Uttar Pradesh Journal of Zoology

Volume 45, Issue 8, Page 59-70, 2024; Article no.UPJOZ.3343
ISSN: 0256-971X (P)

Assessment of Avian Richness in Nature Park, Kolkata, West Bengal, India

Mousumi Das [a*]

[a] *Department of Zoology, Sammilani Mahavidyalaya, Baghajatin, E.M.ByPass, Kolkata - 700094, India.*

Author's contribution

The sole author designed, analyzed, interpreted and prepared the manuscript.

Article Information

DOI: 10.56557/UPJOZ/2024/v45i83997

Open Peer Review History:
This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here: https://prh.mbimph.com/review-history/3343

Original Research Article

Received: 20/01/2024
Accepted: 27/03/2024
Published: 03/04/2024

ABSTRACT

This study is a preliminary inventory of the avifauna diversity in Nature Park, situated in the south western periphery of Kolkata within the state of West Bengal, India. A rigorous study of avifauna was carried out from March 2022 to February 2024. Basic line transects and point count methods were used in this study. A total of 108 bird species taxonomically belonging to 79 genera, 41 families and 12 orders were recorded from the study site. Passeriformes was the most predominant order with 48 species belonging to 21 families. Ardeidae with 11 species was the most dominant family. Maximum numbers of species were noted in genus *Ardea*. One vulnerable and one near threatened bird species was recorded from the study site regarding IUCN status.

Keywords: Avifauna; ecological indicators; inventory; IUCN; Kolkata; Nature Park.

1. INTRODUCTION

Avifauna and their diversity constitute a central part of the natural environment. Birds are important ecological indicators assessing the quality of habitats [1]. "Birds play various roles in ecosystem as pollinators, agents of seed dispersals, predators and scavengers" [2].

**Corresponding author: Email: mousumidas21@gmail.com;*

Biodiversity is under threat worldwide and avian diversity is not an exception. Avifauna diversity has been reducing due to natural phenomenon as well as anthropogenic activities. Urbanization coupled with climate change aggravates the problem [3]. Destruction of natural habitats is one of the important reasons for decreasing bird diversity [4]. The Indian subcontinent is rich in avifauna diversity due to huge habitats variability, prevalent climatic conditions and a wide range of altitudes from the peak of Himalaya to the sea level. As a result more than13% of the world's avifauna is found here [5].

Present study aims to prepare a baseline survey report on avifauna diversity in Nature Park. Nature Park is considered as wetland ecosystem which contains a wide variety of habitats. According to WWF-India, wetlands are one of the most threatened of all ecosystems in India. Wetlands are one of the important, diverse and highly productive ecosystems. Wetlands are recognized for their essential biological, hydrological and ecological functions. Not only these, they also have socio-economic functions.

2. MATERIALS AND METHODS

2.1 Study Site

The present study was conducted in Nature Park of Kolkata, West Bengal, India (22° 31' 23"-22° 33' 00" N and 88° 17' 15"- 88° 18' 26" E, Fig. 1).

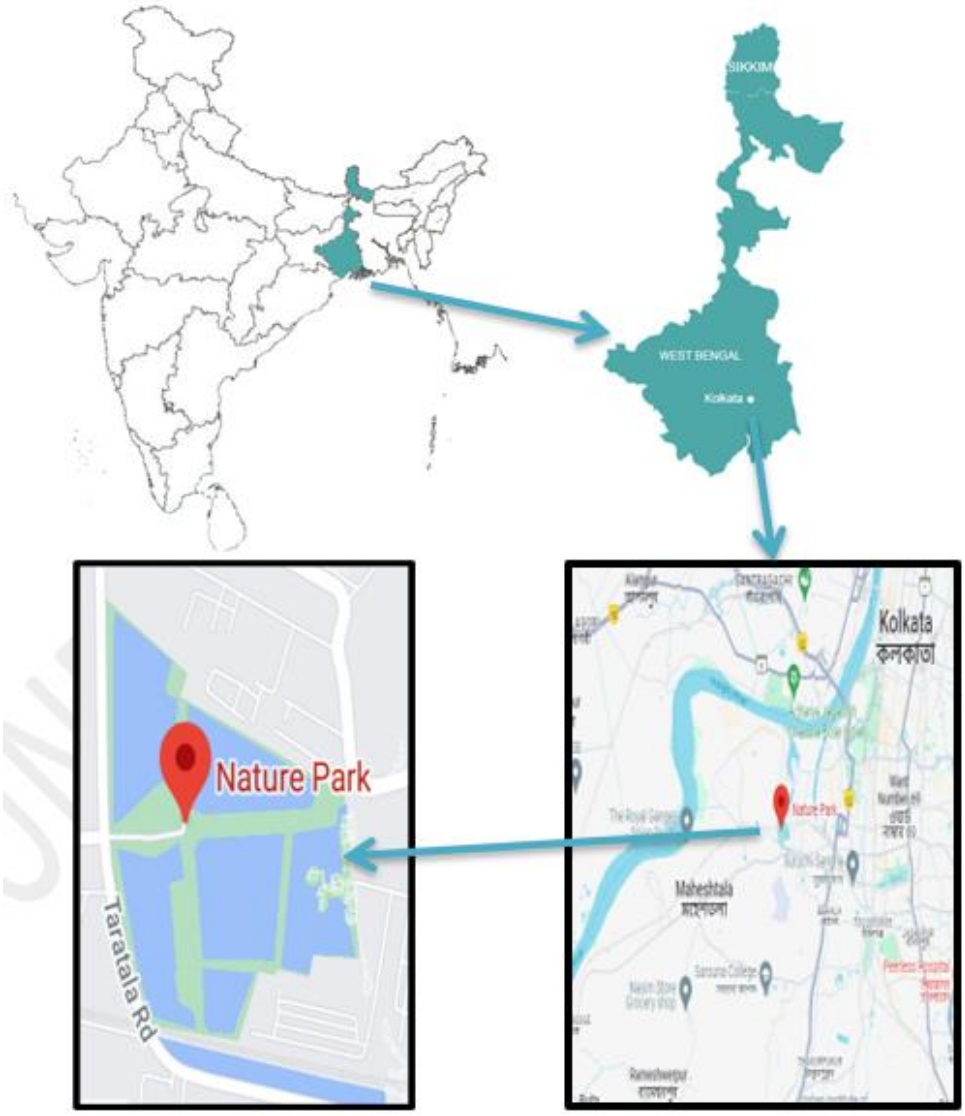

Fig. 1. Maps showing location of Nature Park, Kolkata, West Bengal, India
(Source: Google Earth)

The whole area is habitat of more than 120 plant species including herbs, shrubs, grasses and trees. In addition, the Nature Park occupies plenty of water bodies. The water body, greenery, plenty of flowers and fruits, availability of foraging, breeding and nesting sites attracts a wide variety of avifauna.

2.2 Avifauna Survey

An extensive study of avifauna was carried out for two consecutive years at regular intervals of fifteen days from March 2022 to February 2024. Bird survey was conducted both in the early morning and evening hours due to intensive birds' activity [6]. Basic line transects and point count methods were used in this study [7]. Activity of birds like calling, perching, mobbing, overflying, walking, nest building and feeding during the study period was also recorded. Birds were identified by using field guides [8, 9] and by searching internet resources. Observations were carried out with the help of binocular (Olympus 8x40) and data was recorded from different habitat during each survey. Photography was also done with digital camera (Canon power shot SX50 HS) for documentation of avifauna. For Scientific nomenclature and authorship of Bird species, Howard and Moore 4th Edition was followed [10,11].

3. RESULTS AND DISCUSSION

A total of 108 bird species taxonomically belonging to 79 genera, 41 families and 12 orders were recorded (Table 1). Different species of birds were photographically documented during survey from Nature Park. The habitats with nests of some bird species were also noted.

The family richness of orders was estimated (Fig. 2). Order Passeriformes represented the highest richness with 21 families (51.21%) followed by Charadriiformes with 5 families (12.19%) and Pelecaniformes with 3 families (7.31%). Avian orders Strigiformes, Coraciiformes, Piciformes consisted 2 families each (4.87% each) of the total bird family. Orders Accipitriformes, Anseriformes, Columbiformes, Cuculiformes, Gruiformes and Psittaciformes consisted 1 family each (2.43% each) of the total family surveyed. The contribution of percentage of species in different orders of avifauna (Fig. 3) showed that Passeriformes was the most dominant order comprising 44.44% of total species followed by Pelecaniformes (13.88%), Charadriiformes (11.11%), Piciformes (8.33%), Coraciiformes (5.55%), Cuculiformes (4.62%), Columbiformes (3.70%), Gruiformes (2.77%), Strigiformes, Psittaciformes, (1.85% each), Anseriformes and Accipitriformes (0.92% each). The percentage of species in different families of avifauna was also analysed (Fig. 4). The result showed that out of 41 families, Ardeidae family (11 species) dominated the avifauna followed by Motacillidae (7 species), Muscicapidae, Picidae (6 species each), Scolopacidae,

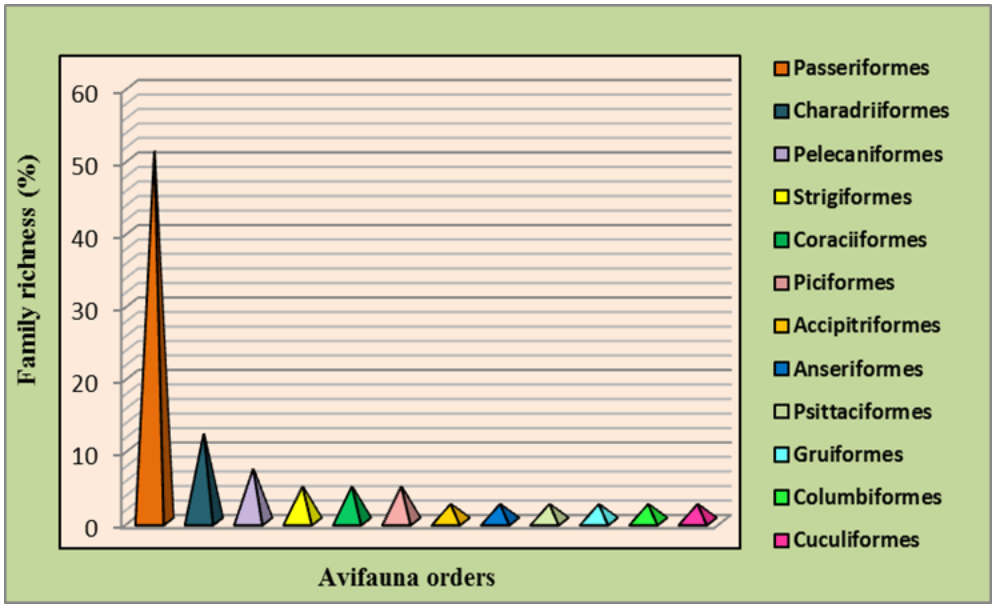

Fig. 2. Family richness of avifauna orders in Nature Park

Table 1. Avifauna recorded from Nature Park, Kolkata, West Bengal, India during survey

Common Name	Scientific Name	Family	Order	Current status (IUCN 3.1)
1. Black kite	*Milvus migrans* (Boddaert,1783)	Accipitridae	Accipitriformes	Least concern
2. Lesser Whistling Duck	*Dendrocygna javanica* (Horsfield,1821)	Anatidae	Anseriformes	Least concern
3. Bronze winged Jacana	*Metopidius indicus* (Latham, 1790)	Jacanidae	Charadriiformes	Least concern
4. Pheasant tailed Jacana	*Hydrophasianus chirurgus* (Scopoli, 1786)	Jacanidae	Charadriiformes	Least concern
5. Red wattled Lapwing	*Vanellus indicus* (Boddaert,1783)	Charadriidae	Charadriiformes	Least concern
6. Little Ringed Plover	*Charadrius dubius* Scopoli, 1786	Charadriidae	Charadriiformes	Least concern
7. Common Sandpiper	*Actitis hypoleucos* (Linnaeus,1758)	Scolopacidae	Charadriiformes	Least concern
8. Green Sandpiper	*Tringa ochropus* Linnaeus,1758	Scolopacidae	Charadriiformes	Least concern
9. Wood Sandpiper	*Tringa glareola* Linnaeus,1758	Scolopacidae	Charadriiformes	Least concern
10. Common Snipe	*Gallinago gallinago* (Linnaeus, 1758)	Scolopacidae	Charadriiformes	Least concern
11. Pintail Snipe	*Gallinago stenura* (Bonaparte, 1831)	Scolopacidae	Charadriiformes	Least concern
12. River Tern	*Sterna aurantia* J.E. Gray, 1831	Laridae	Charadriiformes	Vulnerable
13. Gull billed Tern	*Gelochelidon nilotica* (J.F. Gmelin, 1789)	Laridae	Charadriiformes	Least concern
14. Black winged Stilt	*Himantopus himantopus* (Linnaeus, 1758)	Recurvirostridae	Charadriiformes	Least concern
15. Rock Pigeon	*Columba livia* J.F. Gmelin, 1789	Columbidae	Columbiformes	Least concern
16. Yellow footed Green Pigeon	*Treron phoenicopterus* (Latham, 1790)	Columbidae	Columbiformes	Least concern
17. Spotted Dove	*Streptopelia chinensis* (Scopoli, 1786)	Columbidae	Columbiformes	Least concern
18. Eurasian Collared Dove	*Streptopelia decaocto* (Frivaldszky, 1838)	Columbidae	Columbiformes	Least concern
19. Green Bee eater	*Merops orientalis* Latham, 1801	Meropidae	Coraciiformes	Least concern
20. White throated Kingfisher	*Halcyon smyrnensis* (Linnaeus, 1758)	Alcedinidae	Coraciiformes	Least concern
21. Black Capped Kingfisher	*Halcyon pileata* (Boddaert,1783)	Alcedinidae	Coraciiformes	Least concern
22. Pied Kingfisher	*Ceryle rudis* (Linnaeus,1758)	Alcedinidae	Coraciiformes	Least concern
23. Stork billed Kingfisher	*Pelargopsis capensis* (Linnaeus, 1766)	Alcedinidae	Coraciiformes	Least concern

Common Name	Scientific Name	Family	Order	Current status (IUCN 3.1)
24. Common King fisher	*Alcedo atthis*(Linnaeus,1758)	Alcedinidae	Coraciiformes	Least concern
25. Common Hawk Cuckoo	*Hierococcyx varius* (Vahl,1797)	Cuculidae	Cuculiformes	Least concern
26. Pied Cuckoo	*Clamator jacobinus* (Boddaert, 1783)	Cuculidae	Cuculiformes	Least concern
27. Asian Koel	*Eudynamys scolopaceus* (Linnaeus,1758)	Cuculidae	Cuculiformess	Least concern
28. Greater Coucal	*Centropus sinensis* (Stephens, 1815)	Cuculidae	Cuculiformess	Least concern
29. Plaintive Cuckoo	*Cacomantis merulinus* (Scopoli, 1786)	Cuculidae	Cuculiformess	Least concern
30. White breasted Water hen	*Amaurornis phoenicurus* (Pennant, 1769)	Rallidae	Gruiformes	Least concern
31. Watercock	*Gallicrex cinerea* (J.F. Gmelin, 1789)	Rallidae	Gruiformes	Least concern
32. Common Moorhen	*Gallinula chloropus* (Linnaeus, 1758)	Rallidae	Gruiformes	Least concern
33. Green Leaf Warbler	*Seicercus nitidus* (Blyth, 1843)	Phylloscopidae	Passeriformes	Least concern
34. House Crow	*Corvus splendens* Vieillot, 1817	Corvidae	Passeriformes	Least concern
35. Rufous Treepie	*Dendrocitta vagabunda* (Latham, 1790)	Corvidae	Passeriformes	Least concern
36. Large billed crow	*Corvus macrorhynchos* Wagler,1827	Corvidae	Passeriformes	Least concern
37. Black-headed Cuckoo shrike	*Lalage melanoptera* (Rüppell, 1839)	Campephagidae	Passeriformes	Least concern
38. Small Minivet	*Pericrocotus cinnamomeus* (Linnaeus, 1766)	Campephagidae	Passeriformes	Least concern
39. House Sparrow	*Passer domesticus* (Linnaeus, 1758)	Passeridae	Passeriformes	Least concern
40. Black headed Munia	*Lonchura malacca* (Linnaeus, 1766)	Estrildidae	Passeriformes	Least concern
41. Scaly breasted Munia	*Lonchura punctulata* (Linnaeus, 1758)	Estrildidae	Passeriformes	Least concern
42. Black naped Oriole	*Oriolus chinensis* Linnaeus, 1766	Oriolidae	Passeriformes	Least concern
43. Eurasian golden Oriole	*Oriolus oriolus* (Linnaeus, 1758)	Oriolidae	Passeriformes	Least concern
44. Black hooded Oriole	*Oriolus xanthornus* (Linnaeus, 1758)	Oriolidae	Passeriformes	Least concern
45. Ashy Wood swallow	*Artamus fuscus* Vieillot, 1817	Artamidae	Passeriformes	Least concern
46. Grey backed Shrike	*Lanius tephronotus* (Vigors, 1831)	Laniidae	Passeriformes	Least concern
47. Brown Shrike	*Lanius cristatus* Linnaeus, 1758	Laniidae	Passeriformes	Least concern
48. Long tailed Shrike	*Lanius schach* Linnaeus, 1758	Laniidae	Passeriformes	Least concern
49. Purple Sunbird	*Cinnyris asiaticus* (Latham, 1790)	Nectariniidae	Passeriformes	Least concern
50. Pulple rumped Sunbird	*Leptocoma zeylonica* (Linnaeus, 1766)	Nectariniidae	Passeriformes	Least concern
51. Jungle Babbler	*Turdoides striata* (Dumont,1823)	Leiothrichidae	Passeriformes	Least concern

Common Name	Scientific Name	Family	Order	Current status (IUCN 3.1)
52. Yellow billed Babbler	*Turdoides affinis* (Jerdon, 1845)	Leiothrichidae	Passeriformes	Least concern
53. Pale billed flowerpecker	*Dicaeum erythrorhynchos* (Latham, 1790)	Dicaeidae	Passeriformes	Least concern
54. Red vented Bulbul	*Pycnonotus cafer* (Linnaeus, 1766)	Pycnonotidae	Passeriformes	Least concern
55. Red rumped Swallow	*Cecropis daurica* (Laxmann, 1769)	Hirundinidae	Passeriformes	Least concern
56. Common Tailorbird	*Orthotomus sutorius* (Pennant, 1769)	Cisticolidae	Passeriformes	Least concern
57. White Wagtail	*Motacilla alba* Linnaeus, 1758	Motacillidae	Passeriformes	Least concern
58. Yellow Wagtail	*Motacilla flava* Linnaeus, 1758	Motacillidae	Passeriformes	Least concern
59. Grey Wagtail	*Motacilla cinerea* Tunstall, 1771	Motacillidae	Passeriformes	Least concern
60. Forest Wagtail	*Dendronanthus indicus* (J.F. Gmelin,1789)	Motacillidae	Passeriformes	Least concern
61. Olive backed Pipit	*Anthus hodgsoni* (Richmond, 1907)	Motacillidae	Passeriformes	Least concern
62. Tree Pipit	*Anthus trivialis* (Linnaeus, 1758)	Motacillidae	Passeriformes	Least concern
63. Paddyfield Pipit	*Anthus rufulus* Vieillot, 1818	Motacillidae	Passeriformes	Least concern
64. Streaked weaver	*Ploceus* manyar (Horsfield,1821)	Ploceidae	Passeriformes	Least concern
65. Ashy Drongo	*Dicrurus leucophaeus* Vieillot, 1817	Dicruridae	Passeriformes	Least concern
66. Black Drongo	*Dicrurus macrocercus* Vieillot, 1817	Dicruridae	Passeriformes	Least concern
67. Bronzed Drongo	*Dicrurus aeneus* Vieillot, 1817	Dicruridae	Passeriformes	Least concern
68. Bank Myna	*Acridotheres* ginginianus (Latham, 1790)	Sturnidae	Passeriformes	Least concern
69. Common Myna	*Acridotheres tristis* (Linnaeus, 1766)	Sturnidae	Passeriformes	Least concern
70. Jungle Myna	*Acridotheres fuscus* (Wagler,1827)	Sturnidae	Passeriformes	Least concern
71. Chestnut Tailed Starling	*Sturnia malabarica* (J.F. Gmelin, 1789)	Sturnidae	Passeriformes	Least concern
72. Asian Pied Starling	*Gracupica contra* (Linnaeus, 1758)	Sturnidae	Passeriformes	Least concern
73. Indian Robin	*Saxicolodies fulicatus* (Linnaeus, 1766)	Muscicapidae	Passeriformes	Least concern
74. Oriental Magpie Robin	*Copsychus saularis* (Linnaeus, 1758)	Muscicapidae	Passeriformes	Least concern
75. Verditer Flycatcher	*Eumyias thalassinus* (Swainson, 1838)	Muscicapidae	Passeriformes	Least concern
76. Asian Brown Flycatcher	*Muscicapa dauurica* Pallas, 1811	Muscicapidae	Passeriformes	Least concern
77. Dark sided Flycatcher	*Muscicapa sibirica* J.F. Gmelin, 1789	Muscicapidae	Passeriformes	Least concern
78. Red throated Flycatcher	*Ficedula albicilla* (Pallas, 1811)	Muscicapidae	Passeriformes	Least concern
79. Orange headed thrush	*Geokichla citrina* (Latham, 1790)	Turdidae	Passeriformes	Least concern
80. Great tit	*Parus cinereus* Vieillot, 1818	Paridae	Passeriformes	Least concern
81. Open billed Stork	*Anastomus oscitans* (Boddaert, 1783)	Ciconiidae	Pelecaniformes	Least concern

Common Name	Scientific Name	Family	Order	Current status (IUCN 3.1)
82. Little Cormorant	Microcarbo niger (Vieillot, 1817)	Phalacrocoracidae	Pelecaniformes	Least concern
83. Indian Cormorant	*Phalacrocorax fuscicollis* Stephens, 1826	Phalacrocoracidae	Pelecaniformes	Least concern
84. Great Cormorant	*Phalacrocorax carbo* (Linnaeus, 1758)	Phalacrocoracidae	Pelecaniformes	Least concern
85. Indian Pond Heron	*Ardeola grayii* (Sykes,1832)	Ardeidae	Pelecaniformes	Least concern
86. Black crowned Night Heron	*Nycticorax nycticorax* (Linnaeus, 1758)	Ardeidae	Pelecaniformes	Least concern
87. Grey Heron	*Ardea cinerea* Linnaeus, 1758	Ardeidae	Pelecaniformes	Least concern
88. Little Egret	*Egretta garzetta* (Linnaeus, 1766)	Ardeidae	Pelecaniformes	Least concern
89. Purple Heron	*Ardea purpurea* Linnaeus, 1766	Ardeidae	Pelecaniformes	Least concern
90. Cattle Egret	*Bubulcus ibis* (Linnaeus,1758)	Ardeidae	Pelecaniformes	Least concern
91. Great Egret	*Ardea alba* Linnaeus, 1758	Ardeidae	Pelecaniformes	Least concern
92. Intermediate Egret	*Ardea intermedia* Wagler,1829	Ardeidae	Pelecaniformes	Least concern
93. Cinnamon Bittern	*Ixobrychus cinnamomeus* (J.F. Gmelin, 1789)	Ardeidae	Pelecaniformes	Least concern
94. Yellow Bittern	*Ixobrychus sinensis* (J.F. Gmelin, 1789)	Ardeidae	Pelecaniformes	Least concern
95. Black Bittern	*Ixobrychus flavicollis* (Latham, 1790)	Ardeidae	Pelecaniformes	Least concern
96. Greater Flameback	*Chrysocolaptes guttacristatus* (Tickell,1833)	Picidae	Piciformes	Least concern
97. Black rumped Flameback	*Dinopium benghalense* (Linnaeus, 1758)	Picidae	Piciformes	Least concern
98. Rufous Woodpecker	*Micropternus brachyurus* (Vieillot, 1818)	Picidae	Piciformes	Least concern
99. Streak throated Woodpecker	*Picus xanthopygaeus* (J.E. & G.R. Gray, 1846)	Picidae	Piciformes	Least concern
100 . Fulvous breasted woodpecker	*Dendrocopos macei* (Vieillot,1818)	Picidae	Piciformes	Least concern
101. Eurasian Wryneck	*Jynx torquilla* Linnaeus, 1758	Picidae	Piciformes	Least concern
102. Coppersmith Barbet	*Psilopogon haemacephalus* (Statius Muller, 1776)	Ramphastidae	Piciformes	Least concern
103. Blue throated Barbet	*Psilopogon asiaticus* (Latham, 1790)	Ramphastidae	Piciformes	Least concern
104. Lineated Barbet	*Psilopogon lineatus* (Vieillot, 1816)	Ramphastidae	Piciformes	Least concern
105. Rose-ringed Parakeet	*Psittacula krameri* (Scopoli, 1769)	Psittaculidae	Psittaciformes	Least concern
106. Alexandrine Parakeet	*Psittacula eupatria* (Linnaeus, 1766)	Psittaculidae	Psittaciformes	Near Threatened
107. Barn Owl	*Tyto alba* (Scopoli, 1769)	Tytonidae	Strigiformes	Least concern
108. Spotted Owlet	*Athene brama* (Temminck,1821)	Strigidae	Strigiformes	Least concern

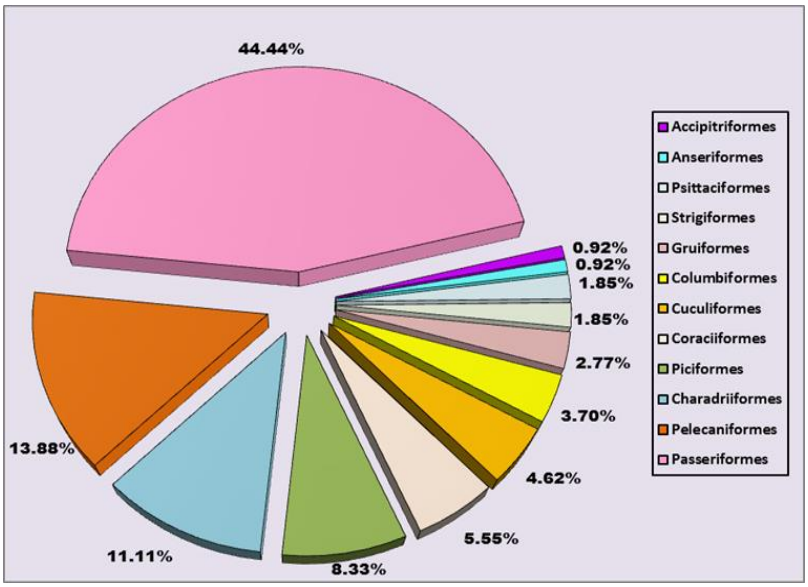

Fig. 3. Percentage of species composition under different avian orders in Nature Park

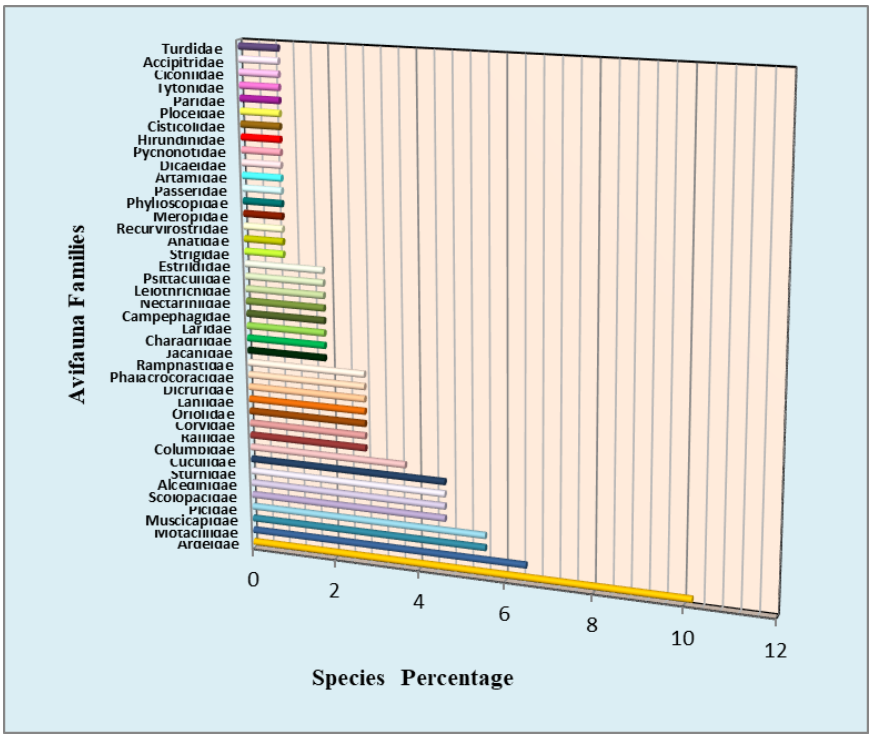

Fig. 4. Percentage of species in different avifauna families in Nature Park

Alcedinidae, Sturnidae, Cuculidae (5 species each), Columbidae (4 species), Rallidae, Corvidae, Oriolidae, Laniidae, Dicruridae, Phalacrocoracidae, Ramphastidae (3 species each), Jacanidae, Charadriidae, Laridae, Campephagidae, Nectariniidae, Estrildidae Leiothrichidae, Psittaculidae (2 species each), Strigidae, Anatidae, Recurvirostridae, Meropidae, Phylloscopidae, Passeridae, Artamidae, Dicaeidae, Pycnonotidae, Hirundinidae, Cisticolidae, Ploceidae, Paridae, Tytonidae, Ciconiidae, Accipitridae, Turdidae (1 species each). The maximum numbers of bird species were seen in the genus *Ardea*. The abundance of *Treron phoenicopterus, Streptopelia chinensis, Halcyon smyrnensis, Ceryle rudis Pelargopsis*

capensis, Eudynamys scolopaceus, Amaurornis phoenicurus, Dendrocitta vagabunda, Passer domesticus, Oriolus xanthornus, Turdoides striata, *Pycnonotus cafer, Dicrurus macrocercus, Acridotheres fuscus, Micropternus brachyurus, Picus xanthopygaeus, Anastomus oscitans,* and *Acridotheres fuscus* were notably increased during the survey. Of the total bird species recorded, River Tern (*Sterna aurantia*) was Vulnerable and Alexandrine Parakeet (*Psittacula eupatria*) was near threatened according to IUCN status. Rest of the bird species were least concern.

4. CONCLUSION

Ornithological surveys provide necessary information for basic and applied ecology. It is also important for identifying priority areas for conservation. The present study was an attempt to reveal preliminary record of avifauna in Nature Park that has not been explored previously. Nature Park supports significant number of avifauna being a part of urban Kolkata. The diversity of passerine (Order Passeriformes) was higher in Nature Park with 48 species as compared to non -passerine (60 species). Ecologically suitable and healthy environment of Nature Park made it possible. Of the total bird species recorded in this study, 1 species was vulnerable and 1 species was near threatened indicating their conservation significance. So there is a need to protect the ecosystem and conserve the diversity of the study area. Further, in order to attract more avifauna, plantation of all seasonal variety of flowering and fruiting plants along with regular monitoring is very important.

COMPETING INTERESTS

Author has declared that no competing interests exist.

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SUPPLEMENTARY MATERIALS

Fig. S1. Nature Park, Kolkata, West Bengal, India

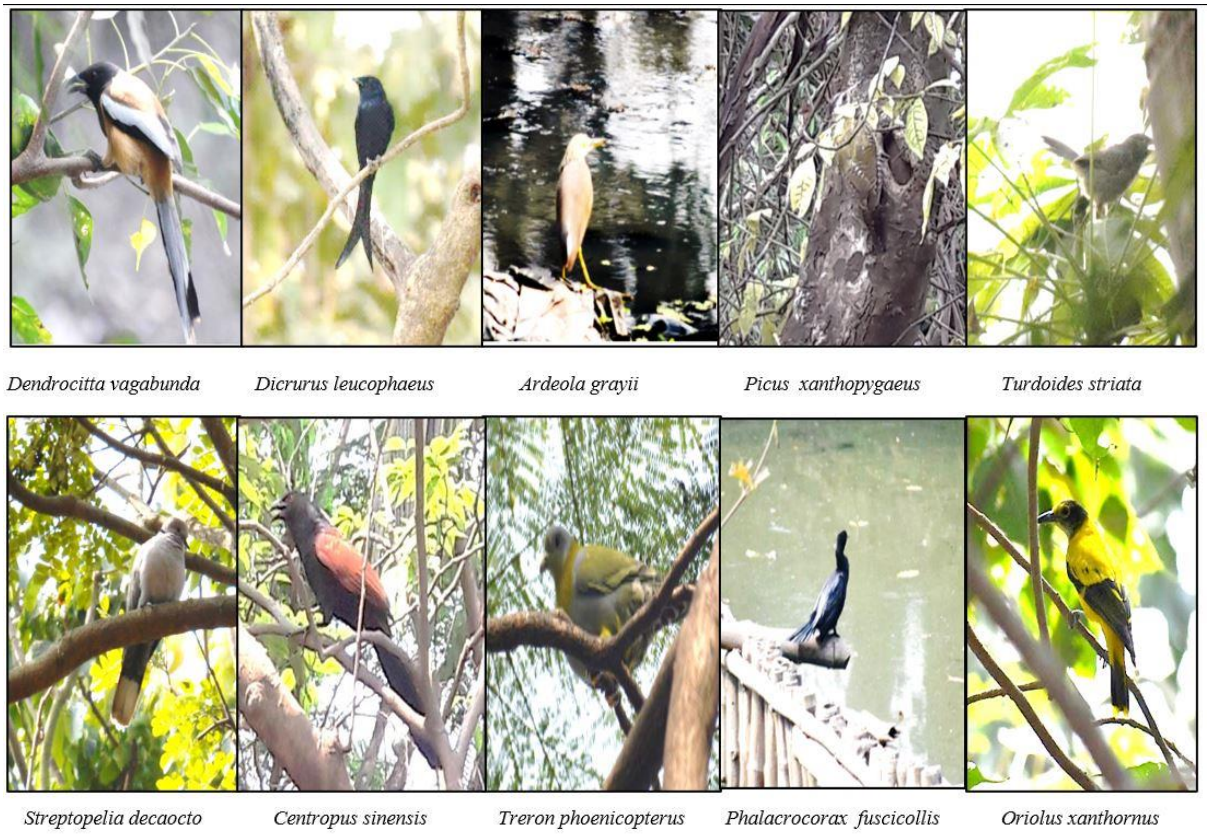

Fig. S2. Different species of birds documented during survey from Nature Park, Kolkata, West Bengal, India

***Anastomus oscitans* in nest**

Cormorant habitat

Bird nests on trees

Fig. S3. Habitats with nests of some bird species

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