

## ORIGINAL ARTICLE

**THE CHANGING DIVERSITY OF THE AVIAN SPECIES IN TWO SEASONS  
WITH ECOLOGICAL NOTES IN AND AROUND NARASINHA DUTT  
COLLEGE CAMPUS****Anirban Sinha and Subrata Kumar Basu***Department of Zoology, Narasinha Dutt College, Howrah, West Bengal, 711101, India.**(Corresponding author: arup8express@gmail.com; subratakr.basu2014@gmail.com)*

**Abstract:** *We have tried here to make a primary progress in inspecting our immediate surroundings with a scientific look. Our college is located in the Indo-Gangetic planes under the Oriental zoo-geographical region. India possess more than 1200 species of birds out of these more than 850 types of birds are found in West Bengal. That is too big a number to think for us. With the limited scope, power and facility we have tried to understand our immediate environmental conditions and ecological status with scientific documentation of avian diversity.*

**Key Words:** Diversity, avian species, community, seasonal pattern.

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**1. INTRODUCTION**

We often look for distal fields for ecological study neglecting our own resources in anticipation of better recognizable results. However, it is the most effective way of practicing ecological studies in small scales in the vicinity of the institution when distal movements are not possible. This study's primary objective was to gather knowledge of bird species diversity and their numbers in two different seasons with skillful observation and identification by proper teamwork in our college campus and surrounding areas. We have tried to isolate any variation of bird community composition in pre-winter (August – September) and winter seasons (December - January) in respect to the changing environmental parameters that we have recorded in the two seasons mentioned. We tried to spot different habitats present for the bird communities to sustain in this area. We also tried to isolate and group birds into different feeding guilds according to their foraging preferences. The birds perform different ecological roles in different tropic levels in those groups. Changes in temperature, photoperiod and humidity over the two seasons might have some influence over those feeding groups. We have tried to find out changes of those foraging groups if any between the two seasons. Finally, we tried to figure out some potent threats of the bird communities in the area studied.

**2. METHODOLOGY AND STUDY DETAILS****Study Location, Area and Time Period**

A study was conducted in the area of Narasinha Dutt College Campus and surroundings including major portions of Belilious Park gardens in a rectangular area with a perimeter of 865.74 meter and an area of

38,122.7 square meter. The study was carried out during 2019 pre-winter to 2019-2020 winter session (Table 2). Our campus included a garden with lush green bushes, flowering plants, some long canopy trees, a pond as well as grasslands and dense kash plants (*Saccharum spontaneum*). The GPS location and satellite map of the study area are shown in Table 1 and Figure 1 respectively.

**Table 1: The GPS location and area of survey covered by our team.**

Terminal Study points	GPS Locations
1. South west	22 <sup>0</sup> 35' 32'' N ; 88 <sup>0</sup> 19' 37'' E
2. North west	22 <sup>0</sup> 35' 39'' N ; 88 <sup>0</sup> 19' 39'' E
3. North east	22 <sup>0</sup> 35' 37'' N ; 88 <sup>0</sup> 19' 45'' E
4. South East	22 <sup>0</sup> 35' 32'' N ; 88 <sup>0</sup> 19' 43'' E.

Study length (Perimeter) in Meter	Area in Square Meter
865.74	38,122.7



Figure 1. Satellite image of the college campus and surrounding areas. The study area was marked with yellow border in the map.

## Equipment

For the birds' identification and count, Olympus 10 x 50 DPS I; Field 6.5<sup>0</sup> Binocular was used in the study. For the GPS location of the points covered during the survey Mobile phone GPS data was recorded. For the Map making of the study area Google Earth and Map maker was used. For the identification of birds three standard books on Indian birds were consulted [1- 3]. For the photographic documentation making mobile camera of students and Nikon Digital camera and different telephoto lenses and wideangle lenses were used. For the data counts, three successive days of each season were taken and the average number recorded for any species between these three days was taken in the data bank. The environmental data was taken from the middle day of the three successive days (Table 2). The total count of birds has been done for each days following standard methods [4- 6]. Our college has five four storied buildings. For the canopy analysis the roofs of the buildings were used while for the ground study, slow walking and standing at

points was practiced. The timings for the bird watching were from 9 a.m. to 12 p.m. for each day of both the seasons. After the collection of raw primary data from the field, in the lab computer ‘Microsoft Excel’ and ‘Microsoft word’ were used for the preparation and processing of different parameters. For the ecological data analysis of communities, “PAST” (Paleontological Statistics) software version 3.22 was used [7]. The important diversity indices were calculated by the software and analysed [8-10]. Importance of the community composition was analysed along with the changing habitat composition by these data [11, 12]. Environmental data was recorded from the smart phones of students from the Geological Survey of India on the days of studies.

### Habitat

The present study area had some combination of different habitats in a small patchy area amidst industrial hazardous ambience. But our college and surrounding park areas are the only green spot in the locality. Our college itself has a garden, with grasses, shrubs and some long trees with beautiful canopy, a moderate sized pond, some patches of thick grassland and tall and dense kash plants (*Saccharum spontaneum*). The college premises including the garden poses many flowering plants and ornamental plants as well as natural tall plants. Some of the plants are shrub plants that include Jaba or Chinese Rose (*Hibiscus rosa-sinensis*), *Siuli* (*Nyctanthes arbor-tristis*), Bokul (*Mimusops elengi* L.) Nishinda or Chinese chaste tree (*Vitex negundo*), Kamini (*Murraya exotica* L.), Alexander Palm (*Archontophoenix alexandrae*). Some moderately taller plants include Shimul (*Bombax ceiba* L.), Kadamba (*Neolamarckia cadamba*), Krishnachura (*Delonix regia*), Radhachura (*Peltophorum pterocarpum*), Akashmoni (*Acacia auriculiformis*), Arjun (*Terminalia arjuna*), Coconut tree (*Cocos nucifera*), etc. These plant associations and the waterbody made a charming combination of different habitats for the variety of bird species to dwell in.



Figure 2: a). A front view of the college premises from the entry gate. A small glimpse of the Garden in the left and tall trees with the canopy on the right side; b). A beautiful pond in the middle of the campus suitable for the waterbirds; c). Some of the tall vegetation with almost nude canopy during our winter study. They

had shaded bulk of their leaves during this period of time; d). One view of the grassland beside our cycle stand. Tall grasses and dense thorny shrubs are the habitat characteristics here for the wintering birds.

### 3. RESULTS

Some noticeable differences of environmental parameters between the two seasons studied have been listed in Table 2. The day length difference between the two seasons was 1 hours and 12 minutes. The winter days were shorter by 1 hours and 12 minutes on average from the pre-winter study days. The average temperature during pre-winter days under study was 30.5<sup>0</sup>C while that of winter days was 18<sup>0</sup>C. The mean temperature difference between the two seasons was 12.5<sup>0</sup>C. The average differences between the humidity levels between the two seasons was 17.5%. That is, the winter days were 17.5% drier than the pre-winter days.

Table 2: Weather report of the two seasons during the study periods.

<u>DATE</u>	<u>TEMPERATURE</u>				<u>HUMIDITY</u>		<u>RAINFALL</u>	<u>SUNRISE</u>	<u>SUN SET</u>	<u>DAY LENGTH</u>
<b><u>For pre winter bird study</u></b>										
26.08.2019	MAX		MIN		MAX	MIN	0.7mm	5:42 am	6:16 pm	12 hours 34 minutes
	91 <sup>0</sup> F	33 <sup>0</sup> C	82 <sup>0</sup> F	28 <sup>0</sup> C	92%	77%				
<b><u>For winter bird study</u></b>										
28.01.2020	MAX		MIN		MAX	MIN	Nil	6:20 am	5:42 pm	11 hours 22minutes
	73 <sup>0</sup> F	23 <sup>0</sup> C	55 <sup>0</sup> F	13 <sup>0</sup> C	91%	44%				

Table 3. List of total bird species encountered in our college campus during the two seasonal study periods.

<b>COMMON NAME</b>	<b>SCIENTIFIC NAME</b>
1. Indian cormorant	<i>Phalacrocorax fuscicollis</i>
2. Little cormorant	<i>Microcarbo niger</i>
3. Little Egret	<i>Egretta garzetta</i>
4. Cattle Egret	<i>Bubulcus ibis</i>
5. Black Kite	<i>Milvus migrans</i>
6. Black shouldered kite	<i>Elanus axillaris</i>
7. Common kestrel	<i>Falco tinnunculus</i>

8. Shikra	<i>Accipiter badius</i>
9. White breasted water hen	<i>Amaurornis phoenicurus</i>
<b>COMMON NAME</b>	<b>SCIENTIFIC NAME</b>
10. Pond Heron	<i>Ardeola grayii</i>
11. Common sandpiper	<i>Actitis hypoleucos</i>
12. Yellow Footed Green pigeon	<i>Treron phoenicoptera</i>
13. Rock pigeon	<i>Columba livia</i>
14. Spotted dove	<i>Spilopelia chinesis</i>
15. Ring necked dove	<i>Streptopelia capicola</i>
16. Alexandrian parakeet	<i>Psittacula eupatria</i>
17. Common Cuckoo	<i>Cuculus canorus</i>
18. Spotted Owlet	<i>Athene brama</i>
19. White throated Kingfisher	<i>Halcyon smyrnensis</i>
20. Small blue Kingfisher	<i>Alcedo atthis</i>
21. Stork billed Kingfisher	<i>Pelargopsis capensis</i>
22. Pied Kingfisher	<i>Ceryle rudis</i>
23. Common Hoopoe	<i>Upupa epops</i>
24. Chestnut headed Bee-eater	<i>Merops leschenaulti</i>
25. Green Bee-eater	<i>Merops orientalis</i>
26. Black-rumped Flameback	<i>Dinopium benghalense</i>
27. Brown-capped Pygmy Woodpecker	<i>Yungipicus nanus</i>
28. Coppermith Barbet	<i>Megalaima haemacephala</i>
29. Blue throated Barbet	<i>Megalaima asiatica</i>
30. Lineated Barbet	<i>Megalaima lineata</i>
31. Brown-capped Woodpecker	<i>Dendrocopos nanus</i>

32. Brown Shrike	<i>Lanius cristatus</i>
33. Long tailed Shrike	<i>Lanius schach</i>
<b>COMMON NAME</b>	<b>SCIENTIFIC NAME</b>
34. House Sparrow	<i>Passer domesticus</i>
35. Black hooded Oriole	<i>Oriolus xanthornus</i>
36. Golden Oriole	<i>Oriolus oriolus</i>
37. Black Drongo	<i>Dicrurus macrocercus</i>
38. Bronze winged Drongo	<i>Dicrurus aeneus</i>
39. Common Myna	<i>Acridotheres tristis</i>
40. Asian pied Starling	<i>Gracupica conta</i>
41. Chestnut tailed Starling	<i>Sturnia malabarica</i>
42. Jungle Myna	<i>Acridotheres fuscus</i>
43. Rufous Treepie	<i>Dendrocitta vagabunda</i>
44. Common Crow	<i>Corvus brachyrhynchos</i>
45. Red vented Bulbul	<i>Pycnonotus cafer</i>
46. Red whiskered Bulbul	<i>Pycnonotus jocosus</i>
47. Common Prinia	<i>Prinia inornata</i>
48. Ashy Prinia	<i>Prinia socialis</i>
49. Common Babbler	<i>Turdoides caudata</i>
50. Brown breasted Flycatcher	<i>Muscicapa muttui</i>
51. Taiga Flycatcher	<i>Ficedula albicilla</i>
52. Tailorbird	<i>Orthotomus sutorius</i>
53. Bluethroat	<i>Luscinia svecica</i>
54. Pied Bushchat	<i>Saxicola caprata</i>

55. Oriental Magpie robin	<i>Copsychus saularis</i>
<b>COMMON NAME</b>	<b>SCIENTIFIC NAME</b>
56. Pale billed Flowerpecker	<i>Dicaeum erythrorhynchos</i>
57. White Wagtail	<i>Motacilla alba</i>
58. Pied Wagtail	<i>Motacilla alba</i>
59. Yellow Wagtail	<i>Motacilla flava</i>
60. Citrine Wagtail	<i>Motacilla citreola</i>
61. Purple rumped Sunbird	<i>Leptocoma zeylonica</i>
62. Silver billed Munia	<i>lonchura punctulata</i>
63. White throated Fantail	<i>Rhipidura albicollis.</i>

**Table 4: List of the birds found in pre-winter and winter season along with their numbers.**

<b>BIRD SPECIES</b>	<b>Pre-winter numbers</b>	<b>Winter numbers</b>
1. Indian cormorant	8	6
2. Little cormorant	14	12
3. Little Egret	8	6
4. Cattle Egret	18	10
5. Black Kite	6	4
6. Black shouldered kite	1	1
7. Common kestrel	0	1
8. Shikra	1	1
9. White breasted water hen	4	4
10. Pond Heron	6	8
11. Common sandpiper	0	4
12. Y. F. Green pigeon	14	10

13. Rock pigeon	50	48
<b>BIRD SPECIES</b>	<b>Pre-winter members</b>	<b>Winter members</b>
14. Spotted dove	12	12
15. Ring necked dove	2	8
16. Alexandrian parakeet	4	2
17. Common cuckoo	4	4
18. Spotted Owlet	2	4
19. White throated kingfisher	8	6
20. Small blue kingfisher	4	6
21. Stork billed kingfisher	1	1
22. Pied kingfisher	2	2
23. Common hoopoe	2	2
24. Chestnut headed bee-eater	0	4
25. Green bee-eater	0	12
26. Lesser Flameback	2	2
27. Greater Flameback	2	4
28. Coppersmith barbet	14	10
29. Blue throated barbet	2	6
30. Lineated barbet	2	0
31. Brown-capped woodpecker	2	4
32. Brown shrike	0	2
33. Long tailed shrike	0	2
34. House sparrow	68	42
35. Black hooded oriole	10	12



36. Golden Oriole	4	4
<b>BIRD SPECIES</b>	<b>Pre-winter members</b>	<b>Winter members</b>
37. Black Drongo	12	4
38. Bronze winged Drongo	0	2
39. Common Myna	50	60
40. Asian pied starling	24	28
41. Chestnut tailed starling	0	24
42. Jungle Myna	2	0
43. Rufous Treepie	6	2
44. Common Crow	68	74
45. Red vented bulbul	28	14
46. Red whiskered bulbul	12	6
47. Common Prinia	18	10
48. Ashy Prinia	0	4
49. Common babbler	26	16
50. Brown breasted flycatcher	0	4
51. Taiga flycatcher	0	2
52. Tailorbird	12	10
53. Bluethroat	0	6
54. Pied Bushchat	0	2
55. Oriental magpie robin	6	10
56. Pale billed Flowerpecker	4	4
57. White wagtail	0	8
58. Pied wagtail	0	8

59. Yellow wagtail	0	10
<b>BIRD SPECIES</b>	<b>Pre-winter members</b>	<b>Winter members</b>
60. Citrine wagtail	0	8
61. Purple rumped sunbird	1	0
62. Silver billed Munia	0	16
63. White throated fantail	0	2
<b>TOTAL IN NUMBERS</b>	<b>540</b>	<b>606</b>

A total of 63 bird species were recorded in two seasons (Table 3 & 7). In Pre-winter study we have recorded 42 types of bird species with a total number of 540. In winter study we have recorded 60 types of bird species with a total number of 606 (Table 5 & 7). Of these findings 3 species that were found in pre-winter survey were found to be absent in winter survey. They were Lineated barbet, Jungle myna and Purple rumped sunbird. However, these absences might be due to the chance factors in bird count. On the other hand 18 species of birds were recorded in winter specifically. Out of the 60 species encountered in winter, 40 types of species were common to pre-winter survey. In percentages, 41% types of species were present in pre-winter and 59% were in winter season. (Figure 3 for explanation.)

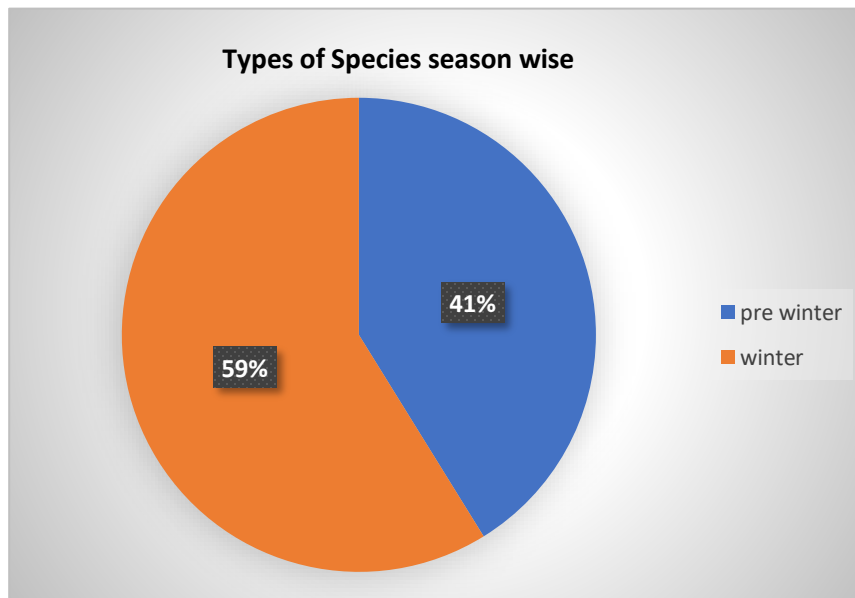


Figure 3: Species Type Percentages Encountered between the Two Seasons

To access diversity patterns of the birds studied we have done some primary diversity index analysis to look inside into the community compositions in two seasons. The indices studied were Simpson's Dominance index, Shannon-Weiner general diversity index, Brillouin's diversity index, Pielou's Evenness

index and Margalef's Richness index. For the similarity analysis simple Sorenson's Coefficient index was used between the two seasonal bird community counts.

Table 5: Feeding behaviour composition of the bird community in all seasons

Seasonal study period	Seed Eater/ Frugivorous	Insectivorous/ carnivorous	Omnivorous	Piscivorous
<b>Pre- winter</b>	27.8	18.15	47.2	6.85
<b>Winter</b>	20.13	27.89	46.53	5.45

Table 5 explains bird community composition according to their feeding nature. Calculations has been done in percentages according to their specific group numbers to the total numbers of the species present in specific seasons.

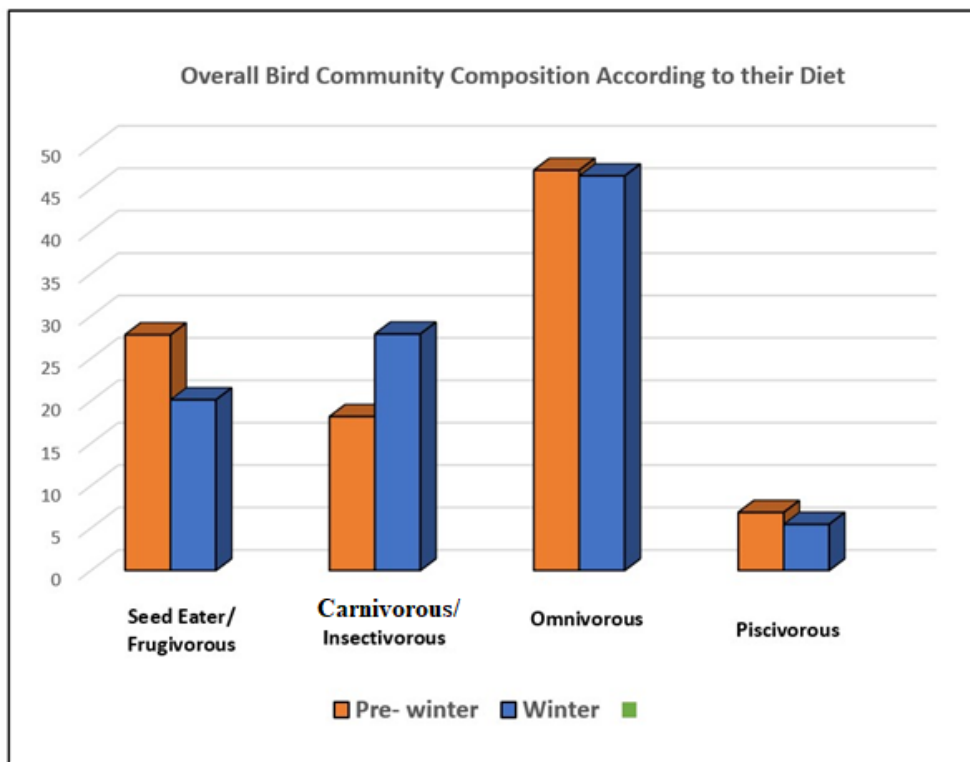


Figure 4. Pre-winter and Winter Seasonal Bird Community Composition Studied According to their Feeding Habit.

Calculations has been done in percentages according to their guild group numbers to the total population of the species present in specific seasons. Since it is a ratio presentation, it only reflects the change of guild abundance and not in total population of species in the two separate seasons.

**Table 6: Calculations for pre-winter foraging type analysis of birds.**

Seed eater/Frugivorous	Insectivorous/carnivorous	Omnivorous	Piscivorous
Y. F. Green pigeon (14)	Little Egret (8)	White breasted water hen (4)	Indian cormorant (8)
Rock pigeon (50)	Cattle Egret (18)	Common Cuckoo (4)	Little cormorant (14)
Spotted dove (12)	White breasted water hen (4)	Coppersmith Barbet (14)	White throated kingfisher (8)
Ring necked dove (2)	Pond Heron (6)	Lineated Barbet (2)	Small blue kingfisher (4)
Alexandrian parakeet (4)	Black Kite (8)	Black hooded Oriole (6)	Stork billed kingfisher (1)
House sparrow (68)	Black shouldered kite (1)	Golden Oriole (2)	Pied kingfisher (2)
	Common cuckoo (4)	Common Myna (50)	
	Spotted Owlet (2)	Asian pied Starling (24)	
	Common hoopoe (2)	Jungle Myna (2)	
	Lesser Flameback (2)	Rufous Treepie (6)	
	Greater Flameback (2)	Common Crow (68)	
	Brown-capped woodpecker (2)	Red vented Bulbul (28)	
	Shikra (1)		
	Black Drongo (10)	Red whiskered Bulbul (12)	
	Common Prinja (12)	Common Babbler (26)	
	Tailorbird (12)	Oriental magpie robin (6)	
	Pale billed Flowerpecker (4)	Purple rumped Sunbird (1)	
<b>TOTAL = 150 out of 540</b>	<b>Total =98 out of 540</b>	<b>Total = 255 out of 540</b>	<b>Total = 37 out of 540</b>
<b>Percentage = 27.8</b>	<b>Percentage = 18.15</b>	<b>Percentage =47.2</b>	<b>Percentage = 6.85</b>

Table 7: Calculations for the foraging type analysis of birds in winter.

Seed eater/Frugivorous	Insectivorous/carnivorous	Omnivorous	Piscivorous
Y. F. Green pigeon (10)	Little Egret (6)	White breasted water hen (6)	Indian cormorant (6)
Rock pigeon (48)	White breasted water hen (4)	Common cuckoo (4)	Little cormorant (12)
Alexandrian parakeet (2)	Cattle Egret (10)		
Spotted dove (12)	Pond Heron (8)	Coppersmith Barbet (10)	White throated kingfisher (6)
Ring necked dove (8)	Black Kite (10)	Blue throated Barbet (6)	Small blue kingfisher (6)
	Black shouldered kite (1)	Black hooded Oriole (12)	Stork billed kingfisher (1)
House sparrow (42)	Common kestrel (1)	Golden Oriole (4)	Pied kingfisher (2)
	Shikra (1)	Common Myna (60)	
	Common sandpiper (4)	Asian pied Starling (28)	
	Common cuckoo (4)	Chestnut tailed Starling (24)	
	Spotted Owlet (4)		
	Green bee-eater (12)	Rufous Treepie (2)	
	Lesser Flameback (2)	Common Crow (74)	
	Greater Flameback (4)	Red vented Bulbul (14)	
	Brown-capped woodpecker (4)	Red whiskered Bulbul (6)	

Seed eater/Frugivorous	Insectivorous/carnivorous	Omnivorous	Piscivorous
	Common hoopoe (2)		
	Brown shrike (2)	Common babbler (16)	
	Long tailed shrike (2)	Oriental magpie robin (10)	
	Black Drongo (4)	Silver billed Munia (16)	
	Bronze winged Drongo (2)		
	Common Prinia (10)		
	Ashy Prinia (4)		
	Brown breasted flycatcher (4)		
	Taiga flycatcher (2)		
	Tailorbird (10)		
	Bluethroat (6)		
	Pied Bushchat (2)		
	Pale billed Flowerpecker (4)		
	White wagtail (8)		
	Pied wagtail (8)		
	Yellow wagtail (10)		
	Citrine wagtail (8)		
	White throated fantail (2)		
<b>Total = 122 out of 606</b>	<b>Total = 169 out of 606</b>	<b>Total = 282 out of 606</b>	<b>Total = 33 out of 606</b>
<b>Percentage = 20.13</b>	<b>percentage = 27.89</b>	<b>Percentage = 46.53</b>	<b>Percentage = 5.45</b>

**Table 8: Pre-winter bird diversity composition:**

Taxa S	42
Individuals N	540
Dominance D	0.0742
Simpson 1-D	0.905
Shannon H	2.859
Pielou's Evenness e <sup>H/S</sup>	0.428
Brillouin	2.73
Margalef's Richness	6.19

**Table 9: Winter bird diversity composition:**

Taxa S	60
Individuals N	606
Dominance D	0.0485
Simpson 1-D	0.936
Shannon H	3.326
Pielou's Evenness e <sup>H/S</sup>	0.456
Brillouin	3.161
Margalef's Richness	9.346

The diversity composition and indices were analysed and presented in Table 8 and Table 9. The similarity between the two seasonal communities has been depicted in Table 10.

**Table 10: Similarity found between the two seasonal avian communities studied.**

Sorenson's Coefficient	$(CC) = 2 \times 40 / (42 + 60) = 0.784.$
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#### 4. DISCUSSION

Our study showed that a total of 63 types of bird species were found in the two seasons in total which is quite a good number, in spite of the highly polluted surrounding industrial area. Though most of the species

were encountered in winter season (59%) rather than pre-winter (41%) (figure 3), 40 species were common to both seasons. It indicated a general trend of community composition was set by residential bird species. The Sorenson's Coefficient of 0.784 (Table 10) perfectly justified this similarity findings. However, 21 specific species that we have found during winter studies made a good impact on species richness and evenness set up. Species general diversity (Shannon 2.859 and Brillouin 2.73) in pre-winter community was clearly lesser to the winter (Shannon 3.326 and Brillouin 3.161). So was the case for the species richness, a pre-winter Margalef's Richness value of 6.19 against that of 9.346 for the winter. However, the evennesses were slightly different. The pre-winter Pielou's Evenness was found slightly lesser, 0.428 against that of 0.456 for the winter community. Interestingly the Simpson\_1-D dominance was found to be 0.905 for the pre-winter counts against the 0.936 for winter community (table 8, 9 & 10). These combinations clearly suggests that some of the species in pre-winter community dominated others and enjoyed a major portion of resources available. A longer photoperiod and higher temperature in pre-winter favoured more the flowering and fruit plants which attracted more seed eaters and frugivorous birds as well as omnivorous birds to succeed. In contrast, winter days with shorter day length by 1 hours and 12 minutes and cooler climate by 12.5<sup>0</sup>C (Table 2) prevented most of the flowering plants to bloom. A general cessation of flowering and fruit production was naturally set for the plants. As a consequence, there was a shift clearly observed between the feeding guilds of birds. A good amount of decrease in both seed eaters & frugivorous birds was observed while a significant increase was observed in insectivorous and carnivorous birds (Table 5-7 and Figure 4). Omnivorous birds almost maintained their presence to similar level by showing greater adaptability. A general trend of slightly increased evenness in winter might be the reflection of such shifts. The Piscivorous birds also slightly decreased but remained more or less constant as the waterbody conditions remained more or less constant. All of this might be due to the lower condition of flowering plants which forced a decline for some of the vegetarian species by restricting their niche sharing. Same might be the case for the omnivorous birds but due to their wider niche breaths they coped up to this changing situation by shifting to different food choices. Now their main food source might be insects and larvae, small reptiles like lizards and small mammals. Due to their higher adaptability, they were found to be the most dominant bird group in both of the seasons. Due to the drier and cooler winter seasons and shading of leaves by some long trees, insectivorous and carnivorous birds got an increase against the seed eating & frugivorous birds. Though the data we have collected might have some errors due to observation errors or chance factors, one cannot overlook the general trends we found in community composition along with the seasonal variations in our study.

Industrial pollutants and huge dusts released from the vehicles and factories are a serious concern to the health of bird community. Habitat destruction and modification over the past decade in the surrounding Belilious Park had been a prime threat to the community. A giant tall multiplex building construction is going on inside the Belilious Park next to our college (Figure 2d). It signifies a tall question to the surrounding habitat and its denizens. Of late, another mobile tower is built near our college ground has made a serious threat for the bird communities. Plastics has been a threat for the animals including birds for their detrimental effects of clogging and choking upon consumption. Though our college strictly maintains plastic free zones inside our college premises, the surrounding areas has no discipline to 7.

## 5. CONCLUSION

In this short study we have found significant differences in avian diversity and community composition between the time periods. A clear difference is noticed between the two temporal counts of residential and

migratory birds. This might be due to the changing nature of the avian niche along with the changing environmental parameters. We are pleased and amazed at the diversity we have of the birds in our immediate surroundings and wish them to flourish in future.

## 6. ACKNOWLEDGEMENTS

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## 7. CONFLICTS OF INTEREST

The authors have no conflicts of interest regarding the publication of this manuscript.

## 8. REFERENCES

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