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RESEARCH ARTICLE

FEEDING GUILD AND DIVERSITY OF AVIFAUNA AT SOTHUPARAI RESERVOIR, PERIYAKULAM, THENI DISTRICT, TAMILNADU, INDIA

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ABSTRACT

Understanding the diversity and structure of bird communities is essential to delineate the importance of regional or local landscapes for avian conservation. Birds are very sensitive to environmental changes and are used as "bioindicator." The study was carried out to explore the diversity and status of avifauna in the Sothuparai Reservoir, Periyakulam, Theni District, from June, 2013 to May, 2014. Total count method was used to cover most of the study area. A total of 38 species of birds belonging to 29 families were identified. Campephagidae was the most dominant family with 4 species. The analysis of data on residential status revealed that 24 species were residents, 10 local migrants and 4 resident migrants. The analysis of feeding habits showed that a maximum bird species were insectivorous, and minimum species was Piscivore. According to the International Union for the Conservation of Nature, all the 38 species were in the Least Concern category. The number of species was high during May whereas the abundance was high in October. Number of species and abundance was low in June. The diversity of the birds were high during the month of May and low in June. Thus, the Sothuparai Reservoir supports a sound avifaunal diversity. Its proper management will not only improve the situation for its resident species, but will also attract more migrants in the future.

INTRODUCTION

One thousand and two hundred and twenty six bird species were threatened globally. India being a mega –diversity center harbours about 1301 species of birds that amounts to 13% of the total birds of the world (Ali, 2012). Out of which 88 species of bird and is in the seventh position (Bird life International,2010).Birds are the most conspicuous and significant component of different habitats, their presence or absence may indicate the ecological conditions of the particular area (Rajpar & Zakaria, 2011).Birds are the best monitors of an environmental change. And hence birds serves as the best monitors of an environmental change. Due to the spreading of urbanization and modern technology distribution of species may change with the local scale processes. The preservation of global species diversity has emerged as one of the most important issues today (Hue *et al*., 2011).

The health of the forest ecosystem depends on the avian population, density and species diversity which in turn directly reflects the changes in their habitat conditions. The extent of change determines the long term conservation of biodiversity (Canterbury *et al*., 2000). The population studies have traditionally been used to monitor large scale, long term changes in avian population and to assess both habitat quality and the responses of birds to both natural and human caused environmental changes (Weins, 1989).

Preservation of global species diversity has emerged as one of the most important issues today. Rapid decline of some common birds in India has been widely reported but here is a lack of solid documentation. Study of avifaunal diversity is an essential ecological tool which acts as an important indicator to evaluate different habitats both qualitatively and quantitatively (Bilgrami, 1995). Unfortunately global diversity of birds is decreasing incessantly primarily due to anthro-pogenic disturbances (Rapoport, 1993) and climate change (Chen *et al*., 2011; Sekercioglu *et al*., 2012).

The Western Ghats is one of the 24 Biodiversity hotspots in the world. Evaluating the bird communities of the Ghats to plan for biodiversity friendly is gaining significance. The study was undertaken in Sothuparai Reservoir located at the foothills of the Western Ghats.

Ali (1979) opined that the study of birds in relation to habitats would give valuable data for forest management. Although the

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vegetation determined the distribution and abundance of most terrestrial bird species, correlation analysis of various communities, resource and habitat parameters provide no such guidance to underlying causes community pattern (Gilbert, 1984). Many factors are thought to play a secondary role in determining the community structure (MacArthur, 1972).

Seasonal variations in the food availability also determines the regular pattern of migration and local movements. Food availability is the major factor determining the seasonality of breeding (Vijayan *et al.*, 1999).Cody (1968) explored the resource division in grassland bird communities and found that the influx of migratory bird population was due to the availability of arthropods (Greedberg,1995).

The bird species differ from an vertical strata of an area to another and are adapted to specific types of plant and animal food.

Therefore the present work is a documentation of the distribution of birds in the Sothupaarai Reservoir, based on their migratory status, feeding habit, guild and threats of avifauna.

METHODOLOGY

Study Area

Periyakulam (PKM) is located at 10.07°N 77.33°E. It has an average elevation of 282 metres (925 feet). It is located at the foothills of the Western Ghats bordering the neighbouring state of Kerala. It is one of the most fertile places in the state of Tamil Nadu. Periyakulam Town has an area of 21 km^2, within an Semi urban area now extending over as much as 55 km^2 The climate is dry and hot, with Northeast monsoon rains during October–December. Temperatures during summer reach a maximum of 40 and a minimum of 26.3 °C, though temperatures over 43 °C are not uncommon. Winter temperatures range between 29.6 and 18 °C. The average annual rainfall is about 135 cm.

Sothuparai is situated at Periyakulam in Theni District and it is 9 km away from Periyakulam. Sothuparai dam supplies water to Periyakulam throughout the year. Irrigation under Sothuparai system 2,865 acre. Capacity of maximum water level is 100 million sq .ft. Water spread area of maximum water level is 48.64 sq. m. Maximum flood discharged allowed, 807.48. Full reservoir level is 405.5cm. Length of dam is 345 meter. Height of the dam is 1035.00 feet. Maximum water level is 100.22 feet.

The plants such as Tamarind (*Tamarind indica*) Mango (*Mangifera indica*), Neem (Azdiracta indica), Kashid (*Cassia fistula*), Gulmplhar (*Delonix regia*), Nilgiri (*Ecalyptus sp*.), Baniyan (*Ficus religiosa*), Fig (*F.bengalensis*) Accacia (*Accacia arabica*), Bor (Ziziphus jujube) and Karanj (*Pongamia glabra*) are found in and around the Sothuparai Reservoir. The most cultivating crops are Mango, Banana and Sugar cane.

Bird Census

The bird census was taken from June, 2013 to May, 2014. The method of total count was employed to survey the bird population (Howes and Bake well, 1989). In this method, the blocks were identified and the bird in the blocks were counted using a pentax binocular and identified using physical features with the help of field guide (Ali and Ripley,1983, Inskipp *et al.*,1998). Birds were recorded during the study period. The list of bird species were arranged family wise following Manakadan and Pittie (2001).The feeding habit guild of bird species were categorized as insectivorous, piscivorous, omnivorous, carnivorous, granivorous, frugivorous and nectivorous.

RESULT

During the period of study from June 2013 to May, 2014, 1946 birds were recorded. Among them 38 species belonging to 29 families were categorized in the Sothuparai Reservoir. Figure 1 depicts the number of birds in Sothuparai Reservoir during the year 2013 – 2014. The maximum number of birds were in October and minimum in June.

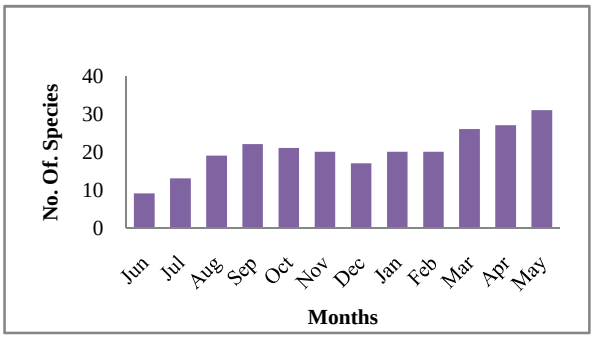

Figure 1 Number of Avifauna seen in Sothuparai Reservoir during June, 2013 to May, 2014

Migratory Status

Campephagidae was the most dominanat family with 4 species. Figure 2 depicts the analysis of data on residential status revealed that 24 species (59.96%) were residents (R) ten species (27.28 %) were Local migrants (LM) and four species (12.94 %) were resident migrants (RM). The resident migrants (RM) were Indian Golden Oriole, Large Cuckoo Shrikes, Red rumped Swallow and Southern spotted Owl.

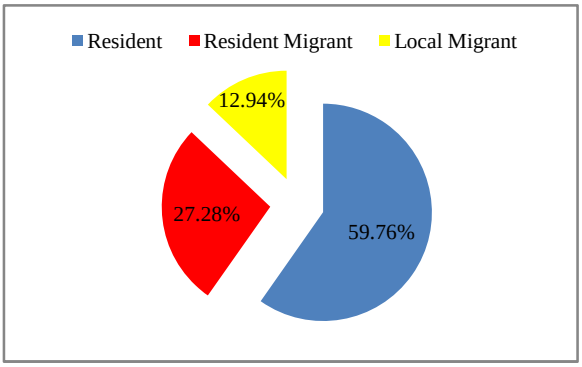

Figure 2 Migratory status of bird species in the Sothuparai Reservoir

Feeding Guild

According to the IUCN, all the 38 species were in the least concern category. Feeding habit of each bird species was observed cautiously. Analysis of feeding guild revealed that 45.42% were insectivorous, 19.06% were Omnivorous, 15.72 % piscivorous, frugivores were 8.17 % Insectivorous and frugivores 5.34%, Nectivorous 4.72% and Carnivorous, 1.54%. The present study reveals a high percentage of insectivorous bird diversity (Figure 3) as compared to birds with other food habits in Sothuparai Reservoir. The Omnivorous bird rank the second in the guild structure and next is the piscivorous(15.06 %). The piscivorous birds such as Coot, Grebe, Cormorant, Little Egret, Indian Pond Heron was dominant during the rainy season.

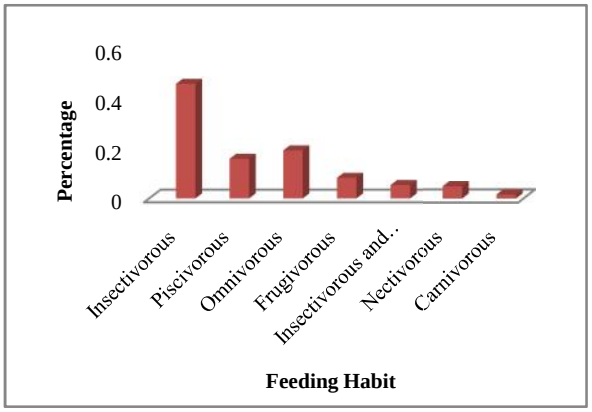

Figure 3 Percentage of bird species related with feeding habit in Sothuparai Reservoir

The diversity of birds were high during May (2.92) and low in June (1.75) (Figure 4). Evenness was High in August (0.853) and it was low in November (0.761) (Figure 5).

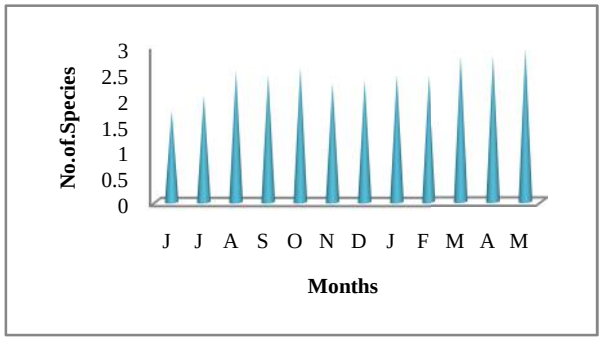

Figure 4 Diversity of Avifauna seen in Sothuparai Reservoir during June, 2013 to May, 2014

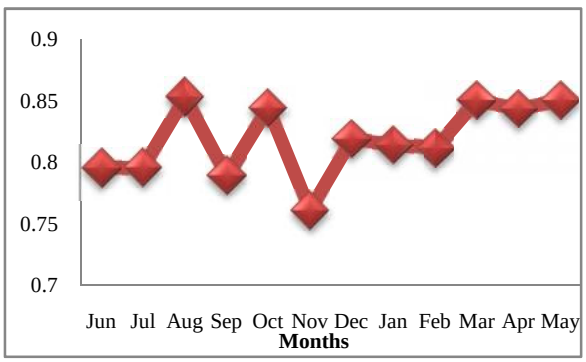

Figure 5 Evenness of Avifauna seen in Sothuparai Reservoir during June, 2013 to May, 2014

DISCUSSION

Birds serves as an important component to study an ecosystem as they have the ability to fly away and abnoxious condition. Therefore they are the important health indicators and productivity of an ecosystem (Newton 1995., Desai and Shawberg, 2007., Li and Mundkur, 2007). In a bird study the important parameters are the species richness (Nilsson and Nilsson, 1978., Weller, 1978., Murphy *et al*., 1984) their density (Patterson, 1976., Nilsson and Nilsson, 1978) and diversity (Krebs, 1985).

The insectivorous birds recorded in Sothuparai Reservoir weres Red breasted flycatcher, Red rumped Swallow, common Iora, Chestnut headed Bee eater, South Indian Black Backed Robin, South Indian Black Drongo, Small minivet, Swift and Indian Tailor bird. The dominance of insectivorous birds could be due to the flowering and fruiting season of many angiosperm plants and higher population of insects. These facts might be responsible for increase insect prey resource during rainy summer season as a resultant rise in the insectivorous bird population.

Similar dominancy of insectivorous bird population has been reported in dry deciduous forest of Sangili district (Kumbar and Ghadage, 2012) Amaravati district comprised of evergreen, semi- evergreen and deciduous forests (Wadataker and Kasmbe, 2002, Kulkani *et al*., 2005).

Bird species shift their feeding habit between seasons (Ward, 1969). Also, the presence of high number of bird species in terrestrial habitats could be due to the presence of varieties of microhabitats which provide niche for different species of birds. The area had different patches of habitats ranging from grasslands, shrublands, and wooded shrublands and riverine vegetation, thus providing multiple and varieties of alternative food and roost for birds

Seasonal variation in water level in the Sothuparai reservoir is dependent on the amount of rainfall received in the Catchment area. The depth of water varies from 20 -24 feet during rainy season and 8n -10 feet during summer, drought was never noticed in this area during the study period. Therefore the high number of piscivores in the study area might be due to the availability of food, huge aquatic ground for shelter, perching and breeding.

The distinct seasonality of rainfall and seasonal variation in the abundance of food resources result in seasonal changes in the species abundance of birds (Gaston *et al*. 2000; Karr & Roth 1971). The distribution and abundance of many bird species are determined by the composition of the vegetation that forms a major element of their habitats. As vegetation changes along complex geographical and environmental gradients, a particular bird species may appear, increase or decrease in number, and disappear as the habitat changes (Lee & Rotenberry 2005).

These reservoirs are also an important site for observing some birds listed as near threatened species of IUCN Red list. The occurrence of the migratory birds in the area indicates that the critical habitat is important for the organisms. Likewise, the occurrence of these birds in the area suggests that the area

provides a favorable condition for the bird's breeding, feeding and nesting (Donar *et al*., 2012). Studies have shown that birds migrate to different areas because of seasonal changes (Lank *et al*., 2003), availability of food (Scott, 1993) and threat of predation Shirazi,(1993).

The higher abundance of birds in terrestrial habitat could also be due to the composition of the vegetation that forms the main element of their habitat (Lee and Rotenberry, 2005; Chapman and Reich, 2007; Salah and Idris, 2013). Vegetation cover has been reported to have a strong influence on avifauna diversity (Scott Mills *et al*., 1989; Radford *et al*., 2005).

The Shannon Weiner diversity Index of the present study was highest during summer and minimum during June. Joshi and. Shrivastava, (2012) reported that the bird diversity throughout the three seasons of the study period were high at these Tawa Reservoir. The large size of Yiganda, as compared to the other sites might contribute to the highest bird species diversity and evennes. In natural habitats where the intervention of humans is less and minimum, the diversity as well as the evennes of species is higher than the fragemented ones where intensive farming is carried out (Rana 2005)

CONCLUSION

The study concluded that Sothuparai Reservoir is very important for the bird communities. There was greater variation in species composition between terrestrial and aquatic habitats. Terrestrial habitat contributed much in terms of species composition than aquatic habitat. Thus, if the amount and quality of Reservoir is substantially reduced, populations birds in the area also can be expected to decrease. Further studies to cover the nocturnal birds to generate a comprehensive list of bird species diversity in and around the Sothuparai Reservoir is vital. Land use planning protects the area and emphasizes bird-friendly land-scape design around Sothuparai reservoir may enhance avian diversity and abundance within the area.

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