

Anthropogenic impact and Urbanization on Avifauna from a populated Residential area in Ottapalam, Kerala.

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Abstract

In a world of swift anthropogenic land use changes and declining biodiversity, there is an urgent need for considerate the state of biodiversity to aid management and conservation. In order to magnificently manage land use in ways that is least harmful for biodiversity, it is vital to be able to identify habitats that are of most importance for biodiversity. The objective of this paper is to report the most bird observations and to augment the knowledge of the avifauna of an ornithological poorly known area.

Keywords: Avifauna, residential area, biodiversity conservation

Introduction

All kind of land use and alteration has a consequence on biodiversity; like urbanization, de- and afforestation, industry or agriculture (Vitousek *et al.*, 1997, Sala *et al.*, 2000). The type and the nature of urban green spaces (Oleyar, *et al.* 2008) yield very different outcomes (Pickett *et al.* 2001; Mansfield *et al.* 2005; Sandström *et al.* 2006, Maas *et al.* 2006, Farmer and Lipscomb 2006). Birds are some of the most prominent species of the Earth's biodiversity and sensitive to environmental changes and act as ecological indicators (Niemi, 1985; Furness and Greenwood, 1993; Taper *et al.* 1995; Gregory *et al.*, 2003; Olechnowski 2009). The relative value of different habitats and conservation importance of sites can be assessed by investigating the diversity of birds present at those sites (Bensizerara *et al.* 2013). Domestic gardens collectively cover substantial areas within cities and play an important role in supporting urban biodiversity and ecosystem functioning (Heezik *et al.* 2013). Fontana *et al.* 2011 suggests that conservation of birds in cities should be part of strategies to conserve native local species. The effects of high population densities can be largely mitigated by maintaining as much green spaces between the buildings as possible and reducing direct interference by negative factors, such as noise levels

In India, several studies have focused on changes in bird populations and distribution in natural habitats (Urfi *et al.* 2005), but very few have attempted to investigate the impacts of urbanization on birds. Habitat fragmentation has several components including reduction in patch size, increased isolation of patches and often changes in habitat

quality (Berg 1997; Andrén, 1994; Wiens, 1995). Kerala is a home ground of many bird species representing several migratory birds consisting exotic, endangered and endemic birds. Since little has been done in residential areas on the non-public spaces a study was conducted on avifauna diversity and an effort has also been made to prepare a checklist of its bird species.

Materials and Methods

Vidhyanagar residential area which spans a region in Palapuram, Ottapalam Taluk of Palakad district in Kerala, is 54.m above sea level and located at 10° 46' 52" North, 76° 23' 56" East. The area enjoys an equable, tropical climate. It receives both, south-west (the predominant one) and north-east Monsoons with a dry season spanning from February to May. The land use of the residential area shows the typical mosaic pattern of a small holder farm with fruit trees and garden like plantations around the house with roads and alleys. The dominant tree species were Acacia (*Acacia longifolia*), Mango (*Mangifera indica*), Tamarind (*Tamarindus indica*), Neem (*Azadirachta indica*), Coconut (*Cocos nucifera*), Bamboo (*Bambusa vulgaris*), Ficus (*Ficus benghalensis* and *Ficus racemosa*), Palm trees, teak etc. Moist and marshy paddy cultivable area and a pond were also in vicinity.

Study area was explored on foot in different parts of the study area. A bird species inventory survey was carried out from June (2010) to April (2014), twice a week from 07.30–11.00 hr. and 16.00–18.00hr. The bird life communities in and around the study area were documented by direct observations (Bibby *et al.* 1992), random walk and opportunistic surveys. In few places applied line transect, point count and opportunistic sighting methods to record avifauna. Birds passing by were not recorded, only those who were using the habitat, sitting or displaying over it.

Birds were identified and counted with the help of binoculars (8x45 X Crown) and a field guide (Ali 2003). All sites located over land (like residential gardens, portions of streets, parking area, playground) were surveyed, whether they would be subjectively considered suitable habitat for birds or not. Bird abundance was based on the following criteria: common, >10 sightings; fairly common, 6-10 sightings; uncommon, 3-5 sightings; and rare, 1-2 sightings.

Data Analysis

(a) Species composition: abundance for each species was calculated by summing up the number of individuals recorded in all transects.

(b) Activities of birds recorded during the survey period included calling, overflying, and perching, walking, mobbing, construction of nest, collection of grass materials, feeding and loafing. The frequency of each activity was summed up to give the activity rating and the percentages values of the frequency of each activity were calculated

Results

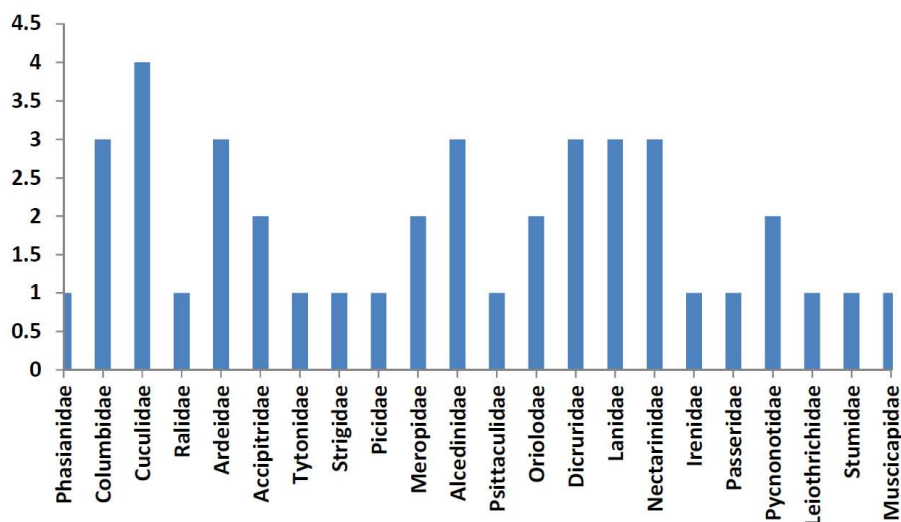
Bird species representing from 11 orders, 21 families and 41 genera were recorded (Table 1 Fig 1 and Fig 2). Passeriformes alone represents 10 family with 16 bird species. Among the birds recorded were mostly resident and were-

Discussion

As more and more natural habitats are vanishing in tropical countries, residential areas with domestic gardens, agricultural habitats and any suitable dwelling areas will become increasingly important as alternative habitats for many bird species. This is the first exclusive study conducted in this area to determine the bird species. It was hoped the results of this study will positively contribute to the ongoing bird fauna research. In the present study it is showed that seasonality along with change in the habitat structure may influence bird assemblage organization over time.

The bird community structure is affected by changes in vegetation structure either due to natural or any human induced disturbances (Maurer 1981; Wiens 1989; Rahayuningsih *et al.* 2007). The contribution of birds to properly functioning ecosystems cannot be underestimated (Marquis and Whelan, 1994). DeGraaf and Wentworth (1986) noted that bird diversity varied with, amongst other dimensions, tree density, or tree density predicted bird diversity. Oleyar, *et al.* (2008) noted the isomorphic relationship: urban forest functionality was an integration of many factors; and bird diversity was a good predictor of tree density. Fernández-Juricic (2000) also reached a similar finding. They noted that trees located at the street level had a positive effect on bird and population abundance and also noted that bird diversity varied with vegetation in urban

Figure 1. Graph Showing Species richness



common. The abundant populations of the Black Drongo and the Red-vented Bulbul, Treepie, Orioles, and oriental robin shows an increasing urbanization in the vicinity and an increase in human settlements during the study period showed no loss of bird species. Activity pattern of birds showed that most of the bird were feeding (69%) followed by breeding and nest building (28%) and loafing (3%).

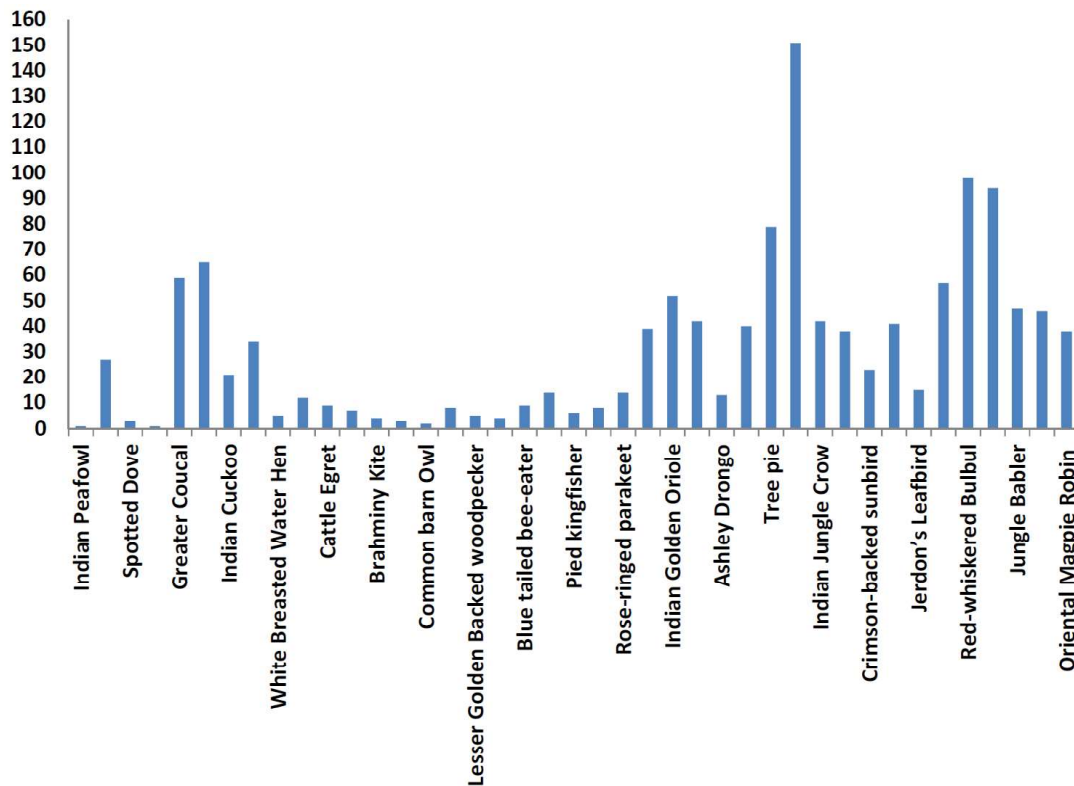
settings. Crooks *et al.* (2004) finally equate the presence of bird diversity with urban ecosystem diversity broadly. Temporal variation in canopy and vegetation would be indicated by an observation of neighborhood bird diversity and population. This implies that a more height variable canopy and vegetation, which has known positive environmental externalities, likely supports a richer population of birds.

Table 1. Showing checklist of avifauna recorded

Order	Family	Common Name	Scientific Name	Status
1. Galliformes	Phasianidae	Indian Peafowl	Pavocristatus	R
2. Columbiformes	Columbidae	Rock Pigeon	Columba livia	FC
		Spotted Dove	Streptopeliachinensis	UC
		Emerald Dove	Chalcophapsindica	R
3. Cuculiformes	Cuculidae	Greater Coucal	Centropussinensis	C
		Asian Koel	Eudynamysscolopaceus	FC
		Indian Cuckoo	Cuculusmicropterus	UC
		Drongo Cuckoo	Surniculslugubris	R
4. Gruiformes	Ralidae	White Breasted Water Hen	Amauornisphoenicurus	UC
5. Pelecaniformes	Ardeidae	Indian Pond Heron	Ardeolagrayii	R
		Cattle Egret	Bubulcus ibis	UC
		Little Egret	Egrettazarzetta	R
6. Accipitriformes	Accipitridae	Brahminy Kite	Haliasturindus	UC
		Black Kite	Milvusmigrans	UC
7. Striformes	Tytonidae	Common barn Owl	Tylo alba	R
	Strigidae	Spotted Owlet	Athenebrama	UC
8. Piciforms	Picidae	Lesser Golden Backed Wood pecker	Dinopiumbengalense	FC
9. Coraciiformes	Meropidae	Green Bee –eater	Meropusorientalis	UF
		Blue tailed bee-eater	Meropusphilippinus	UC
	Alcedinidae	Common King fisher	Alcedoatthis	C
		Pied Kingfisher	Cerylerudis	FC
		Indian White Breasted Kingfisher	Halconsmyrnensis	FC
10 Psittaciformes	Psittaculidae	Rose-ringed parakeet	Psittaculakrameri	C
	Oriolodae	Black headed Oriole	Oriolusxanthornus	C
		Indian Golden Oriole	Orioluskundoo	C
	Dicruridae	Black Drongo	Dicrurusmacrocerus	C
		Ashley Drongo	Dicrurusleucophaeus	C
		Greater Racket tailed Drongo	Dicrurusparadiseus	R
	Lanidae	Tree pie	Dendrocittavagabunda	C
		House crow	Corvussplendens	C
		Indian Jungle Crow	Corvusmacrorhynchos	C
11. Passeriformes	Nectarinidae	Purple-rumped sunbird	Leptocomazeylonica	FC
		Crimson-backed sunbird	Leptocoma minima	FC
		Purple Sunbird	Cinnyrisasiatics	FC
	Irenidae	Jerdon's Leafbird	Chloropsisjerdani	C
	Passeridae	House sparrow	Passer domesticus	UC
	Pycnonotidae	Red-whiskered Bulbul	Pycnonotusjocosus	C
		Red-vented bulbul	Pycnonotuscafer	C
	Leiothrichidae	Jungle Babler	Turdoidesstriata	C
Sturnidae	Common Myna	Acridotherestrictis	C	
Muscicapidae	Oriental Magpie Robin	Copsychussularis	C	

common, >10 sightings; fairly common, 6-10 sightings; uncommon, 3-5 sightings; and rare, 1-2 sightings

Figure 2. Graph showing Species abundance



Fahrig *et al.*, (2011) and Pickett and Siriwardena, (2011) looked at the impact of the mosaic in the landscape and habitat heterogeneity affects bird's abundance and behavior by considering different scales of the study.

Conclusion

An upsurge in human settlements will cause more threat to avian species. A more eco-friendly urbanization will enhance avifauna in these areas to curb negative human interference. Research on appropriate conservation strategies and management practices is to be the prime goal in changing urban environments into species rich ecosystems.

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