e-planet **19** (1): 79-87 (June 2021)

Avifaunal diversity of National Zoological Park, Delhi

P. KHAN[1*], M. KUMAR[2] AND R. K. PANDEY[2]

[1]North Orissa University, Takatpur, Mayurbhanj, Odisha, India*
[2]National Zoological Park, Mathura road, Pragati Maidan, New Delhi- 110003, India.

**pk0006719@gmail.com*

Date of receipt : 17.12.2020 Date of acceptance : 14.05.2021

ABSTRACT

The present study was aimed to prepare a checklist of avifaunal diversity of National Zoological Park (NZP), Delhi. The survey carried out from 20 January 2020 to 30 November 2020. During the survey, a total of 124 species belonging to 52 families were recorded which comprised 69 non-passerine and 55 passerine species. Our efforts resulted in the documentation of accurate data of all the avifaunal species. Based on the collected data highest bird species were found from Muscicapidae (12 species) family, followed by Columbidae (7 species), Anatidae (6 species), Ardeidae (6 species) and Sturnidae (6 species). Black kite (*Milvus migrans*), Common Myna (*Acridotheres tristis*), Jungle babbler (*Turdoides striata*), Indian Peafowl (*Pavo cristatus*), Grey hornbill (*Tockus birostris*), Alexandrine Parakeet (*Psittacula eupatria*), Green pigeon (*Treron phoenicoptera*) and Purple Sunbird (*Nectarinia asiaticus*) were the most abundance and dominant bird species of NZP. The survey data shows that NZP supports a vast variety of avifaunal species diversity. The impressive amount of birds provides ecosystem services, food and aesthetic values for visitor and staffs around NZP. However, the survival of species depends upon the conservation of NZP's natural forest, foraging fauna and artificial ponds.

Key words: Avifaunal diversity, feeding habitat, National Zoological Park, species richness

INTRODUCTION

According to (Ali and Ripley 1987; Manakadan and Pittie, 2004), Indian has 1340 bird species, which is about 13% of the world's birds. Birds are considered as indicator species (Blair, 1993), and they are common denizens of ecosystem. In Delhi, more than 450 species and subspecies have been recorded. The main aim of this survey is to make valuable based line information of the avifaunal species for their future as well as to create awareness for educational purpose and their conservation. National Zoological Park (NZP) bears an impressive amount of avifauna diversity. However, previously no data has been published on the diversity of avifauna species from NZP. The NZP provides habitation for a vast variety of natural as well as artificial flora such as : Common species : *Azadirachta indica, Mangifera indica, Syzygium cumini, Morus rubra, Ficus virens, Eucalyptus hybrida, Alstonia scholaris, Terminalia arjuna, Bauhinia variegata, Ficus religiosa, Cassia fistula, Grevillea robusta, Cassia javanica and Ficus carica.*

Shrubs: *Hibiscus rosa-sinensis, Nerium oleander.*

Herbs: *Phyllanthus urinaria, Gymnema sylvestre* and *Scoparia dulcis.*

Grasses: *Cenchrus ciliaris, Saccharum spontaneum, Cynodon dactylon, Panicum repens and Pennisetum pedicellatum.*

The above habitation is associated with the field survey as a roosting place of the different species of birds at day time. The beat no. 14 serves as the resting place for a Partial Albino Jungle babbler (Khan and Kumar, 2019). And a big pond is

the breeding center of painted stork (*Mycteria leucocephala*) during mid-august to January. In the past few years researchers have studied related to the avifaunal diversity in India (Asomani and Boateng, 2019; Blair, 1993); Biswajit and Parthankar et al., 2016; Chopra et al., 2012; Chopra et al., 2013; Chakdar et al., 2016; Gupta et al., 2009; Harvey, 2003; Lehkar, 2011; Joshi, 2015; Nayan et al., 2005; Pawar et al., 2010. Pawar et al., 2010; Joshi and Shrivastava, 2012; Ramitha and Vijyalaxmi 2001; Sisodia and Moundiotiya, 2005; Verma et al., 2004; Urfi, 2003; NZP supports resident and migratory birds throughout the year. In the past few years significant researchers have studied related to the avifaunal diversity in India (Harvey, 2003 ; Urfi, 2003; Sisodia and Moundiotiya, 2005; Pawar et al., 2010; Joshi and Shrivastava, 2012; Chopra et al, 2012; Chopra et al., 2013; Patil and Hiragond, 2013; Kumar et al., 2016). NZP supports resident and migratory birds throughout the year.

MATERIALS AND METHODS

Study area

The current analysis was observed in the National Zoological Park (28.6044359°N, 77.2461981°E) established in the year 1959. It situated in the middle of Delhi, with an area of 176-acre, a sprawling green island and a motley collection of animals and birds. The Zoo area nestled with artificial ponds, butterfly garden, plant nurseries, and impressive floral and foraging faunal diversity. The entire area is crisscrossed with a good network of concrete roads (Fig. 1).

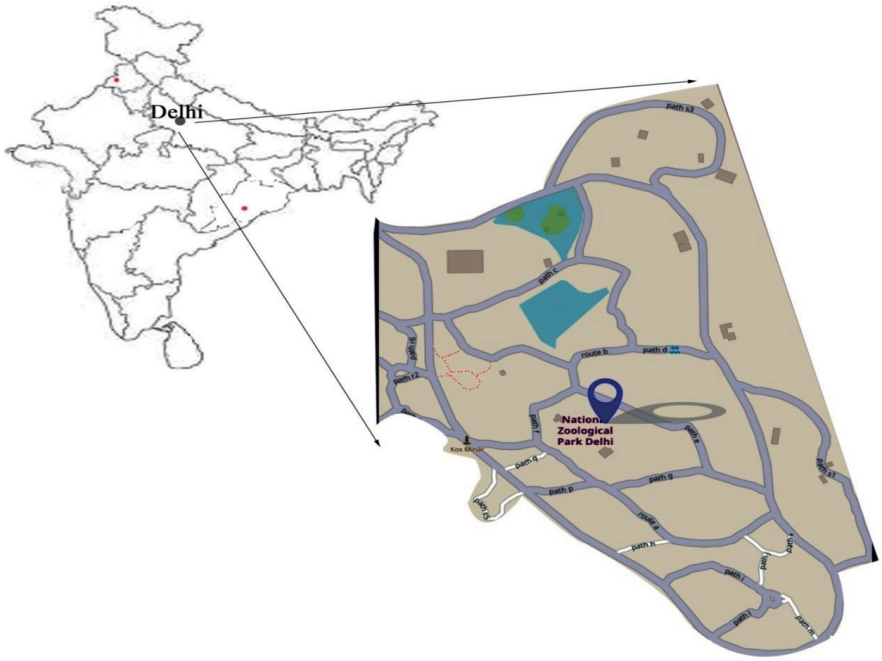

Fig. 1. Map of study area

The surveys were conducted from 20 January 2020 to 30 November 2020 at National Zoological Park to assess the effects of human interferences. Surveys were performed in every parts of study area. Many direct and indirect methods were employed to examine the diversity of avifauna within the study area. In general, for the avifauna that has been actively assessed the authors carried out intensive work during the surveys. The survey was covered both summer (average temperature 25° to 45° C) and winter (average temperature 5° to 25° C) season and habitat. Besides several trapping methods, transects survey, trap station and random walk were established at each sampling site. During study period; regularly fieldwork carried out twice a day in morning (06:30 to 08:30 AM) and in evening

(04:30 to 06:30 PM). All the survey sides were visited at least once in a week. Birds were listed along with the frequency of occurrence for sighting calls or other indirect signs. For the identification, a pocket guide to the Birds of Indian Subcontinent; Ali and Ripley (1999) and Ali and Ripley (1987) were used for sighting and digital data collection. Digital Camera (Nikon D3300 with 70-300 mm zoom lens) and binocular were used for sighting of birds and digital data collection. The scientific names of different bird species were recorded as per the birds of the Indian subcontinent (Manakadan and Pittie, 2004). In the study area, breeding birds' nests were observed and subsequently this information was used to assess the status of birds that are resident to the area or not. For obtaining the percentage of occurrence of families Fig. 2, we used the following formula.

$$\text{Species occurrence (\%)} = \frac{\text{No.of species}}{\text{Total no.of diff. species}} \times 100$$

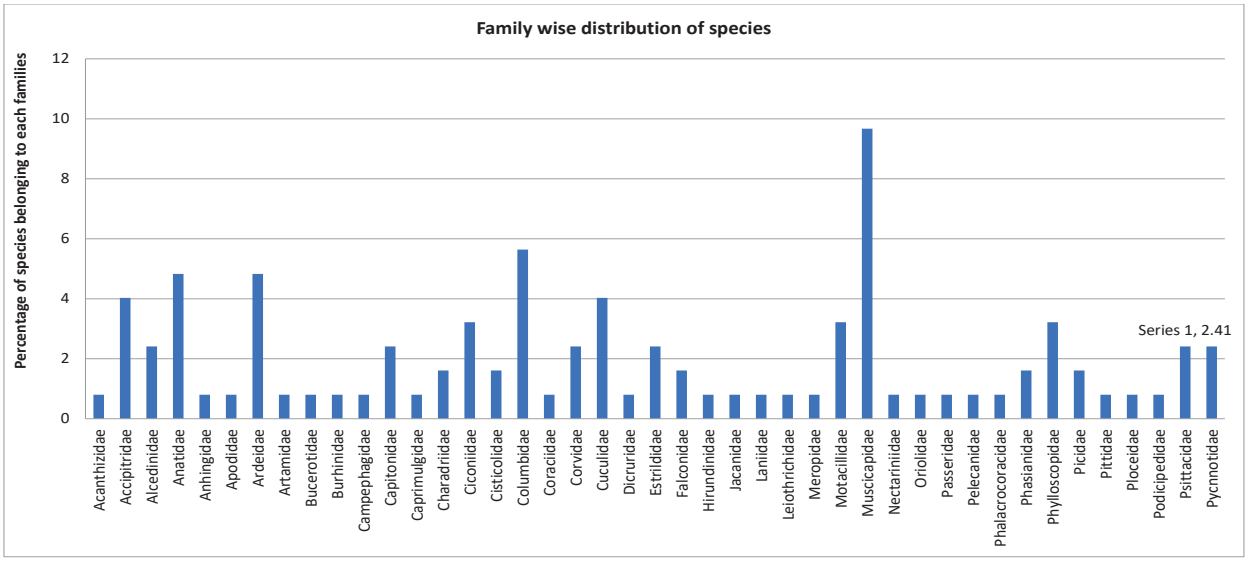

Fig. 2. Percentage distribution of families

RESULTS AND DISCUSSION

On the basis of field survey of NZP, a total of 124 bird species belong to 93 genera and 52 families were recorded. In which 69 are non-passerine and 55 passerine species (Table 1) were recorded.

Out of total 124 species, 31 winter migrants, 12 summer migrants, 5 local migrants and remaining 76 were found resident birds (Fig.3). Out of 76 resident species most of the species have been observed to be positively breeding inside NZP; black kite (*Milvus migrans*), red vented bulbul (*Pycnonotus cafer*), red-wattled lapwing (*Vanellus indicus*), alexandrine parakeet (*Psittacula eupatria*), rose ringed parakeet (*Psittacula krameri*), house crow (*Corvus splendens*), common myna (*Acridotheres stristis*), copper smith barbet (*Megalaima haemacephalaI*), purple sunbird (*Cinnyris asiaticus*), jungle babbler (*Turdoides striata*) and blue rock pigeon (*Columba livia*) were found common resident. The species richness near the pond (basically water birds) found in impressive

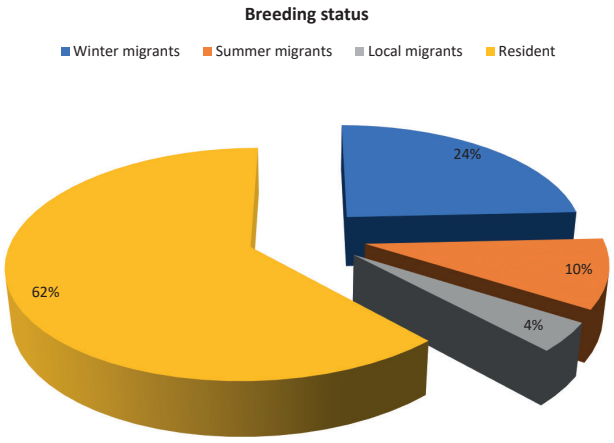

Fig. 3. Distribution of migratory and resident birds

Table 1. Checklist of the birds of National Zoological Park, Delhi

Sl. No.	Family	Common name	Scientific name	Freq-uency	Feeding habitat	Breeding	IUCN status
1.	Acanthizidae	Grey warbler	*Gerygone igata*	C	I	WM	LC
2.	Accipitridae	Black kite	*Milvus migrans*	A	Ca	R,B	LC
3.		Black-winged kite	*Elanus caeruleus*	R	Ca	WM	LC
4.		Crested serpent eagle	*Spilornis cheela*	UC	Ca	#	LC
5.		Indian spotted eagle	*Clanga hastata*	R	Ca	#	VU
6.		Shikra	*Accipiter badius*	A	Ca	R,B	LC
7.	Alcedinidae	Common kingfisher	*Alcedo atthis*	C	P	R,B	LC
8.		Lesser pied kingfisher	*Ceryle rudis*	r	P	R,B	LC
9.		White-breasted kingfisher	*Halcyon smyrnensis*	A	P	R,B	LC
10.	Anatidae	Comb duck	*Sarkidiornis melanotos*	C	P	WM	LC
11.		Common teal	*Anas crecca*	C	P	WM	LC
12.		Pintail duck	*Anas acuta*	C	O	WM	LC
13.		Northern shoveler	*Anas clypeata*	r	O	WM	LC
14.		Spotbilled duck	*Anas poecilorhyncha*	C	G	R,B	LC
15.		Lesser whistling-duck	*Dendrocygna javanica*	A	P	WM	LC
16.	Anhingidae	Darter or snake bird	*Anhinga rufa*	C	P	WM	LC
17.	Apodidae	Asian palm swift	*Cypsiurus balasiensis*	A	I	R	LC
18.	Ardeidae	Little egret	*Egretta garzetta*	A	P	SM	LC
19.		Large egret	*Casmerodius albus*	C	P	R	LC
20.		Cattle egret	*Bubulcus ibis*	A	P	R,B	LC
21.		Median egret	*Mesophoyx intermedia*	A	I	R	LC
22.		Indian pond-heron	*Ardeola grayii*	A	P	R,B	LC
23.		Night heron	*Nycticorax nycticorax*	C	P	R	LC
24.	Artamidae	Ashy woodswallow	*Artamus fuscus*	UC	F	LM	LC
25.	Bucerotidae	Grey hornbill	*Tockus birostris*	A	F	R	LC
26.	Burhinidae	Eurasian stone-curlew	*Burhinus oedicnemus*	r	I	WM	LC
27.	Capitonidae	Blue throated barbet	*Megalaima asiatica*	C	F	R	LC
28.		Brown headed barbet	*Megalaima zeylanica*	A	F	R,B	LC
29.		Coppersmith barbet	*Megalaima haemacephala*	A	F	R,B	LC
30.	Caprimulgidae	Indian nightjar	*Caprimulgus asiaticus*	C	In	R	LC
31.	Campephagidae	Large cuckooshrike	*Coracina macei*	UC	Ca	LM	LC
32.	Charadriidae	Red-wattled lapwing	*Vanellus indicus*	A	I	R,B	LC
33.		Yellow-wattled lapwing	*Vanellus malabaricus*	r	I	WM	LC
34.	Ciconiidae	Black necked stork	*Ephippiorhynchus asiaticus*	UC	P	LM	NT
35.		Painted stork	*Mycteria leucocephala*	A	P	LM	NT

Sl. No.	Family	Common name	Scientific name	Freq-uency	Feeding habitat	Breeding	IUCN status
36.	Ciconiidae	White stork	*Ciconia ciconia*	UC	Ca	WM	LC
37.		White necked stork	*Ciconia episcopus*	UC	Ca	WM	VL
38.	Cisticolidae	Ashy wren warbler	*Prinia socialis*	r	I	WM	LC
39.		Jungle prinia	*Prinia sylvatica*	r	I	WM	LC
40.	Columbidae	Blue rock pigeon	*Columba livia*	A	G	R,B	LC
41.		Domestic pigeon	*Columba livia domestica*	C	G	R,B	LC
42.		Indian ring dove	*Streptopelia decaocto*	C	G	R	LC
43.		Little brown dove	*Streptopelia senegalensis*	UC	G	R	LC
44.		Red turtle dove	*Streptopelia tranquebarica*	UC	G	R	LC
45.		Spotted dove	*Streptopelia chinensis*	A	G	R	LC
46.		Yellow-legged green-pigeon	*Treron phoenicoptera*	C	F	R	LC
47.	Coraciidae	Indian roller	*Coracias benghalensis*	C	I	R	LC
48.	Corvidae	Rufous treepie	*Dendrocitta vagabunda*	A	I	R,B	LC
49.		House crow	*Corvus splendens*	A	O	R,B	LC
50.		Jungle crow	*Corvus macrorhynchos*	A	O	SM	LC
51.	Cuculidae	Asian koel	*Eudynamys scolopacea*	A	F	R	LC
52.		Common cuckoo	*Cuculus canorus*	UC	I	R	LC
53.		Common hawk-cuckoo	*Hierococcyx varius*	UC	I	R	LC
54.		Greater coucal	*Centropus sinensis*	A	O	WM	LC
55.		Pied – crested cuckoo	*Clamator jacobinus*	r	O	SM	LC
56.	Dicruridae	Black drongo	*Dicrurus macrocercus*	A	I	R,B	LC
57.	Estrildidae	Scaly -breasted munia	*Lonchura punctulata*	UC	I	R,B	LC
58.		White throated munia	*Lonchura malabarica*	r	G	R	LC
59.		Red munia	*Estrilda amandava*	C	I	R	LC
60.	Falconidae	Red-necked falcon	*Falco chicquera*	r	Ca	WM	NT
61.		Peregrine falcon	*Falco peregrinus*	r	Ca	WM	LC
62.	Hirundinidae	Barn swallow	*Hirundo rustica*	R	I	WM	LC
63.	Jacanidae	Pheasant-tailed jacana	*Hydrophasianus chirurgus*	r	Ca	WM	LC
64.	Laniidae	Bay backed shrike	*Lanius vittatus*	r	Ca	R	LC
65.	Leiothrichidae	Large grey babbler	*Argya malcolmi*	UC	O	R	LC
66.	Meropidae	Green bee-eater	*Merops orientalis*	UC	I	R	LC
67.	Motacillidae	Grey wagtail	*Motacilla cinerea*	C	I	WM	LC
68.		Large pied wagtail	*Motacilla maderaspatensis*	UC	I	WM	LC
69.		Yellow headed wagtail	*Motacilla citreola*	UC	I	WM	LC
70.		White wagtail	*Motacilla alba*	A	I	WM	LC

Sl. No.	Family	Common name	Scientific name	Freq-uency	Feeding habitat	Breeding	IUCN status
71.	Muscicapidae	Bluethroat	*Luscinia svecica*	UC	I	WM	LC
72.		Black redstart	*Phoenicurus ochruros*	UC	I	WM	LC
73.		Common babbler	*Turdoides caudatus*	A	I	R	LC
74.		Indian robin	*Saxicoloides fulicata*	A	I	R	LC
75.		Jungle babbler	*Turdoides straita*	A	I	R	LC
76.		Jungle babbler (albino)	*Turdoides straita*	r	I	R	LC
77.		Magpie robin or dhyal	*Copsychus saularis*	A	I	R	LC
78.		Siberian rubythroat	*Luscinia calliope*	UC	I	WM	LC
79.		Spotted flycatcher	*Muscicapa striata*	UC	I	LM	LC
80.		Streaked faintail warbler	*Cisticola juncidis*	A	I	R	LC
81.		Common tailorbird	*Orthotomus sutorius*	A	I	R	LC
82.		Yellow-eyed babbler	*Chrysomma sinense*	UC	F	R	LC
83.	Nectariniidae	Purple sun bird	*Cinnyris asiaticus*	A	N	R	LC
84.	Oriolidae	Eurasian golden oriole	*Oriolus oriolus*	C	I	SM	LC
85.	Passeridae	House sparrow	*Passer domesticus*	r	I	R	LC
86.	Pelecanidae	White or rosy pelican	*Pelecanus onocrotalus*	UC	P	R,B	LC
87.	Phalacrocoracidae	Little cormorant	*Phalacrocorax niger*	A	P	SM	LC
88.		Indian cormorant	*Phalacrocorax fuscicollis*	C	P	SM	LC
89.	Phasianidae	Grey francolin	*Fracolinus pondicerianus*	UC	O	WM	LC
90.		Indian peafowl	*Pavo cristatus*	A	O	R,B	LC
91.	Phylloscopidae	Common chiffchaff	*Phylloscopus collybita*	UC	I	WM	LC
92.		Dusky warbler	*Phylloscopus fuscatus*	UC	O	R	LC
93.		Greenish warbler	*Phylloscopus trochiloides*	C	I	R, B	LC
94.		Hume's leaf warbler	*Phylloscopus humei*	UC	I	WM	LC
95.	Picidae	Black-rumped flameback	*Dinopium benghalense*	C	O	R,B	LC
96.		Yellow-crowned woodpecker	*Leiopicus mahrattensis*	UC	I	R,B	LC
97.	Pittidae	Indian pitta	*Pitta brachyura*	UC	I	#	LC
98.	Ploceidae	Baya weaver	*Ploceus philippinus*	UC	I	SM	LC
99.	Podicipedidae	Little grebe	*Tachybaptus ruficollis*	C	P	R,B	LC
100.	Psittacidae	Alexandrine parakeet	*Psittacula eupatria*	A	F	R,B	NT
101.		Plum headed parakeet	*Psittacula cyanocephala*	A	F	R	LC
102.		Rose ringed parakeet	*Psittacula krameri*	UC	F	R,B	LC

Sl. No.	Family	Common name	Scientific name	Frequency	Feeding habitat	Breeding	IUCN status
103.	Pycnnotidae	Red-vented bulbul	*Pycnonotus cafer*	A	F	R,B	LC
104.		Red-whiskered bulbul	*Pycnonotus jocosus*	A	F	R,B	LC
105.		White-cheeked bulbul	*Pycnonotus leucotis*	UC	F	SM	LC
106.	Rallidae	Common moorhen	*Gallinula chloropus*	C	I	R,B	LC
107.		Eurasian coot	*Fulica atra*	C	O	R,B	LC
108.		White-breasted waterhen	*Amaurornis phoenicurus*	C	I	R,B	LC
109.	Recurvirostridae	Black-winged stilt	*Himantopus himantopus*	r	I	SM	LC
110.	Scolopacidae	Common sandpiper	*Actitis hypoleucos*	C	I	WM	LC
111.		Green sandpiper	*Tringa ochropus*	C	P	WM	LC
112.	Strigidae	Oriental scops owl	*Otus sunia*	#	Ca	R	LC
113.		Spotted owlet	*Athene brama*	C	Ca	R	LC
114.	Sturnidae	Bank myna	*Acridotheres ginginianus*	A	I	R	LC
115.		Brahminy starling	*Sturnus pagodarum*	C	I	R	LC
116.		Common myna	*Acridotheres tristis*	A	O	R	LC
117.		Jungle myna	*Acridotheres fuscus*	r	O	R	LC
118.		Pied starling	*Gracupica contra*	A	I	R	LC
119.		Rosy starling	*Pastor roseus*	r	I	R	LC
120.	Threskiornithidae	Black-headed ibis	*Threskiornis melanocephalus*	C	P	SM	NT
121.		Red-naped ibis	*Pseudibis papillosa*	C	O	SM	LC
122.	Tytonidae	Barn owl	*Tyto alba*	UC	Ca	R	LC
123.	Upupidae	Eurasian hoopoe	*Upupa epops*	C	I	R,B	LC
124.	Zosteropidae	Indian white eye	*Zosterops palpebrosus*	C	I	R,B	LC

Abbreviations: LC – Least concern, NT- Near Threatened, V – Vulnerable, R- Resident, WM- Winter Migrant, SM- Summer Migrant, LM- Local migrant Ca- Carnivores, F-Frugivores, G-Granivores, I- Insectivores, N-Nectarivores, O-Omnivores, P- Piscivores, #- Recorded only once, A- Abundant, C- Common, UC- Uncommon r- Rare, B- Breed.

amount. black kite (*Milvus migrans*), jungle babbler (*Turdoides striata*) and peafowl (*Pavo cristatus*) showed the maximum species richness in NZP as compare to other resident birds. black headed ibis (*Threskiornis melanocephalus*) mostly sighted inside Indian rhinoceros (*Rhinoceros unicornis*) enclosure. The NZP official provides good food and shelter for migratory as well as resident birds. Out of 124 bird species, 5 species were found Near Threatened (NT), 2 species were Vulnerable (V) and remaining all were found Least Concern (LC) under the IUCN Red List of Threatened Species (2017).

The species richness and abundance of avifauna is due to more floral diversity which provides impressive amount of food as well as nesting and breeding sites. Birds play a vital role and are key species in agriculture ecosystem to maintain the ecological balance, they provide important ecosystem services; pest control, pollination, seed dispersal. The NZP area birds are composed of insectivores (52) followed by piscivores (20), frugivores (14), omnivores (15), carnivores (14), granivores (8) and only 1 species of nectarivores (Fig.4).

Table 2. Avifauna represented in families

Sl. No	Family	Percentage occurrence
1	Acanthizidae	0.80
2	Accipitridae	4.03
3	Alcedinidae	2.41
4	Anatidae	4.83
5	Anhingidae	0.80
6	Apodidae	0.80
7	Ardeidae	4.83
8	Artamidae	0.80
9	Bucerotidae	0.80
10	Burhinidae	0.80
11	Campephagidae	0.80
12	Capitonidae	2.41
13	Caprimulgidae	0.80
14	Charadriidae	1.61
15	Ciconiidae	3.22
16	Cisticolidae	1.61
17	Columbidae	5.64
18	Coraciidae	0.80
19	Corvidae	2.41
20	Cuculidae	4.03
21	Dicruridae	0.80
22	Estrildidae	2.41
23	Falconidae	1.61
24	Hirundinidae	0.80
25	Jacanidae	0.80
26	Laniidae	0.80
27	Leiothrichidae	0.80
28	Meropidae	0.80
29	Motacillidae	3.22
30	Muscicapidae	9.67
31	Nectariniidae	0.80
32	Oriolidae	0.80
33	Passeridae	0.80
34	Pelecanidae	0.80
35	Phalacrocoracidae	0.80
36	Phasianidae	1.61
37	Phylloscopidae	3.22
38	Picidae	1.61
39	Pittidae	0.80
40	Ploceidae	0.80
41	Podicipedidae	0.80
42	Psittacidae	2.41
43	Pycnnotidae	2.41
44	Rallidae	2.41
45	Recurvirostridae	0.80
46	Scolopacidae	0.80
47	Strigidae	1.61
48	Sturnidae	4.83
49	Threskiornithidae	1.61
50	Tytonidae	0.80
51	Upupidae	0.80
52	Zosteropidae	0.80

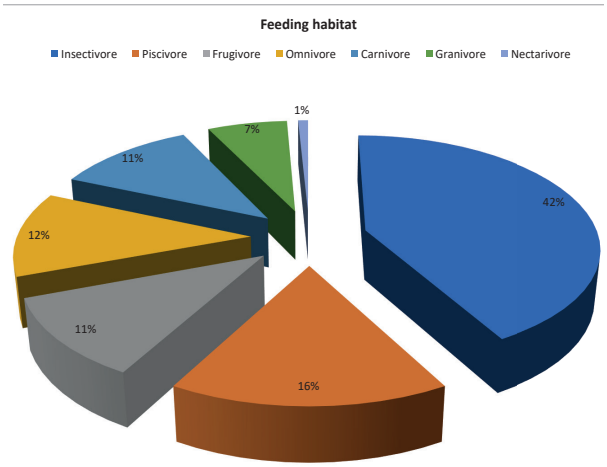

Fig. 4. Distribution of feeding habitat of NZP birds

A good percentage of insectivore bird species shows that the NZP has good insect species. Accidently the state bird of Delhi; house sparrow (*Passer domesticus*) were found only once in this year in front of NZP gate. Surprisingly every year gray wagtail (*Motacilla cinerea*) comes during winter, but this year we first sighted on 1st September 2020 inside the swamp deer enclosure. The results of the study could provide baseline information that would be helpful in understanding the avifauna species diversity and their distribution patterns. Awareness and conservation programs are also needed in order to understand the importance of bird species and their significant contribution to maintain the ecosystem.

CONCLUSION

The present survey provides the prelusive framework to understand the avifaunal diversity of National Zoological Park, Delhi. It indicates that even in metropolitan cities like Delhi still selected habitats have supported a significant number of avifauna. Hence, it is concluded that in order to attract more and more birds, it needs to plant all season varieties of flowering plants, fruiting trees facilitating nesting sites to avifaunal species. Therefore, it is recommended that regular monitoring of the survey site should be carried out every year and every season with support from university faculties and students to protect the marvelous and sustainable ecosystem like NZP to ensure the better protection of natural resources to ensure sustainable ground for the welfare of birds.

ACKNOWLEDGEMENT

The authors are thankful to the Curator, NZP, Delhi for extending permission to undertake the study. Also thanks to Dr. Abhijeet Bhawal and Dr. V.K. Jayswal of National Zoological Park; Subhadra Barik and Prajna Parimita Sahoo from North Odisha University, Odisha for their keen support.

REFERENCES

Ali, S and Ripley, S.D. 1987. *Handbook of The Birds of India and Pakistan.* Oxford Press. New Delhi. p. 289.

Ali, S and Ripley, S.D. 1999. *A pocket guide to the Birds of Indian Subcontinent.* Bombay Natural History Society, *Bombay* p. 345.

Asomani, R. and Boateng, R 2019. Urban wetland planning and management in Ghana: a disappointing implementation. *Wetlands*. **39**: 251–61.

Blair, R.B. 1993. Land use and avian species diversity along an urban gradient. *Ecol Appl*.6(2):506–19.

Chakdar, B.., Choudhury, P. and Singha, H. 2016. Avifaunal Diversity in Assam University Campus, Silchar, India. *J. Thr. Taxa* **8**(1): 8369-8378.

Chopra, G., Tyor, A.K. and Kumari, S. 2013. A study on wetland avian species of Sultanpur National Park Gurgaon, Haryana (India). *Ecoscan* **7**(1 & 2): 21-26.

Chopra, G, Tyor, A.K., Kumari S and Rai, D. 2012. Status and conservation of avian fauna of Sultanpur National Park Gurgaon, Haryana (India). *J. Appl. Nat. Sci.* **4**(2): 207-213.

Gupta, K.S., Kumar, P. and Malik, K.M. 2009. Avifaunal diversity in the University Campus of Kurukshetra, Haryana. *J Thr. Taxa,* **1**(12): 629-632.

Harvey, B. 2003. Checklist of the Basai Wetlands. Retrieved from http://www.delhibird.com/Checklists/Basai.html on 24/09/2015.

IUCN. 2017. The IUCN Red List of Threatened Species. Version 2017-3.

Joshi, P. and Shrivastava, V.K. 2012. Ecological study and bird diversityof Tawa Reservoir and its surrounding areas of Hoshangabad District (Madhya Pradesh). *Bioscan* 7(1): 129-133

Joshi, P.P. 2015. Assessment of avian population in the different habitats around Amolakchand Mahavidyalaya Campus, Yavatmal, Maharashtra, India. *J. Glob. Biosci*. **4**(5): 2244-2250.

Khan, P and Kumar, M. 2019. A record of partial albinism in jungle babbler (*Turdoides striata*), National zoological park, New Delhi, India. *Newsletter for Birdwatchers* **59** (5): 55-59.

Lahkar, D., Rout, S.D. and Sahu, H.K. 2011. Checklist of birds of the North Orissa University campus, Baripada, Orissa, *Zoo's Print* **26**(5): 25-28.

Manakadan, R., and Pittie, A. 2004. Standardized English and scientific name of the birds of the Indian subcontinent. *Buceros* **6**(1): 1-38.

Nayan, J.K., Patel, S.N. and Patel, M.V., 2005. Birds of Gujarat University Campus, Ahmedabad. *Zoos' Print J.* **20**(12): 2111-2113.

Pawar, S.M., Ganeshwade, R.M. and Sonawane, S.R. 2010. Avian fauna along three water reservoir from Satara district (Maharashtra), India. *Bioscan* **5**(4): 609-612.

Ramitha, M. and Vijayalaxmi, K. 2001. A Checklist of birds in and around Mangalore University Campus, Karnataka. *Zoos' Print J.* **16**(5): 489-492.

Sisodia, R. and Moundiotiya, C. 2005. Biodiversity of Jal Mahal Lake and Kalakho Lake, Rajasthan. *Int. J. Environ. Stud.* **62**(6): 621-641.

Urfi, A.J. 2003. The birds of Okhla Barrage Bird Sanctuary, Delhi, India. *Fortail* **19**: 39-50

Verma, A., Balachandran, S., Chaturvedi, N. and Patil, V. 2004 A preliminary report on the biodiversity of Mahul Creek, Mumbai, India with special reference to avifauna. *Zoos' Print J.* **19**(9): 1599-1605.