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*Research Article*

# Population Status of Black-Winged Stilt at Alaniya Dam of Kota District, Rajasthan

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**ABSTRACT**

*Aves are a fascinating group of animals that have captured the interest of researchers and the general public alike. Birds are unique among animals, with their ability to fly and the presence of feathers being two of their most distinctive features. The Black-winged Stilt (Himantopus himantopus) stands out as an intriguing subject due to its unique behaviour and adaptations throughout the breeding process. Present study was undertaken in Alaniya Dam of Kota district, Rajasthan with special reference to its population and breeding state including threats to its population. Study was conducted between October 2019 to November 2021. Regular monitoring revealed that during the whole study period, a total of 106 sighting was sighted consisting of 9834 individuals. Total 1013 individuals were observed between 2019-2020 with mean number of 13.15±0.54. 5179 total individuals were observed during the period of 2020-2021 with mean of 95.90±8.50. But this bird is acing great loss due to threat factors such as habitat fragmentation, fishing, cattle grazing, Pollution, fuel wood collection, draining of wetland and Invasion of water hyacinth etc.*

***Keywords****: Population, Breeding behaviour, Sampling, Feeding.*

## INTRODUCTION

Birds are found in a wide range of habitats including forests, grasslands, wetlands, and deserts. Several studies have explored the relationship between habitat and bird diversity. Wetlands are important habitats for water birds such as ducks, geese, and swans. Wetlands provide water birds with food, shelter, and nesting sites. A number of studies have shown that wetland destruction and degradation are major threats to water bird diversity. Forests are one of the most important habitats for birds. Grasslands are another important habitat for birds. Grasslands provide birds with food and nesting sites.

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Rajasthan is the largest state in India, located in the north-western part of the country. It is a region with a diverse landscape and a wide range of climatic conditions, which makes it an ideal habitat for different bird species. The avian diversity of Rajasthan has been a topic of interest for many researchers over the years. Rajasthan is home to more than 500 species of birds, which can be found in different parts of the state. The bird species found in Rajasthan include migratory birds, resident birds, and breeding birds. A study by Bhardwaj et al. (2021) documented 489 bird species from various habitats in Rajasthan, including 134 resident species, 214 winter migrants, and 141 summer migrants. The authors noted that desert and grassland habitats had the highest species diversity, while wetlands had the highest abundance of birds. They also found that the proportion of migratory species was higher in wetlands and forests than in other habitats. The study of avian breeding biology plays a vital role in understanding the life history and reproductive strategies of various bird species. Among these 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 species faces various challenges, including habitat loss, disturbance, and predation. By investigating breeding biology, scientists and conservationists can identify key factors influencing reproductive success and implement targeted conservation strategies. For example, protecting and restoring wetland habitats, establishing predator control measures, and raising awareness about the importance of these birds among local communities can contribute to the long-term survival of the Black-winged Stilt. According to a study by Vijayan and Vijayan (2013), habitat loss is one of the major threats to avian diversity, caused by various human activities such as agriculture, urbanization, and industrialization. The Black-winged Stilt *(Himantopus himantopus*) faces numerous conservation challenges due to habitat loss, disturbance, and predation. Implementing effective conservation strategies is crucial to ensure the long-term survival of this species.

## STUDY AREA

The study area is located in Kota districts which lies along the Chambal river in southern part of Rajasthan state. This district lies between 24.2º & 25.2º N and 75.37º & 77.26º S of the state. " Alniya " has been selected for the present study, located between N 24º59’21.80” and E 075º52’54.38”. Although various resident and resident migratory birds are present here throughout the year, but this reservoir serves as a refuge for many migratory waterfowl which congregate during winter season. Alniya is an irrigation source that supports agriculture in the surrounding areas. Under normal rainfall conditions, there are also up to 30,000 different species of waterfowl. 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).

## MATERIALS AND METHODS

The Black-winged Stilt *Himantopus himantopus* has a wide distribution in the world: Australia, Central and South America, Africa and large parts of North America and Eurasia (Pizzey 1997). The species breeds in the northeast, northwest, south and southwest of Iran (Mansoori 2008). Some research has been carried out on the breeding biology of the Black-winged Stilt in Italy (Tinarelii 1992) and in Spain (Arryo 2000, Cuervo 2003, 2004).

To assess the distribution and population of Black winged stilt in selected study sites; many steps were followed.

**A. Site selection:**

First of all, Stratified suitable sites were selected on following bases;

1. The study sites should have a high abundance of Black winged stilts or suitable habitat for these birds.
2. The study sites should be representative of the range of habitats where Black winged stilt occurs.

**3.** The study sites should be manageable in terms of logistics and resources.

**B. Sampling Method:**

Random sampling was used to ensure a representative sample of the Black winged stilt population in each study site. The study area was divided into strata based on environmental variables, such as water depth and vegetation cover, and random sampling was conducted in each stratum. The number of sample points in each stratum are proportional to the area of the stratum.

**C. Data Collection**

The third step is to collect data on the distribution and population of Black winged stilt in each study site. Field data was collected using a combination of direct observation and indirect methods such as playback calls, remote sensing, and trapping.

## OBSERVATION AND RESULTS

In Alniya dam, a total of 24 monthly periodic visits were conducted from October 2019 to September 2021, depicting flock size and composition of Black-winged stilt (Table 1). Results of monthly visit show that throughout the first year of the study period (November, 2021 to October, 2022), a total of 77 sightings of Black-winged stilt were recorded with a minimum of two sighting per visit to a maximum of twenty-two sightings per visit.

**Table-1 Group composition of Black-winged stilt in Alniya Dam, Kota from November 2022 to October 2023**

| Monthly Visits (Month) | Number of individuals seen/sighting | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | I | II | III | IV | V | VI | VII | VIII |
| **1** (October) | 11 | 13 | 17 | 3 | 19 | 12 | 17 | 10 |
| **2** (November) | 18 | 15 | 13 | 15 | 8 | 12 | - | - |
| **3** (December) | 7 | 19 | 12 | 9 | 17 | 8 | 12 | - |
| **4** (January) | 17 | 6 | 21 | 12 | 6 | 11 | 10 | - |
| **5** (February) | 19 | 12 | 7 | 21 | 17 | 7 | 5 | 16 |
| **6** (March) | 17 | 7 | 13 | 11 | 9 | 16 | 8 | 12 |
| **7** (April) | 10 | 12 | 9 | 21 | - | - | - | - |
| **8** (May) | 19 | 13 | 17 | - | - | - | - | - |
| **9** (June) | 15 | 21 | 12 | 7 | 19 | - | - | - |
| **10** (July) | 16 | 12 | 7 | 21 | 5 | 7 | 19 | 11 |
| **11** (August) | 18 | 9 | 15 | 12 | 22 | 4 | - | - |
| **12** (September) | 15 | 17 | 11 | 9 | 13 | 19 | 15 | - |

Data regarding the distribution and population of black-winged stilt were collected through 12 monthly periodic visits. The distribution study of this species was conducted in Alniya dam. Information on the number of sightings per visit along with a number of individuals per sighting, flock composition, and population structure (adult and Juvenile) of black-winged stilt was recorded with the help of the Scan Sampling method (Altman, 1974). Maximum mean group size was observed during the winter season in first year as well as second year of the study period. Regular monitoring revealed that during the whole study period (from October, 2019 to September, 2021), a total of 106 sighting was sighted consisting of 9834 individuals with a range of 7 to 252 individuals (Table 1.). Table 2 reveals that Total 1013 individuals were observed between 2019-2020 with mean number of 13.15±0.54. 5179 total individuals were observed during the period of 2020-2021 with mean of 95.90±8.50.

**Table 2. Seasonal variations in total sightings, range of number of individuals seen/sighting and mean number of individuals of Black-winged stilt seen/sighting in Alaniya dam from November 2021 to October 2022**

| Seasons | Total sightings (N) | Range of Number of individuals seen/sighting | Total no. of individuals seen/season in all sightings | Mean Number of Individuals Seen/Sighting /Season± S.E. |
|---|---|---|---|---|
| Winter, 2019-2020 (October to March) | 44 | 3 - 21 | 561 | 12.75±0.68 |
| Summer, 2020 (April to September) | 33 | 4 - 22 | 452 | 13.69±0.87 |
| **Annual (2019-2020)** | **77** | **3- 22** | **1013** | **13.15±0.54** |
| Winter, 2020-2021 (October to March) | 32 | 19 - 251 | 3070 | 95.93±10.25 |
| Summer, 2021 (April to September) | 22 | 16 - 252 | 2109 | 95.86±14.92 |
| **Annual (2020-2021)** | **54** | **16 - 252** | **5179** | **95.90±8.50** |
| **Total (Oct. 2019 to Sept. 2021)** | **106** | **7 - 252** | **9834** | **92.77±5.99** |

"S.E- Standard error"

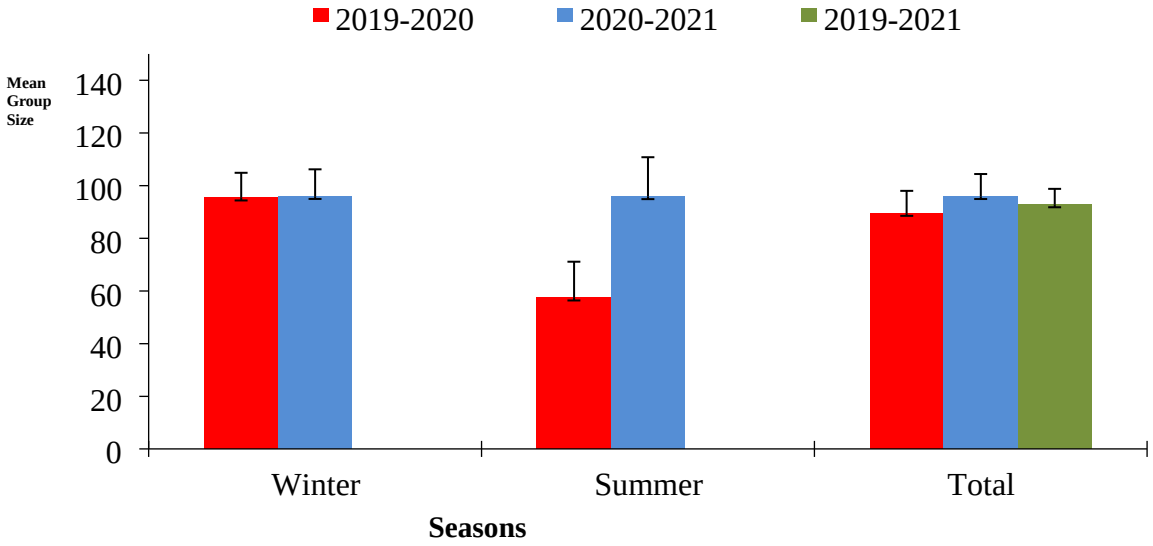


**Fig-1: Mean group size in different seasons**

## THREAT FACTORS

During the entire study period, threat factors such as habitat fragmentation, fishing, cattle grazing, Pollution, fuel wood collection, draining of wetland and Invasion of water hyacinth were identified at selected sites and were classified into natural and anthropogenic stress factors (man-made).

### 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**

Rapid spread of water hyacinth has been recorded at all the study sites, which progressively reduces the open water area available to the Black-winged stilt. This encroachment by hyacinth adversely affects the population of species. The wetlands of Abhera biological park, were infested with water hyacinth throughout the year, and that confines the feeding area for Black-winged stilt. Water hyacinth was observed to spread very rapidly in the whole wetland and mudflat area of the Abhera. If the rate of spread will not get controlled, Black-winged stilt will lose their open water feeding grounds, results a decline in their population.

- **Predators**

A number of predators such as jackal (*Canis aureus*), feral dogs and black Kite (*Milvus migrans*) were reported to attack on adult and juveniles (sub-adults) of Black-winged stilt. Feral dogs were reported to be as a major threat to the Black-winged stilt at almost each study area. Many instances were recorded depicting groups of feral dogs chasing the flocks of Black-winged stilt.

- **Rainfall pattern**

During the study of two years (from November, 2021 to October, 2022), variations in Rainfall patterns were noted, resulting in water scarcity and flood-like conditions. It was reported that flooding was a serious threat for Black-winged stilt in Alaniya dam. Heavy rainfall results rise in water level that creates flood like condition in these areas and also disturbs the nest of Black-winged stilt. During excessive rainfall, their nests get washed off. The Chambal river seen to be have higher flow during the monsoon season and water flow periodically surges many folds when additional water get released from reservoirs creating floods in the area of Alaniya, which forces the Black-winged stilt and other wading birds to move to other sites. Sometimes, due to reduction in rainfall the wetland area gets dried up, also resulting decline in population of Black-winged stilt.

### 2. Anthropogenic Threat

A number of anthropogenic pressures experienced by different type of habitat in the selected study area have been reported. It was observed that wetlands in the study area are also subjected to a continuous stress of various

types of anthropogenic pressures, which are discussed below:

- **Habitat fragmentation**

Construction of roads along wetlands and draining of wetland are key anthropogenic activities that result in fragmentation and shrinkage of habitats. Road construction activities were recorded initially in our study, but construction activities were on its peak during second year. This was a major reason for drastic decline in sighting of Black-winged stilt in wetland during second year of study period (from October, 2020 to September, 2021). The encroachment of urbanisation and industrialization leads to a rise in road development, resulting in rapid decline in its habitat.

- **Fishing**

Overfishing was reported in the area of Alaniya dam.

- **Cattle grazing**

The majority of the study area was under pressure of livestock grazing. This threat affecting the abundance of Black-winged stilt were observed in Alaniya dam area, as this is surrounded by various agricultural fields.

- **Dumping of domestic wastes and untreated sewage**

The water quality of wetlands is continually declining owing to a variety of factors, making them less suited for aquatic flora & fauna. Huge pressure of uncontrolled siltation, dumping of domestics waste such polythene bags, plastic bottles, household refuge and other waste matter contributing towards water pollution were observed at selected study sites, causing disturbance to bird species.

- **Land Conversion during the present study period**

The peripheral areas of Alaniya dam, has been encroached by the locals for the expansion of agricultural fields. Some part of these wetland areas get converted to fish pond and other construction purposes. As a result, the area of these wetlands has gradually shrunken and has resulted in decline in number of both resident and migratory species. For example, in the Alaniya dam a large area has been encroached by the local villagers, thereby resulting in an augmentation in human interferences at these sites.

- **Draining of wetland**

Most of the study areas are surrounded by agriculture fields. Therefore, water from wetlands in the study area is being drained regularly for meeting with various needs of the people such as irrigating the agricultural fields as well as for domestic purposes. Wetland area of Alaniya dam, received a huge stress of wetland drainage. As a result, water recedes along the shores and causes depletion of vegetation cover which in turn results reduction of important food cover for the aquatic birds.

- **Bathing and washing activities**

Use of water bodies by the people for bathing, cloth washing, cattle cleaning etc., was very frequently seen in the Alaniya dam. Cattle herds of slum dwellers living around the different site, pose a serious threat to feeding habitats of Black-winged stilt. The cattle herds, especially buffalo use the Alaniya water.

- **Stubble Burning**

Stubble burning was notice in Alaniya dam area. As these sites are get surrounded by a large number of agriculture fields.

- **Carcass disposal**

Animal carcasses are dumped in wetland regions of various study sites has been recorded throughout the study period. Dumping of dead body of animal leads to water contamination, making unsuitable for bird species.

## COCLUSION

From the field visits conducted during the study period and the data obtained, it is concluded that Aalniya pond itself is an excellent wetland, which is a suitable refuge for not only local but also migratory bird species. The data shows that there were no significant changes in the population of Black Winged Stilt during the study session, which is indicative of the stability and suitability of this wetland.

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**Author Contribution:** The credit for all types of research related work from field visits and data collection goes to the main author Ms. Mamta Nagar**.**

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