
<i>Anasacuta</i> Linnaeus, 1758	Northern Pintail	Ow	S, M
<i>Anasquerquedula</i> Linnaeus, 1758 *	Garganey	Ow	Vr, M
<i>Anascrecca</i> Linnaeus, 1758	Common Teal	Ow	S, M
<i>Rhodonessaruifina</i> (Pallas, 1773)	Red-crested Pochard	Ow	S, M
<i>Aythyaferina</i> (Linnaeus, 1758)	Common Pochard	Ow	S, M
<i>Aythyafuligula</i> (Linnaeus, 1758)	Tufted Pochard	Ow	R, M
Family: Accipitridae	Vultures		
<i>Neophronpercnopterus</i>	Egyptian Vultures	Ar, Lm	R, Re
Family: Gruidae	Cranes		
<i>Grusantigone</i> (Linnaeus, 1758) *	Sarus Crane	Lm	R, Re
<i>Grusvirgo</i> (Linnaeus, 1758)	Demoiselle Crane	Lm	A, M
<i>Grusgrus</i> (Linnaeus, 1758) *	Common Crane	Lm	S, M
Family: Rallidae	Moorhens and Coots		
<i>Porphyrioporphyrus</i> (Linnaeus, 1758)	Purple Moorhen	Ow, Lm	S, M
<i>Fulicaatra</i> Linnaeus, 1758	Common Coot	Ow	A, M
Family: Charadriidae	Plovers and Lapwings		
<i>Pluvialisapricaria</i> (Linnaeus, 1758)*	European Golden Plover	Lm	R, M
Scientific name	Common name	Habitat	Status
<i>Charadriusdubius</i> Scopoli, 1786	Little Ringed Plover	Lm	R, M
<i>Charadrius alexandrinus</i> Linnaeus, 1758	Kentish Plover	Lm	R, M
<i>Charadrius leschenaultia</i> Lesson, 1826*	Greater Sand Plover	Lm	R, Re
<i>Vanellusmalabaricus</i> (Boddaert, 1783)*	Yellow-wattled Lapwing	Lm	R, Re
<i>Vanellusduvaucelii</i> (Lesson, 1826)	River Lapwing	Lm	R, M
<i>Vanellusindicus</i> (Boddaert, 1783)	Red-wattled Lapwing	Lm	S, Re
Family: Scolopacidae	Sandpipers, Stints, Snipes,	Godwits &	Curlews
<i>Gallinagostenura</i> (Bonaparte, 1830)*	Pintail Snipe	Lm	R, M
<i>Gallinagogallinago</i> (Linnaeus, 1758)*	Common Snipe	Lm	S, M
<i>Limosalimosa</i> (Linnaeus, 1758)*	Black-tailed Godwit	Lm	R, M
<i>Numeniusphaeopus</i> (Linnaeus, 1758)*	Whimbel	Lm	R, M
<i>Numeniusarquata</i> (Linnaeus, 1758)*	Eurasian Curlew	Lm	S, Re
<i>Tringa tetanus</i> (Linnaeus, 1758)	Common Redshank	Lm	S, M
<i>Tringastagnatilis</i> (Bechstein, 1803)*	Marsh Sandpiper	Lm	S, M
<i>Tringanebularia</i> (Gunner, 1767)	Common Greenshank	Lm	R, M
<i>Actithypoleucos</i> Linnaeus, 1758	Common Sandpiper	Lm	S, M
<i>Calidris alba</i> (Pallas, 1764)*	Sanderling	Lm	Vr, M
<i>Calidrisminuta</i> (Leisler, 1812)	Little Stint	Lm	S, M
<i>Calidristemminckii</i> (Leisler, 1812)	Temminck's Stint	Lm	R, M
<i>Calidrisferruginea</i> (Pontoppidan, 1813)*	Curlew Sandpiper	Lm	S, M
<i>Philomachuspugnax</i> (Linnaeus, 1758)	Ruff (& Reeve)	Lm	Vr, M
Family: Recurvirostridae	Ibisbill, Avocets and Stilts		
Scientific name	Common name	Habitat	Status
<i>Ibidorhynchastruthersii</i> Vigors, 1832 *	Ibisbill	Sw, Lm	LM
<i>Himantopus himantopus</i> (Linnaeus, 1758)	Black-winged Stilt	LM	A, Re
<i>Recurvirostra avosetta</i> Linnaeus, 1758	Pied Avocet	LM	S, Re
Family: Glareolidae	Pratincoles		
<i>Glareolapratincola</i> (Linnaeus, 1758)	Collared Pratincole	LM	R, M
Family: Laridae	Gulls & Terns		
<i>Laruscachinnans</i> Pallas, 1811	Yellow-legged Gull	Ow, Lm	R, M
<i>Larusbrunnicephalus</i> Jerdon, 1840	Brown-headed Gull	Ow, Ar	R, M
<i>Larusridibundus</i> Linnaeus, 1766	Black-headed Gull	Lm, Ar	R, M
<i>Sterna aurantia</i> J.E. Gray, 1831*	River Tern	Ar	S, Re
<i>Chlidonias hybridus</i> (Pallas, 1811)	Whiskered Tern	Ar	R, M

Ow= Open waters, Sw=Shallow waters, Lm=Lake margins, Ar=Aerial, H=Heronry, A=Abundant, S=Sizeable, R=Rare, Vr=Very rare, Re=Resident, M=Migrant and *=New Records.

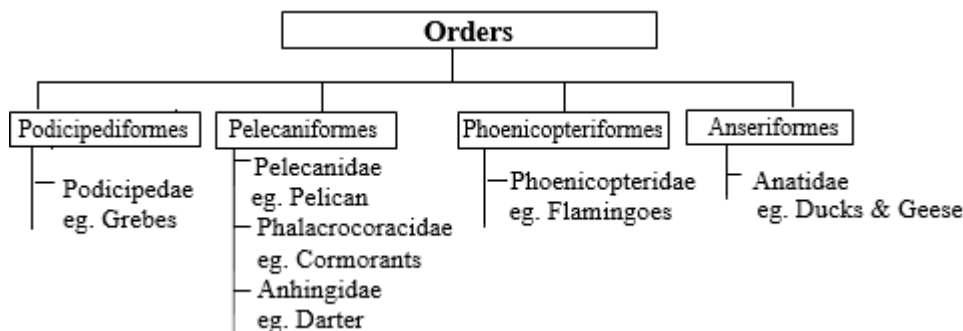


Figure 1: Taxonomic status of Waterfowls of Sambhar Lake

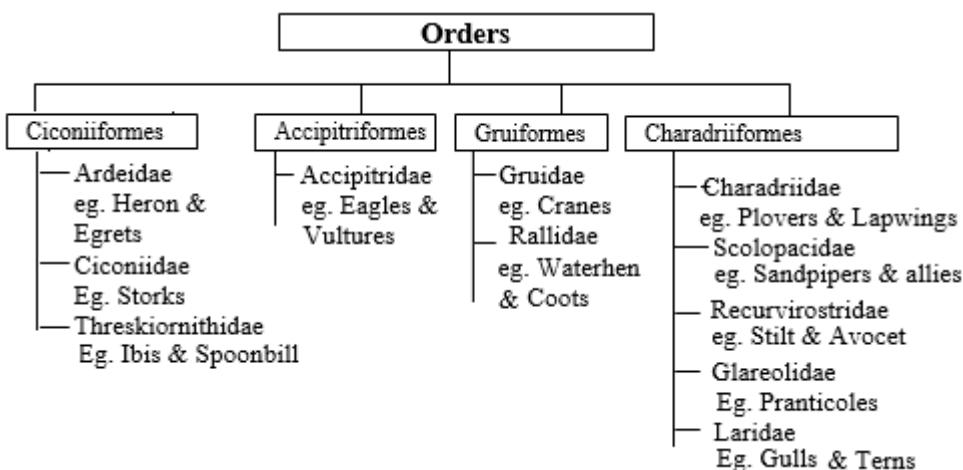


Figure 6: Taxonomic Status of Shore and Upland birds of Sambhar Lake

4. Summary

There are 26 wetlands in India which have been designated as Ramsar sites and Sambharlake is one of them. In these wetlands a large number of floral and faunal diversity is located. High salinity of water is present in Sambhar Lake. The present study was carried out with the aim to know the present avian fauna of Sambhar salt lake.

5. Conclusions

Based on the investigation from this work, a large number of avian species were recorded in which maximum species were seen during winter season. In summer season minimum numbers of birds were seen because of low level of water. The lake is shrinking due to anthropological activities. It should be conserved, its important salt production site and for migratory birds.

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