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Migratory wetland birds diversity in Rewa district, Madhya Pradesh

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Abstract

Rewa district has several large and small water bodies having diverse aquatic flora and fauna. These wetlands not only provide suitable habitat for resident and as well as migratory avian species but also contribute much to the biodiversity. The present study deals with the diversity, abundance and variations of avian migratory species at wetlands of Rewa district. The study reflects that there are 43 migratory bird species in number in these wetland regions belonging to 8 orders and 12 families. Red-crested Pochard, Tufted Duck, Lesser Whistling Duck, Northern Pintail, Gadwall, Eurasian Wigeon, Common Coot etc. are found in large number in winter season in these wetlands.

Keywords: Avian migratory fauna, diversity, wetland, Rewa district

Introductions

Wetlands, the marshy areas of land where the soil is saturated with water are crucial incubators of species diversity. Avifaunal species are one of the main indicators which determine the health of wetlands (Ali, 2002)^[1]. Migratory bird species play a significant role in the aquatic ecosystem and increase faunal diversity. However now-a-days, migratory birds' diversity has been decreasing due to the destruction of natural habitats and anthropogenic interference (Sanderson *et al.*; 2002)^[9]. Avian species of wetlands are facing tremendous pressure due to the unethical behaviour of human beings.

The Indian subcontinent is very rich in bird diversity. Ali and Ripley (1987) considered 176 species of birds are endemic (local) to the Indian subcontinent. Out of the more than 9,000 bird species of the world, the Indian subcontinent contains about 1,300 species, or over 13% of the world's birds (Grimmett *et al.*, 1998)^[6]. This subcontinent, rich in avifauna also boasts 48 bird families out of the total 75 families in the world. Grimmett *et al.*, (1998)^[6] have shown that the Indian peninsula is home to many bird families (or other distinctive groups of birds) where the majority of the species of the family or group are found in this subcontinent. For instance, 71% of the treecreepers (Certhiinae), 62% of accentors (Prunellinae), 55% of laughingthrushes (Garrulacinae) and 50% of ioras (Aegithininae) are found in the Indian subcontinent. Similarly, 37% of the barbet and 38% of the drongo species of the world are seen in India.

Birds are a good candidate taxon for monitoring global environmental change, because they have long been monitored worldwide (Bibby, 1999, Pereira and Cooper, 2006, Schmeller *et al.*, 2012, Upadhyay *et al.* 2020 and Purohit *et al.* 2020)^[4, 7, 10, 11, 8].

In the Indian subcontinent the majority of migratory birds are winter migrant. It is estimated that over hundred species of migratory birds fly to India, either in search of feeding grounds or to protect themselves from severe winter bite of their native habitat (According to ENVIS Centre of Avian Ecology).

District Rewa is an adobe of various migratory as well as residential birds. Considering this scenario, an effort has been made to study the avifaunal migratory species of the wetlands of this district. Among the major wetlands of Rewa district basically Site A (Around Govindgarh lake) and Site B (around Beehar-Bichchiya river) attract a large number of migratory birds in winter. There are only a few reports available till date about avian species diversity of the entire Rewa district region.

Objectives of the Study

An effort has been taken to focus on the following objectives through the present study.

1. To focus the geographical position of the study area.
2. To analysis migratory species diversity.
3. To analysis the richness of migratory birds.
4. To Comparative analysis of monthly and seasonal Migratory birds species.

Observation Period

The present study has been conducted for four consecutive years (July 2020-June 2022) to record avian migratory birds' diversity.

Study area

On the basis of habitat structure and geographical locations 02 different sites will selected in Rewa district. These sites will selected in such a way that every part of the study area is covered and included almost every type of habitat available in the study area.

1. Site A: Around Govindgarh Lake, Rewa (M.P.)

The summer capital of Rewa dynasty is about 13 kilometer from Rewa in Madhya Pradesh. The region is known for its natural beauty and waterfalls. The Govindgarh is also known as mini Vrindavan it is also believed that the name of Govindgarh is based on Govind temple situated there. Govindgarh is one of the oldest reservoirs of Madhya Pradesh. Construction of which was started in 1850 and completed in 1910.

2. Site B: Around Beehar-Bichchiya river Beehar river

It is one of the most important river of Rewa district. Beehar river is North westerly flowing river of Rewa district and is about 97 kilometers long. The river originates in the Kaimore hills of Kharamkheda village (Satna district) at the elevation of 600 meters above sea level in the Satna district (M.P.). After its origin in Kharamkheda, it flows through the hilly tract of Amarpatan, courses through plateau of Huzur and Sirmour tehsil, reaches the edges of plateau of Chachai village, where with its other tributaries, it forms a water fall, known as "Chachai fall". The river descends about 115 meters below its normal level and flow through a plain, to join the tons rivers, which is one of the important tributaries of Ganga river. Its catchment covers an area of about 1685 sq.km. out of which 636 sq.km. is in Satna and rest 1049 sq.km. in Rewa district.

Bichchiya river

It is one of the main tributary of Beehar river. It arises from the village Khaira near Kund of Kaimore rang and flowing 58 km. Its locations in Rewa district is on 24°10" latitude north and 81°15" longitude east. The river originates from Khaira village of Gurh tehsil and joins in Beehar river behind Rewa fort. The confluence place is known as Rajghat. From there, the river jointly flows (with confluence of Bichchiya and Beehar river) covers several villages of Gurh and Huzur tehsil, which ultimately joins in Chachai fall of Sirmour tehsil of Rewa district

Data Source & Methodology

This study is mainly based on primary and secondary data sources. For primary data, avian species have been observed and recorded directly in the field. Different research papers, Wikipedia, different books, internet access have been used as secondary data sources. Regular field trips were made throughout this period. Two different methods have been adopted to study avifaunal diversity. First one is Line Transects Method and second one is Point Count Method. Through these said methods, a checklist is prepared. Nikon Aculon Binocular A211 10-22x50 has been used for close observation of birds and Nikon D7200 camera, with Nikkor Lens 70-300 mm for photography. The check list of species has been prepared following Ali (1996), Grimmett and Inskipp (2011) [5]. To get better response in observations relating to peak behavioral activities of birds, suitable time (1 or 2 hours after sunrise or before sunset) has been considered.

Result and Discussion

Species diversity is a measurement of an ecosystem's species richness and species evenness. More species richness will contribute to increase in biodiversity also which is an important aspect on biodiversity conservation.

The checklist of observed migratory avian species in Rewa District along with their order, common name, scientific name, families, habit location, visibility, from where they migrate and IUCN status are given in Table 1.

During observation when the mean values of monthly migratory birds species distribution at Govindgarh lake no. of species were found to be more (27) in November to February. While no. of individuals were max. (103) in December. When we looked at station Beehar-Bichchiya river it was noticed that no. of species was more (19) in August to February where as total no. of individuals were more (94) in December. (Table 2).

Average seasonal variation of species showed that maximum no. of species (92) were found in winter season, while max. no. of individuals (27) were also found in winter season at Govindgarh lake and maximum no. of species (80) were found in winter season, while max. no. of individuals (19) were also found in winter season at Beehar-Bichchiya river (Table 2, Fig. 1).

Local migratory birds observation when the mean values of monthly distribution at Govindgarh lake no. of species were found to be more (05) in all months. While no. of individuals were max. (37) in December. When we looked at station Beehar-Bichchiya river it was noticed that no. of species were more (06) in September to March where as total no. of individuals were more (29) in December. (Table 3).

Average seasonal variation of local migratory birds species showed that maximum no. of species (33) were found in winter season, while max. no. of individuals (05) were also found in all season at Govindgarh lake and maximum no. of species (26) were found in winter season, while max. no. of individuals (6) were also found in winter season at Beehar-Bichchiya river (Table 3, Fig. 2).

Table 1: Migratory Birds diversity in terms of order & Relative Diversity of Birds Families

| Order | Common Name | Scientific Name | Families | Site | Habitat Location | Visibility | Migrate From | IUCN Status |
|------------------|----------------------|-------------------------------|----------------|------|------------------|------------|--------------------------------------|-----------------|
| Charadriiformes | Green Sandpiper | <i>Tringa ochropus</i> | Scolopacidae | A, B | Water Edge | Uncommon | Subarctic Europe and Asia | Least Concern |
| | Common Sandpiper | <i>Actitis hypoleucos</i> | Scolopacidae | A, B | Water Edge | Common | Subtropical Europe and Asia | Least Concern |
| | Marsh Sandpiper | <i>Tringa stagnatilis</i> | Scolopacidae | A | Water Edge | Uncommon | Western Europe and Central Asia | Least Concern |
| | Wood Sandpiper | <i>Tringa glareola</i> | Scolopacidae | A | Water Edge | Uncommon | Eurasia | Least Concern |
| | Temminck's stint | <i>Calidris temminckii</i> | Scolopacidae | A | Water Edge | Uncommon | Arctic Europe and Asia | Least Concern |
| | Little stint | <i>Calidris minuta</i> | | A | Water Edge | Uncommon | Arctic Europe and Asia | Least Concern |
| | common snipe | <i>Gallinago gallinago</i> | Scolopacidae | A | Water Edge | Uncommon | European Russia and Siberia. | Least Concern |
| | Little Ringed Plover | <i>Charadrius dubius</i> | Charadriidae | A, B | Water Edge | Common | Europe and Western Asia | Least Concern |
| | Golden Plover | <i>Pluvialis fulva</i> | Charadriidae | A, B | Water Edge | Uncommon | Eurasia | Least Concern |
| Anseriformes | Red-Crested Pochard | <i>Nettion rufina</i> | Anatidae | A | Open Water | Common | Southern Europe and Central Asia | Least Concern |
| | Gadwall | <i>Mareca strepera</i> | Anatidae | A | Open Water | Uncommon | Central Europe and Asia | Least Concern |
| | Garganey | <i>Spatula querquedula</i> | Anatidae | A, B | Open Water | Common | Europe and Western Asia | Least Concern |
| | Tufted Duck | <i>Aythya fuligula</i> | Anatidae | B | Open Water | Uncommon | Northern Eurasia | Least Concern |
| | Common Pochard | <i>Aythya farina</i> | Anatidae | B | Open Water | Common | Northern Europe and Asia | Vulnerable |
| | Eurasian Wigeon | <i>Mareca penelope</i> | Anatidae | A, B | Open Water | Common | Northern Europe And Asia | Least Concern |
| | Northern Pintail | <i>Anas acuta</i> | Anatidae | A, B | Open Water | Common | Northern Europe And Asia | Least Concern |
| | Northern Shoveler | <i>Spatula clypeata</i> | Anatidae | B | Open Water | Common | Northern Europe And Asia | Least Concern |
| | Common Teal | <i>Anas crecca</i> | Anatidae | A, B | Open Water | Common | Northern Europe and Asia | Least Concern |
| | Greylag Goose | <i>Anser anser</i> | Anatidae | B | Open Water | Common | Middle Asia | Least Concern |
| | Ruddy Shelduck | <i>Tadorna ferruginea</i> | Anatidae | A, B | Open Water | Common | Southeastern Europe And Central Asia | Least Concern |
| | Ferruginous Duck | <i>Aythya nyroca</i> | Anatidae | A | Open Water | Common | Eurasia | Near Threatened |
| Podicipediformes | Great Crested Grebe | <i>Podiceps cristatus</i> | Podicipedidae | A | Open Water | Uncommon | Middle Asia | Least concern |
| Gruiformes | Common Coot | <i>Fulica atra</i> | Rallidae | A, B | Water Edge | Common | Eurasia | Least concern |
| | Baillon's Crake | <i>Zapornia pusilla</i> | Rallidae | A | Water Edge | Uncommon | Western Eurasia | Least concern |
| Passeriformes | Common Chiffchaff | <i>Phylloscopus collybita</i> | Phylloscopidae | B | Tree | Common | Temperate Europe and Asia | Least concern |
| | Greenish | <i>Phylloscopus</i> | Phylloscopidae | B | Tree | Uncommon | North eastern | Least concern |

| | | | | | | | | |
|-----------------|---------------------|-----------------------------|-------------------|------|------------|----------|---------------------------------|-----------------|
| | Warbler | <i>trochiloides</i> | | | | | Europe And Central Asia | |
| | Siberian rubythroat | <i>Calliope calliope</i> | Muscicapidae | A, B | Water Edge | Uncommon | Siberia | Least concern |
| | Citrine Wagtail | <i>Motacilla citreola</i> | Motacillidae | A | Water Edge | Uncommon | North Central Asia | Least concern |
| | Yellow Wagtail | <i>Motacilla flava</i> | Motacillidae | A | Water Edge | Uncommon | Temperate Europe and Asia | Least concern |
| | Grey Wagtail | <i>Motacilla cinerea</i> | Motacillidae | A | Water Edge | Uncommon | Temperate Europe and Asia | Least Concern |
| | Tree Pipit | <i>Anthus trivialis</i> | Motacillidae | A, B | Water Edge | Uncommon | Europe and western Asia | Least concern |
| Suliformes | Great Cormorant | <i>Phalacro corax carbo</i> | Phalacrocoracidae | B | Tree | Common | Western Europe and Central Asia | Least concern |
| Accipitriformes | Osprey | <i>Pandion haliaetus</i> | Pandionidae | B | Tree | Common | Central Asia | Least concern |
| | Marsh Harrier | <i>Cirus aeruginosus</i> | Accipitridae | A, B | Tree | Common | Western Europe | Least concern |
| | Pallid Harrier | <i>Cirus harrier</i> | Accipitridae | B | Tree | Common | Eurasia | Near Threatened |
| Falconiformes | Peregrine Falcon | <i>Falco peregrinus</i> | Falconidae | A | Tree | Common | Northern Europe and Asia | Least concern |

Local Migratory Birds

| Order | Common Name | Scientific Name | Families | Site | Habitat Location | Visibility | IUCN Status |
|------------------|------------------------|---------------------------------|---------------|------|------------------|------------|---------------|
| Charadriiformes | Yellowwattled Lapwing | <i>Vanellus malabarius</i> | Charadriidae | A, B | Water Edge | Common | Least Concern |
| | Red-wattled Lapwing | <i>Vanellus indicus</i> | Charadriidae | A, B | Water Edge | Common | Least Concern |
| Anseriformes | Lesser Whistling Duck | <i>Dendrocygna javanica</i> | Anatidae | A, B | Open Water | Common | Least Concern |
| | Indian spotbilled duck | <i>Anas poecilorhyncha</i> | Anatidae | B | Open Water | Common | Least Concern |
| | Cotton Pygmy Goose | <i>Nettapus coromandelianus</i> | Anatidae | A | Open Water | Common | Least Concern |
| Gruiformes | Common Moorhen | <i>Gallinula chloropus</i> | Rallidae | A | Open Water | Common | Least Concern |
| Podicipediformes | Little Grebe | <i>Tachybaptus ruficollis</i> | Podicipedidae | B | Open Water | Common | Least Concern |

Note = A – Govindgarh lake, B- Beehar-Bichchiya river

Table 2: Comparative analysis of monthly Migratory birds species distributions at Govindgarh lake and at Beehar-Bichchiya river from July 2020-June 2022

| S. No | Month | Govindgarh lake | | Beehar-Bichchiya river | |
|----------------------------|--------|-------------------|-------------------------|------------------------|-------------------------|
| | | Total no. of sps. | Total no. of individual | Total no. of sps. | Total no. of individual |
| 1 | Jul. | 19 | 20 | 11 | 12 |
| 2 | Aug. | 22 | 27 | 19 | 22 |
| 3 | Sept. | 22 | 36 | 19 | 33 |
| 4 | Oct. | 25 | 44 | 19 | 64 |
| 5 | Nov. | 27 | 85 | 19 | 85 |
| 6 | Dec. | 27 | 103 | 19 | 94 |
| 7 | Jan. | 27 | 97 | 19 | 85 |
| 8 | Feb. | 27 | 83 | 19 | 54 |
| 9 | Mar. | 26 | 42 | 18 | 27 |
| 10 | Apr. | 14 | 18 | 14 | 17 |
| 11 | May | 13 | 13 | 11 | 11 |
| 12 | Jun. | 19 | 21 | 13 | 17 |
| Maximum | | 27 | 103 | 19 | 94 |
| Minimum | | 13 | 13 | 11 | 11 |
| Average Seasonal variation | | | | | |
| 1 | Rainy | 22 | 32 | 17 | 33 |
| 2 | Winter | 27 | 92 | 19 | 80 |
| 3 | Summer | 18 | 24 | 14 | 18 |

Table 3: Comparative analysis of monthly Local Migratory birds species distributions at Govindgarh lake and at Beehar-Bichchiya river from July 2020-June 2022

| S. No | Month | Govindgarh lake | | Beehar-Bichchiya river | |
|-----------------------------------|--------|-------------------|-------------------------|------------------------|-------------------------|
| | | Total no. of sps. | Total no. of individual | Total no. of sps. | Total no. of individual |
| 1 | Jul. | 5 | 09 | 04 | 04 |
| 2 | Aug. | 5 | 11 | 02 | 03 |
| 3 | Sept. | 5 | 10 | 06 | 07 |
| 4 | Oct. | 5 | 30 | 06 | 14 |
| 5 | Nov. | 5 | 34 | 06 | 24 |
| 6 | Dec. | 5 | 37 | 06 | 29 |
| 7 | Jan. | 5 | 34 | 06 | 28 |
| 8 | Feb. | 5 | 28 | 06 | 21 |
| 9 | Mar. | 5 | 19 | 06 | 10 |
| 10 | Apr. | 5 | 09 | 02 | 02 |
| 11 | May | 5 | 05 | 04 | 04 |
| 12 | Jun. | 5 | 08 | 05 | 05 |
| Maximum | | 05 | 37 | 06 | 29 |
| Minimum | | 05 | 05 | 02 | 02 |
| Average Seasonal variation | | | | | |
| 1 | Rainy | 5 | 15 | 5 | 7 |
| 2 | Winter | 5 | 33 | 6 | 26 |
| 3 | Summer | 5 | 10 | 4 | 5 |

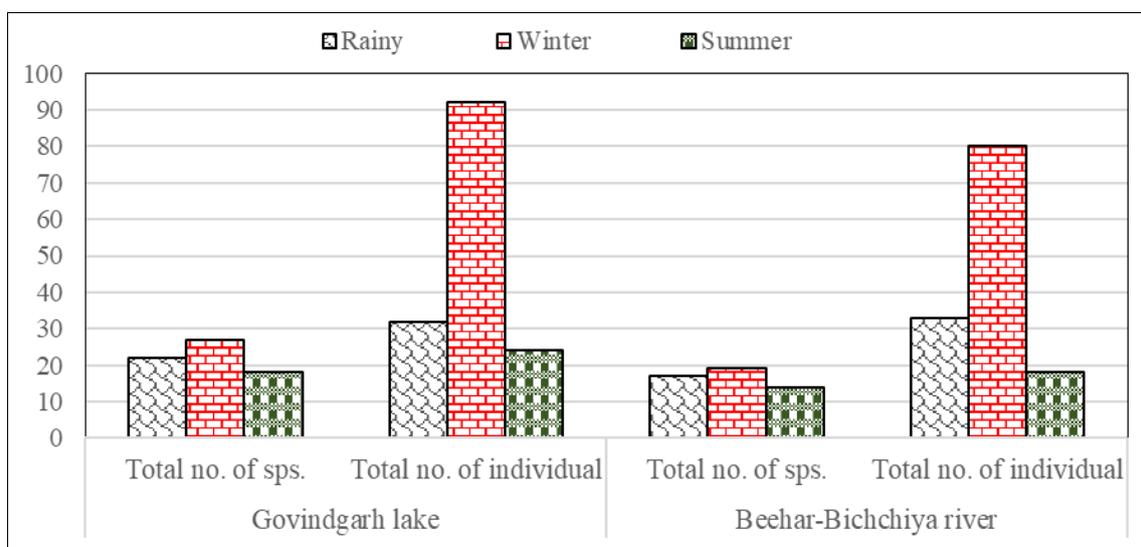


Fig 1: Comparative analysis of seasonal Migratory birds species distributions at Govindgarh lake and at Beehar-Bichchiya river from July 2020-June 2022

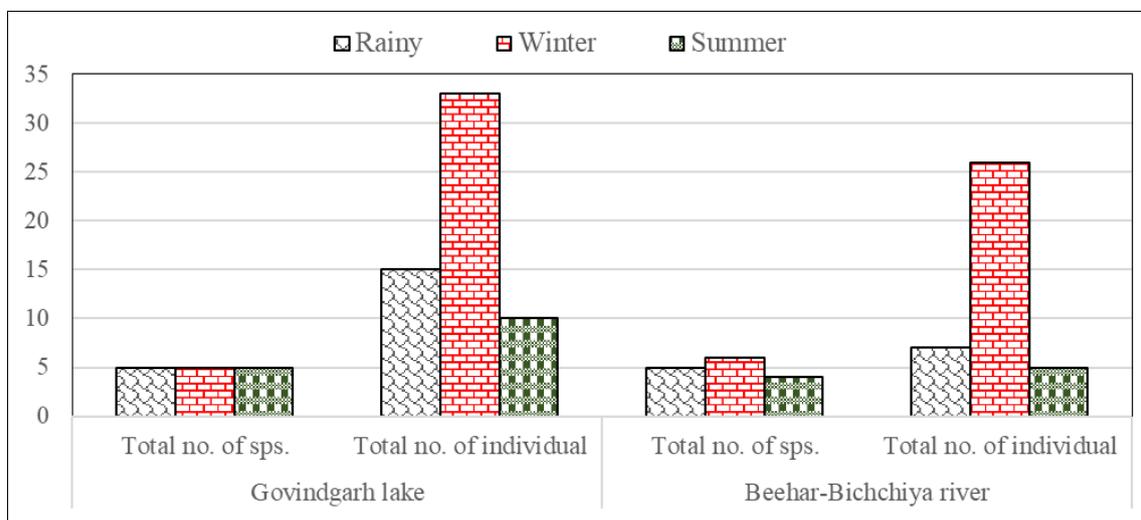


Fig 2: Comparative analysis of seasonal Local Migratory birds species distributions at Govindgarh lake and at Beehar-Bichchiya river from July 2020-June 2022

Conclusion

Present study reveals that the wetlands harbour a large number of migratory birds especially in winter season and play a crucial role to enrich the biodiversity. It is observed that the wetlands are undergoing unwanted change in biodiversity due to anthropogenic pressure which creates terrible effect on migratory birds. To come back the earlier well favourable or more favourable environment to the migratory bird species, first of all it is needed to develop awareness among civilized being like human. To aware in depth awareness programme to be run periodically containing the facts like why people should safeguard wetlands, socio-economic value of wetlands in continuous way. Identifying the specific goal of specific wetland, decision against some infrastructure development may be taken for healthy and flourish environment in the wetlands such as building up watch tower. Activities of the tourists are also causing disturbances to the lake ecosystem. There should be strict management rules for visitors for the conservation of biodiversity in the wetlands and the area should be announced as a polythene free zone. Govt. should take further steps to protect wetlands' diversity. A sustainable and holistic management planning is necessary for conservation of wetlands.

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