

Avifauna of Sophia Girls' College Campus, Ajmer, Rajasthan



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Abstract

Diversity of avifauna plays a very important role in determining the health of an ecosystem, especially in an anthropogenically modified landscape. The present study was carried out in Sophia Girls College Campus Ajmer which forms a micro habitat and is situated beside a National Highway, spreading over an area of 9.9 acres. The objective of the present study was the assessment of diversity and dominance of avifauna of Sophia Girls' College Ajmer, campus and to prepare a comprehensive database of the same. A total of 56 species belonging to 34 families was observed during the study period from December 2017 to December 2018. The Relative Diversity Index of the various species was calculated to observe the species dominance in a particular area. The feeding guild of the observed birds was utilized to classify them accordingly. Overall a sound number of species are present in the area depicting an average environmental health of the Campus.

Keywords: Avifauna, Sophia Girls' College, Relative Diversity Index (RDI).

Introduction

According to *Merck Manuals (pet health edition)*, "there are between 8,700 and 9,600 living species of birds today. These range in size from tiny (such as hummingbirds) to huge (such as ostriches and condors)" (quoted in *Audubon*, April 8, 2013, online edition). Birds live all over the world in different terrains and climates. They are essential links of many different ecological communities. In these ecological communities, birds perform a variety of functions that benefit other beings in the communities, including humans.

Some birds help in pollination of flowers. These types of birds are called "pollinators", and they help in fertilization of flowers. Pollinators are attracted to the flowers by colors, scents, and nectars. The pollen dust gets stuck on the body of the bird which it carries to the next flower it visits. The flower may be ornamental – valued for its appearance – or agricultural – valued for its food production, like tomato and squash flowers. Birds along with other pollinators (butterflies, bees, beetles, wasps, flies, bats, etc.) are essential for reproduction of certain plants to provide us with foods such as apples, peaches, and strawberries. Ecologically speaking, the pollinator gets food (the nectar), and the plant gets a passenger service for its pollen. The fruit-eating birds consume seeds as they eat apples, raspberries, cherries, blueberries, and strawberries and other types of fruits. Robins, bluebirds, chickadees, blue jays, waxwings, and mockingbirds are some of the species of birds that eat fruit as a regular food. After they eat the fruit and its seeds, birds deposit the indigestible seeds in their feces dropped all over their territory. The seeds are buried in leaf litter and watered by rain. These subsequently germinate, producing new fruit bearing bushes, plants and trees and the cycle starts again.

Some birds perform an important role of pest control. These birds eat insects, consequently providing humans with pest control. The insects eaten by birds include aphids, mosquitoes, Japanese beetles and other bugs. Bird species such as finches, crows, blackbirds, and sparrows eat weed seeds. This makes them partners with humans in controlling unwanted plants. Another important function performed by birds is scavenging. The scavenging birds quickly and effectively dispose of carcasses of dead animals they find, thus reducing the chances for diseases to spread. The fecal matter of birds called guano, is extensively used as fertilizer as it contains nitrogen, phosphates, calcium, iron etc. Many birds profess changes in seasons. In India, the appearance of cuckoo suggests the onset of spring. The peculiar voice of peacocks in cloudy weather indicates rainfall. Birds boost tourism by attracting bird-loving tourists to their migration and nesting areas, which in turn support

economic sustenance of an area. Bird watchers also spend money on equipments like binoculars, camping gear, nest boxes, birdseed, bird feeders, books, and other items providing impetus to industrial development.

The symbiotic relation between man and birds is a coveted one. As an important cog in the ecological wheel, it is our irrefutable responsibility to ensure preservation and sustenance of this vital class for environment development.

Diversity is mostly used as an indicator of stable and sustainable ecological system. Avian diversity plays an important role in the linking of food chain in ecological unit of nature. Birds may give clues about overall natural health of an ecosystem. Preparing of a list of species is basic to the study of avian species of a site, because a list indicates species diversity. Therefore this study was conducted on avian diversity of Sophia Girls College campus Ajmer and efforts have also been made to prepare a checklist of its avian species.

Review of Literature

Studies on assessment of the avifaunal components in various terrestrial and urban habitats have been conducted from time to time so as to assess the general health of the habitat. A few of them are Dapke et al., (2015) studied the diversity and abundance of avifauna in and around Laxminarayan Institute of Technology campus, Nagpur, Central India and documented 62 species of birds belonging to 11 orders and 38 families during January 2013 to December 2014. Sathya and Antoney (2015) conducted a comprehensive study at Christ University Campus which forms an excellent

microhabitat in the midst of metropolitan city Bangalore and total 40 species of 27 families belonging to 12 orders were recorded. Jagruti et al., (2017) compiled the diversity of avifauna in Urban City, Vadodara, Gujarat in which they documented 82 species of birds according to three classified habitats i.e. disturbed, moderately disturbed and undisturbed. Callaghan et al., (2018) analyzed bird biodiversity in 112 urban green spaces from 51 cities across eight countries, using eBird, a broad scale citizen science project.

Aim and Scope of the Study

The aims of the present study were to assess the diversity and dominance of avifauna of Sophia Girls' College Ajmer, campus and to prepare a comprehensive database of the same. This would be helpful for preparing the strategies for urban green patches for the conservation of avian diversity as the city is now a part of the Smart City Project and various developmental processes have to start.

Material and Methods

Profile of Study Area

Sophia Girls College Ajmer was established in the year 1959. The lushly green college campus is spread over an area of 9.9 acres with a sports field, three gardens, hostel and the various blocks situated on the strategic entrance to the city of Ajmer on Jaipur Road. The College has the facility for 11 playgrounds and courts. There is a solar panel of approximately 300 kilowatts. The college even has a rain water harvesting system and a bio gas plant. The campus has a beautiful garden with a variety of flora which hosts a variety of faunal diversity too. The trees present in the campus include:

Table 1: Floral composition of the Sophia Girls' College Campus, Ajmer

S. No.	Scientific name	Common Name	Hindi Name	Number
1	<i>Azadirachta indica</i>	Margosa	Neem	134
2	<i>Ficus religiosa</i>	Sacred fig	Peepal	1
3	<i>Cassia fistula</i>	Golden rain	Amaltas	23
4	<i>Dalbergia sissoo</i>	Indian rosewood	Shisham	6
5	<i>Butea monosperma</i>	Flame of the forest	Palaash	2
6	<i>Peltophorumpterocarpum</i>	Yellow flame tree	Gulmohar	2
7	<i>Ailanthus excels</i>	Tree of heaven	Mahanimb	13
8	<i>Polyalthialongifolia</i>	Buddha tree	Ashoka	34
9	<i>Mangifera indica</i>	Mango	Aam	24
10	<i>Punicagranatum</i>	Pomegranate	Anaar	1
11	<i>Citrus limon</i>	Citrus/ Lemon	Neemboo	2
12	<i>Carica papaya</i>	Papaya	Papita	2
13	<i>Cocus nucifera</i>	Coconut	Shreefal/ Nariyal	1
14	<i>Psidium guajava</i>	Guava	Amrood	3
15	<i>Ziziphus mauritiana</i>	Indian Plum	Ber	5
16	<i>Phyllanthus emblica</i>	Indian gooseberry	Amla	1
17	<i>Plumaria alba</i>	Tree tale	Champa	1
18	<i>Roystonea regia</i>	Royal Palm/ Bottle palm	Palm	25
19	<i>Thuja occidentalis</i>	White cedar	Morpankhi/Vidya	2
20	<i>Borassusflabellifer</i>	Asian palmyra palm	Palm	1
21	<i>Araucaria araucana</i>	Monkey puzzle tree		2
22	<i>Araucaria columnaris</i>	Christmas tree		6

A large number of birds are utilizing the campus area and these trees for various activities like feeding, breeding, foraging etc

Field Studies and Surveys

A brief study on avifaunal diversity was carried out at the campus of Sophia Girls College Ajmer for a period of one year from the month of December 2017 to December 2018. Observations

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were made with the aid of binocular (Olympus 8x40 magnification) and representative cases of species were photographed with Nikon D5300 (55-300 and 500 mm zoom) and Sony DSLR (500 mm zoom). Identification was done with the help of field guides given by Ali and Ripley (1995), Ali (1996) and Grimith and Inskipp (1999). Calls of some birds were also recorded. Regular surveys were done by systematically walking on fixed routes through the study area. Birds were mostly observed during the most active period of the day, i.e from 6:00 to 9:00 hrs

and from 16:00 to 18:00 hrs. However, observations were also made during other timings according to convenience. Birds seen were recorded. The nomenclature is based on Manakadan & Pittie (2004), and taxonomic arrangement is following Gill & Donsker (2014). The birds were also classified into different categories on the basis of their feeding habit such as frugivores, carnivores, insectivores, graminivores, omnivores and nectarivores.

Figure 1: Map of Study Area highlighted with its location in map of Rajasthan



Data Collection and Analysis

Relative Diversity (RDi)

The relative diversity (RDi) of families was calculated using the following formula (Torre-Cuadros et al., 2007)

$$RDi = \frac{\text{Number of bird species in a family}}{\text{Total number of species}} \times 100$$

Observation

Table No.2: Avifauna of Sophia Girls' College Campus, Ajmer, Rajasthan

S. No.	Common Name	Scientific Name	Feeding Guild	IUCN Status
	Hérons, Egrets & Bitterns	Ardeidae		
1	Little Egret (49)	<i>Egretta garzetta</i> (Linnaeus, 1766)	Carnivorous	LC
2	Cattle Egret (44)	<i>Bubulcus ibis</i> (Linnaeus, 1758)	Carnivorous	LC
3	Indian Pond-Heron (42-42a)	<i>Ardeola grayii</i> (Sykes, 1832)	Carnivorous	LC
	Ibises & Spoonbills	Threskiornithidae		
4	Black Ibis (70)	<i>Pseudibis papillosa</i> (Temminck, 1824)	Carnivorous	LC
	Hawks, Eagles, Buzzards, Old World Vultures, Kites, Harriers	Accipitridae		
5	Black-shouldered Kite (124)	<i>Elanus caeruleus</i> (Desfontaines, 1789)	Omnivorous	LC

6	Black Kite (132-134)	<i>Milvus migrans</i> (Boddaert, 1783)	Carnivorous	LC
7	Shikra (137-140)	<i>Accipiter badius</i> (Gmelin, 1788)	Carnivorous	LC
	Pheasants, Partridges, Quails	Phasianidae		
8	Grey Francolin (244-246)	<i>Francolinus pondicerianus</i> (Gmelin, 1789)	Omnivorous	LC
9	Indian Peafowl (311)	<i>Pavo cristatus</i> (Linnaeus, 1758)	Omnivorous	LC
	Plovers, Dotterels, Lapwings	Charadriidae		
10	Red-wattled Lapwing (366-368)	<i>Vanellus indicus</i> (Boddaert, 1783)	Omnivorous	LC
	Ibisbill, Avocets & Stilts	Recurvirostridae		
11	Black-winged Stilt (430-431)	<i>Himantopus himantopus</i> (Linnaeus, 1758)	Omnivorous	LC
	Pigeons & Doves	Columbidae		
12	Blue Rock Pigeon (516-517)	<i>Columba livia</i> (Gmelin, 1789)	Granivorous	LC
13	Little Brown Dove (541)	<i>Streptopelia senegalensis</i> (Linnaeus, 1766)	Granivorous	LC
14	Eurasian Collared-Dove (534)	<i>Streptopelia decaocto</i> (Frivaldszky, 1838)	Granivorous	LC
15	Yellow-legged Green-Pigeon (503-505)	<i>Treron phoenicoptera</i> (Latham, 1790)	Frugivorous	LC
	Parakeets & Hanging-Parrots	Psittacidae		
16	Rose-ringed Parakeet (549-550)	<i>Psittacula krameri</i> (Scopoli, 1769)	Frugivorous	LC
17	Plum-headed Parakeet (557-558)	<i>Psittacula cyanocephala</i> (Linnaeus, 1766)	Frugivorous	LC
	Cuckoos, Malkohas & Coucals	Cuculidae		
18	Asian Koel (590-592)	<i>Eudynamis scolopacea</i> (Linnaeus, 1758)	Omnivorous	LC
19	Greater Coucal (600-602)	<i>Centropus sinensis</i> (Stephens, 1815)	Omnivorous	LC
	Owls	Strigidae		
20	Spotted Owlet (650-652)	<i>Athene brama</i> (Temminck, 1821)	Carnivorous	LC
	Kingfishers	Alcedinidae		
21	White-breasted Kingfisher (735-738)	<i>Halcyon smyrnensis</i> (Linnaeus, 1758)	Carnivorous	LC
	Bee-eaters	Meropidae		
22	Small Bee-eater ((749-752)	<i>Merops orientalis</i> (Latham, 1801)	Insectivorous	LC
	Rollers	Coraciidae		
23	European Roller (754)	<i>Coracias garrulus</i> (Linnaeus, 1758)	Carnivorous	LC
24	Indian Roller (755-757)	<i>Coracias benghalensis</i> (Linnaeus, 1758)	Carnivorous	LC
	Hoopoes	Upupidae		
25	Common Hoopoe (763-766)	<i>Upupa epops</i> (Linnaeus, 1758)	Insectivorous	LC
	Hornbills	Bucerotidae		
26	Indian Grey Hornbill (767)	<i>Ocyeros birostris</i> (Scopoli, 1786)	Omnivorous	LC
	Barbets	Capitonidae		
27	Coppersmith Barbet (792)	<i>Megalaima haemacephala</i> (P.L.S. Müller, 1776)	Frufivorous	LC
	Woodpeckers	Picidae		
28	Lesser Golden-backed Woodpecker (818-823)	<i>Dinopium benghalense</i> (Linnaeus, 1758)	Insectivorous	LC
	Swallows & Martins	Hirundinidae		
29	Dusky Crag-Martin (914)	<i>Hirundo concolor</i> (Sykes, 1833)	Insectivorous	LC
30	Wire-tailed Swallow (921)	<i>Hirundo smithii</i> (Leach, 1818)	Insectivorous	LC
	Wagtails & Pipits	Motacillidae		
31	Large Pied Wagtail (1891)	<i>Motacilla maderaspatensis</i> (Gmelin, 1789)	Insectivorous	LC
32	Paddyfield Pipit (1858-1860)	<i>Anthus rufulus</i> (Vieillot, 1818)	Insectivorous	LC
	Cuckoo-Shrikes, Flycatcher-Shrikes, Trillers, Minivets, Woodshrikes	Campephagidae		
33	Common Woodshrike (1069-1071)	<i>Tephrodornis pondicerianus</i> (Gmelin, 1789)	Insectivorous	LC
	Bulbuls & Finchbills	Pycnonotidae		
34	Red-vented Bulbul (1126-1132)	<i>Pycnonotus cafer</i> (Linnaeus, 1766)	Frugivorous	LC
	Shrikes	Laniidae		
35	Rufous-backed Shrike (946-948)	<i>Lanius schach</i> (Linnaeus, 1758)	Carnivorous	LC
36	Southern Grey Shrike (933-935)	<i>Lanius meridionalis</i> (Temminck, 1820)	Carnivorous	LC
	Thrushes, Shortwings, Robins, Forktails, Wbeaters	Turdinae		
37	Oriental Magpie-Robin (1661-1664)	<i>Copsychus saularis</i> (Linnaeus, 1758)	Insectivorous	LC
38	Indian Robin (1717-1721)	<i>Saxicoloides fulicata</i> (Linnaeus, 1776)	Insectivorous	LC
39	Common Stonechat (1695-1698)	<i>Saxicola torquata</i> (Linnaeus, 1766)	Insectivorous	LC

40	Indian Chat (1692)	<i>Cercomela fusca</i> (Blyth, 1851)	Insectivorous	LC
	Babblers, Laughingthrushes, Babaxes, Barwings, Yuhinas	Timaliinae		
41	Large Grey Babbler (1258)	<i>Turdoides malcolmi</i> (Sykes, 1832)	Omnivorous	LC
	Goldcrest, Prinias, Tesias, Warblers	Sylviinae		
42	Ashy Prinia (1515-1518)	<i>Prinia socialis</i> (Sykes, 1832)	Insectivorous	LC
43	Common Lesser Whitethroat (1567-1568)	<i>Sylvia curruca</i> (Linnaeus, 1758)	Insectivorous	LC
	Flycatchers	Muscicapinae		
44	Red-throated Flycatcher (1411-1412)	<i>Ficedula parva</i> (Bechstein, 1792)	Insectivorous	LC
	Sunbirds & Spiderhunters	Nectariniidae		
45	Purple Sunbird (1916-1918)	<i>Nectarinia asiatica</i> (Latham, 1790)	Nectivorous	LC
	Munias (Estrildid Finches)	Estrildidae		
46	White-throated Munia (1966)	<i>Lonchura malabarica</i> (Linnaeus, 1758)	Omnivorous	LC
	Sparrows & Snowfinches	Passerinae		
47	House Sparrow (1938-1939a)	<i>Passer domesticus</i> (Linnaeus, 1758)	Granivorous	LC
	Weavers	Ploceinae		
48	Baya Weaver (1957-1959)	<i>Ploceus philippinus</i> (Linnaeus, 1766)	Omnivorous	LC
	Starlings & Mynas	Sturnidae		
49	Brahminy Starling (994)	<i>Sturnus pagodarum</i> (Gmelin, 1789)	Granivorous	LC
50	Asian Pied Starling (1002-1004)	<i>Sturnus contra</i> (Linnaeus, 1758)	Granivorous	LC
51	Common Myna (1006-1007)	<i>Acridotheres tristis</i> (Linnaeus, 1766)	Granivorous	LC
52	Bank Myna (1008)	<i>Acridotheres ginginianus</i> (Latham, 1790)	Granivorous	LC
	Orioles	Oriolidae		
53	Eurasian Golden Oriole (952-953)	<i>Oriolus oriolus</i> (Linnaeus, 1758)	Omnivorous	LC
	Drongos	Dicruridae		
54	Black Drongo (962-964)	<i>Dicrurus macrocercus</i> (Vieillot, 1817)	Insectivorous	LC
	Crows, Jays, Treepies, Magpies	Corvidae		
55	Indian Treepie (1030a-1034)	<i>Dendrocitta vagabunda</i> (Latham, 1790)	Frugivorous	LC
56	House Crow (1048-1051)	<i>Corvus splendens</i> (Vieillot, 1817)	Omnivorous	LC

Table legends

LC: Least Concern

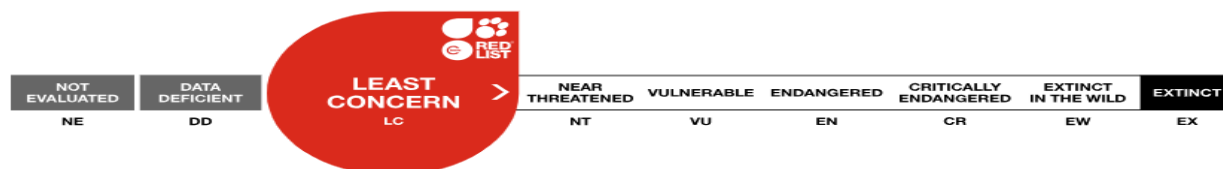


Figure 2: Pie diagram showing the occurrence of various feeding guild pattern of birds from Sophia Girls' College campus, Ajmer

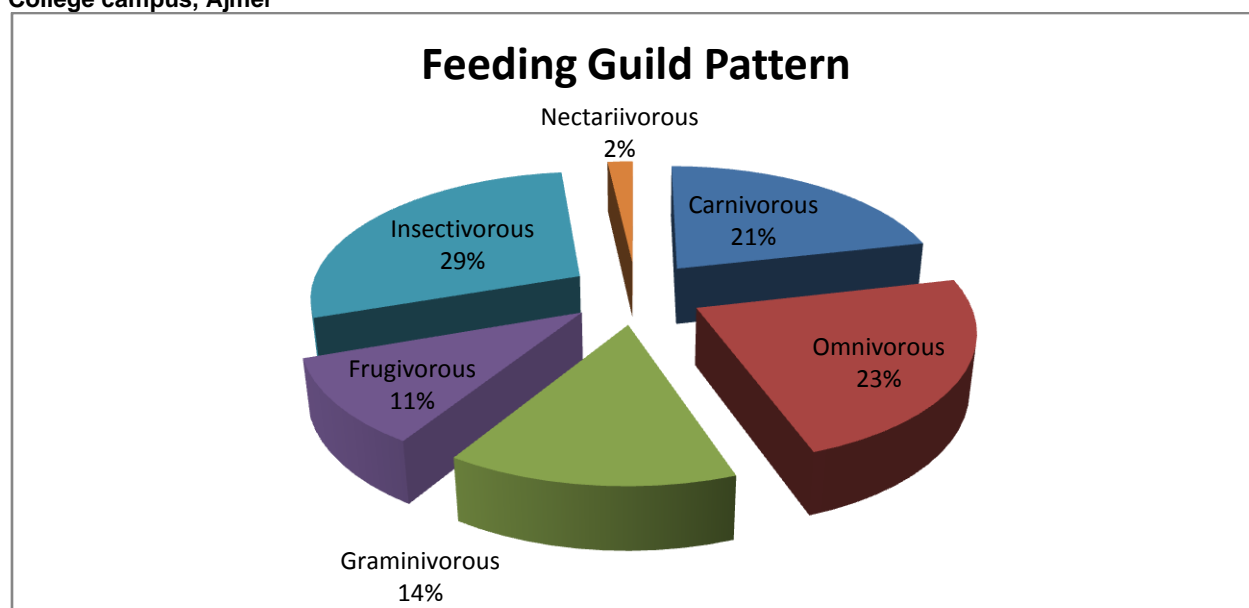
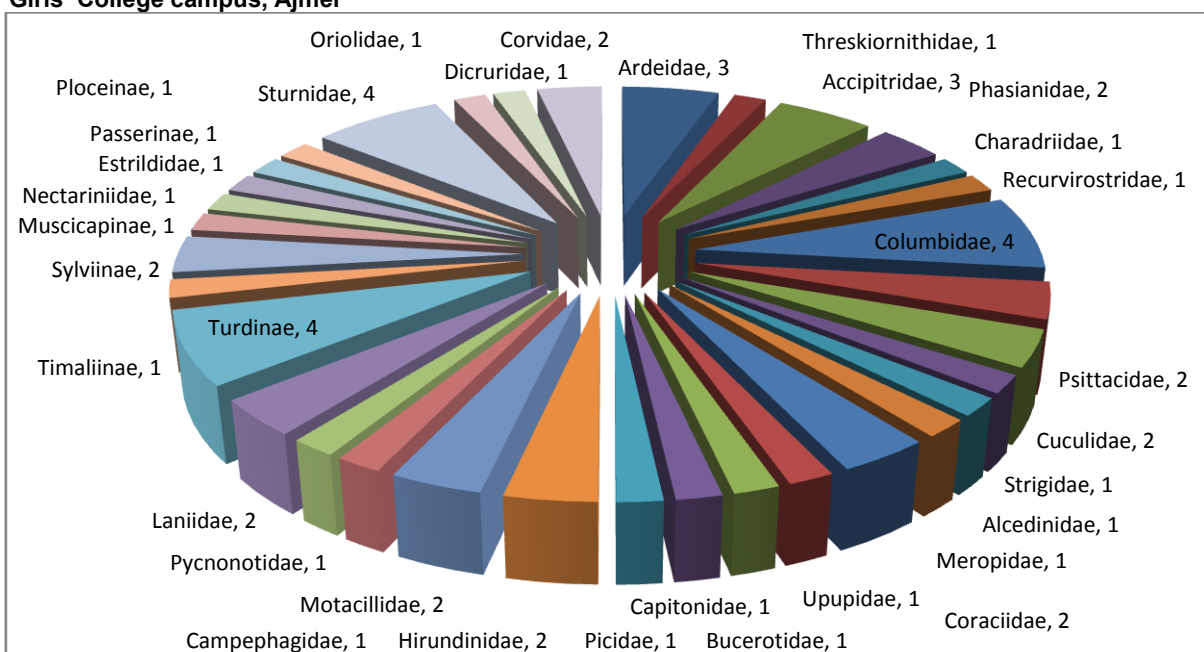


Table 3: Family wise Species Occurrence and Relative Diversity Index (RDi)

S. No.	Family	Species Number	RDi
1	Ardeidae	3	5.35714286
2	Threskiornithidae	1	1.78571429
3	Accipitridae	3	5.35714286
4	Phasianidae	2	3.57142857
5	Charadriidae	1	1.78571429
6	Recurvirostridae	1	1.78571429
7	Columbidae	4	7.14285714
8	Psittacidae	2	3.57142857
9	Cuculidae	2	3.57142857
10	Strigidae	1	1.78571429
11	Alcedinidae	1	1.78571429
12	Meropidae	1	1.78571429
13	Coraciidae	2	3.57142857
14	Upupidae	1	1.78571429
15	Bucerotidae	1	1.78571429
16	Capitonidae	1	1.78571429
17	Picidae	1	1.78571429
18	Hirundinidae	2	3.57142857
19	Motacillidae	2	3.57142857
20	Campephagidae	1	1.78571429
21	Pycnonotidae	1	1.78571429
22	Laniidae	2	3.57142857
23	Turdinae	4	7.14285714
24	Timaliinae	1	1.78571429
25	Sylviinae	2	3.57142857
26	Muscicapinae	1	1.78571429
27	Nectariniidae	1	1.78571429
28	Estrildidae	1	1.78571429
29	Passerinae	1	1.78571429
30	Ploceinae	1	1.78571429
31	Sturnidae	4	7.14285714
32	Oriolidae	1	1.78571429
33	Dicruridae	1	1.78571429
34	Corvidae	2	3.57142857
		56	100

Figure 3: Pie diagram showing the occurrence of various species in different families of birds from Sophia Girls' College campus, Ajmer

Result and Discussion

We had studied observations of various researchers of this field and few of which were similar to our observations Dapke et al., (2015) studied the diversity and abundance of avifauna in and around Laxminarayan Institute of Technology campus, Nagpur, Central India and documented 62 species of birds belonging to 11 orders and 38 families during January 2013 to December 2014. Jagruti et al., (2017) compiled the diversity of avifauna in Urban City, Vadodara, Gujarat in which they documented 82 species of birds according to three classified habitats i.e. disturbed, moderately disturbed and undisturbed. Callaghan et al., (2018) analyzed bird biodiversity in 112 urban green spaces from 51 cities across eight countries, using eBird, a broad scale citizen science project. Sathya and Antoney (2015) conducted a comprehensive study at Christ University Campus which forms an excellent microhabitat in the midst of metropolitan city Bangalore and total 40 species of 27 families belonging to 12 orders were recorded.

In the present study the campus hosts a variety of flora ranging from seasonal floral plants to large trees which attract the avifauna to visit the place and few of them like blue rock pigeon, house crow, dusky crag martin, red wattle lapwing, spotted owl, Eurasian colored dove and rose ringed parakeet even prefer to build their nest and breed successfully in the safe surroundings of the campus. 29% of birds found in the campus were from the Insectivorous bird species as the campus has a diverse population of insects. This was followed by 23% of Omnivorous, 21% of Carnivorous, 14% of Graminivorous, 11% of Frugivorous and 2% of Nectarivorous bird species. All the observed species of the campus fall under the category of Least Concern status of IUCN.

Conclusion

The observation of the study area clearly shows that Columbidae, Turdinae and Sturnidae families dominate the area with four representative species each and highest relative diversity index (RDi) value of 7.14. This is followed by the Ardeidae and Accipitridae with three species in each of these families and RDi of 5.36. The Phasianidae, Psittacidae, Cuculidae, Coraciidae, Hirundinidae, Motacillidae, Laniidae, Sylviinae and Corvidae families have a relative diversity index of 3.57 which have a representation of two species in each family. This was followed by the leftover families which were represented by one species each with an RDi value of 1.78 (Table 3).

The study clearly revealed that Sophia College campus harbors rich species diversity of birds. This diversity of birds can be attributed to

habitat structure of the college campus. This area seems to provide a viable corridor for birds to feed, shelter, breed and forage. The study amply brings out the necessity to protect the habitat structure present in the college campus as it harbours food niches of bird species. This study brings to light the importance of conservation of open or green space of the college campus and areas adjoining for maintaining ecological balance and sustenance of avian diversity. This study is first of a kind attempt to prepare a comprehensive database of birds seen in Sophia College campus.

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