



Importance of urban forest in conservation of bird biodiversity in Kota city

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ABSTRACT

With the advent of agriculture urbanisation started. Topologically plain areas which were covered by forests were deforested to set up agriculture fields. Further human settlements arose nearby crop fields. Up to this phase there was still cooperative interaction between humans and nature. Second and major blow came from industrialization. This led to immense negative impact on landscape shape and its biodiversity. Biodiversity of any area reflect the ecosystem health and also give insight to its future prospect and age. Any change in the landscape shows change in various interactions, particularly interspecific competition and population density of different inhabitants. A study is conducted in Government College Kota campus and JDB College which is a major urban forest in the heart of Kota city. This region is covered by Mango trees (Anacardiaceae), Ficus – Peepal, Banyan (Moraceae), Casia – Fabaceae. Other includes plants from Asteraceae, Gramineae family plants which provide food material for much type of birds and small animals. This urban forest is inhabited by Forty seven bird species compared to the other parts of city in which only thirty one avifauna was recorded. Green area harbours more biodiversity than constructed city areas. In urban forest though pigeons continues to dominate but have other co-habitants such as rose ring parakeet *Psittacula krameri*, collared dove *Streptopelia decaocto*, jungle babbler *Turdoides striata*, and different species of peafowl, babret, humming birds, spotted owl, . These birds compete for nesting holes in building walls, prefers cooler sites then areas which are more sun exposed. Study shows that nest site competition is also affected by sun exposed area where nesting sites were less than shadow area with more tree surrounding. This clearly indicates dire need of more trees particularly trees with greater canopy and fruits.

Keywords: Biodiversity, Avifauna, Nest site selection, Interspecific competition.

INTRODUCTION

As humans left nomadic habit and settled in villages near agriculture fields, his interference started in nature. Second blow came with industrialisation. Cities emerged with dense habitation which we

generally refer as urbanisation. In last century rate of urbanization increased. This drastically affected wild life. Human activities have brought changes in the behaviour, food habit, reproduction cycles of wild animals (Luniak 2004, Mikula et al. 2014). An increase in the urbanisation the forested area was cut down which is termed as habitat loss and to develop connecting roads and rail network unhabituated area was fragmented. It greatly affected existing vegetation, available food resources and nesting sites. (Lowry et al. 2012, Sol et al. 2013, Han et al. 2019). Changes and modifications in land cover use greatly affected all aspects of biodiversity including bird biodiversity. Populations of many bird species declined as we observe sparrow and crow population shifted from concrete jungles, and many species completely became extinct, this is mainly due to loss of suitable and safe breeding grounds and food resources. It is also noteworthy that few species occupied this void and successfully adapted to the changes in habitat types and food resources so their number increased. (Luniak 2004, Partecke et al. 2006, Francis & Chadwick 2012, Han et al. 2019). A study was conducted to know how urban forest and green cover supports the avian biodiversity compared to dense colonies of humans with little green patches.

MATERIALS AND METHODS

Study site:

Kota is the third-largest city in the southeast of the northern Indian state of Rajasthan situated on the banks of Chambal River. With a population of over 1.2 million, it is the third most populous city of Rajasthan after Jaipur and Jodhpur, 46th most populous city of India and 56th most populous urban agglomeration of India. Kota is only district in the state where urban population is more than rural population. The district Kota of Rajasthan is located at 25.18°N & 75.83°E and has an average elevation of 271 metres (889 feet). Kota comes under semiarid region with summer temperature 25 °C -42 °C and winter temperature 12 °C -26 °C.

In the heart of city Government College Kota and Janki Devi Bajaj Women's College is located with the adjoining army cantonment area. These three parts of the Kota city also host a considerable size of green cover. Government College Kota is 115 years old so the green cover is well developed and stable. This study was conducted during

the March 2023 up to October 2024. Due to the rectangular architectural design of both colleges five sites per college were selected that present four directions and the central part so in all ten site were selected to record avian biodiversity.

Data Collection:

Periodic observations were made in these twenty month duration. Each site was visited fortnightly during early morning hours between six to eight am morning. For observations binocular of Olympus make, 10 x 42 EXWP was used and camera of Canon make, mark 2, and lens EF 75 – 300 mm f was used. At each visit the number of bird species was recorded and photographed. Those species which were not visible but producing sound was identified using Merlin Bird id app. Line transect method was used on the site to record whilst walking a survey route that took within 50 m of every part of the site. All species using the site were included. Only those birds were recorded which were using the site that is either foraging or nesting.

RESULTS

Table 1:

Order Charadriiformes		
Family Charadriidae		
1.	Yellow-wattled Lapwing	<i>Vanellus malabaricus</i>
2.	Red-wattled Lapwing	<i>Vanellus indicus</i>
Order. Pelecaniformes		
Family. Ardeidae		
3.	Grey Heron	<i>Ardea cinerea</i>
4.	Cattle Egret	<i>Bubulcus ibis</i>
Family. Threskiornithidae		
5.	Black-headed Ibis	<i>Threskiornis melanocephalus</i>
6.	Red-naped Ibis	<i>Pseudibis papillosa</i>
Order. Coraciiformes		
Family. Meropidae		
7.	Asian Green Bee-eater	<i>Merops orientalis</i>
Family. Coraciidae		
8.	Indian Roller	<i>Coracias benghalensis</i>
Order. Passeriformes		
Family. Cisticolidae		
9.	Ashy Prinia	<i>Prinia socialis</i>
10.	Common Tailorbird	<i>Orthotomus sutorius</i>
Family. Sturnidae		
11.	Indian Pied Starling	<i>Gracupica contra</i>
12.	Common Myna	<i>Acridotheres tristis</i>

13.	Brahminy Starling	<i>Sturnia pagodarum</i>
Family. Muscicapidae		
14.	Indian Robin	<i>Copsychus fulicatus</i>
15.	Oriental Magpie-Robin	<i>Copsychus saularis</i>
16.	Bluethroat	<i>Luscinia svecica</i>
Family. Ploceidae		
17.	Baya Weaver	<i>Ploceus philippinus</i>
18.	House Sparrow	<i>Passer domesticus</i>
Family. Motacillidae		
19.	Citrine Wagtail	<i>Motacilla citreola</i>
20.	White Wagtail	<i>Motacilla alba</i>
21.	Indian Golden Oriole	<i>Oriolus kundoo</i>
Family. Rhipiduridae		
22.	White-browed Fantail	<i>Rhipidura aureola</i>
Family. Dicruridae		
23.	Black Drongo	<i>Dicrurus macrocercus</i>
24.	Ashy Drongo	<i>Dicrurus leucophaeus</i>
Family. Pycnonotidae		
25.	White-eared Bulbul	<i>Pycnonotus leucotis</i>
Family. Leiothrichidae		
26.	Jungle Babbler	<i>Argya striata</i>
27.	Common Babbler	<i>Argya caudata</i>
Family. Phylloscopidae		
28.	Greenish Warbler	<i>Phylloscopus trochiloides</i>
Family. Nectariniidae		
29.	Purple Sunbird	<i>Cinnyris asiaticus</i>
Order. Strigiformes		
Family. Strigidae		
30.	Spotted Owlet	<i>Athene brama</i>
31.	Indian Scops-Owl	<i>Otus bakkamoena</i>
Family. Tytonidae		
32.	Barn Owl	<i>Tyto alba</i>
Order. Piciformes		
Family. Megalaimidae		
33.	Coppersmith Barbet	<i>Psilopogon haemacephalus</i>
34.	Brown-headed Barbet	<i>Psilopogon zeylanicus</i>
Order. Columbiformes		
Family. Columbidae		
35.	Spotted Dove	<i>Spilopelia chinensis</i>
36.	Laughing Dove	<i>Spilopelia senegalensis</i>
37.	Yellow-footed Green-Pigeon	<i>Treron phoenicopterus</i>
38.	Rock Pigeon	<i>Columba livia</i>
Order. Cuculiformes		
Family. Cuculidae		
39.	Greater Coucal	<i>Centropus sinensis</i>
40.	Asian Koel	<i>Eudynamis scolopaceus</i>
41.	Pied Cuckoo	<i>Clamator jacobinus</i>
42.	Common Cuckoo	<i>Cuculus canorus</i>

Order. Bucerotiformes		
Family. Bucerotidae		
43.	Indian Grey Hornbill	<i>Ocyrceros birostris</i>
Upupidae		
44.	Eurasian Hoopoe	<i>Upupa epops</i>
Order. Galliformes		
Family. Phasianidae		
45.	Rock Bush-Quail	<i>Perdica argoondah</i>
46.	Indian Peafowl	<i>Pavo cristatus</i>
47.	Common Quail	<i>Coturnix coturnix</i>

CONCLUSION

These observations clearly indicate importance of urban green areas that provide shelter and food to sustain biodiversity. Due to anthropogenic interference it is noted that more number of generalist bird species are found in urban areas compared to specialist groups. Except babblers no other ground nesting bird was recorded from these two study sites which show that lack of dense herbs and shrubs affects ground nesting birds.

Conflict of Interest: None of the authors have any conflicts of interest to disclose. All the authors approved the final version of the manuscript.

Data Availability Statement: Not applicable.

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