

## Study of Communal Behavior of Black-Winged Stilt with other Bird Species in Selected Wetlands of Kota (Rajasthan)

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Received: 5.10.2023 | Revised: 30.11.2023 | Accepted: 17.12.2023

### ABSTRACT

*A comprehensive understanding of bird behaviour is essential for developing and enhancing avian life-history theory content and organizing efficient management and conservation plans. The knowledge of the crucial nesting characteristics and the tactics used by birds throughout their life histories often fluctuate between environments. Despite being seen in small groups, the black-winged stilt has an intriguing social behaviour that demonstrates flexibility. These birds are sociable and will often gather in large groups. But during the breeding season, in particular, their social dynamics shift. They break off from their usual groupings now and either form pairs or congregate in bigger groups. During this time, they display specific behavior with other bird species found in their habitat, especially with those species with which they share their feeding and nesting sites. Their various behaviors can be understood on the basis of continuous study of their vocalization, flapping of wings and body posture. In this context, the communal behavior of Black-winged Stilt has been studied at the wetlands Alniya and Abheda ponds located in Kota.*

**Keywords:** Wetland Birds, *Himantopus himantopus*, Social behaviour, Conservation.

### INTRODUCTION

Bird behavior is incredibly diverse and complex, with many species displaying a wide range of vocalizations, social behaviors, and migration patterns. Most bird species exhibit complex social behaviors, such as cooperative breeding and flocking (Ligon et al., 2021). Understanding bird behavior is important not

only for its intrinsic value but also for its potential applications in fields such as conservation biology and animal welfare. Several studies have explored the relationship between habitat and bird diversity. Wetlands are important habitats for waterbirds such as ducks, geese, and swans. Wetlands provide waterbirds with food, shelter, and nesting sites.

**Cite this article:** Nagar, M., Gulati, H. and Johri, S. (2023). Study of communal Behavior of Black-winged Stilt with other Bird Species in Selected Wetlands of Kota (Rajasthan), *Ind. J. Pure App. Biosci.* 11(6), 37-45. doi: <http://dx.doi.org/10.18782/2582-2845.9034>

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A number of studies have shown that wetland destruction and degradation are major threats to waterbird diversity. For example, a study conducted by Iknayan et al. (2022) found that wetland degradation in California is causing a decline in waterbird diversity. Another study by Pakeman et al. (2022) found that wetland destruction in Scotland is leading to a decline in waterbird diversity.

Among various bird species, the Black-winged Stilt (*Himantopus himantopus*) stands out as an intriguing subject due to its unique behaviors and adaptations throughout the breeding process. The present research aims to comprehensively examine the communal behaviour of the Black-winged Stilt with other avian species present in its habitat and present threats while incorporating the latest research findings and scientific advancements.

**STUDY AREA**

The study area is located in the Kota district, which lies along the Chambal River in the southern part of Rajasthan state. This district lies between 24.2° & 25.2° N and 75.37° &

77.26° S of the state. Kota once came under the state of Bundi, which the Chauhan kings ruled. Over time, many buildings and wetlands of historical value were constructed by various rulers here. Which are currently a place of recreation for public, as well as serve as a shelter for various animals.

One of these wetland "Abhedha Pond" has been selected for the present study, located between N 25°12'04.77" and E 075°47'22.25". Although various resident and resident migratory birds are present here throughout the year, this reservoir serves as a refuge for many migratory waterfowl congregating during winter.

Similarly, another wetland, "Alniya", has also been selected for study purposes, which lies between N 24°59'21.80" and E 075°52'54.38". Alniya is an irrigation source that supports agriculture in the surrounding areas. A large number of waterfowl congregate in this wetland in winter. Hence, on this basis it has been recognized as an IBA (Important Bird Area).

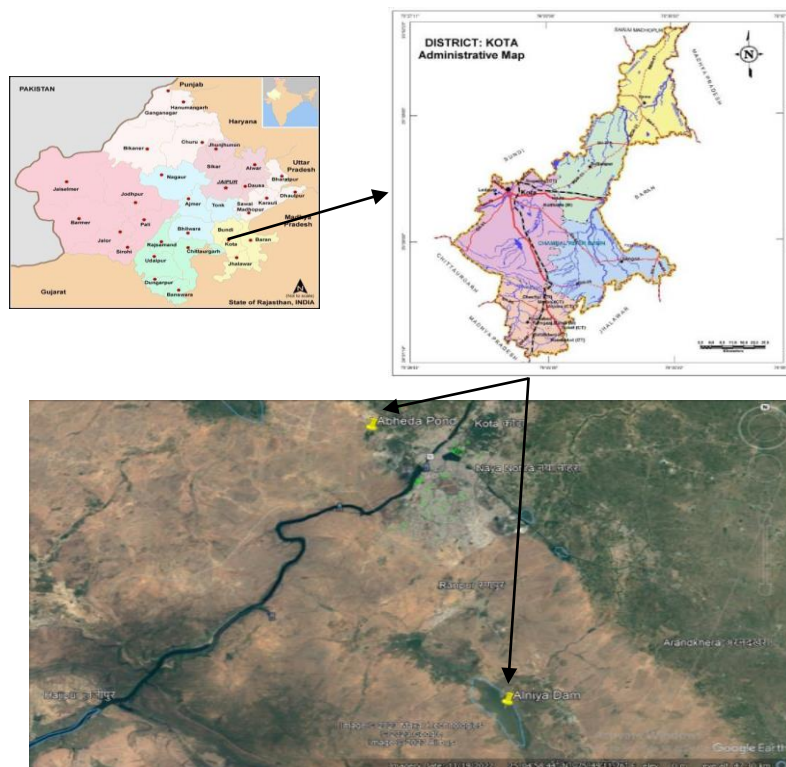


Figure1. Map showing location of the study area

## MATERIALS AND METHODS

Few scientific methods were used to observe the avian fauna of selected wetlands. To record avian species, high-resolution cameras for photos, GPS for assess the locality, binoculars and field guides etc., were used.

- **Stratified random sampling** will be used to ensure a representative sample of the Black winged stilt population in each study site. (Hansen & Hurwitz, 1943).
- Field data were collected using **the Direct observation method**. (Mac Kenzie DI, et al., 2006) Direct observation of Black-winged stilt was conducted by walking or boat through the wetlands. Binoculars and spotting scopes were used to identify individual birds and record their location and behavior.
- To document various threats to the Black-winged questionnaire surveys and regular field observations were carried out in the study area. A threat matrix has been developed for the species; it lists the principal threats and scores for the severity of threats.

## OBSERVATION AND RESULTS

- **Avian species in association of feeding sites with Black-winged stilt**

During the field studies, the Black-winged stilt was recorded to share its feeding habitat with several other avifaunal species. It was usually seen foraging in alliance with Red-wattled Lapwing (*Vanellus indicus*) and Painted stork (*Mycteria leucocephala*). Altogether, a sum of 63 avian species constituting 46 genera, 21 families and 11 orders were depicted from the study sites (Table-1). A list of bird species, their feeding guilds, and conservation status is provided in annotated list of reported avian species representing their feeding guilds, conservation status provided in Table-1.

Order Charadriiformes (19 species) and Family Anatidae with 13 species (accounting 20.63% of the total number of bird species) dominated the recorded bird fauna in the study area. The result of IUCN status depicted that three species were Vulnerable (Common Pochard, Asian Woolly-neck & Sarus Crane) and eight species (Ferruginous Pochard, Painted Stork, Black-necked Stork, Eurasian Curlew, Black-tailed Godwit, River Tern, Black-headed Ibis & Oriental Darter) were Near threatened (Table-1). Avian species that shared feeding sites with Black-winged stilt in the selected study sites from October, 2019 to September, 2021 were represented in Fig. 2.

**Table 1: Communal avian species that shared feeding sites with Black winged stilt in the study areas**

S.No.	Common/Scientific name	Feeding guild	IUCN Status
<b>ACCIPITRIFORMES</b>			
<b>Accipitridae</b>			
1.	“Black Kite <i>Milvus migrans</i> ”	C	LC
<b>ANSERIFORMES</b>			
<b>Anatidae</b>			
2.	“Lesser Whistling-duck <i>Dendrocygna javanica</i> ”	O	LC
3.	“Bar-headed Goose <i>Anser indicus</i> ”	H	LC
4.	“Greylag Goose <i>Anser anser</i> ”	H	LC
5.	“Common Pochard	O	VU

	<i>Aythya farina</i> "		
6.	"Ferruginous Pochard <i>Aythya nyroca</i> "	H	NT
7.	"Garganey <i>Spatula querquedula</i> "	H	LC
8.	"Northern Shoveler <i>Spatula clypeata</i> "	O	LC
9.	"Gadwall <i>Mareca strepera</i> "	H	LC
10.	"Eurasian Wigeon <i>Mareca penelope</i> "	H	LC
11.	"Indian Spot-billed Duck <i>Anas poecilorhyncha</i> "	H	LC
12.	"Northern Pintail <i>Anas acuta</i> "	C	LC
13.	"Common Teal <i>Anas crecca</i> "	O	LC
14.	"Comb Duck <i>Sarkidiornis melanotos</i> "	O	LC
<b>CORACIFORMES</b>			
<b>Alcedinidae</b>			
15.	"Pied Kingfisher <i>Ceryle rudis</i> "	P	LC
16.	"White-throated Kingfisher <i>Halcyon smyrnensis</i> "	C	LC
<b>CICONIIFORMES</b>			
<b>Ciconiidae</b>			
17.	"Painted Stork <i>Mycteria leucocephala</i> "	C	NT
18.	"Asian Openbill <i>Anastomus oscitans</i> "	C	LC
19.	"Black Necked Stork <i>Ephippiorhynchus asiaticus</i> "	C	NT
20.	"Asian Woolly neck Stork <i>Ciconia episcopus</i> "	C	VU
<b>CHARADRIIFORMES</b>			
<b>Burhinidae</b>			
21.	"Indian Thick-knee <i>Burhinus indicus</i> "	O	LC
<b>Recurvirostridae</b>			

22.	“Pied Avocet <i>Recurvirostra avosetta</i> ”	C	LC
23.	“Black-winged Stilt <i>Himantopus himantopus</i> ”	C	LC
<b>Charadriidae</b>			
24.	“Little-ringed Plover <i>Charadrius dubius</i> ”	C	LC
25.	“Red-wattled Lapwing <i>Vanellus indicus</i> ”	C	LC
26.	“White-tailed Lapwing <i>Vanellus leucurus</i> ”	C	LC
<b>Rostratulidae</b>			
27.	“Greater Painted-snipe <i>Rostratula benghalensis</i> ”	O	LC
<b>Jacanidae</b>			
28.	“Pheasant-tailed Jacana <i>Hydrophasianus chirurgus</i> ”	O	LC
<b>Scolopacidae</b>			
29.	“Eurasian Curlew <i>Numenius arquata</i> ”	In	NT
30.	“Black-tailed Godwit <i>Limosa limosa</i> ”	In	NT
31.	“Ruff <i>Calidris pugnax</i> ”	In	LC
32.	“Common Sandpiper <i>Actitis hypoleucos</i> ”	In	LC
33.	“Spotted Redshank <i>Tringa erythropus</i> ”	In	LC
34.	“Common Redshank <i>Tringa tetanus</i> ”	In	LC
35.	“Wood Sandpiper <i>Tringa glareola</i> ”	In	LC
36.	“Marsh Sandpiper <i>Tringa stagnatilis</i> ”	In	LC
<b>Laridae</b>			
37.	“Black-headed Gull <i>Chroicocephalus ridibundus</i> ”	C	LC
38.	“Pallas's Gull <i>Ichthyaetus ichthyaetus</i> ”	C	LC
39.	“River Tern <i>Sterna aurantia</i> ”	C	NT

<b>GRUIFORMES</b>			
<b>Rallidae</b>			
40.	“Purple Swamphen <i>Porphyrio porphyria</i> ”	O	LC
41.	“Common Moorhen <i>Gallinula chloropus</i> ”	O	LC
42.	“Common Coot <i>Fulica atra</i> ”	H	LC
<b>Gruidae</b>			
43.	“Sarus Crane <i>Antigone antigone</i> ”	O	VU
<b>PHOENICOPTERIFORMES</b>			
<b>Phoenicopteridae</b>			
44.	“Lesser Flamingo <i>Phoeniconaias minor</i> ”	O	LC
<b>PODICIPEDIFORMES</b>			
<b>Podicipedidae</b>			
45.	“Little Grebe <i>Tachybaptus ruficollis</i> ”	C	LC
<b>PELECANIFORMES</b>			
<b>Pelecanidae</b>			
46.	“Great White Pelican <i>Pelecanus onocrotalus</i> ”	C	LC
<b>Ardeidae</b>			
47.	“Black-crowned Night Heron <i>Nycticorax nycticorax</i> ”	C	LC
48.	“Indian Pond Heron <i>Ardeola grayii</i> ”	C	LC
49.	“Cattle Egret <i>Bubulcus ibis</i> ”	C	LC
50.	“Grey Heron <i>Ardea cinerea</i> ”	C	LC
51.	“Purple Heron <i>Ardea purpurea</i> ”	C	LC
52.	“Great Egret <i>Ardea alba</i> ”	C	LC
53.	“Little Egret <i>Egretta garzetta</i> ”	C	LC
<b>Threskiornithidae</b>			

54.	“Black-headed Ibis <i>Threskiornis melanocephalus</i> ”	C	NT
55.	“Red-naped Ibis <i>Pseudibis papillosa</i> ”	C	LC
56.	“Glossy Ibis <i>Plegadis falcinellus</i> ”	C	LC
57.	“Eurasian Spoonbill <i>Platalea leucorodia</i> ”	C	LC
<b>SULIFORMES</b>			
<b>Phalacrocoracidae</b>			
58.	“Little Cormorant <i>Microcarbo niger</i> ”	C	LC
59.	“Great Cormorant <i>Phalacrocorax carbo</i> ”	C	LC
60.	“Oriental Darter <i>Anhinga melanogaster</i> ”	C	NT
<b>PASSERIFORMES</b>			
<b>Motacillidae</b>			
61.	“Citrine Wagtail <i>Motacilla citreola</i> ”	In	LC
62.	“White Wagtail <i>Motacilla alba</i> ”	In	LC
<b>Hirundinidae</b>			
63.	“Wire-tailed Swallow <i>Hirundo smithii</i> ”	In	LC

(Feeding guilds: H-Herbivore, O-Omnivore, In-Insectivore, C-Carnivore, G-Grainivore, F-Frugivore, P-Piscivore; IUCN Status: LC- Least concern, NT- Near-threatened, VU- Vulnerable)

### Threat factors and conservation measures of Black-winged stilt in study area

During the entire study period detailed information on various threats were collected with the help of questionnaire surveys and periodic field visits. The recorded threats factors were classified into 2 categories *i.e.*, natural and anthropogenic threats, responsible for affecting the abundance population of Black winged stilt.

#### 1. Natural Threat

It was found during the course of the study that the wetlands in the study area were continuously stressed by a variety of natural threats, some of which are detailed below:

- Invasion of water hyacinth
- Predators

#### 2. Anthropogenic Threat

Several anthropogenic pressures experienced by different type of habitat in the selected study area, which are discussed below:

- Habitat fragmentation
- Fishing
- Cattle grazing
- Dumping of domestic wastes and untreated sewage
- Land Conversion
- Draining of wetland
- Bathing and washing activities
- Stubble Burning
- Carcass disposal

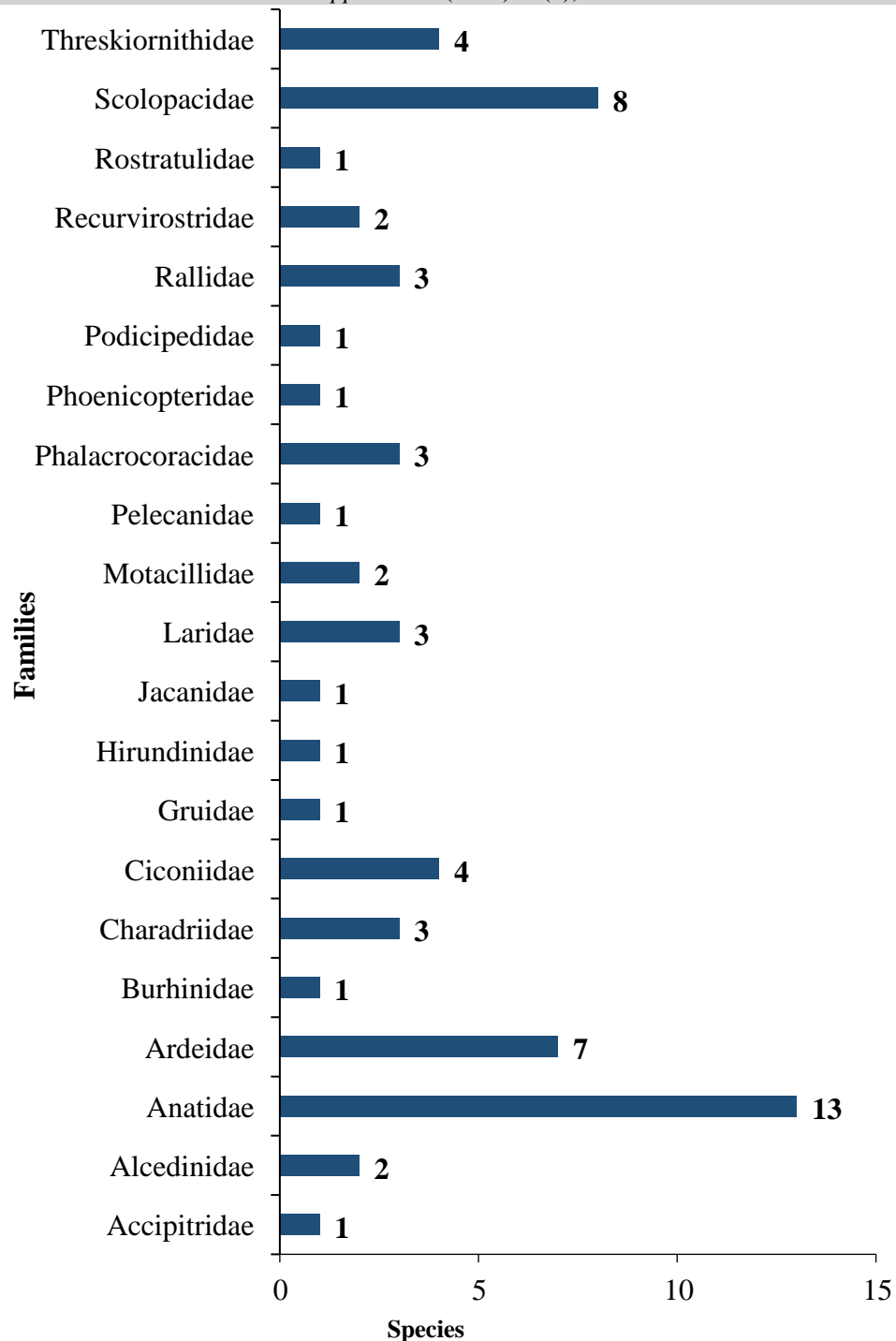


Fig. 2: Number of birds with diverse orders shared feeding sites with Black-winged stilt (*Phoenicopterus roseus*) in the study areas

### CONCLUSION

The present study concludes that the Black-winged Stilt is a highly social bird. It displays specific behavior and response not only with birds of its own species but also with birds of other species. It remains vocal all the time, i.e. during non-breeding and breeding periods, and communicates with familiar and unfamiliar

birds. The study has found that in general it is a social bird. It remains busy in search of food throughout the year and during this time there is interspecific conflict, but generally it does not show any special rivalry with other species. But during breeding season it becomes very aggressive and fights with other species of birds to protect its breeding site.



Apart from this, at this time it also competes with predatory creatures larger than itself, which shows its high ancestral quality.

#### **Acknowledgement:**

The authors express their ted permission to study the selected wetlands and provided cooperation in data collection.

**Funding:** NIL.

#### **Conflict of Interest:**

There is no such evidence of conflict of interest.

#### **Author Contribution**

The credit for gratitude to the local forest department, which granall types of research related work from field visits and data collection goes to the main author Ms. Mamta Nagar.

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