

Population Fluctuations of Local Migratory Birds in the Human Inhabited areas of Thattekkad Bird Sanctuary, Kerala, India

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Abstract—Birds are among the best monitors of environmental changes and have been used to evaluate the environment throughout the history as “bio-monitors” and; the changes in their population, behaviour patterns and reproductive ability have most often been used to examine how in the long term it affects the habitat fragmentation. 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). The present study was on the population of Local migratory birds sighted in the human inhabited areas of Thattekkad Bird Sanctuary, Kerala, India during the study period (March 2015-April 2018). It was observed that 62% of the total observed birds were Residents, 12% were Residents or Local Migrants, 10% Local Migrants, 8% Migrants, 7% Resident Migrants and only 1% belong to Migrant or Local Migrant status. As majority of the birds were residents, they will be present within the habitat in the entire year whereas the migrant birds present in the human inhabited areas of the Thattekkad bird sanctuary is only 8% and so those birds will visit the study area only in the specific months of the year. It was found that 10 species of birds belonging to four families were local migrants, which migrate only to a short distance and found within the short distances of the locality. The local migration depends on the behaviour like roosting, nesting and mating; or may depend on the availability of food and water and also may be on the climatic and environmental factors. The local migrants observed were little egret, median egret, large egret, cattle egret, purple heron and black bitter of family Ardeidae; Blue-winged parakeet and Blossom headed parakeet of family Psittacidae; chestnut headed bee-eater of family Meropidae and Great black woodpecker under family Picidae. Family Ardeidae dominates the other three families in number of species as well population of birds sighted during the study period. Family Ardeidae consists of 6 species of birds and the most species-rich one, followed by Psittacidae with two species of birds. Rest of the two families Meropidae and Picidae constitute only one species of birds each. The guild status revealed the presence of 60% of carnivores and 20% each for Insectivorous and Frugivorous birds. As insects form a part of the diet of carnivorous birds, these birds along with insectivorous birds play vital role in pest control.

1. INTRODUCTION

India ranks 10th in the list of most forested nations in the world with 76.87 million ha of forest and tree cover. Like other forests of the world, our forests also provide critical ecosystem goods and services. However, the significant role of forests in carbon storage and sequestration has increased their importance manifold and brought them to the centre-stage of climate change mitigation strategies. India's forest and tree cover accounts for about 23.4% of the total geographical area of the country. Diversity of avifauna is one of the most important ecological indicators to evaluate the quality of habitats. Now-a-days, avifaunal diversity has been decreasing due to the destruction of natural habitats and human disturbances. Birds are among the best monitors of environmental changes. Changes in their population, behavior patterns, and reproductive ability have most often been used to examine the long-term effects of habitat fragmentation (Harisha and Hosetti, 2009).

Kerala has six National parks and 16 Wildlife Sanctuaries, Of which, Thattekkad Bird sanctuary is one of the famous ones. The present study was carried out in the human inhabited areas of Thattekkad Bird Sanctuary, the first Bird Sanctuary in Kerala which owes its tribute to world famous ornithologist Dr. Salim Ali, who was the one who recognized the area's significant avian diversity. The sanctuary lies on the foothills of the Western Ghats and is a large ecological unit comprising of Malayattoor, Sholayar, Parambikulam hill ranges on one side while Munnar, Eravikulam and Chinnar on the other side enriched with diverse vegetation types from Evergreen to Suburb forests aiding birds in their seasonal migration.. Recently, Dr. Sugathan recorded 270 species of birds, which is now upgraded to 284 species of birds from the Thattekkad bird sanctuary. The present paper focus on the detailed study of Local migratory birds observed in the study area.

2. STUDY AREA

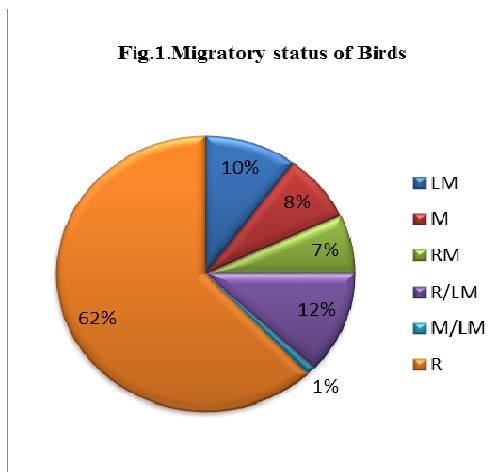
The study area selected for the present study is the human inhabited land area within the Thattekkad bird sanctuary cultivated, with diverse kinds of crops, spread in around 9 kms. Six plots of three hectares were selected each with different cultivated crops.

3. METHODOLOGY

Direct observation and line-transect methods were involved and observations were made once in a week in the morning hours (8am -10am) for three years (March 2015-April 2018) in the selected six plots on either side of the transect.

4. RESULTS AND DISCUSSIONS

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).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). From the present study in the human inhabited areas of Thattekkad Bird sanctuary, about 17,515 birds were recorded from the selected transects, belonging to 14 orders and 37 families during the study period. The migratory status of observed birds(Fig.1) found that 62% of the total birds were Residents , 12% were Residents or Local Migrants(R/LM), 10% Local Migrants(LM), 8% Migrants(M), 7% Resident Migrants(RM) and only 1% were Migrant or Local Migrant(M/LM) status.



As majority of the birds were residents, they will be present within the habitat throughout the period whereas the migrant birds present in the human inhabited areas of the Thattekkad

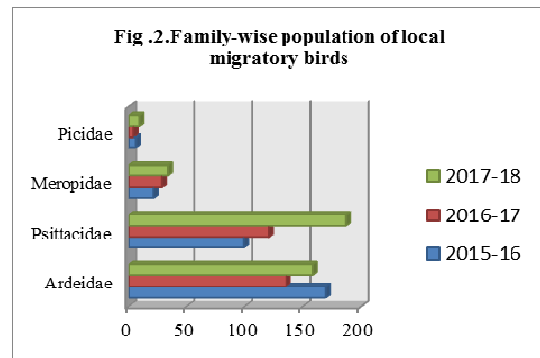
bird sanctuary is only 8% and will visit the study area only during the specific months of the year. Only 1% of the observed birds was Migratory or Local migratory, migrate only for a short distance, occupied by a single species of bird ie., Greyheaded Myna.

4.1. Local migrants in the study area

It was found that 10 species of birds belonging to four families were local migrants, which migrate only to a short distance and found within short distances of the locality. The local migration depends on the behaviour like roosting, nesting and mating; or may depend on the availability of food and water and also may be on the climatic and environmental factors.

4.2. Family-wise population of local migrants in the study area

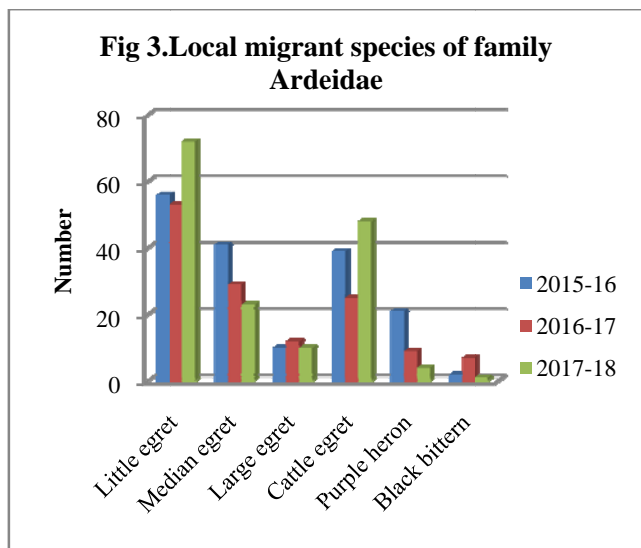
Family Ardeidae dominates the other three families in number of species as well population of birds sighted during the study period. Family Psittacidae form the second dominant family of local migrant species with only two species of birds followed by family Meropidae and Picidae with one species each, which was depicted(Fig.2).



Family Ardeidae dominate in two years of study from 2015-2017, while family Psittacidae dominate others in the year 2017-2018. Two families like Psittacidae and Meropidae showed gradual increasing populations from 2015-2018 whereas the other two families Picidae and Ardeidae showed a u-shaped plot with a sink in the middle year of 2016-2017, despite of higher values in the other periods.

4.3. Species-wise distribution of family Ardeidae

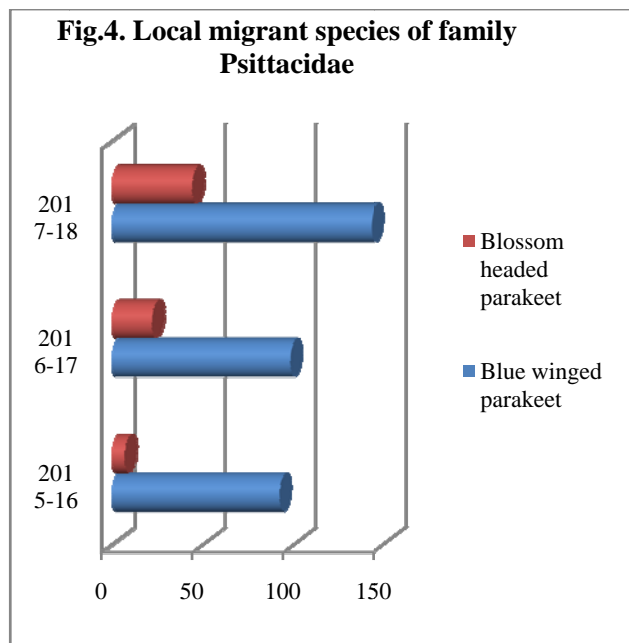
Family Ardeidae formed the most species-rich one with 6 species of birds, followed by Psittacidae with two species of birds. Families Meropidae and Picidae were the least represented with only one species of birds each.



The species-wise distribution of family Ardeidae (Fig.3) represented the 6 species of birds like Little egret, Median egret, Large egret, Cattle egret, Purple heron and Black bittern. Little egrets form the most dominant group in the entire study period. Median egrets dominates at second position only in the first two years of study (2015-17) while Cattle egrets form the second dominant group in the third year(2017-18). Large egrets were dominated by a more or less constant rate in the entire study period whereas Black bittern form the least dominant group in the study area throughout the period. Median egrets and cattle egrets represented a declining graphs, but Little egrets and cattle egrets showed the same representation, with a dip in the centre(2016-2017) and high levels in the other periods of study. Large egrets and Black bittern showed an elevation in the middle year (2016-17) besides low levels in the other periods of study(2015-16 & 2017-18).

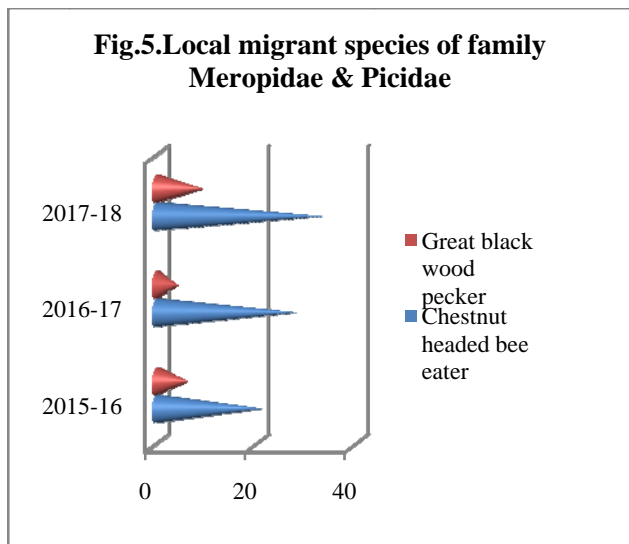
4.4. Species-wise distribution of family Psittacidae

Family Psittacidae constitute only two species of birds namely, Blue winged parakeet and Blossom headed parakeet. Their population distribution in the study area(fig.4) represented a gradual increase in the population of two species of birds from 2015-2018, in the same way. Blue winged parakeet form the most dominant and populated species both in number and resource utilisation within the study area while Blossom headed parakeet represent the least dominant species of family Psittacidae, in number and distribution within the habitat. The period of study i.e.,2017-2018 marked the highest species richness of these two species while 2015-2016, the least species-rich period.



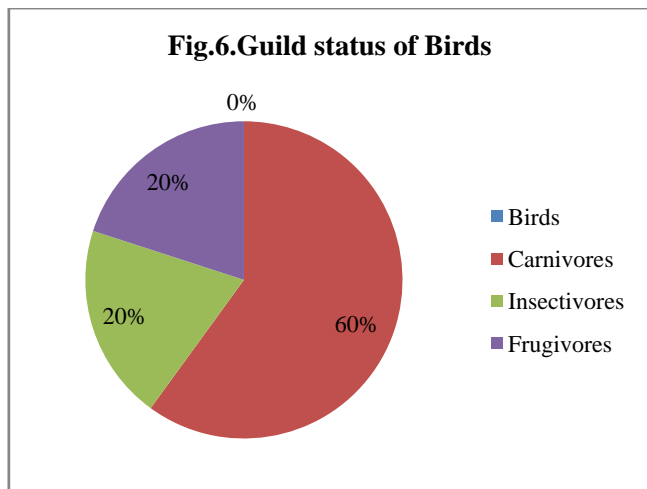
4.5. Species-wise distribution of Meropidae and Picidae

Rest of the two families Meropidae and Picidae constitute only one species of birds and their population-wise distribution depicted (fig.5) showed a gradual increase in the population of Chestnut headed bee-eater of family Meropidae from 2015-2018, with highest value in 2017-18(33) and least in 2015-16(21). Great black woodpecker of family Picidae form the only local migrant species and its population showed a peak in 2017-18(9) with least value in 2016-17.



4.6. Guild status of Local migratory birds

The birds and the food present at a particular habitat is called feeding guilds. It was found that about 60% of the Local migratory birds observed were carnivores, feed on animal matter like fishes, frogs, insects, etc., and 20% each for insectivorous birds and frugivorous birds, feeding on insects and fruits respectively (Fig.6).



As insects form one of the major food constituents of Carnivorous birds, besides the insectivores, help to control and check the pest population of the agricultural crops in the habitat. Thus they act as natural “bio-controlling agents” or “pest-managers”. Agricultural ecosystem provides a concentrated and highly predictable source of food to many birds which include grains, seeds, fruits, green vegetation of the crop plants and grasses, insects, other arthropods and rodents found in the soil, crops and other plants.

5. CONCLUSIONS

About 10% of the observed birds were Local migrants which showed migration only to a short distance within their habitat depending on factors like the availability of food, water, nesting site, breeding period etc. Agricultural production is highly dependent on ecosystem services such as pest control, pollination, seed dispersal and soil fertility. Birds that feed on harmful insects and other pests from the agro-ecosystem are beneficial to agriculturists which enhance the yield and crop-growth. Therefore important predators like insectivorous birds need to be conserved. Both “planned” and “associated” biodiversity in farming systems and agricultural landscapes provide important ecosystem services.

The major threat of bird is from habitat destruction, fragmentation and hunting. In addition to this pesticide poisoning is also one of the factors for bird extinction. The rigid framework should be made in order to avoid killing of birds and also the interdisciplinary research should be carried out with the help of experts in various fields that leads to the decrease in damage of farmers and also increase in the life of birds, maintaining diversity and homeostasis of the ecosystem.

6. ACKNOWLEDGEMENTS

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