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## Study on diversity of birds in Barkatullah University campus

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### Abstract

Study on bird diversity in the campus of Barkatullah University Bhopal M.P. was done, over a period of six month from July 2019 to December 2019. A total number of 30 birds species belonging to 27 families were recorded during the study covering an area. Of about 360 acres {1.5K.M<sup>2</sup>} University Campus the study was divided. Into different regions that are:

SITE A-Zoology and Applied Aquaculture and DBT

SITE B-Forest area in front of Department of zoology and aquaculture

SITE C-Hatchery and hatchery ponds

SITE D-K.C Nayar pond

Of the 30 bird species observed, the University Campus has wide variety of trees, which may be one of the major contributing factor for the richness of bird species.

**Keywords:** department of zoology and applied aquaculture and DBT, forest area in front of department of zoology and applied aquaculture , hatchery and hatchery pond, K.C Nayar pond

### Introduction

#### BU Campus.

The campus of Barkatullah University covers 360 acres [1.5 km<sup>2</sup>]. It is on the National Highway 12 which passes through Bhopal. It is a residential-type campus and, apart from the quarters for the vice-chancellor and the staff, there are four hostels for boys and a hostel for girls.

### Birds

Birds also known as Aves. are a group of endothermic vertebrates, characterized by feathers, toothless beaked jaws, the laying of hard-shelled eggs, a high metabolic rate, a four-chambered heart, and a strong yet light weight skeleton. Their skeleton is made of hollow bones.

#### Importance Of Birds

1. Birds control pests
2. Birds pollinate plants
3. Birds are nature's clean-up crew
4. Birds spread seeds
5. Birds transform entire landscapes
6. Birds keep coral reefs alive
7. Birds inspire science

#### Importance Of Birds To Human

Food

Economy

In agriculture

Pollination

Fertility

Pest control

Communication

Beauty and attraction

Games

**Importance of Birds In Nature**

Food chain

Scavengers

Seed propagation

Beauty to nature

**Material and Methods**

Point count protocol- A point count consists of standing in a specific location and counting birds. One counts the number of individual birds [of each species] within a circle of a certain radius. In most cases, especially when gathering data to compare one point count to the next, radius size should be consistent. But what radius to choose. The radius should be as large as possible to maximize information gathering, but not so large that birds can not be seen or heard throughout the survey area. Also, landscapes are very different from one survey site to the next. It is difficult to select a radius that

works for every situation. For this reason and based on our experience, we suggest participants use a radius of 20 meter [65.5ft] for most situations. Keeping the surveyed areas the same makes comparing different point count that much easier in the long run.

A typical 20 m [m=meter] radius point count where one person counts all the birds seen or heard within 10 minute period.

Study Area- study area has four sites located in Barkatullah University

Site A.- Zoology and Applied Aquaculture and DBT

Site B- Forest area in front of dept. of Zoology and Applied Aquaculture.

Site C- Hatchery and hatchery pond

Site D- K.C Nayar pond

**Data Analysis****Table 1:** Shannon Index (H) for Site – A, Simpson Index (D) for Site – A

S. No.	Name of Species	n	pi	ln pi	pi ln pi
1	Laughing Dove	7	0.035533	-3.3373	-0.1186
2	Red-Wattled Lapwing	3	0.015228	-4.1846	-0.0637
3	Oriental Magpie Robin	5	0.025381	-3.6738	-0.0932
4	Pekin (White Pekin)	0	0.000000	0.0000	0.0000
5	Shining Bronze Cuckoo	26	0.131980	-2.0251	-0.2673
6	Common Black Bird	4	0.020305	-3.8969	-0.0791
7	Dusky Copped Flycatcher	16	0.081218	-2.5106	-0.2039
8	Born Swallow	5	0.025381	-3.6738	-0.0932
9	Little Black Cormorant	0	0.000000	0.0000	0.0000
10	Striated Heron	0	0.000000	0.0000	0.0000
11	Baya Weaver	15	0.076142	-2.5752	-0.1961
12	Buff Throated Saltator	18	0.091371	-2.3928	-0.2186
13	Dusky Sunbird	5	0.025381	-3.6738	-0.0932
14	Morning Dove	5	0.025381	-3.6738	-0.0932
15	Common Bulbul	14	0.071066	-2.6441	-0.1879
16	Homing pigeon	0	0.000000	0.0000	0.0000
17	Eurasian Wryneck	0	0.000000	0.0000	0.0000
18	Grey Shrike thrush	11	0.055838	-2.8853	-0.1611
19	Green Bee Eater	25	0.126904	-2.0643	-0.2620
20	Brahminy Starling (Myna)	3	0.015228	-4.1846	-0.0637
21	Rose Ring Parakeet	2	0.010152	-4.5901	-0.0466
22	Crow	0	0.000000	0.0000	0.0000
23	Greater Coucal	1	0.005076	-5.2832	-0.0268
24	Masked Laughing Thrush	10	0.050761	-2.9806	-0.1513
25	Red Whiskered Bulbul	2	0.010152	-4.5901	-0.0466
26	Eurasian Collared Dove	0	0.000000	0.0000	0.0000
27	Kingfisher (White throated Kingfisher)	0	0.000000	0.0000	0.0000
28	Eurasian Tree Sparrow	5	0.025381	-3.6738	-0.0932
29	Black Drongo	9	0.045685	-3.0860	-0.1410
30	Red Breasted Chat	6	0.030457	-3.4914	-0.1063

S (No. of Species) = 30

N (Total No. of Individuals) =197

S (Sum of Pi<sup>2</sup> (n/N<sup>2</sup>)) = 0.073617

S Sum of Pi ln Pi = -2.806894

H 2.806894

D 13.58381895

**Table 2:** Shannon Index (H) for Site – B, Simpson Index (D) for Site - B

S. No.	Name of Species	n	pi	ln pi	pi ln pi
1	Laughing Dove	0	0.000000	0.0000	0.0000
2	Red-Wattled Lapwing	9	0.058824	-2.8332	-0.1667
3	Oriental Magpie Robin	3	0.019608	-3.9318	-0.0771
4	Pekin (White Pekin)	1	0.006536	-5.0304	-0.0329
5	Shining Bronze Cuckoo	5	0.032680	-3.4210	-0.1118
6	Common Black Bird	9	0.058824	-2.8332	-0.1667
7	Dusky Copped Flycatcher	10	0.065359	-2.7279	-0.1783

8	Born Swallow	8	0.052288	-2.9510	-0.1543
9	Little Black Cormorant	0	0.000000	0.0000	0.0000
10	Striated Heron	0	0.000000	0.0000	0.0000
11	Baya Weaver	3	0.019608	-3.9318	-0.0771
12	Buff Throated Saltator	8	0.052288	-2.9510	-0.1543
13	Dusky Sunbird	10	0.065359	-2.7279	-0.1783
14	Morning Dove	3	0.019608	-3.9318	-0.0771
15	Common Bulbul	5	0.032680	-3.4210	-0.1118
16	Homing pigeon	0	0.000000	0.0000	0.0000
17	Eurasian Wryneck	1	0.006536	-5.0304	-0.0329
18	Grey Shrike thrush	15	0.098039	-2.3224	-0.2277
19	Green Bee Eater	16	0.104575	-2.2578	-0.2361
20	Brahminy Starling (Myna)	2	0.013072	-4.3373	-0.0567
21	Rose Ring Parakeet	1	0.006536	-5.0304	-0.0329
22	Crow	4	0.026144	-3.6441	-0.0953
23	Greater Coucal	3	0.019608	-3.9318	-0.0771
24	Masked Laughing Thrush	16	0.104575	-2.2578	-0.2361
25	Red Whiskered Bulbul	2	0.013072	-4.3373	-0.0567
26	Eurasian Collared Dove	0	0.000000	0.0000	0.0000
27	Kingfisher (White throated Kingfisher)	1	0.006536	-5.0304	-0.0329
28	Eurasian Tree Sparrow	9	0.058824	-2.8332	-0.1667
29	Black Drongo	6	0.039216	-3.2387	-0.1270
30	Red Breasted Chat	3	0.019608	-3.9318	-0.0771

S (No. of Species) = 30

N (Total No. of Individuals) = 153

S (Sum of  $P_i^2$  ( $n/N^2$ )) = 0.062668S Sum of  $P_i \ln P_i$  = -2.941331

H 2.941331

D 15.9571073

**Table 3:** Shannon Index (H) for Site – C, Simpson Index (D) for Site - C

S. No.	Name of Species	ni	pi	ln pi	pi ln pi
1	Laughing Dove	9	0.030303	-3.4965	-0.10595
2	Red-Wattled Lapwing	35	0.117845	-2.1384	-0.25200
3	Oriental Magpie Robin	3	0.010101	-4.5951	-0.04642
4	Pekin (White Pekin)	6	0.020202	0.0000	0.00000
5	Shining Bronze Cuckoo	10	0.033670	-3.3911	-0.11418
6	Common Black Bird	17	0.057239	-2.8605	-0.16373
7	Dusky Copped Flycatcher	10	0.033670	-3.3911	-0.11418
8	Born Swallow	3	0.010101	-4.5951	-0.04642
9	Little Black Cormorant	4	0.013468	0.0000	0.00000
10	Striated Heron	11	0.037037	0.0000	0.00000
11	Baya Weaver	23	0.077441	-2.5582	-0.19811
12	Buff Throated Saltator	11	0.037037	-3.2958	-0.12207
13	Dusky Sunbird	6	0.020202	-3.9020	-0.07883
14	Morning Dove	15	0.050505	-2.9857	-0.15079
15	Common Bulbul	9	0.030303	-3.4965	-0.10595
16	Homing pigeon	22	0.074074	0.0000	0.00000
17	Eurasian Wryneck	1	0.003367	0.0000	0.00000
18	Grey Shrike thrush	8	0.026936	-3.6143	-0.09735
19	Green Bee Eater	16	0.053872	-2.9211	-0.15737
20	Brahminy Starling (Myna)	3	0.010101	-4.5951	-0.04642
21	Rose Ring Parakeet	1	0.003367	-5.6937	-0.01917
22	Crow	6	0.020202	0.0000	0.00000
23	Greater Coucal	3	0.010101	-4.5951	-0.04642
24	Masked Laughing Thrush	6	0.020202	-3.9020	-0.07883
25	Red Whiskered Bulbul	9	0.030303	-3.4965	-0.10595
26	Eurasian Collared Dove	11	0.037037	0.0000	0.00000
27	Kingfisher (White throated Kingfisher)	8	0.026936	0.0000	0.00000
28	Eurasian Tree Sparrow	14	0.047138	-3.0547	-0.14399
29	Black Drongo	6	0.020202	-3.9020	-0.07883
30	Red Breasted Chat	11	0.037037	-3.2958	-0.12207

S (No. of Species) = 30

N (Total No. of Individuals) = 297

S (Sum of  $P_i^2$  ( $n/N^2$ )) = 0.050936S Sum of  $P_i \ln P_i$  = -2.395026

H 2.395026

D 19.63247997

**Table 4:** Shannon Index (H) for Site – D, Simpson Index (D) for Site - D

S. No.	Name of Species	n	pi	ln pi	pi ln pi
1	Laughing Dove	33	0.077830	-2.5532	-0.19872
2	Red-Wattled Lapwing	32	0.075472	-2.5840	-0.19502
3	Oriental Magpie Robin	3	0.007075	-4.9511	-0.03503
4	Pekin (White Pekin)	46	0.108491	0.0000	0.00000
5	Shining Bronze Cuckoo	20	0.047170	-3.0540	-0.14406
6	Common Black Bird	11	0.025943	-3.6518	-0.09474
7	Dusky Copped Flycatcher	18	0.042453	-3.1594	-0.13412
8	Born Swallow	12	0.028302	-3.5648	-0.10089
9	Little Black Cormorant	5	0.011792	0.0000	0.00000
10	Striated Heron	17	0.040094	0.0000	0.00000
11	Baya Weaver	9	0.021226	-3.8525	-0.08177
12	Buff Throated Saltator	42	0.099057	-2.3121	-0.22903
13	Dusky Sunbird	17	0.040094	-3.2165	-0.12896
14	Morning Dove	7	0.016509	-4.1038	-0.06775
15	Common Bulbul	6	0.014151	-4.2580	-0.06025
16	Homing pigeon	12	0.028302	0.0000	0.00000
17	Eurasian Wryneck	1	0.002358	0.0000	0.00000
18	Grey Shrike thrush	10	0.023585	-3.7471	-0.08838
19	Green Bee Eater	24	0.056604	-2.8717	-0.16255
20	Brahminy Starling (Myna)	1	0.002358	-6.0497	-0.01427
21	Rose Ring Parakeet	15	0.035377	-3.3417	-0.11822
22	Crow	2	0.004717	0.0000	0.00000
23	Greater Coucal	3	0.007075	-4.9511	-0.03503
24	Masked Laughing Thrush	11	0.025943	-3.6518	-0.09474
25	Red Whiskered Bulbul	11	0.025943	-3.6518	-0.09474
26	Eurasian Collared Dove	10	0.023585	0.0000	0.00000
27	Kingfisher (White throated Kingfisher)	1	0.002358	0.0000	0.00000
28	Eurasian Tree Sparrow	9	0.021226	-3.8525	-0.08177
29	Black Drongo	18	0.042453	-3.1594	-0.13412
30	Red Breasted Chat	18	0.042453	-3.1594	-0.13412

S (No. of Species) = 30

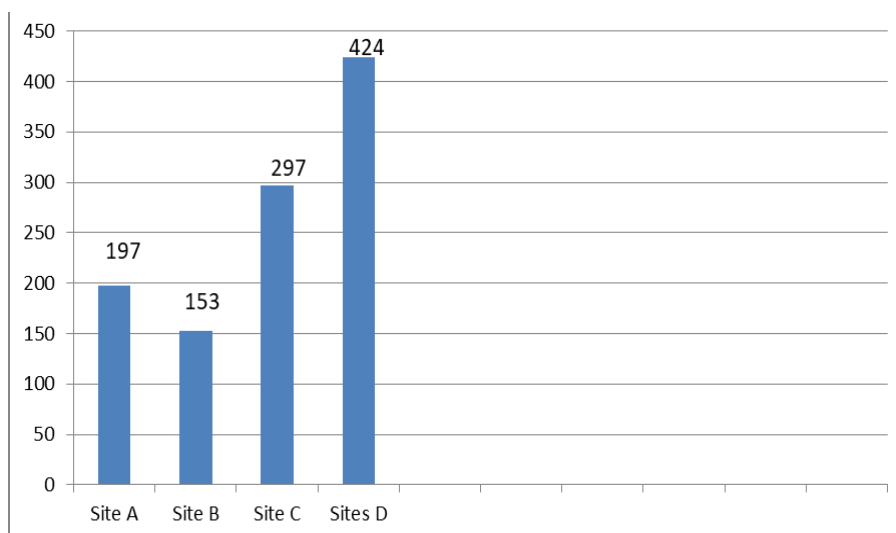
N (Total No. of Individuals) =424

S (Sum of Pi<sup>2</sup> (n/N<sup>2</sup>) = 0.055024

S Sum of Pi ln Pi = -2.428300

H 2.428300

D 18.17388776



**Fig 1:** Series 1

**Result**

**Abundance**

A total of 30 species were recorded during the study.

Represented by 27 families

Site d was most abundance habitat with 424 followed by

Site c 297 individuals followed by

Site a 197 individuals followed by

Site b 153 individuals followed by

Shannon index[H]=

Simpson index[d]=

**Diversity Index**

Shannon index[h]

Site A

H = 2.806894

Site b

H = 2.941331

Site c

H = 2.395026

Site d

H = 2.428300

Simpson index

Site a

D = 13.58381895

Site b

D = 15.9571073

Site c

D = 19.63247997

Site d

D = 18.17388776

### Discussion

BU campus are the important interfaces between terrestrial and pond ecosystem vegetation found in this area plays an important role to manage and balance various a biotic and biotic factors as well as provided a number of ecosystem services such as reducing the sediment run of the many more.

### Conclusion

To grasp better knowledge on birds species composition diversity, it is felt necessary to take into account of others possible factors that might have greater influence on birds species composition and diversity. It is also felt that such studies should encompass all the season of the year. So, long term study should be considered to really understand birds and relationship with altitude, habitat variables and surrounding environment. The indicate that this support both terrestrial and aquatic birds like white belled heron , great hornbill, alexandrine parakeet and lapwing for feeding and foraging in open water zone. Hance a habitat with open water having submerged vegetation and reed bed is the most suitable habitats and makes them free from human interference. Therefore, the need of proper studies on ecological behaviour of above mentioned birds for appropriate conservation is suggested as highly crucial before the establishment of hydropower reserve in the study area.

The area, undistributed forest and the adjacent agricultural field act as potential foraging ground offering a wide variety of roosting and nesting places for several migratory and resident bird species.

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