

Research Paper

Status of avifauna of Ousudu lake, Puducherry, India

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Abstract

Ousudu lake is one of the important Wetlands of Puducherry. The Periodical survey of the Avian fauna in the selected sites of the Ousudu lake reveals the presence of 41 species belong to 18 families. In general, the species to the order Pelicaniformes, Podicipediformes, Ciconiiformes, Anseriformes, Falconiformes, Gruiformes, Charadriiformes, Apodiformes, Coraciiformes and Passeriformes were found in the Ousudu lake. However, the Relative density varies with seasons as Summer > Monsoon > Winter. The study on the Survey of Avianfauna would be useful for future initiatives in studying ecotourism and Conserving the Ousudu lake, an important wintering area for migratory birds and more suitable for aquatic birds.

Keywords Ousudu Lake, Avianfauna, Relative Density, Wetland

Introduction

Birds are the most apparent and familiar wildlife in wetlands. Wetlands are vital feeding and nesting grounds for waders, feeding areas for fish-eating birds and wintering grounds for migratory birds. Wetlands also provide important environmental services – they filter out toxic wastes, pathogens, excess nutrients, sediment and other pollutants. They prevent erosion, reduce flooding by storing storm water, and (in the case of coastal wetlands) reduce storm damage by absorbing waves^[1,2]. The relation between wetlands and birds is shaped by many factors. These include the availability, depth and quality of water, the availability of food and shelter, and the presence or absence of predators. Birds that use wetlands for breeding depend on the physical and biological attributes of the wetland. Birds have daily and seasonal dependencies on wetlands for food and other life-support systems. The value of a wetland to a specific bird species is affected by the presence of surface water or moist soils and the duration and timing of flooding^[3].

Among the three major wetlands of Puducherry (Ousudu lake, Kaliveli and Bahour lakes), the Ousudu lake is not only the most important fresh-water lake of Puducherry region, but also the most important wetlands of Asia. Ousudu lake is a major wintering spot for a large number of migratory birds from the northern countries like USSR and China to seek respite from the severe cold and is a rich source of inland fisheries. The lake catchment harbours several plants which have high utility value as medicinal, ornamental and timber yielding species. At present, the lake catchment as well as the water body are facing serious threats from weed infestation, encroachment, poaching and pollution^[4].

Since the available information on the physicochemical characteristics and Diversity of Fauna and Flora of Ousudu Lake is limited, the present investigation is undertaken to make a preliminary Survey on the

Wetland Avifauna of Ousudu lake for future initiatives in studying Ecotourism and conservation of Ousudu lake Puducherry.

Materials and Methods

Information on the historical background and the biological importance of the selected site, Ousudu lake were collected from the Gazetteer of Puducherry and the Public Works Department, Government of Puducherry.^[5] The lake is situated near the village Ousudu, a 11° 57' N, 79° 45' E partly in Tamilnadu State and partly in Puducherry Union Territory. The eastern and northern portions of the lake lie in Tamil Nadu. The fore-shore of the lake lies in Kadapperikuppam, Kondimedu and Poothurai villages of South Arcot district of Tamilnadu. Ousudu lake is situated about 16 km South of the much larger Kaliveli Tank of Tamil nadu the two wetlands are ecologically linked through the migratory birds which frequent both the lakes on their visits lake was intensively surveyed for diversity of Avian fauna. For the convenience, the area of the lake is divided into four zones, North, South, East and West.

The survey was done periodically once in 15 days, for a period of 9 months Monsoon, Winter and Summer seasons. The visual counting method was followed to count the number of birds of different species found in the branches of trees, shore regions and water. The counting was done in all four sites of the lake. Then the birds were identified with the help of a Manual^[6]. Further, the identification was confirmed with the Ornithologist, Department of Wildlife Biology, AVC College, Mayiladuthurai. The Relative Density of each Species was calculated. Water samples were also collected and the Physico-chemical Parameters viz., Temperature, pH, Dissolved Oxygen content and Salinity of water samples were analyzed by standard methods^[7].

Results and Discussion

The range, distribution and abundance of birds is closely linked to climate, various factors which shape the relation between wetlands and birds. The factors include the availability, depth, and quality of water, availability of food and shelter and the presence or absence of predators. Birds that use wetlands for breeding depend on the physical and biological attributes of the wetland. Any variation in any of these wetland features affects the distribution of birds^[8]. Several species of resident or locally migrated birds are found in Puducherry. In Winter months, the bird fauna is considerable enriched by the arrival of several species of migratory birds from the North. Most of the birds found in other parts of the plains of peninsular India occur in Puducherry also^[5].

Abbasi^[4] has reported that the Ousudu lake is an important wintering area for migratory water fowl and is considered much more suitable for diving ducks, than the nearby Kaliveli wetland so far as 105 species of native and migratory birds have been spotted in and around Ousudu lake. Peak counts in the winters of 1986-87 and 1987-1988, included thousands of dabbling ducks, like *Anas querquedula*, *Anas penelope*, *Anas acute*, Egrets, *Aythya ferina*, *Ciconia ciconia*, *Himantopus*, *Threskiornis melanocephalus*, *Anastomus fuligula*, *Anastomus oscitans*, *Ardea cinerea*, *Fulica atra* and *Plegadis falcinellus* and other shore birds Ousudu lake also serves as an alternative to birds when Kaliveli dries out. Some species like egrets, Storks, and ibises move to Ousudu lake when there is dearth of water in Kaliveli. Further, it has been reported that some birds like fantail snipe, stints, plovers, Lapwing and sandpipers come to Ousudu lake from as far as Africa and Northern Europe.

The number of species of Avian fauna and their composition and diversity in Ousudu lake have been presented in (Figures 1-2 and Table 1). The Periodical survey of the Avian fauna in the selected sites of the Ousudu lake reveals the presence of 41 species belong to 18 families. In general, the species belong to the order Pelicaniformes, Podicipediformes, Ciconiiformes, Anseriformes, Falconiformes, Gruiformes, Charadriiformes, Apodiformes, Coraciiformes and Passeriformes were found in the Ousudu lake. However, the Relative density of the birds belong to these orders vary.

Among the orders, Passeriformes comprising four families, followed by Ciconiiformes, and Charadriiformes comprising three families each. The order Pelecaniformes includes two families and the remaining six orders comprising only one family each. In general, the present study reveals the presence of waders

(Ciconiiformes), migratory birds (Anseriformes), Shore birds (Charadriiformes) perching birds (Passeriformes), Hawks (Falconiformes), Rails and Coots (Gruiformes), Grebs (Podicipediformes), Fish eating birds (Pelicaniformes and Coraciiformes)

Among the order Ciconiiformes, the family Ardeidae is found to be dominant and representing 8 species viz., *Ardea cinera*, *Ardea goliath*, *Ardea purpurea*, *Casmerodius albus*, *Ardeola grayii*, *Bubulcus ibis*, *Egretta garzetta* and *Nycticorax nycticorax*. The order Pelecaniformes includes *Phalacrocorax niger*, *P. carbo* and *Anhinga melanogaster*. The Family Charadriidae is comprising *Pluvialis squatarole*, *P. fulva*, *Tringa tetanus*, *Tringa Stagnatilis* and *Calidris minuta*. Further, the family is charadriidae followed by *Glareolidae* and *Laridae*. Two species of birds, *Glareola prantincola* and *Glareola lactea* belong to *Glareolidae*. The species composition of Family *Laridae* is *Chlidonias hybridus*, *Sterna aurantia* and *Sterna hirundo*. The Family *Podicipitidae* of podicipediformes, *Anatidae* of Anseriformes, *Accipitridae* of Falconiformes, *Rallidae* of Gruiformes and Family *Alcedinidae* of order Coraciiformes represent only one species each.

The physico-chemical characteristics of the water such as Temperature, pH, Dissolved oxygen, Salinity, were analysed for the period of Nine months (October 2010 – June 2011) to observe the variations in the parameter with different season's viz. Monsoon, Winter and Summer. The values are presented in Tables (Figure 3- 6). The Temperature observed in the Surface water was found to be Minimum, (29.5°C) during October 2011 and Maximum (35.8°C) during June 2011 (Figure 3) and (Figure 4) depicts the variation in the levels of pH in the water samples of Ousudu lake has highest value was observed in the month of June 2011(8.4) and lowest in the Month of October 2010(6.8) The levels of Dissolved oxygen in the water samples of Ousudu lake for the period October2010-June 2011 has been shown in Fig 5 . The Dissolved oxygen level was found to be Minimum in the Month of April 2011 and the Maximum in the Month of December 2010. The highest Salinity content level was recorded during the period (May-June 2010) and the Minimum was observed in the Month of October 2011 (Figure 6).

Dissolved oxygen showed inverse relationship with water temperature. The Maximum Dissolved oxygen was observed during Monsoon season when the Temperature was Minimum. Our results are in agreement with the studies of [9,10] who have observed the inverse relationship between dissolved oxygen and temperature. Seasonal variation observed in dissolved oxygen content with higher values in rainy season could be due to increased aeration because of rainfall. Ayoade [11] reported that Dissolved oxygen level at Asejire lake attained its peak in the rainy season. Temporal variations in aquatic systems can have direct and indirect effects on factors influencing Nutrient fluxes [12]. In the present study also, the Dissolved oxygen was indirectly proportionally to Temperature. pH of water plays an important role in the life of aquatic organisms because most of their metabolic activities are pH dependent. According to king [13], higher pH is normally associated with a high photosynthetic activity in water. The high pH in summer observed in the present study may be due to increased photosynthesis. Moreover, accumulation of dissolved salts, increased salinity due to high rate of evaporation in summer.

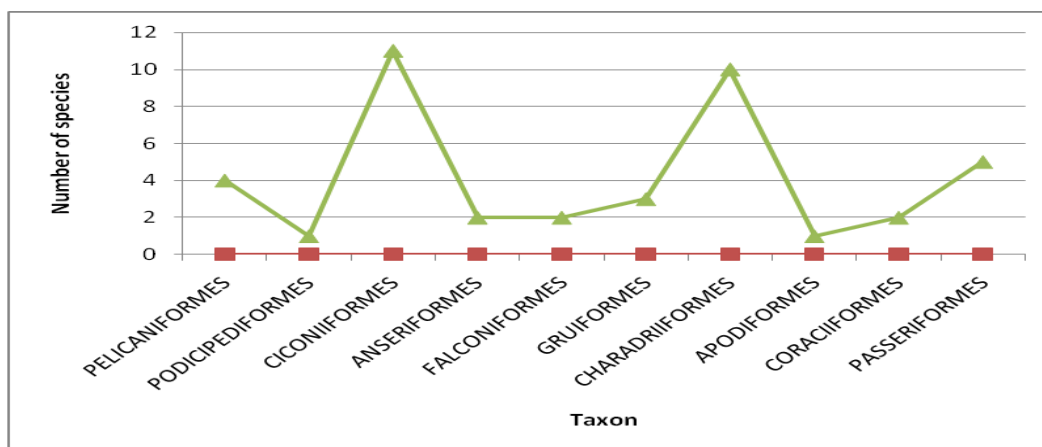


Figure 1: Avian Diversity in Ousudu lake, Puducherry, India

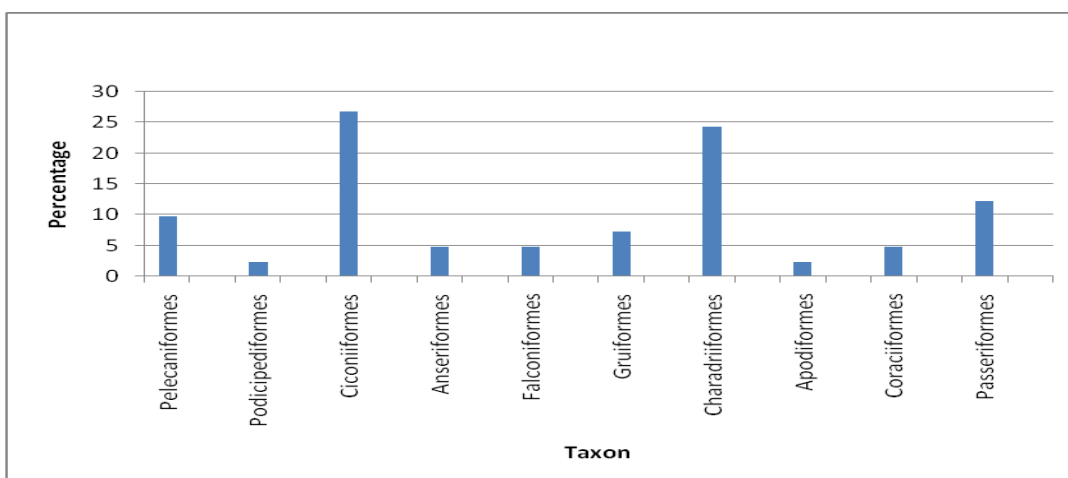


Figure 2: Percentage composition of Avifauna in Ousudu lake, Puducherry India

Table 1: List of different species of birds observed in Ousudu lake, Puducherry

S. No.	Family	Scientific name	Common name	Local name
1	Phalacrocoracidae	Phalacrocorax niger Phalacrocorax carbo Anhinga melanogaster	Little cormorant Great cormorant Darter or Snake-bird	Neer kagam Peria near Kagam Pambuttara
2	Pelecanidae	Pelecanus philippensis	Spot-billed pelican	Kulakeda
3	Podicipitidae	Tachybaptus ruficollis	Little grebe	Tanni pullu
4	Ardeidae	Ardea cinera Ardea goliath Ardea pupurea Casmerodius albus Ardeola grayii Bubulcus ibis Egretta garzetta Nycticorax nycticorax	Grey heron Goliath heron Purple heron Large egret Indian pond- heron Cattle egret Little egret Black-crowned night-heron	Sambal narai Peria narai Chennarai Peria vellai kokku Madayan Unni kokku Chinna vellai kokku Vakka
5	Ciconiidae	Anastomus oscitans	Asian openbill-stork	Naththai kuththi narai

6	Threskiornithidae	Therkiornis melanocephalus Plegadis facinellus	Oriental white ibis Glossy ibis	Thalaikaththi chondan Karuppukottan
7	Anatidae	Aythya ferina Aythya fuligula	Common pochard Tufted pochard	None recorded Kurungalian
8	Accipitridae	Milvus migrans Haliastur Indus	Black kite Brahminy kite	Kalu parandu Krishna parandu
9	Rallidae	Gallinula chloropus Porphyrio porphyrio Fulica atra	Common moorhen Purple moorhen	Kanan kozhi Neela kozhi Neer kozhi
10	Charadriidae	Pluvialis squatarola Pulvialis fluva Tringa totanus Tringa stagnatilis Calidris minuta	Common coot Grey plover Pacific golden plover Common redshank Marsh Sandpiper	None recorded Kottan Segappu kal ullan None recorded
11	Glareolidae	Glareola pratincola Glareola lactea	Collared pratincole Small pratincole	None recorded None recorded
12	Laridae	Chlidonias hybridus Sterna aurantia Sterna hirundo	Whiskered tern River tern Common tern	Kadal Kuruvi None recorded None recorded
13	Apodidae	Cypsiurus balasiensis	Asian palm swift	Ulavara kuruvi
14	Alcedinidae	Alcedo atthis Merops orientalis	Small blue kingfisher Small Bee-eater	Meenkotti Kuttalan kuruvi
15	Dicuridae	Dicrurus macrocercus	Black drongo	Karichan
16	Sturnidae	Acridotheres tristis	Common myna	Nahanavai
17	Corvidae	Dendrocitta vagabunda Corvus splendens	Indian treepie House crow	Val kakai Maniyan kaka
18	Muscicapidae	Turdoides caudatus	Common babbler	Huni

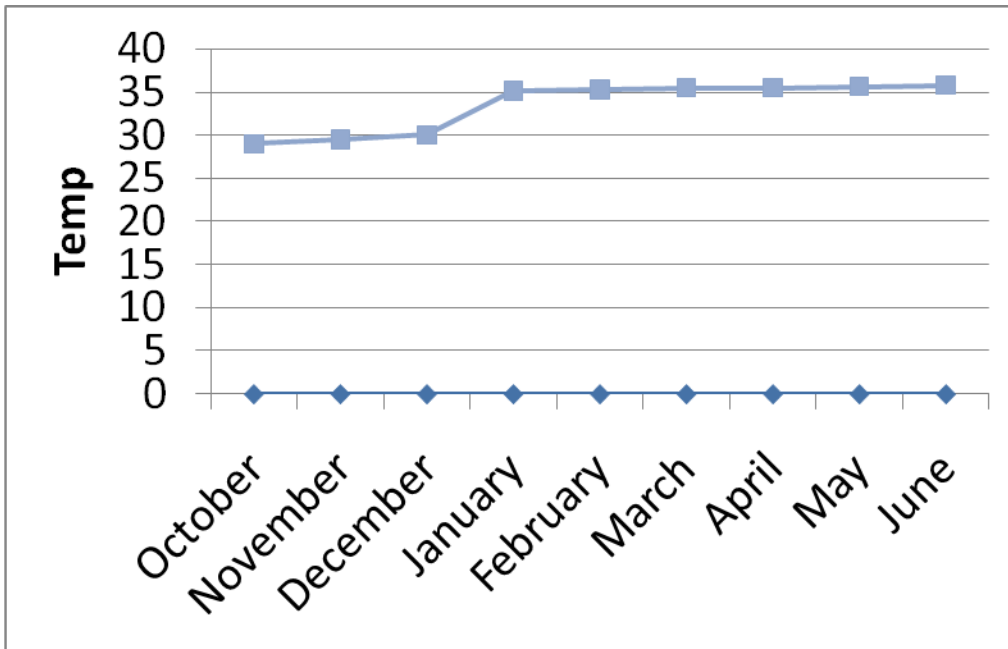


Figure 3: Seasonal variation of water temperature levels in the Ousudu lake during the study periods from Oct'2010-June2011

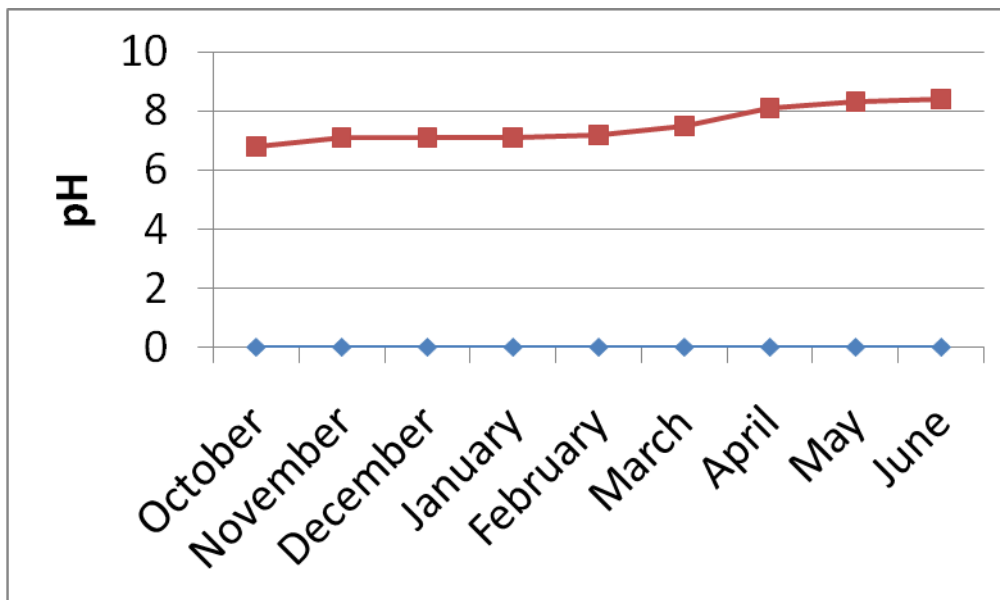


Figure 4: Seasonal variation of pH levels in the Ousudu lake during the study periods from Oct'2010-June2011

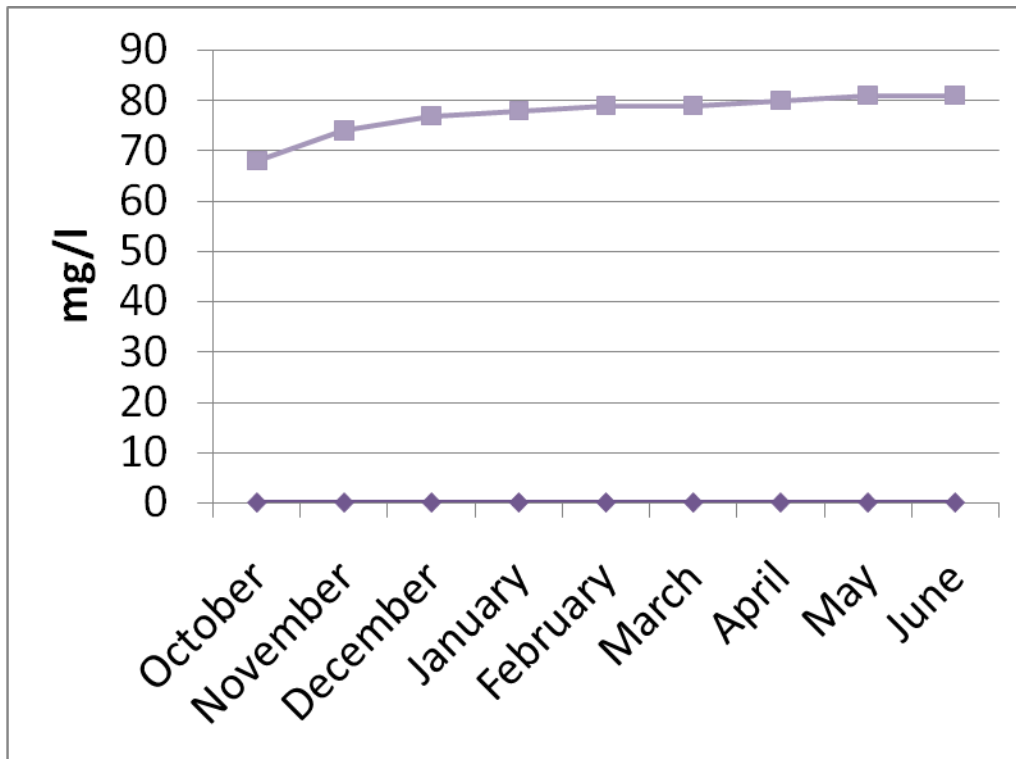


Figure 5: Seasonal variation of dissolved oxygen levels in the Ousudu lake during the study periods from Oct'2010-June2011

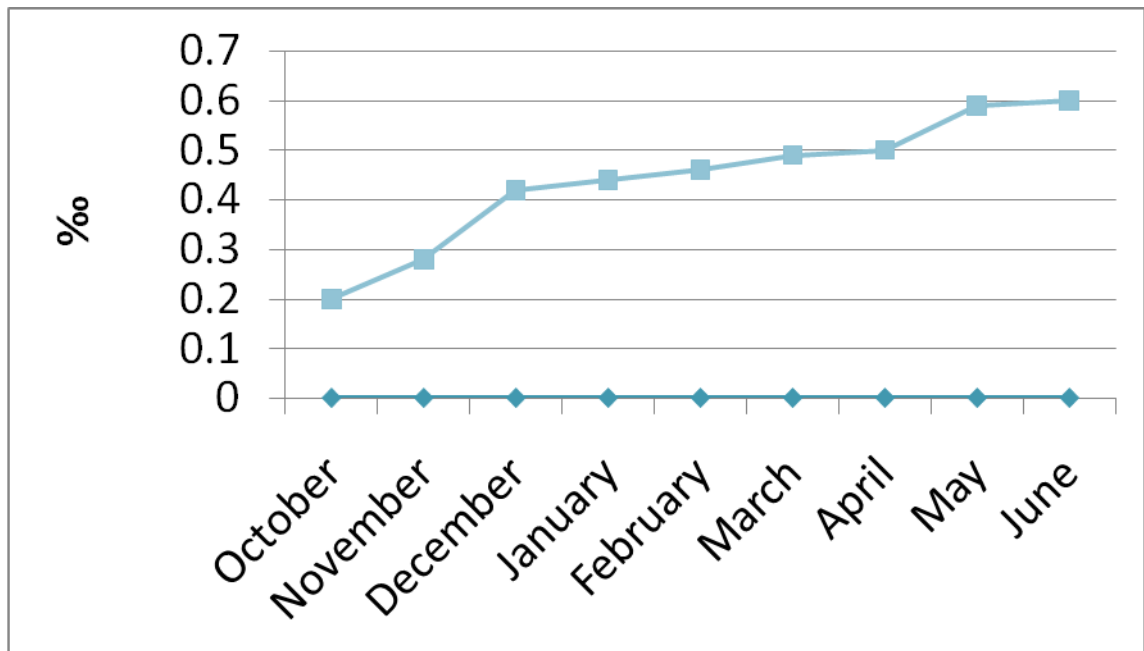


Figure 6: Seasonal variation of salinity levels in the Ousudu lake during the study periods from Oct'2010-June2011

The birds observed in the Ousudu lake displayed a well pronounced seasonal variation in their abundance and composition. In general, birds exhibit diversity and the relative density varies with seasons as the abundance and diversity is the maximum during winter season and lower during summer and monsoon seasons. The relative density depends of the birds reflects the relationship between the faunal abundance and biotic and abiotic environmental factors. In the present study, the abundance of native and migratory birds in the winter may be due to the availability of food in the form of plants, Invertebrates and smaller vertebrates, vegetarian birds eat the fruits, tubers and leaves of wetland plants. It is also evident that the water temperature influences food production. Invertebrate production in the water column is ultimately depending on water temperature and the ability of a wetland to produce algae. Further, cold water might not be a hospital environment for small animals and plants that some wetland birds eat.

Reports are available to suggest that the peak counts of birds in the winter season have been correlated with the abiotic and biotic factors and their interaction in the wetland ecosystem. Eight kinds of birds microhabitats were identified in the Chilka lake and each individual has its own specialities and thus severe to a particular group of birds. One of the main specialities of the avifaunal character of Chilka lake is that, most of its bird population is of migratory nature, 25% of total bird population are found to be residents of the lake and the rest migratory ^[14]. It has been reported that the abundance of plankton population is found to be poor during monsoon due to increase in salinity but abundant after monsoon floods and peaks of plankton were observed in the northern sector of Chilka lake.^[14]

In the present study, the abundance and diversity of native and migratory birds are maximum in the monsoon period, indicating the interrelationship between Avian fauna and the abiotic and biotic factors. The peak counts in the winter season are mainly due to the availability of food which includes the planktons and smaller animals. Further, the physico-chemical factors like pH, Salinity, Dissolved oxygen and Temperature, Turbidity are also reported to be the determining factors, which may be conducive for native and migratory birds for feeding and breeding.

The physical and chemical variations in the wetland ecosystem are largely influenced by the annual cycle of monsoon rains prevalent during October-December of every year. During the season, North east Monsoon is very active bringing rainfall to Tamil Nadu and Puducherry. A Monsoon impact is the lowering of the temperature increasing the availability of water, which is followed by growth of vegetation. The rise in temperature and abundance of vegetation during post monsoon and summer might have influenced the diversity of avian species.

In the present study also, the relative density of avian species is lower in summer compared to Monsoon and winter. It may be due to high Temperature and Salinity and low Dissolved Oxygen content. In general, birds exhibit diversity and the relative density varies with seasons as summer > Monsoon > Winter. The seasonality of birds may be a reflection of their life style adaptation, Particularly controlled by temperature regime. Further, unchecked poaching, Excessive grazing of littoral vegetation by domestic animals might have affected bird life by destroying habitats.

The present investigation reveals that the luxuriant growth of vegetation and the climatic changes during the later part of Monsoon is highly conducive for feeding and breeding and the population is in a better position to grow and establish for the continuation of the race. Thus, the birds have beautifully synchronised their life style to the ecobiology of the region.

Thus the present study reveals that the wetland Ousudu lake is an important wintering area for migratory birds and more suitable for aquatic birds. Since the wetland Ousudu lake is declared as a bird sanctuary by the Department of Forest and Wildlife, Government of Puducherry, bird watching may be encouraged, Unchecked poaching may be prevented, Destruction of the habitat by the local people for the firewood collection and cattle grazing may be prohibited. Further, the present study on the Survey of Avianfauna would be useful for future initiatives in studying ecotourism and conserving the Ousudu lake, the most important wet land of Puducherry region.

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