



A Check list of Avifaunal Diversity in Semi-Urban areas of Cuttack, India: Implication on Conservation and Environmental Studies

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Abstract

Biodiversity is the term used to describe the variety of life found on earth. Urban deforestation is a serious problem due to much un-controlled anthropogenic activities. Birds play a vital role in regeneration of flowering plant species and help in the reforestation. This symbiotic relationship is not only for the sustainability, but it also plays a vital role in maintaining the balance of nature. The birds eat the fruits and help in the dispersion of seeds in different urban area of the city. They also help in the pollination of many flowering plants. Keeping this all in view, an attempt was made to check list of birds in semi-urban area of Cuttack. Cuttack is a lush-green urban area situated in the eastern part of India. The perching frequencies have been recorded. Results revealed that out of 122 avian species, of which 18 furgivorous birds were recorded along with 08 birds as frequent seen as pollinators in this semi-urban area. The study reveals that furgivorous and pollinating birds play a vital role in pollination and regeneration of flowering plants. The presence of such plants also regulates the existence of birds in urban areas. The present findings suggest that the conservation of plant wealth dependent upon the conservation of birds to make the environment eco-friendly.

Keywords: Avifauna, Cuttack, Conservation.

Introduction

Biodiversity is the composition of all the genes, species and ecosystems which are found in the nature. It comprehends microorganisms, flora, fauna and abiotic components in which they thrive and interact¹. Human beings cannot survive on this planet for long without the floral and faunal wealth, because it gives life stuffs. This wealth bestows food, medicine, fodder and also has paramount economic and socio-cultural worth throughout the world. They are also helpful in maintaining the ecosystem².

Floral and faunal diversity is the elite integrant of biological diversity. Due to various biotic and abiotic factors, the floral and faunal diversities are declining in alarming rate. It is the rationale behind the environmental problems, climatic changes and scarcity of therapeutic as well as food resources. Recent global researches indicate that people are bending towards the green society^{3,4}.

Recent finding reveals that not only natural, semi-natural landscapes and rural and tribal areas in and around the forest can be rich sources of biodiversity, but also the urban areas in the form of small patches, residential sectors, campus of educational, institutional and other government bureaus⁵.

Urbanization is spreading at a gallop across the world; pivotal challenge for the conservation is to understand how it affects the

biodiversity. This increasing trend has severe consequences for the environment, as it fragments and changes natural areas and alters environmental conditions⁶. Urban-institutional ecosystems differ from the forested ones in a number of ways, although most of the factors which affect ecosystems in the cities such as climate, soil, water conditions, human impact are comparable to those in non-urban areas.

The combination of these factors creates unique urban-institutional ecosystems⁷. So, the city has to be regarded as a "New type of Environment" with species compositions and habitats peculiar to urban-institutional areas.

In addition to more natural landscapes, conservation of biodiversity in institutional campus should be a major task for nature conservation.

People with higher socio-economic status were found to harbour more diverse species assemblages in their gardens/ campus than those of lower socio-economic status. This phenomenon was termed the "luxury green concept". Outside India, urbanization and its consequences have been intensively studied.

The high diversity of semi-urban landscapes, resulting from variable land use, creates a great variety of ecological conditions. Plant species in semi-urban areas is usually richer than main cities which provide a sound platform for the faunal diversity.

Among the faunal diversity, avifaunal are much common and important to maintain the semi-urban ecosystems. Conservation of biological diversity thus represents an important objective not only in nature reserves and semi-natural areas, but has also become vital in areas where human activity is most intense⁸. The richness of avifaunal diversity is helpful to regenerate the floral diversity in semi-urban areas. Therefore, keeping the all above cited factors in view, an attempt was made to document the avifaunal diversity of the study area. The present study addresses the importance of the avifauna in semi-urban areas to maintain the urban biodiversity for the students and researchers to build upon it. This study is meant to give base line data for the semi-urban areas around Cuttack so far as the avifauna is concerned.

Methodology

Regularly daily surveys following the imaginary grid method and line transect method by Gaston (1973)⁹ were carried out from March 2015 to March 2016, and birds were recorded for the semi-urban areas of Cuttack. Semi-forested / disturbed forested tracts within a radius of 2 km to 8 km from the area were selected for daily observations. The birds were observed during most active periods (dusk & dawn) of the day (6:00 AM to 9:00 AM and 15:00 PM to 6:00 PM). Based on the number of sightings and occurrence, the status of a given species was assigned as common (encountered daily in relatively large number), uncommon (encountered daily but in small number) and rare (encountered less than 10 times a year).

Taxonomy of this updated checklist follows December 2012 classification by the South American Checklist Committee of the American Ornithologists Union (SACC, Remsen *et al.* 2012)¹⁰.

In addition, frugivorous birds are recorded along with enumeration of respective perched plant species. The frequency of pollinations by selected pollinators and respective wild plant species are documented.

Study Area: Cuttack is an very old city of Odisha, popularly known as the Silver city. It is the about 28 km North-East of Bhubaneswar, the capital city of Odisha. The name of the city is an anglicized form of Kataka that literally means the cantonment, a reference to the ancient Barabati fort around which the city developed¹¹⁻¹³. The city is located at 20° 30' N to 85° 50' E and it spreads across an area of 398 km², is situated at the Mahanadi river delta.

The city has an average elevation of 36 m. the monsoon months are from July to October when the city receives most of its rainfall from the South West Monsoon. The annual rainfall measures around 144 cm. The temperature of the city may exceed 40°C in summer and falls below 10°C in winter^{14,15}. The geographical variations and unique climate of the study area provide a base for floral and faunal diversity. Around the urban

area, many types of medicinal, edible and other flowering plant species are found which attract the avifaunal species for their perching. Due to lack of scientific documentation, the Katakis (populace of the city) do not know much about the avifaunal diversity and the importance to maintain the urban biodiversity.

Results and Discussion

Survey of avifauna provides useful information on basic and applied ecology, and is useful for identifying priority areas for conservation. The semi-urban area of Cuttack situated in eastern part of India. Climatic variations and diverse landscapes provided diverse habitats for birds. Of total 122 birds (Table-1) are recorded in the semi-urban areas of Cuttack.

The present observations results revealed, 122 species were belonging to the 90 genera and 52 families (Table-1). Out of them, 117 species were in the list of least concern (LC) and 05 in the list of different threatened categories.

Out of total avifaunal diversity, it was observed that the most common birds (encountered daily in relatively large number) in semi-urban areas of were Red vented bulbul, Black drongo, Cattle egret, Black winged stilt (Figure-1.4), Asian pied starling, River lapwing (Figure-1.1), Common crow, Little cormorant, Paddy field pipit, Purple-rumped sunbird, Spotted dove, White browed wagtail, White throated kingfisher, Bronze winged jacana, Common hoopoe, Coppersmith barbet, House sparrow, Indian robin (Figure 1.3), Indian roller, Magpie robin, Pied bush chat, Rock pigeon, Rosy starling etc.

We also listed some birds sighted daily but in small numbers, were Brown shrike, Asean koel, Common kingfisher, Pied kingfisher (Figure 1.2), Ruddy shelduck (Figure-1.5), Red watted lapwing, Black hooded oriole, Asian openbill stork, Black kite, Green bee eater, Citrine wagtail, Common myna, Common sandpiper, Common tailorbird, Jungle myna, Shikra, Plain prinia etc. We also observed some rare birds which encountered less than 15 times a year.

These were Ashy drongo, Great thick knee (Figure-1.6), Gray francolin, Indian paradise flycatcher, Pacific golden plover, Purple heron, Red headed bunting, Rufous woodpecker, White eye buzzard etc.

We also analysed that in the diversity of observed avifauna in semi-urban area of Cuttack, 19 birds were list in frugivorous (Figure-2, Table-2) and 9 birds were in the list of pollinators (Figure-2, Table-3). They are seen frequently in semi-urban area of Cuttack.

The common frugivorous were Black hooded oriole, Brown headed barbet, Coppersmith barbet, Red whiskered bulbul, Rosy starling etc and the common pollinators were Purple rumped sunbird, Red vented bulbul, House crow etc.

Table-1
Checklist of avifaunal diversity in semi-urban areas of Cuttack

Common Name	Scientific name	Family	First sight count	Status
Alexandrine Parakeet	<i>Psittacula eupatria</i>	Psittaculidae	3	NT
Ashy Drongo	<i>Dicrurus leucophaeus</i>	Dicruridae	1	LC
Ashy Prinia	<i>Prinia socialis</i>	Cisticolidae ^l	1	LC
Asian Koel	<i>Eudynamys scolopaceus</i>	Cuculidae	1	LC
Asian Openbill	<i>Anastomus oscitans</i>	Ciconiidae	4	LC
Asian Pied Starling	<i>Gracupica contra</i>	Sturnidae	9	LC
Barn Owl	<i>Tyto alba</i>	Tytonidae	1	LC
Barn Swallow	<i>Hirundo rustica</i>	Hirundinidae	10	LC
Baya Weaver	<i>Ploceus philippinus</i>	Ploceidae	2	LC
Besra	<i>Accipiter virgatus</i>	Accipitridae	1	LC
Black Drongo	<i>Dicrurus macrocercus</i>	Dicruridae	12	LC
Black Eagle	<i>Ictinaetus malaiensis</i>	Accipitridae	1	LC
Black Kite	<i>Milvus migrans</i>	Accipitridae	1	LC
Black-headed Cuckooshrike	<i>Lalage melanoptera</i>	Campephagidae	1	LC
Black-hooded Oriole	<i>Oriolus xanthornus</i>	Oriolidae	3	LC
Black-rumped Flameback	<i>Dinopium benghalense</i>	Picidae	1	LC
Black-shouldered Kite	<i>Elanus caeruleus</i>	Accipitridae	1	LC
Black-winged Stilt	<i>Himantopus himantopus</i>	Recurvirostridae	4	LC
Blue-tailed Bee-eater	<i>Merops philippinus</i>	Meropidae	3	LC
Blyth's Reed-Warbler	<i>Acrocephalus dumetorum</i>	Acrocephalidae	1	LC
Booted Eagle	<i>Hieraaetus pennatus</i>	Accipitridae	1	LC
Brahminy Starling	<i>Sturnia pagodarum</i>	Sturnidae	3	LC
Bronze-winged Jacana	<i>Metopidius indicus</i>	Jacanidae	4	LC
Brown Shrike	<i>Lanius cristatus</i>	Laniidae	1	LC
Brown-headed Barbet	<i>Psilopogon zeylanicus</i>	Megalaimidae	4	LC
Cattle Egret	<i>Bubulcus ibis</i>	Ardeidae	5	LC
Chestnut-tailed Starling	<i>Sturnia malabarica</i>	Sturnidae	3	LC

Common Name	Scientific name	Family	First sight count	Status
Citrine Wagtail	<i>Motacilla citreola</i>	Motacillidae	1	LC
Common Greenshank	<i>Tringa nebularia</i>	Scolopacidae	1	LC
Common Hawk-Cuckoo	<i>Hierococcyx varius</i>	Cuculidae	1	LC
Common Kingfisher	<i>Alcedo atthis</i>	Alcedinidae	1	LC
Common Myna	<i>Acridotheres tristis</i>	Sturnidae	20	LC
Common Sandpiper	<i>Actitis hypoleucos</i>	Scolopacidae	3	LC
Common Snipe	<i>Gallinago gallinago</i>	Scolopacidae	1	LC
Common Tailorbird	<i>Orthotomus sutorius</i>	Cisticolidae	2	LC
Coppersmith Barbet	<i>Psilopogon haemacephalus</i>	Megalaimidae	2	LC
Cotton Pygmy-Goose	<i>Nettapus coromandelianus</i>	Anatidae	2	LC
Crested Bunting	<i>Melophus lathami</i>	Emberizidae	2	LC
Eurasian Collared-Dove	<i>Streptopelia decaocto</i>	Columbidae	1	LC
Eurasian Hoopoe	<i>Upupa epops</i>	Upupidae	8	LC
Eurasian Kestrel	<i>Falco tinnunculus</i>	Falconidae	1	LC
Eurasian Moorhen	<i>Gallinula chloropus</i>	Rallidae	3	LC
Gray Francolin	<i>Francolinus pondicerianus</i>	Phasianidae	3	LC
Gray Heron	<i>Ardea cinerea</i>	Ardeidae	3	LC
Gray-bellied Cuckoo	<i>Cacomantis passerinus</i>	Cuculidae	1	LC
Great Cormorant	<i>Phalacrocorax carbo</i>	Phalacrocoracidae	2	LC
Great Egret	<i>Ardea alba</i>	Ardeidae	15	LC
Great Thick-knee	<i>Esacus recurvirostris</i>	Burhinidae	1	NT
Greater Coucal	<i>Centropus sinensis</i>	Cuculidae	1	LC
Green Bee-eater	<i>Merops orientalis</i>	Meropidae	9	LC
Green Imperial-Pigeon	<i>Ducula aenea</i>	Columbidae	2	LC
Gull-billed Tern	<i>Gelochelidon nilotica</i>	Sternidae	1	LC
House Crow	<i>Corvus splendens</i>	Corvidae	16	LC
House Sparrow	<i>Passer domesticus</i>	Passeridae	11	LC
Indian Cormorant	<i>Phalacrocorax fuscicollis</i>	Phalacrocoracidae	1	LC

Common Name	Scientific name	Family	First sight count	Status
Indian Cuckoo	<i>Cuculus micropterus</i>	Cuculidae	1	LC
Indian Golden Oriole	<i>Oriolus kundoo</i>	Oriolidae	4	LC
Indian Paradise-Flycatcher	<i>Terpsiphone paradisi</i>	Monarchidae	1	LC
Indian Pond-Heron	<i>Ardeola grayii</i>	Ardeidae	6	LC
Indian Robin	<i>Copsychus fulicatus</i>	Muscicapidae	6	LC
Indian Roller	<i>Coracias benghalensis</i>	Coraciidae	1	LC
Intermediate Egret	<i>Mesophoyx intermedia</i>	Ardeidae	1	LC
Jungle Babbler	<i>Turdoides striata</i>	Leiothrichidae	13	LC
Jungle Myna	<i>Acridotheres fuscus</i>	Sturnidae	2	LC
Laughing Dove	<i>Streptopelia senegalensis</i>	Columbidae	1	LC
Little Cormorant	<i>Phalacrocorax niger</i>	Phalacrocoracidae	9	LC
Little Egret	<i>Egretta garzetta</i>	Ardeidae	13	LC
Little Grebe	<i>Tachybaptus ruficollis</i>	Podicipedidae	2	LC
Little Ringed Plover	<i>Charadrius dubius</i>	Charadriidae	2	LC
Long-tailed Shrike	<i>Lanius schach</i>	Laniidae	1	LC
Northern Pintail	<i>Anas acuta</i>	Anatidae	4	LC
Olive-backed Pipit	<i>Anthus hodgsoni</i>	Motacillidae	1	LC
Oriental Darter	<i>Anhinga melanogaster</i>	Anhingidae	1	NT
Oriental Magpie-Robin	<i>Copsychus saularis</i>	Muscicapidae	2	LC
Oriental Turtle-Dove	<i>Streptopelia orientalis</i>	Columbidae	2	LC
Pacific Golden-Plover	<i>Pluvialis fulva</i>	Charadriidae	12	LC
Paddyfield Pipit	<i>Anthus rufulus</i>	Motacillidae	1	LC
Pheasant-tailed Jacana	<i>Hydrophasianus chirurgus</i>	Jacanidae	1	LC
Pied Bushchat	<i>Saxicola caprata</i>	Muscicapidae	12	LC
Pied Kingfisher	<i>Ceryle rudis</i>	Cerylidae	2	LC
Plain Prinia	<i>Prinia inornata</i>	Cisticolidae	1	LC
Plaintive Cuckoo	<i>Cacomantis merulinus</i>	Cuculidae	1	LC
Plum-headed Parakeet	<i>Psittacula cyanocephala</i>	Psittaculidae	4	LC

Common Name	Scientific name	Family	First sight count	Status
Purple Heron	<i>Ardea purpurea</i>	Ardeidae	1	LC
Purple Sunbird	<i>Cinnyris asiaticus</i>	Nectariniidae	1	LC
Purple-rumped Sunbird	<i>Leptocoma zeylonica</i>	Nectariniidae	2	LC
Red Avadavat	<i>Amandava amandava</i>	Estrildidae	3	LC
Red-crested Pochard	<i>Netta rufina</i>	Anatidae	500	LC
Red-headed Bunting	<i>Emberiza bruniceps</i>	Emberizidae	1	LC
Red-vented Bulbul	<i>Pycnonotus cafer</i>	Pycnonotidae	6	LC
Red-wattled Lapwing	<i>Vanellus indicus</i>	Charadriidae	1	LC
Red-whiskered Bulbul	<i>Pycnonotus jocosus</i>	Pycnonotidae	2	LC
River Lapwing	<i>Vanellus duvaucelii</i>	Charadriidae	12	LC
River Tern	<i>Sterna aurantia</i>	Sternidae	1	NT
Rock Pigeon	<i>Columba livia</i>	Columbidae	6	LC
Rose-ringed Parakeet	<i>Psittacula krameri</i>	Psittaculidae	4	LC
Rosy Starling	<i>Pastor roseus</i>	Sturnidae	6	LC
Ruddy Shelduck	<i>Tadorna ferruginea</i>	Anatidae	8	LC
Rufous Treepie	<i>Dendrocitta vagabunda</i>	Corvidae	1	LC
Rufous Woodpecker	<i>Micropternus brachyurus</i>	Picidae	2	LC
Scaly-breasted Munia	<i>Lonchura punctulata</i>	Estrildidae	2	LC
Shikra	<i>Accipiter badius</i>	Accipitridae	1	LC
Spotted Dove	<i>Streptopelia chinensis</i>	Columbidae	4	LC
Spotted Owlet	<i>Athene brama</i>	Strigidae	1	LC
Taiga Flycatcher	<i>Ficedula albicilla</i>	Muscicapidae	2	LC
Tickell's Blue-Flycatcher	<i>Cyornis tickelliae</i>	Muscicapidae	1	LC
Tree Pipit	<i>Anthus trivialis</i>	Motacillidae	1	LC
Verditer Flycatcher	<i>Eumyias thalassinus</i>	Muscicapidae	1	LC
Western Yellow Wagtail	<i>Motacilla flava</i>	Motacillidae	1	LC
White Wagtail	<i>Motacilla alba</i>	Motacillidae	3	LC
White-bellied Drongo	<i>Dicrurus caeruleus</i>	Dicruridae	1	LC

Common Name	Scientific name	Family	First sight count	Status
White-breasted Waterhen	<i>Amaurornis phoenicurus</i>	Rallidae	1	LC
White-browed Bulbul	<i>Pycnonotus luteolus</i>	Pycnonotidae	1	LC
White-browed Wagtail	<i>Motacilla maderaspatensis</i>	Motacillidae	2	LC
White-eyed Buzzard	<i>Butastur teesa</i>	Accipitridae	1	LC
White-rumped Shama	<i>Copsychus malabaricus</i>	Muscicapidae	1	LC
White-throated Kingfisher	<i>Halcyon smyrnensis</i>	Halcyonidae	3	LC
Yellow Bittern	<i>Ixobrychus sinensis</i>	Ardeidae	1	LC
Yellow-eyed Babbler	<i>Chrysomma sinense</i>	Sylviidae	1	LC
Yellow-footed Pigeon	<i>Treron phoenicopterus</i>	Columbidae	1	LC
Yellow-wattled Lapwing	<i>Vanellus malabaricus</i>	Charadriidae	2	LC
Zitting Cisticola	<i>Cisticola juncidis</i>	Cisticolidae	1	LC



Figure-1

Some common avifauna species of semi-urban area of Cuttack, 1- River lapwing (*Vanellus duvaucelii*), 2- Pied kingfisher (*Ceryle rudis*), 3-Indian robin (*Saxicoloides fulicatus*), 4- Black winged stilt (*Himantopus himantopus*), 5-Ruddy shelduck (*Tadorna ferruginea*), 6- Great thick knee (*Esacus recurvirostris*)

Table-2
Most common ten frugivorous birds and their perching relation with fruits bearing plants

Birds name	Scientific name	Fruit bearing plants	Family of tree species	Number of seeds per fruits
Asian koel	<i>Eudynamys scolopaceus</i>	<i>Ficus benghalensis</i>	Moraceae	Many
Black drongo	<i>Dicrurus macrocercus</i>	<i>Diopyros ferrea</i>	Ebenaceae	1
Black headed oriole	<i>Oriolus larvatus</i>	<i>Ficus benghalensis</i>	Moraceae	Many
Brown headed barbet	<i>Megalaima zeylanica</i>	<i>Artocarpus hetrophyllus</i>	Moraceae	Many
Coppersmith barbet	<i>Megalaima haemacephala</i>	<i>Ficus benghalensis</i>	Moraceae	many
Golden oriole	<i>Oriolus kundoo</i>	<i>Antidesma acidum</i>	Euphorbiaceae	1
Red-vented bulbul	<i>Pycnonotus cafer</i>	<i>Butea monosperma</i>	Fabaceae	Many
Red-whiskered bulbul	<i>Pycnonotus jocosus</i>	<i>Bauhinia purpurea</i>	Caselpinaceae	Many
Rosy starling	<i>Pastor roseus</i>	<i>Senna siamea</i>	Caselpinaceae	Many
Scaly breasted munia	<i>Lonchura punctulata</i>	<i>Pennisetum pedicellatum</i>	Poaceae	Many

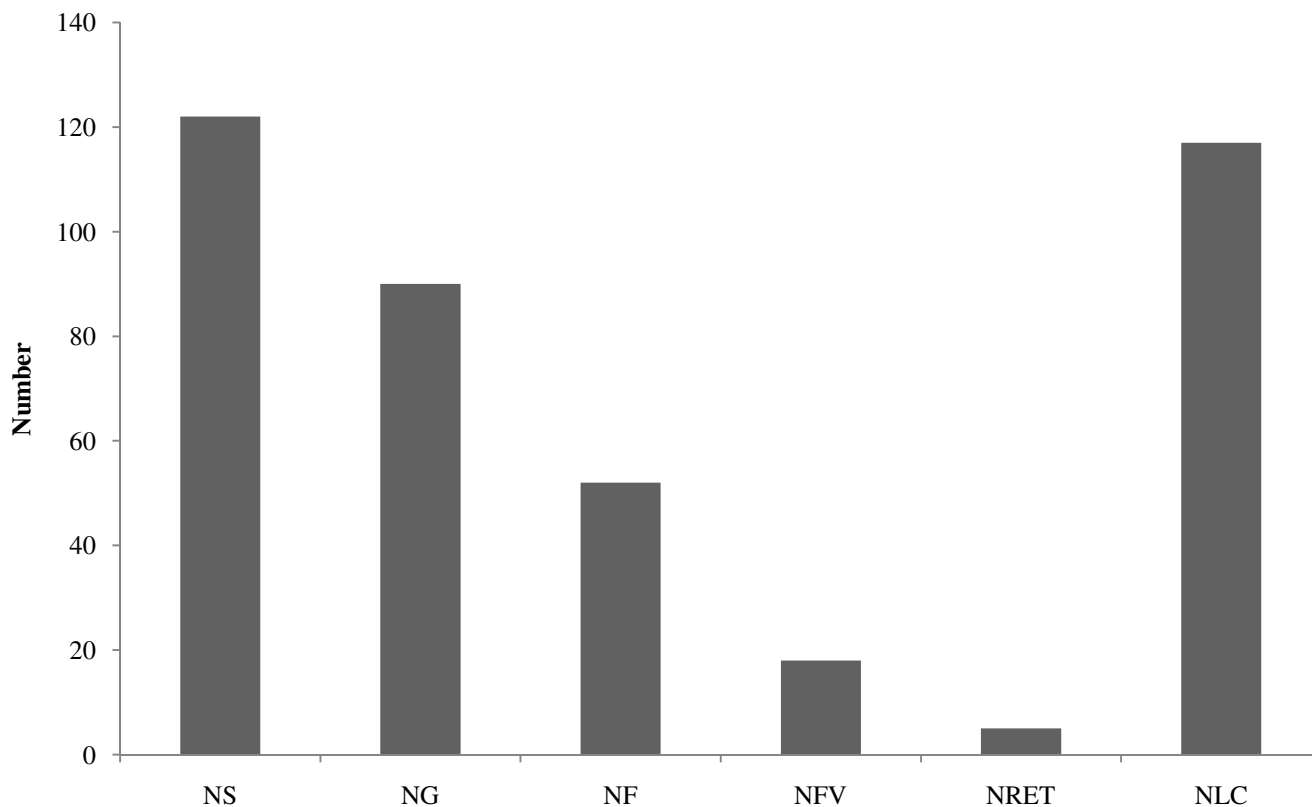


Figure-2

Avifaunal diversity in semi-urban area of Cuttack, India

(NS: Number of species; NG: Number of genus; NF: Number of family; NFV: Number of frugivorous birds; NRET: Number of birds belongs to rare, endangered and threatened; NLC: Number of birds in least concern)

Table-3
Most common five birds act as a pollinator associated with different plant species

Common name of birds	Associate plant species	Frequency of observation/ day ^a
Chestnut Tailed Starling	<i>Cassia saima</i>	> 4 < 7
Purple rumped sunbird	<i>Calliandra inaequilatera</i>	> 50 < 100
Purple sunbird	<i>Mucuna pureans</i>	> 10 < 15
Tailor bird	<i>Capparis brevispina</i>	> 2 < 4
House crow	<i>Bombax ceiba</i>	> 20 < 30

>: Greater; <: Lower; a: observation based on number of perch

Conclusion

The avifaunal wealth of the semi-urban ecosystem is strikingly under-reported in the urban biodiversity. It is quite recent knowledge that not only wild landscapes can be highly diverse in avifauna, but also semi-urban areas show rich diversity of bird species. The present study to make aware the importance of bird diversity among the researchers and locals. The area is full of fergivorous and pollinators which play an important role in forestation by the seed dispersion. Moreover, semi-urban area of Cuttack and its bio-resources provides an ideal situation for the environmental education. As bio-wealth is vanishing very rapidly due to climate change, habitat loss, invasion of exotic species and other factors, semi-urban area like Cuttack provide ideal site for conservation as in the present observation. Therefore, there is immediate need to make strategy to conserve the avifauna in these important places for the ecological balance in urban areas.

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