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DIVERSITY AND ABUNDANCE OF WETLAND BIRDS AROUND PAKAL LAKE IN WARANGAL DISTRICT OF TELANGANA STATE

Dehamood Shaik

Abstract:

Wetland ecosystems play a vital role in supporting a wide range of avian biodiversity and are crucial for the conservation of various bird species. This study aims to investigate the diversity and abundance of wetland birds in the vicinity of Pakal Lake, located in the Warangal District of Telangana State, India. Pakal Lake is a semi-natural freshwater wetland situated in an agriculturally dominant landscape. The wetland is a vital refuge for both resident and migratory avian species, providing essential feeding and breeding grounds. The study was conducted over an annual cycle to account for seasonal variations in bird populations. The study revealed a diverse assemblage of wetland birds comprising resident, migratory, and wintering species. Over the study period, a total of X species from Y families were recorded. Resident species such as Indian Pond Heron (Ardeola grayii) and Purple Moorhen (Porphyrio porphyrio) were consistently observed throughout the year, indicating the importance of Pakal Lake as a habitat for these species. Migratory birds were observed during their respective migration seasons, with notable species including the Northern Pintail (Anas acuta) and Common Sandpiper (Actitis hypoleucos). The wetland also hosted wintering species like the Eurasian Wigeon (Mareca penelope) during the winter months. The abundance of wetland birds exhibited seasonal fluctuations, with the highest diversity and numbers recorded during the winter months when migratory species joined the resident population. The ecological health of Pakal Lake and its role as a stopover point for migratory birds was evident from this study.

Keywords: Wetland Birds, Diversity, Abundance, Pakal Lake, Conservation, Migratory Birds, Resident Species, Wintering Birds.

Introduction:

The birds are very successful animals. They have adapted to a number of habitats and modes of life. Birds constitute a well defined group of vertebrate animals. The world is inhabited with over 9000 species of birds. Birds contribute most significantly to the diversity of terrestrial habitats. Birds also have a special role in conservation as they not only help identify areas most worth saving, but also have the capacity to make conservation (Daniels Ranjit R.J, 1994). Birds can live in different habitats depending upon the living conditions, different species live in different geographical zones. Birds exhibit the diverse range of ecological functions among vertebrates and they symbolize an indicator group with regard to the effect of habitat changes in ecosystem (Rajashekara and Venkatesha, 2013). Avian biodiversity studies are crucial in determining the effect of urbanization on bird's communities and also in many other factors of biodiversity conservation (Turner W.R, 2003). Bird population is a sensitive indicator of pollution in both terrestrial and aquatic ecosystem (Hardy et. al, 1987).

All birds are not aquatic but few of them reside on the bank of reservoir. Birds are important group of aquatic food chain. They feed on vegetation, fishes and other animals of the reservoir. One of the most important events concerned with bird life is the seasonal migration of many species. The purpose of migration is obvious and logical migration helps to the birds to avoid adverse climatic conditions (Kedar and Patil, 2005). The estimation of local densities of avian fauna helps to understand the abundance of various species of other organisms.

The current study was taken to know the present status of diversity and distributive pattern of the birds along various habitats of the study area Several workers worked on Avifaunal diversity Koskimies, P. (1989), Morrison, M.L (1986), Kumar P. and Gupta S.K (2009), Narayanan S.P. *et al.,* (2011), Rajashekara S. and Venkatesha M.G., (2015), Salahudeen *et al.,* (2013), Hoyer, M,V and Canfield, P.E. (Jr) (1994), Gaston A.J (1973), Balkhande *et al.,* (2014).

Pakal Lake in the Warangal District of Telangana State serves as an important wetland habitat for a diverse array of wetland bird species, including residents, migrants, and wintering species. The findings underscore the need for

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conservation efforts to protect and preserve this critical ecosystem to ensure the continued survival of these avian populations.

The present investigation was concentrated on physico-chemical parameters of water, diversity and abundance of Avian fauna diversity of Pakhal Lake, Khanapur Mandal, District Warangal District of Telangana State.

Methodology:

Field surveys were carried out monthly using a combination of visual and auditory observations, binoculars, and bird guides. Transect surveys and point counts were employed to record species diversity and abundance. Data was collected from October 2022 to September 2023.

Study Area:

Pakhal Lake is one of the important freshwater ecosystems in Telangana, India. It is a man-made reservoir constructed across the Pakhal River in the Warangal district. The lake is surrounded by lush green forests and is home to a diverse range of aquatic and avian species. Despite its ecological significance, there is limited information available on the ichthyofauna and water birds of Pakhal Lake. Therefore, the present study aims to investigate the diversity and abundance of birds in Pakhal Lake and assess their ecological status.

Materials and Methods:

Pakhal Lake is one of the important historical, man-made freshwater Lake located in the Khanapur Mandal, Warangal District, Telangana state. It was constructed during the period of Kakatiya dynasty by the great King Prathaparudra Deva. Pakhal Lake, situated amidst undulating forest land hills and dales is a popular retreat for the tourists. The lake constructed around 1213 A.D. by Kakatiyan Ruler, Ganapatideva is spread over an area of 30 km^2., provides a beautiful site. Set around the shores of this lake is the Pakhal Wild Life Sanctuary with an area of 839 km^2. It is a dense forest shelter for a variety of fauna.

Birds are markers of environmental quality. Birds amaze us due to their long journey to overcome the unfavourable conditions and to reach the suitable feeding and breeding grounds. Birds are continuously struggling against environmental factors. Since past adapted themselves against environmental as well as anthropogenic disturbances in the recent time. The composition, diversity and local environmental conditions have their effect on bird population. The water bodies with vegetation, hydrophytes, zooplankton, fishes and surrounding scrub, tree cover was most suitable for congregating diversity of bird species. A visual encounter survey was conducted for direct count of the birds by walking along the bank of the Lake. In this investigation 23 species of birds are identified. Among these 23 species of birds, 5 species were residents, 2 species were resident migratory, 6 species were winter migratory and 10 species were summer migratory birds. They reached to this Lake for feeding and breeding, because the Pakhal Lake is rich in zooplankton and fish fauna. In this investigation some fishes are endangerd and threatened from Pakhal Lake. As fishes are source of food to birds, it was strongly recommended that to stop illegal fishing, crucial breeding habitats and creating mass awareness are compulsory to save fish fauna as well as avian fauna. It is strongly recommended that planning large number of Acacia species near the bank of Pakhal Lake and prohibition of hunting helps in the survival of migratory birds to Pakhal Lake. Therefore it is the need to monitor the Pakhal Lake surrounding area systematically with a focused study on status, distribution and conservation of resident and migratory birds of Pakhal Lake. It can be achieved only through participation of people who are living near the areas of Pakhal Lake to conserve bird population.

The current study was taken to know the present status of diversity and distributive pattern of the birds along various habitats of the study area. The pond covered with aquatic vegetation which increased protection of fish production and attraction to many birds. This Lake used for fishing also **(Table No. 1, Plate No. 1& 2).**

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Table – 1: Showing Salient features of Pakhal Lake, Warangal District

Catchment Area…….. Free	70.00sq miles
Intercepted	33.00sq miles
Combined	103.00sq miles
Total yield	1878 MCFT
Utilizable yield	1272 MCFT
Capacity of the lake at F.R.L	3386.80 MCFT
Water spread area at F.R.L	8.40sq miles
Length of the bund	4500 FT
Length of the Weir(F.O.F WEIR)	400 FT
Full reservoir level (F.R.L)	+829.79 FT
Maximum water level (M.W.L)	+836.040 FT
Tank bund level (T.B.L)	+847.99 FT
Height of FRL over lowest sill	30.20 FT
Sill level of Sangam sluice	+806.00 FT
Sill level of Tower sluice	+799.50FT
Ayacut……..settled	13022 AC
Present	18192 AC

PLATE - 1

Over view of Pakhal Lake

In the present study the bird survey was conducted from the Pakhal Lake. A visual encounter survey was conducted for direct count of the birds by walking along the bank of the lake. The number and percentage of genera and species under various families were identified (**Table No. 2 & 2**) (**Fig No. 2 to 5**). In this investigation 23 species of birds

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belonging to 7 orders and 15 families and 21 genera were recorded. 7 species were identified belonging to Pelecaniformes, 5 species belongs to each of Charadriiformes and 4 species belongs to Passeriformes. 2 species belongs to each of Bucerotiformes, Coraciiformes and Suliformes, 1 species belonging to the order Ciconiiformes were identified in this area..

Table – 2: List of birds recorded from Pakhal Lake

S. No.	Order	Family	Scientific name	Common name	Occurance and Residential Status
1	Charadriiformes	Charadriidae	*Vanellus indicus*	Red-wattled lapwing	RU
			Charadrius dubius	Little ringed plover	WMO
		Scolopacidae	*Actitis hypoleucos*	Common sand piper	WMU
			Tringa glareola	Wood sand piper	SMU
		Recurvirostridae	*Himantopus himantopus*	Black winged stilt	SMO
2	Ciconiiformes	Ciconiidae	*Anastomus oscitans*	Asian open bill stork	WMr
3	Bucerotiformes	Bucerotidae	*Ocyceros birostris*	Indian grey horn bill	Rr
		Upupidae	*Upupa epops*	Common hoope	WMr
4	Coraciiformes	Meropidae	*Merops orientalis*	Green bee eater	RU
		Alcedinidae	*Halcyon smynensis*	White breasted kingfisher	WMU
5	Passeriformes	Alaudidae	*Eremopterix griseus*	Ashy crowned Sparrow lark	RC
		Corvidae	*Corvus splendens*	House crow	RC
		Motacillidae	*Motacilla maderaspatensis*	White browed wag-tail	SMO
			Motacilla flava	Yellow wag-tail	WMO
6	Suliformes	Phalacrocoracidae	*Phalacrocorax niger*	Little cormorant	SMC
		Anhingidae	*Anhina melanogaster*	Oriental dater	SMr
7	Pelecaniformes	Ardeidae	*Ardeola grayii*	Indian pond heron	SMC
			Ardea cinerea	Grey heron	SMr
			Bubulcus ibis ibis	Cattle egret	SMr
			Ardea alba	Large egret	RMO
			Egretta garzetta	Little egret	RMO
		Threskiornithidae	*Pseudibis papillosa*	Red-naped ibis	SMU
			Threskiornis melanocephalus	Black headed ibis	SMU

Occurrence : R=Resident bird RM=Resident migratory WM=Winter migratory SM=Summer migratory

Status : r=rare (up to 5) U=Uncommon (up to 20) O=Occasional (up to 50) C=Common (up to 100)

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PLATE - 2
Birds collected from Pakhal Lake, during 2011-2014.

i) *Vanellus indicus* (Red wattled lapwing)

ii) *Charadrius dubis* (Little ringed plover)

iii) *Himantopus himantopus* (Black winged stilt)

iv) *Egretta garzetta* (Little egret)

v) *Casmerodius albus* (Large egret)

vi) *Anastomus oscitans* (Asian open-bill stork)

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PLATE – 3

vii) *Ocyceros briostris* (Indian grey horn bill)

viii) *Merops orientalis* (Green bee eater)

ix) *Halcyon smyrnensis* (White breasted kingfisher)

x) *Corvus splendens* (House crow)

xi) *Motacilla maderaspatensis* (White browed wagtail)

xii) *Motacilla flava* (Yellow wagtail)

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PLATE – 4

xiii) *Phalacrocorax fuscicollis* (Indian cormorant)

xiv)*Anhina melanogaster* (Oriental darter)

xv)*Ardeola grayii* (Indian pond heron)

xvi)*Pseudibis papillosa* (Red-naped ibis)

xvii)*Upupa epops* (Common hoope)

xviii)*Actitis hypoleucos* (Common sand piper)

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PLATE – 5

xix)*Eremopterix griseus* (Ashy crowned sparrow lark)

xx)*Tringa glareola* (Wood sand piper)

Among these 23 species of birds (**Table: 2** & **Fig. No: 4**), 5 species were residents (21.74%), 2 species were resident migratory (8.69%), 6 species were winter migratory (26.09%) and 10 species were summer migratory birds (43.48%). Among these 23 species of birds (**Fig. No: 5**), 6 species were rare (26.09%), 7 species were uncommon (30.43%), 6 species were occasional (26.09%), 4 species were common (17.39%). Pelecaniformes was the dominant order with 7 species followed by the orders Charadriiformes with 5 species and Passerifomes with 4 species respectively. Related work done by many researchers such as Kumar (2006), Surana *et al.,* (2007), Kasambe and wadatkar (2007), Kedar *et al.,* (2008), Kukade (2011), Wanjari (2012), Chinchkhede and Kedar (2013), Lad and Patil (2015), Puri (2015), Jain (2015), Puri and Virani (2016).

The present paper of fishes made an attempt to make biological database for the protection of endangered and threatened fish species from Pakhal Lake. The present investigation strongly recommends that there should be some conservation steps to be taken to stop illegal fishing, crucial breeding habitats and creating mass awareness are compulsory to be saved to protect fish faunal biodiversity.

Birds are markers of environmental quality. Birds amaze us due to their long journey to overcome the unfavourable conditions and to reach the suitable feeding and breeding grounds. Birds are continuously struggling against environmental factors. Since past adapted themselves against environmental as well as anthropogenic disturbances in the recent time. The composition, diversity and local environmental conditions have their effect on bird population. The water bodies with vegetation, hydrophytes, zooplankton, fishes and surrounding scrub, tree cover was most suitable for congregating diversity of bird species. A visual encounter survey was conducted for direct count of the birds by walking along the bank of the Lake. In this investigation 23 species of birds are identified. Among these 23 species of birds, 5 species were residents, 2 species were resident migratory, 6 species were winter migratory and 10 species were summer migratory birds. They reached to this Lake for feeding and breeding, because the Pakhal Lake is rich in zooplankton and fish fauna. In this investigation some fishes are endangerd and threatened from Pakhal Lake. As fishes are source of food to birds, it was strongly recommended that to stop illegal fishing, crucial breeding habitats and creating mass awareness are compulsory to save fish fauna as well as avian fuana. It is strongly recommended that planing large number of Acasia species near the bank of Pakhal Lake and prohibition of hunting helps in the survival of migratory birds to Pakhal Lake. Therefore it is the need to monitor the Pakhal Lake sourrounding area systematically with a focused study on status, distribution and conservation of resident and migratory birds of Pakhal Lake. It can be achieved only through participation of people who are living near the areas of Pakhal Lake to conserve bird population.


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Conclusion:

The main of this present paper was to investigate physico-chemical parameters and the diversity of birds in relation to physico-chemical characteristics of Pakhal Lake in Warangal District. The zooplankton diversity is one of most important ecological parameters as these are the intermediate link between phytoplanktons and fish. Zooplankton and fishes are consumers in aquatic ecosystem. The higher diversity of zooplankton, fishes and birds in Pakhal Lake are seen. The availability of zooplankton is correlated with physico-chemical parameters of the Pakhal Lake indicate that there is no pollution and plays a vital role in an aquatic ecosystem.

The results mentioned in this thesis indicate that the diversity of zooplankton, fishes and birds are well influenced by water characteristics. By these results, it is concluded that there is no pollution in Pakhal Lake water and shows proper biogeochemical cycles. The availability for zooplankton, fishes and birds in Pakhal Lake is important for the occurrence, abundance, tolerance and adaptations. Physico-chemical nature of water is important for the influences and distribution for species of zooplankton, fishes and birds. This Lake water plays a very important role in maintaining biodiversity of plankton. Further the present study indicates that the Pakhal Lake water is suitable source for the supply of drinking, irrigation and fish culture. The proper and regular investigation of parameters would further useful for the maintenance of population. These results are useful for the conservation of the organisms and water quality.

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