ISSN: 0976-3031

Available Online at http://www.recentscientific.com

CODEN: IJRSFP (USA)

International Journal of Recent Scientific Research
Vol. 15, Issue, 07, pp.4828-4831, July, 2024

International Journal of Recent Scientific Research

DOI: 10.24327/IJRSR

CASE REPORT

AVIFAUNAL DIVERSITY OF GHARANA WETLAND CONSERVATION RESERVE IN RELATION TO THEIR FEEDING HABITS

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DOI: http://dx.doi.org/10.24327/ijrsr.20241507.0907

ARTICLE INFO

Article History:

Received 15th June, 2024
Received in revised form 27th June, 2024
Accepted 17th July, 2024
Published online 28th July, 2024

Keywords:

Gharana wetland; Feeding habits; and Dominant

ABSTRACT

The present piece of work has been conducted (2022) on Gharana Wetland (Reserve) in order to observe avifaunal diversity and their feeding guilds. During this study, 19 species of wetland birds belonging to 16 families and 9 orders were reported from the study area. Out of 9 orders, Charadriiformes and Passeriformes dominated the community of wetland birds in the studied area, represented by 4 and 4 species, respectively. It is made up 21% of the total number of identified species of wetland birds, followed by the order Coraciformes with 15.7% of species (3 species), the order Pelecaniformes and Gruiformes each had 10.5% (2 species) and the least was from the orders Anseriformes, Suliformes, Bucerotiformes and Cuciliformes, i.e. 5.2% each with only one species. Foraging guilds were also recorded according to their habitat, foraging method, bill type and food taken. Of the 19 species, 7 (36.8%) were carnivorous, 4 species (21%) were insectivorous, 1 species (5.2%) were herbivorous, 4 species (21%) were omnivorous, and 3 (15.8%) were from multiple guilds. Carnivores were found to be the dominant species.

INTRODUCTION

We share the world with an immense diversity of wildlife, the breadth and depth of which is, frankly, extraordinary. As our ancestors travelled through the continents of planet Earth, they encountered amazing animals in each new area or vicinity they explored. The normal functioning of the biosphere depends on endless interactions among animals, plants and microorganisms. This, in turn, maintains and enhances human life further. In addition, these ecological processes are vital for agriculture, forestry, fisheries and other endeavours that support human life.

Wetlands are areas where water plays an important role in the development of aquatic plants and animal life. The global wetland size ranges from 5.3 to 12.8 million km^2. These wetlands provide important ecosystem functions such as supplying a wildlife habitat, water filtration and flood control. Wetlands are frequently used by a diverse number of bird species for foraging, nesting and roosting due to their heterogeneity of microhabitats and available rich food resources. These are widely recognized as fragile ecosystems with diverse attributes including a distinctive avifauna. It has been estimated that freshwater wetlands hold more than 40% of bird species of the entire world and 12% of all animal species. About 1313 avian species have been reported in the Indian subcontinent (Grimmett *et al.,* 2011). They are highly important because they serve as critical breeding, staging and wintering grounds for wide array of globally important bird species.Wildlife conservation has two meanings. Absolute protection includes the random release of animals, which has led to the invasion of alien species weakening and hindering the process of wildlife conservation itself (Karanth *et al.* 2008). One is the preservation of both species and species diversity, the other is based on animal welfare, which is primarily aimed at wildlife in captivity (Lu, 2009). Understanding food resources in wetlands is therefore important for determining the potential carrying capacity of the wetlands for water birds (Ma *et al.* 2010). Jammu and Kashmir is the home to avifaunal diversity due to its location and rich habitat. (Ahmed,2004).

The Gharana Wetland Conservation Reserve (GWCR) is a semi-arid wetland adjacent to agricultural areas on the Indo-Pakistani border. GWCR is especially important because it consists of a semi-arid wetland on the international border between the Indian states and the four provinces of Pakistan and provides a unique habitat not only for birds, but also for many meso-predators and small carnivores, herbivores, primates and reptiles. The primary threats to this wetland are human encroachment and its corollaries such as cattle grazing, bathing, stray dogs and military shelling across the Indo-Pakistan border. The left side of the wetland is bounded by a village, Gharana (hence the name) while on the right are agricultural fields. Keeping in view the above information, the

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preliminary research work was carried with following aims and objectives:

- To know the taxonomic status of animal diversity, mainly bird diversity (avifauna) and distribution of Gharana Wetland Reserve.
- To assess the bird feeding guild pattern in the study area.
- To assess the impact of anthropogenic pressure on habitat utilization in Gharana Wetland Reserve.

Literature Review

Whistler (1963) *Popular Handbook of Indian Birds*. Oliver and Boyd, Edinburgh

Sharma and Saini (2012) studied the impact of anthropogenic pressure over the abundance of waterbirds in Gharana Wetland with respect to their habitat utilization.

Pandotra *et al.* (2014) studied the Feeding Guilds of Avifauna of Gharana Wetland Reserve.

Ahmed *et al.(*2015) An avifaunal survey of Rangdum Valley in Kargil District, Jammu and Kashmir A total of 69 species were recorded comprising six passage migrants, 25 residents and 36 summer visitors.

Anthal (2017) Status survey eco biology and conservation perspectives of some resident wetland birds of Jammu

Jamwal *et al. (*2017) recorded 151 species including 62 waterfowl and 89 terrestrial species in Gharana wetland reserve.

Wani *et al.* (2020) conducted a study to analysis the physicochemical parameters of wetlands of Jammu district and to know the survival status of aquatic organisms found in the water of all these wetlands of Jammu district.

Chatterjii *et al.* (2020) studied foraging guild structure and niche characteristics of water birds wintering in selected sub-Himalayan wetlands of India.

Ahmad *et al.* (2021) studied on the water quality and eutrophication Status Using Water Quality Index of Gharana Wetland Reserves in Jammu (J&K), India

MATERIAL AND METHODS

Study Area: Gharana Wetland is situated between the 320 32′ 26″ N latitudes and 740 41′ 24″ E longitudes. It is located at an elevation of 270 meters above sea level. Gharana is a small wetland reserve spanning an area of 0.75 sq. km and is situated near the Indo-Pak International Border in R.S. Pura Tehsil of Jammu District at a distance of 35 km from Jammu City. Main sources of water to this wetland are spillover water from the Ranbir Canal and surface runoff from agricultural fields.

Village Gharana is situated very near to the wetland and lies along the North-South fly way Palaeartic-Oriental migratory route of waterfowl. This reserve is famous for migratory waterfowl also known as 'Bird Watchers Paradise' supports a population of different species during every winter with most of the species being migratory vulnerable and endangered.

Climate

The climatic conditions in and around the study area are sub-humid to arid

1. **Winter Season** – It extends from October to March with a monthly temperature between 9º C and 21º C.
2. **Summer Season** – It sets from April when the temperature begins to rise and continues to rise upto June reaching upto 46º C, setting a heat wave in the region
3. **Monsoon Season** – Southwest monsoon normally arrives by the first week of July and ends in August.
4. **Autumn Season** – This season extends between the months of September to mid October, when the weather is extremely dry with minimal rainfall and temperatures of around 29º C During the period of study Gharana Wetland was divided into four stations:

Study Station I: This station lies close to Gharana village and is under continuous stress of anthropogenic influences. Cattle-bathing, washing of vehicles and disposal of cowdung along with other household waste materials are the common activities occurring at this station.

Study Station II: It is situated exactly opposite to St I. It is bordered by large agricultural fields and thus receives agricultural run-off from these fields.

Study Station III: It is about 530 m away from St I and is situated on the roadside.

Study Station IV: It is the centre of the wetland with least disturbance.

Identification

The bird species were observed with the naked eye or with the help of binoculars whenever found necessary. In order to avoid any disturbance to birds, they were watched from behind a hide as far as possible. A minimum code of conduct was maintained like making less noise, a casual and indirect approach while observing or taking photographs of the species, so that the birds were not disturbed and their natural behaviour could be observed. Photographs, video clips and recordings were made with help of phone cameras, Nikon D5300 camera with 300x zoom. Observed species were identified from the pamphlets provided by the members in the control room of Gharana Wetlands and from the following standard books of Ali and Ripley, Grewal *et al.* and Del Hoyo *et al.* (2014) were used.

Point Count

Point counts are a commonly used method for determining the relative abundance of birds. A point count consists of standing at a predetermined location, and counting all birds seen or heard during a set period. Point counts generally take place in the early morning hours when most birds are at peak activity, so the survey was conducted between 0700 hours and 1100 hours and approximately 15-20 minutes were spent at each station. At each station, birds were counted with minimal disturbance. With the help of this method anthropogenic stress was also studied in different stations. This detailed methodology was previously described by Nadeau *et al.*

The relative abundance (%) of water bird species was determined by using expression:

Relative abundance=n/N×100

where, n is number of particular recorded bird and N is the total recorded birds species.

Feeding Guilds

The feeding guilds were categorized based on the observed foraging behaviour and habitat use (Ding *et al.*).In this survey, feeding guilds were identified. The Point Count method was also beneficial for determining the number of species under a particular feeding guild.

RESULT AND DISCUSSION

Diversity

The study revealed that the order Charadriiformes and Passeriformes represented by 4 and 4 species, respectively dominated the wetland bird community of the study area. It accounted for 21% of the total identified wetland bird species, followed by order Coraciformes with 15.7% of species (3 species), order Pelecaniformes and Gruiformes had 10.5% each (2 species), and the least were from Anseriformes, Suliformes, Bucerotiformes and Cuciliformes i.e. 5.2% each with only one species respectively.

Pie-chart 1: Percentage of bird orders found during the present study

During the study family Ardeidae and Rallidae was found to be the dominant with 11% each representing 2 species. Other families showed least contribution of 5% each representing single species.

Pie-chart 2: Percentage of bird families found during present study

The recorded species were *Phalacrocorax niger, Egretta garzetta garzetta, Bubulcus ibis coromandus, Vanellus indicus indicus, Tringa erythropus, Hydrophasianus chirurgus, Rostratula benghalensis, Gallinula chloropus indica, Porphyrio poliocephalus, Anas poecilorhyncha poecilorhyncha, Halcyon smyrnensis smyrnensis, Ceryle rudius leucomelanura, Alcedo atthis bengalensis, Acridotheres tristis, Dicrurus macrocercus albirictus, Pycnonotus cafer, Corvus splendens, Upupa epops and Centropus sinensis.*

Pie-chart 3: Percentage proportion of feeding guilds utilized by the birds

Out of 19 species, 7 (36.8 %) were carnivorous, 4 species (21%) were insectivorous, 1 species (5.2%) were herbivorous, 4 species (21 %) were omnivorous and 3(15.8%) were from multiple guilds. Carnivores were found out to be dominant species. The order of utilization of feeding guilds in Gharana Wetland Reserve was: Carnivorous (36.8%) >Insectivorous (21%) = Omnivorous (21%) >Multiple Guilds (15.8%) > Herbivorous (5.2%)

Pie chart 4: Percentage proportion of wetland birds with their migration status

Among the 19 recorded species, 15 (79%) were resident (Rst), no winter migrant (WM) was recorded due to the duration period of study, 02 (10.5%) were summer migrant (SM) and 2 (10.5%) were passage migrant (PM). Thus, the maximum proportion of wetland birds recorded in the study area was constituted by the resident species.

Table 1 Table showing different birds species found at different study stations during the study

Bird species	Study station-i	Study station-ii	Study station-iii	Study station-iv
Phalacrocorax niger	–	+	–	+
Egretta garzetta garzetta	–	+	+	+
Bubulcus ibis coromandus	–	+	–	+
Vanellus indicus indicus	–	–	–	+
Tringa erythropus	–	–	–	+
Hydrophasianus chirurgus	–	+	–	+
Rostratula benghalensis	–	–	–	+
Gallinula chloropus indica	–	+	–	+
Porphyrio poliocephalus	–	+	–	+
Anas poecilorhyncha poecilorhyncha	–	–	–	+
Halcyon smyrnensis smyrnensis	+	–	+	+
Ceryle rudius leucomelanura	–	+	+	+
Alcedo atthis bengalensis	--	+	+	+
Acridotheres tristis	+	+	+	–
Dicrurus macrocercus albirictus	–	+	–	+
Pycnonotus cafer	+	+	–	–
Corvus splendens	+	+	+	–
Upupa epops	–	–	+	–
Centropus sinensis	–	+	–	+

From Table 1, we can see the effect of anthropogenic activities in the avian diversity. The lack of concern towards avian habitat was seen during this study. A shift in the foraging habits of cattle Egret and red- wattled lapwing from feeding near the wetlands to the scattered heaps of garbage has occurred mainly due to anthropogenic pressure. The water bodies have been encroached by the locals for the expansion of agricultural fields and for construction purposes. As a result, the area of these wetlands has gradually shrunk over the years and has resulted in decline in number of both resident and migratory wetland birds. From the previous years data, it was found out that the land under wetland has reduced due to human encroachment. From Table 1, it was noted that birds were found least in the station were human activities leading to water pollution, and caused disturbance that is Station I, and the most preferred site where disturbance was least was Station IV which was the centre of the wetland. Shelling and firing from borders by Pakistani troops scared the visitors which restricted them to stay at the wetland and moved to places away from the wetland. It has become wasteland for dumping garbage due to human encroachment near and around the wetland. Sometimes the cattle entered the shallow water for grazing aquatic vegetation which scared most of the waterfowl away.

CONCLUSION

Due to the lack of demarcation of the Gharana Wetland Reserve by the concerned authorities, water bodies have been encroached by the locals for the expansion of agricultural fields and for construction purposes. As a result, the area of these

wetlands has gradually decreased over the years leading to the decline in both resident and migratory wetland birds. Water quality in wetlands is constantly deteriorating for many reasons, making them less suitable for aquatic flora and fauna. Discharge of untreated sewage into water bodies, use of water bodies by people for bathing, washing clothes, cleaning cattle, etc. immersion of waste from cremation and other socio-religious activities, uncontrolled silting, throwing away of polythene bags, plastic bottles, household shelters and other garbage they contribute to water pollution and disturb birds. Farmers usually kill and scare the flying wealth of these wetlands because they claim the birds are destroying their crops. Large quantities of excreta dropped by livestock, agricultural runoff and chemical detergents enter water bodies, leading to an increase in the organic content of the water, causing eutrophication, which is harmful to the living fauna living in or near the water bodies. Increased air temperature, precipitation shifts, increased frequency of storms, droughts and floods, increased concentration of carbon dioxide in the atmosphere and sea level rise could also affect wetlands(Datta,2011)

To sum up, the information generated from this study would be essential to better formulating the various strategies for the conservation of water birds as well as their habitat. (Gupta *et al*.,2017)

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How to cite this article:

Satinder kaur, Hasleen Kour, Shallina Gupta and Anupriya Sachar.(2024). Avifaunal diversity of gharana wetland conservation reserve in relation to their feeding habits. *Int J Recent Sci Res.*15 (07), pp.4828-4831.

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