

A STUDY OF AVIAN DIVERSITY IN DURGAPUR GOVERNMENT COLLEGE CAMPUS, WEST BENGAL, INDIA

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ABSTRACT

The present study was performed to investigate bird diversity at Durgapur Government College Campus, West Bengal, India from January 2013 to January 2020. The standard point count method and opportunistic sightings were used to make the checklist of the bird species. A total of 106 different bird species belonging to 47 families were recorded. Sylviidae was recorded as the most diverse family. Out of the 106 bird species, 23 were winter migrants, 4 were summer migrants, 1 was passage migrant, 1 was vagrant and the rest 77 were residents. Winter months supported the highest species richness while maximum bird density was recorded in the month of March. The global population trend chart of the observed bird species showed that most of the species belonged to the stable category (52 %, 55 species). Alexandrine Parakeet (*Psittacula eupatria*) belonged to the Near Threatened category of the IUCN Red List category among the recorded birds. The present study area is now facing various anthropogenic disturbances which are leading to the decline of the bird populations and need special attention. More extensive studies will surely enrich our knowledge of the avifauna of this area.

Keywords: *bird, checklist, diversity indices, migratory birds, urban diversity*

INTRODUCTION

The study of the diversity and distribution patterns of organisms and their function in the ecosystem are important and challenging at the same time. Birds are one of the most important components of any ecosystem [1]. They have been recorded to function as scavengers,

pollinators and predators on various organisms, which helps to maintain the balance of the ecosystem [2]. Avifauna exhibit diverse patterns in their habitat selection and studies focusing on their diversity and various habitat conditions are becoming ever more popular [3 - 6]. Moreover, birds have been found to be correlated with an increase in

satisfaction and happiness among the human population [7]. Unfortunately, in recent times various observations and studies made by researchers all around the globe have shown that bird populations are facing serious problems due to habitat destruction and climate change [8 - 10]; accordingly, the frequency of out-of-range avifaunal records is increasing day by day [11, 12].

Durgapur is a transitional zone between Chotanagpur Plateau and Gangetic Plains and therefore shows a wide range of diversity in its topography as well as in its faunal composition [13 - 15]. However, despite its rich fauna, this region is considered as one of the least studied regions of West Bengal. Out of the 1451 species of birds found in the Indian subcontinent [16], which makes up about 13 % of the total birds found globally, according to studies conducted by Durgapur Wildlife Information and Nature Guide Society from 2013 to 2022, Durgapur has about 250 species of birds [17, Unpublished data]. Various works on the avifauna of Durgapur were conducted in the previous years [18 - 22] and several works are still in progress. Being located in the middle of an area with rich diversity, the Durgapur Government College Campus also has a huge diversity of plants [23], insects [24], reptiles, amphibians, birds and mammals. However, much of its faunal composition has still remained a mystery to the outer world because of the lack of exploration and studies. Campus Bird Count, a global event organised to study the avifaunal diversity of college and university campuses around the world, provided a chance to explore the untouched corners of the campus and record various interesting observations. Therefore, the primary objective of this study was to prepare a checklist of bird species in Durgapur Government College Campus covering a range of seven consecutive years.

MATERIALS AND METHODS

Study area

The present study was carried out in Durgapur Government College (23.5427°N, 87.3269°E, elevation 65 m MSL) campus located in the “Steel City” Durgapur in Paschim Bardhaman district of West Bengal, India (Figure 1).

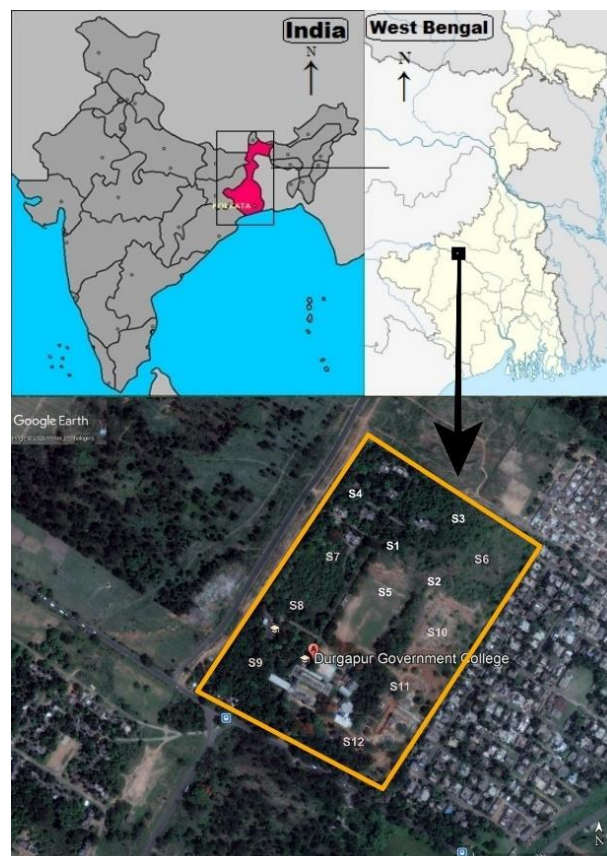


Figure 1. Location of the study site, Durgapur Government College Campus [24]. Satellite image source: Google Earth

The total area of the campus is about 12 hectares. Most of the area is covered by trees like *Shorea robusta*, *Ficus benghalensis*, *Ficus religiosa*, *Mangifera indica*, *Azardicta indica*, *Syzygium cumini* and shrubs like *Phyllanthus niruri* and *Lantana camara*. Some of the campus area is barren in which different varieties of grass flowers grow in winter. These trees and other plants provide shelter and food for birds and other animals, and in a way make the campus highly bio-diverse. The temperature of the study site ranges between 8

and 43 °C and the average rainfall varies between 6 and 213 mm.

Methodology

Birds were spotted and observed using 8X40 magnification binoculars and identified using suitable field guides [25, 26]. The bird survey was done following the point count method for bird diversity study. Also, various opportunistic spotting was added to the list. The survey was conducted from January 2013 to January 2020 on a monthly basis during morning (05.30 AM - 09.00 AM), afternoon (03.00 PM - 04.00 PM) and evening (07.00 PM - 08.30 PM). Birds that occupied the college campus were recorded separately from the birds flying over the campus area. The scientific names and the IUCN status of the birds given in the checklist are shown according to Birdlife International. The data collected was used to estimate the status and diversity of the avifaunal species.

Study of diversity indices is much essential for monitoring biodiversity and conservation. The diversity indices used in the present study were Shannon-Wiener species diversity index [H'], Pielou's evenness index [J], Margalef's richness index [D_{MARG}] and Simpson's dominance index [D_{SIMP}]. All the diversity indices were calculated in PAST version 3.25 Software [27].

RESULTS AND DISCUSSION

A total of 106 bird species belonging to 47 families were recorded during this study in Durgapur Government College Campus (covering an area of about 12 hectares). Among these 106 bird species, 96 were found to be actively using the college campus as shelter and/or foraging area while the rest were recorded only as flying over the campus area. The detailed checklist of the birds along with their IUCN status, population trend, and migratory status is given in Table 1.

In a similar kind of study Aggarwal et al. [28] have reported exactly 106 bird species belonging to 52 families in the Indian Institute of Forest Management (IIFM) campus, Bhopal (covering an area of about 93 hectares) during their nine-month study. Again, Chandrakar and Dhuria [29] have reported 81 bird species belonging to 38 families during their year-long study in Guru Ghasidas University campus, Bilaspur, Chhattisgarh (covering an area of about 700 hectares). In another study, Singh et al. [30] have reported 45 bird species belonging to 23 families during their six months study in the campus of Deen Dayal Upadhyaya Gorakhpur University, Gorakhpur (covering an area of about 121 hectares). Higher bird diversity in the present study in a much smaller geographic area could be attributed to the longer study period (seven consecutive years), as well as the higher bird diversity of the studied location. Sylviidae was recorded as the most diverse bird family with 9 species, followed by Ardeidae and Motacillidae with 6 bird species. Birds from the Sylviidae family are well known for their restricted movements due to their adaptation to short-distance flight patterns. They are mostly forest-dwellers and the studied location having enough diversity of tree population supports higher diversity of bird species from Sylviidae family. This finding agrees well with Jha's research [31]. Other notable bird families were Columbidae and Cuculidae (each had 5 representative bird species) and Muscipidae and Sturnidae (each had 4 representative bird species). Of the remaining 40 families, 8 were represented by 3 bird species, 13 were represented by 2 bird species and the rest 19 families were represented by a single bird species. A similar kind of finding was made by Mahato et al. [32] in and around Purulia town, West Bengal. Out of the total 106 bird species, 23 were winter visitors, 4 were summer visitors, 1 was passage migrant, 1 was vagrant and the rest 77 birds were residents (Figure 2).

Table 1. List of bird species recorded in Durgapur Government College Campus

No.	Scientific name	Common name	IUCN status	Population trend	Migratory status	Flying over
Family - ACCIPITRIDAE						
1.	<i>Accipiter badius</i>	Shikra	LC	S	R	N
2.	<i>Milvus migrans</i>	Black Kite	LC	U	R	N
3.	<i>Pernis ptilorhynchus</i>	Oriental-Honey Buzzard	LC	S	R	N
Family - AEGITHINIDAE						
4.	<i>Aegithina tiphia</i>	Common Iora	LC	U	R	N
Family - ALCEDINIDAE						
5.	<i>Halcyon smyrnensis</i>	White-Throated Kingfisher	LC	I	R	N
6.	<i>Pelargopsis capensis</i>	Stork-Billed Kingfisher	LC	D	R	N
Family – ANATIDAE						
7.	<i>Dendrocygna javanica</i>	Lesser Whistling Duck	LC	D	R	Y
Family - APODIDAE						
8.	<i>Apus affinis</i>	Little Swift	LC	I	R	N
9.	<i>Cypsiurus balasiensis</i>	Asian Palm-Swift	LC	S	R	N
Family - ARDEIDAE						
10.	<i>Ardea cinerea</i>	Grey Heron	LC	U	R	Y
11.	<i>Ardea purpurea</i>	Purple Heron	LC	D	R	Y
12.	<i>Ardeola grayii</i>	Indian Pond-Heron	LC	U	R	
13.	<i>Bubulcus ibis</i>	Cattle Egret	LC	I	R	N
14.	<i>Egretta garzetta</i>	Little Egret	LC	I	R	Y
15.	<i>Nycticorax nycticorax</i>	Black-Crowned Night Heron	LC	D	R	Y
Family - ARTAMIDAE						
16.	<i>Artamus fuscus</i>	Ashy Woodswallow	LC	S	R	N

Table 1. List of bird species recorded in Durgapur Government College Campus (continued)

No.	Scientific name	Common name	IUCN status	Population trend	Migratory status	Flying over
Family - BURHINIDAE						
17.	<i>Burhinus indicus</i>	Indian Thick-knee	LC	D	R	N
Family – CAMPEPHAGIDAE						
18.	<i>Coracina macei</i>	Large Cuckooshrike	LC	S	R	N
19.	<i>Lalage melanoptera</i>	Black-headed Cuckooshrike	LC	S	P	N
Family - CAPRIMULGIDAE						
20.	<i>Caprimulgus asiaticus</i>	Indian Nightjar	LC	S	R	N
Family - CHARADRIIDAE						
21.	<i>Vanellus malabaricus</i>	Yellow-wattled Lapwing	LC	S	R	Y
Family - CHLOROPRIDAE						
22.	<i>Chloropsis jerdonii</i>	Jerdon's Leafbird	LC	S	R	N
Family - CICONIIDAE						
23.	<i>Anastomus oscitans</i>	Asian Openbill Stork	LC	U	R	Y
Family – CISTICOLIDAE						
24.	<i>Prinia socialis</i>	Ashy Prinia	LC	S	R	N
25.	<i>Prinia hodgsonii</i>	Grey-breasted Prinia	LC	S	R	N
26.	<i>Prinia inornata</i>	Plain Prinia	LC	S	R	N
Family - COLUMBIDAE						
27.	<i>Columba livia</i>	Blue Rock Pigeon	LC	D	R	N
28.	<i>Spilopelia chinensis</i>	Spotted Dove	LC	I	R	N
29.	<i>Streptopelia decaocto</i>	Eurasian Collared Dove	LC	I	R	N
30.	<i>Treron phoenicopterus</i>	Yellow-footed Green Pigeon	LC	I	R	N
31.	<i>Treron bicinctus</i>	Orange-breasted Green Pigeon	LC	D	R	N

Table 1. List of bird species recorded in Durgapur Government College Campus (continued)

No.	Scientific name	Common name	IUCN status	Population trend	Migratory status	Flying over
Family - CORVIDAE						
32.	<i>Corvus splendens</i>	House Crow	LC	S	R	N
33.	<i>Dendrocitta vagabunda</i>	Rufous Treepie	LC	S	R	N
Family - CUCULIDAE						
34.	<i>Centropus sinensis</i>	Greater Coucal	LC	S	R	N
35.	<i>Clamator jacobinus</i>	Jacobin Cuckoo	LC	S	SM	N
36.	<i>Cuculus micropterus</i>	Indian Cuckoo	LC	S	SM	N
37.	<i>Eudynamys scolopaceus</i>	Asian koel	LC	S	R	N
38.	<i>Hierococcyx varius</i>	Common Hawk Cuckoo	LC	S	R	N
Family - DICAVIDAE						
39.	<i>Dicaeum erythrorhynchos</i>	Pale-billed Flowerpecker	LC	S	R	N
Family - DICRURIDAE						
40.	<i>Dicrurus hottentottus</i>	Hair-crested Drongo	LC	S	W	N
41.	<i>Dicrurus macrocercus</i>	Black Drongo	LC	U	R	N
Family - ESTRILDIDAE						
42.	<i>Euodice malabarica</i>	Indian Silverbill	LC	S	R	N
43.	<i>Lonchura punctulata</i>	Scaly-breasted Munia	LC	S	R	N
Family - FALCONIDAE						
44.	<i>Falco tinnunculus</i>	Common Kestrel	LC	D	W	Y
Family - HIRUNDINIDAE						
45.	<i>Hirundo rustica</i>	Barn Swallow	LC	D	R	N
46.	<i>Hirundo smithii</i>	Wire-tailed Swallow	LC	I	R	N
Family - LANIIDAE						
47.	<i>Lanius cristatus</i>	Brown Shrike	LC	D	W	N

Table 1. List of bird species recorded in Durgapur Government College Campus (continued)

No.	Scientific name	Common name	IUCN status	Population trend	Migratory status	Flying over
Family - MEGALAIMIDAE						
48.	<i>Psilopogon asiaticus</i>	Blue-throated Barbet	LC	S	R	N
49.	<i>Psilopogon lineatus</i>	Lineated Barbet	LC	S	R	N
50.	<i>Psilopogon haemacephalus</i>	Coppersmith Barbet	LC	I	R	N
Family - MEROPIDAE						
51.	<i>Merops philippinus</i>	Blue-tailed Bee-eater	LC	S	SM	N
52.	<i>Merops orientalis</i>	Green Bee-eater	LC	I	R	N
Family - MONARCHIDAE						
53.	<i>Tersiphone paradisi</i>	Indian Paradise-flycatcher	LC	S	SM	N
54.	<i>Hypothymis azurea</i>	Black-naped Monarch	LC	S	R	N
Family - MOTACILLIDAE						
55.	<i>Anthus hodgsoni</i>	Olive-backed Pipit	LC	S	W	N
56.	<i>Anthus rufulus</i>	Paddyfield Pipit	LC	S	R	N
57.	<i>Dendronanthus indicus</i>	Forest Wagtail	LC	S	V	N
58.	<i>Motacilla alba</i>	White Wagtail	LC	S	W	N
59.	<i>Motacilla cinerea</i>	Grey Wagtail	LC	S	W	N
60.	<i>Motacilla flava</i>	Yellow Wagtail	LC	D	W	N
Family - MUSCICAPIDAE						
61.	<i>Copsychus saularis</i>	Oriental Magpie Robin	LC	S	R	N
62.	<i>Eumyias thalassinus</i>	Verditer Flycatcher	LC	S	W	N
63.	<i>Ficedula albicilla</i>	Taiga Flycatcher	LC	S	W	N
64.	<i>Saxicoloides fulicatus</i>	Indian Robin	LC	S	R	N

Table 1. List of bird species recorded in Durgapur Government College Campus (continued)

No.	Scientific name	Common name	IUCN status	Population trend	Migratory status	Flying over
Family - NECTARINIIDAE						
65.	<i>Cinnyris asiatica</i>	Purple Sunbird	LC	S	R	N
66.	<i>Leptocoma zeylonica</i>	Purple-rumped sunbird	LC	S	R	N
Family - ORIOLIDAE						
67.	<i>Oriolus chinensis</i>	Black-naped Oriole	LC	U	W	N
68.	<i>Oriolus oriolus</i>	Eurasian Golden Oriole	LC	S	R	N
69.	<i>Oriolus xanthornus</i>	Black-hooded Oriole	LC	U	R	N
Family - PHALACROCORACIDAE						
70.	<i>Microcarbo niger</i>	Little Cormorant	LC	U	R	N
Family - PHASIANIDAE						
71.	<i>Francolinus pondicerianus</i>	Grey Francolin	LC	S	R	N
Family - PICIDAE						
72.	<i>Dinopium benghalense</i>	Lesser Flameback	LC	S	R	N
73.	<i>Jynx torquilla</i>	Eurasian Wryneck	LC	D	W	N
74.	<i>Picus xanthopygaeus</i>	Streak-throated Woodpecker	LC	D	W	N
Family - PSITTACIDAE						
75.	<i>Psittacula krameri</i>	Rose-ringed Parakeet	LC	I	R	N
76.	<i>Psittacula eupatria</i>	Alexandrine Parakeet	NT	D	R	N
Family - PYCNONOTIDAE						
77.	<i>Pycnonotus cafer</i>	Red-vented Bulbul	LC	I	R	N
78.	<i>Pycnonotus jocosus</i>	Red-whiskered Bulbul	LC	D	R	N
Family - PASSERIDAE						
79.	<i>Passer domesticus</i>	House Sparrow	LC	D	R	N

Table 1. List of bird species recorded in Durgapur Government College Campus (continued)

No.	Scientific name	Common name	IUCN status	Population trend	Migratory status	Flying over
Family - RALLIDAE						
80.	<i>Amaurornis phoenicurus</i>	White-breasted Waterhen	LC	U	R	N
Family - SCOLOPACIDAE						
81.	<i>Tringa ochropus</i>	Green Sandpiper	LC	I	W	Y
Family - STRIGIDAE						
82.	<i>Athene brama</i>	Spotted Owlet	LC	S	R	N
83.	<i>Otus bakkamoena</i>	Indian Scops Owl	LC	S	R	N
Family - STURNIDAE						
84.	<i>Acridotheres tristis</i>	Common Myna	LC	I	R	N
85.	<i>Gracupica contra</i>	Asian Pied Starling	LC	I	R	N
86.	<i>Sturnia malabaricus</i>	Chestnut-tailed Starling	LC	U	R	N
87.	<i>Sturnia pogodarum</i>	Brahminy Starling	LC	U	R	N
Family - SYLVIIDAE						
88.	<i>Acrocephalus dumetorum</i>	Blyth's Reed Warbler	LC	I	W	N
89.	<i>Orthotomus sutorius</i>	Common Tailorbird	LC	S	R	N
90.	<i>Phylloscopus fuscatus</i>	Dusky Warbler	LC	S	W	N
91.	<i>Phylloscopus affinis</i>	Tickell's Leaf Warbler	LC	S	W	N
92.	<i>Phylloscopus humei</i>	Hume's Leaf Warbler	LC	S	W	N
93.	<i>Phylloscopus inornatus</i>	Yellow-browed Warbler	LC	S	W	N
94.	<i>Phylloscopus trochiloides</i>	Greenish Warbler	LC	I	W	N
95.	<i>Phylloscopus nitidus</i>	Green Warbler	LC	S	W	N

Table 1. List of bird species recorded in Durgapur Government College Campus (continued)

No.	Scientific name	Common name	IUCN status	Population trend	Migratory status	Flying over
96.	<i>Seicercus burkii</i>	Green-crowned Warbler	LC	S	W	N
Family - THRESKIORNITHIDAE						
97.	<i>Pseudibis papillosa</i>	Red-naped ibis	LC	D	R	Y
Family - TIMALIIDAE						
98.	<i>Chrysomma sinense</i>	Yellow-eyed Babbler	LC	S	R	N
99.	<i>Turdoides striata</i>	Jungle Babbler	LC	S	R	N
100.	<i>Dumetia hyperythra</i>	Tawny-bellied Babbler	LC	D	R	N
Family - TURDIDAE						
101.	<i>Geokichla citrina</i>	Orange-headed Thrush	LC	D	R	N
102.	<i>Turdus unicolor</i>	Tickell's Thrush	LC	U	W	N
103.	<i>Zoothera dauma</i>	Scaly Thrush	LC	D	W	N
Family - TURNICIDAE						
104.	<i>Turnix suscitator</i>	Barred Buttonquail	LC	I	R	N
Family - TYTONIDAE						
105.	<i>Tyto alba</i>	Barn owl	LC	S	R	N
Family - UPUPIDAE						
106.	<i>Upupa epops</i>	Common Hoopoe	LC	S	R	N

(Abbreviations used: LC - Least concern, NT - Near threatened, S - Stable, D - Decreasing, I - Increasing, U - Unknown, R - Resident, SM - Summer migrant, W - Winter migrant, P - Passage migrant, V - Vagrant, Y - Yes, N - No)

Few of the notable winter migrants were Hair-crested Drongo (*Dicrurus hottentottus*), Black-naped Oriole (*Oriolus chinensis*), Olive-backed Pipit (*Anthus hodgsoni*), Common Kestrel (*Falco tinnunculus*), Brown Shrike (*Lanius cristatus*), Tickell's Thrush (*Turdus unicolor*) and Scaly Thrush (*Zoothera dauma*), while the summer visitors were Jacobin Cuckoo (*Clamator jacobinus*), Indian Cuckoo (*Cuculus micropterus*), Blue-

tailed Bee-eater (*Merops philippinus*) and Indian Paradise-flycatcher (*Tersiphone paradisi*). Among all the birds recorded in this study, Black-headed Cuckooshrike (*Lalage melanoptera*) was a passage migrant, while Forest Wagtail (*Dendronanthus indicus*) was vagrant in nature. Cattle Egret (*Bubulcus ibis*), Little Egret (*Egretta garzetta*), Little Cormorant (*Microcarbo niger*), Indian Pond-Heron (*Ardeola grayii*),

Lesser Whistling Duck (*Dendrocygna javanica*), Kingfishers (*Halcyon smyrnensis* and *Pelargopsis capensis*) were easily spotted in the study area due to the presence of water bodies near the campus area.

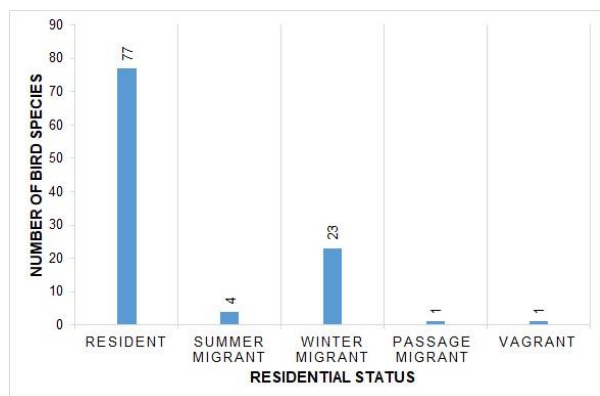


Figure 2. Residential status of different bird species recorded during the study

Yellow-wattled Lapwing (*Vanellus malabaricus*) and Paddyfield Pipit (*Anthus rufulus*) were recorded in considerable numbers because of the presence of grasslands adjacent to the campus area. Barn Owl (*Tyto alba*), Spotted Owlet (*Athene brama*), Indian Scops Owl (*Otus bakkamoena*) and Indian Nightjar (*Caprimulgus asiaticus*) were spotted mostly during evening sampling. Most common birds which were recorded in huge numbers throughout the year in the college campus included Red-vented bulbul (*Pycnonotus cafer*), Red-whiskered Bulbul (*Pycnonotus jocosus*), Black-hooded Oriole (*Oriolus xanthornus*), Rufous Treepie (*Dendrocitta vagabunda*), Jungle Babbler (*Turdoides striata*), Barbets, Doves, Pigeons, Starlings and Mynas. Birds that were very rarely encountered included Indian Thick-knee (*Burhinus indicus*), Streak-throated Woodpecker (*Picus xanthopygaeus*) and Indian Nightjar. Some species like Orange-breasted Green-Pigeon (*Treron bicinctus*), Forest Wagtail (*Dendronanthus indicus*), Tickell's Thrush and Scaly Thrush were recorded only once or twice during the entire study period. Birds like Shikra (*Accipiter badius*), Oriental Honey-buzzard (*Pernis ptilorhynchus*), Black Kite (*Milvus migrans*)

and Common Kestrel were seen flying over the campus area most of the time.

Variation in bird species number during different months in the study period is presented in Figure 3. Winter months actually showed higher bird diversity due to the presence of winter migrants like pipits, warblers, flycatchers, wagtails and shrikes along with the residents.

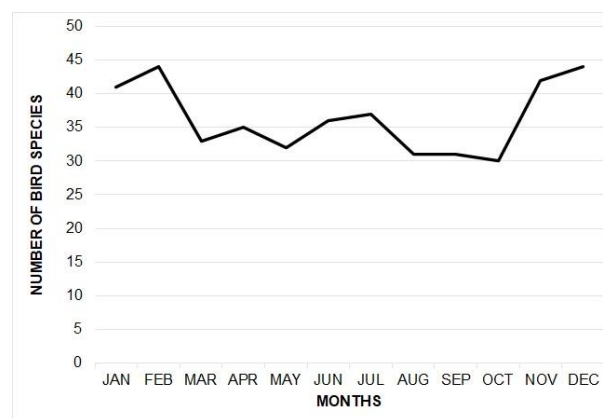


Figure 3. Variation in bird species number during the year

This was also confirmed by the study of diversity indices (Table 2) where the Shannon Weiner general diversity score was found to be highest for the month of November (3.102), followed by January (3.027). Similar patterns were also observed for Margalef's richness index where the highest scores were observed during the months of November and December (7.822 and 7.691 respectively). These findings agree well with the previous studies made by other researchers [32, 33].

In this study, the highest bird density was recorded in the month of March (Figure 4). This was the time of the year when winter migrants started leaving the study area and the resulting species richness was the lowest.

Table 2. Different diversity indices of bird species in Durgapur Government College Campus covering all the seasons

Month	Diversity indices			
	Shannon Weiner diversity	Simpson's dominance index	Pielou's evenness index	Margalef's richness index
January	3.027	0.916	0.504	7.461
February	2.767	0.884	0.379	6.992
March	2.324	0.808	0.300	5.390
April	2.593	0.877	0.382	5.842
May	2.747	0.890	0.487	5.537
June	2.470	0.844	0.329	5.949
July	2.726	0.868	0.413	6.272
August	2.802	0.905	0.532	5.606
September	2.740	0.886	0.500	5.777
October	2.701	0.893	0.497	5.660
November	3.102	0.930	0.530	7.822
December	2.762	0.867	0.360	7.691

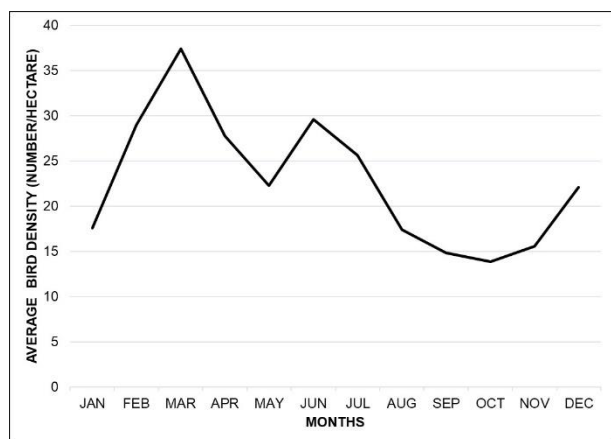


Figure 4. Average density of bird species during the year

This is also evident from the study of diversity indices, where the Shannon Weiner general diversity score, Pielou's evenness index and Margalef's richness index have the lowest value in March (2.324, 0.300 and 5.390, respectively) (Table 2). Apparently, this sounds contradictory. How the lowest diversity, evenness and richness can lead to the highest bird density? To answer this question, it must be borne in mind that this was the time when the arrival of the spring season was evident. The longer days have encouraged huge number of birds to nest there and this finding is in line with that made by

Zacharias and Gaston [34] in south-west parts of India. Furthermore, plants started to bloom and the availability of insects was high, which attracted numerous birds to use the studied area as a foraging ground. Combination of all these factors could have resulted in the highest bird density during the month of March in this study. Simpson's dominance index is comparable for all seasons, indicating the absence of dominance of any particular bird species in the studied location. Both Shannon Weiner general diversity measures (H') and Simpson's index (D_{SIMP}) contemplate the relative abundance of species; however, H' has been reported to be more inclined towards rare bird species, whereas D_{SIMP} emphasizes the common species [35].

Except for the Alexandrine Parakeet (*Psittacula eupatria*) which is considered as Near Threatened in IUCN Threatened category list, all the other bird species recorded in his study belonged to the Least Concern category of the IUCN Red List [36] (Table 1). The global population trend of the observed bird species showed that maximum species belonged to Stable category (52 %, 55 species), followed by Decreasing (19 %, 20 species), Increasing (17 %, 18 species), and Unknown category (12 %, 13 species). The global population trend of the recorded bird species in this study is given in Figure 5.

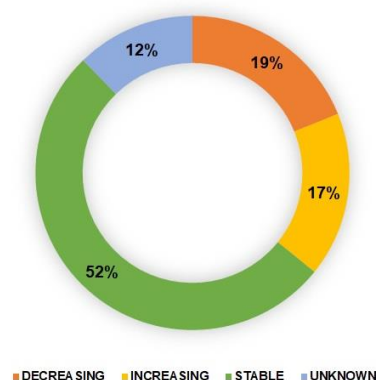


Figure 5. Relative distribution of bird species recorded in Durgapur Government College Campus according to their global population trend

CONCLUSION

A total of 106 different bird species belonging to 47 families were recorded. Sylviidae was recorded as the most diverse family. Out of the 106 bird species, 23 were winter migrants, 4 were summer migrants, 1 was passage migrant, 1 was vagrant and the rest 77 were residents. Winter months supported the highest species richness, while maximum bird density was recorded in the month of March. The global population trend chart of the observed bird species showed that the maximum species belonged to the stable category (52 %, 55 species). The occurrence of 106 different bird species in the campus covering an area of 12 hectares clearly indicated that this area is suitable for avifauna. However, it should be mentioned that the area inside the college campus, as well as adjoining areas, are losing greenery to make space for the construction of buildings and other infrastructures. To add salt to the wound, various types of soil, air and noise pollution have directly or indirectly affected wildlife around the studied area, and avifauna is no exception in this regard. More intensified works on the avifauna of this region will surely enhance our understanding of their function in the ecosystem. The outcome of this kind of research might be beneficial for designing proper management strategies for different habitat types around the studied area.

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