

Research Article

**STUDY OF AVIFAUNA IN SAFARI PARK AND UNIVERSITY OF
KARACHI, PAKISTAN**

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ABSTRACT

The present investigation deals with the population and avian diversity of Safari Park and Karachi University campus area during the period from March, 2009 to December, 2009. A total of (N=176579)¹ individuals were recorded from the study areas (Safari park, Karachi and Karachi University) during the current study. Out of these (n₁=119986)² were recorded in University of Karachi campus while (n₂=56593)³ were observed from Safari Park. Maximum density of birds was recorded soon after the monsoon season (September and October) favoring the availability of food resources for birds. During research period, over all 44 species of birds were recorded belonging to 29 families. Out of these 26 species of birds were found common in both study areas. Including the common specie, 32 species were identified from wild habitat of Safari park belonging to 30 genera and 26 families, while University of Karachi supports 38 species including the common species belonging to 31 genera and 26 families. Avian diversity of Safari Park varied significantly as compared to the avian diversity of University of Karachi as in Safari Park no any member of order Galliformes was observed while in University of Karachi no any member of order Anseriformes and Pelicaniformes was observed during the study period.

Keywords: Birds fauna, Safari Park, species, population density.

INTRODUCTION

More than 10,000 diverse species of birds live currently on the Earth. Out of which about (83%) inhabit the continental regions while the rest in islands (Bird Life International, 2008). Birds distributed unevenly and variably in terms of numbers and population in the different biogeographic realms. Neotropical realm is the richest of all holding 36% of all identified land bird species. The second is Afrotropical (21%, species) followed by Indomalayan (18%, species), Australasian (17%, species), and then the Palearctic (10%, species), Nearctic (8%, species) and Oceanic realms (2%, species) (Bird

Life International, 2008; Newton, 2003). According to (Ripley, 1961, Ali and Ripley, 1987), the total number of species of birds of Indo-Pakistan sub-continent is 2060. Fauna of Pakistan comprises of both Palearctic and Oriental origins (Roberts, 1991). Different researchers have given different figures about the avian diversity of Pakistan like the total number of species of birds is 606 (Ripley, 1961, Ali and Ripley, 1987), having 272 genera and 74 families.

According to Roberts (1991), there are 660 species of birds in Pakistan. The number of species of birds according to (Grimmett *et al.*,

¹ Total number of birds recorded during study period from both study area. ¹ Number of individuals recorded from Karachi University. ¹ Number of individuals recorded from Safari park.

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2008) is 670 species. Numerous works have been done on the avian fauna of the Sind region (Ripley, 1968-74; Ahmed and Ghalib, 1986; Ahmed and Khanum, 1986; Ali and Ripley, 1987; Roberts, 1991 *a & b*; Siddique *et al.*, 2001; Ghalib *et al.*, 2000; Gabol, 2004 and Ghalib *et al.*, 2006). 356 Species of birds have been recorded from the Sindh of which 17 species are globally threatened (Bird Life international, 2013). Furthermore 329 Species of birds have been recorded from Indus Delta region of Pakistan (Khan, 2005). Similarly 204 species of birds were recorded by (Ghalib *et al.*, 2008) from Hingol National Park. Out of which 7 species are threatened and 2 species listed as near threatened.

Avian diversity is one of the most significant environmental indicators to assess the quality of any habitat (Birdlife International, 2103). In recent days Avifaunal diversity has been declining due to human disturbances and destruction of natural habitats like cutting of nesting trees and foraging plants for commercial use of woods and lands degradation due to construction of buildings are the main factors responsible for declining the birds populations (Birdlife International, 2008).

The Wild habitat of Safari Park Karachi and University of Karachi due to their vast open and vegetative area provides a great variety of habitats for avian diversity and other species but there is no research on avian diversity of the study sites, therefore, in the present study Safari Park and Karachi University area of Karachi were selected to study the bird's population and diversity. The objective of the present study was to create a base line data about the avifauna of this region for conservation programs in future.

MATERIALS AND METHOD

The two main locations, Karachi University campus and Safari Park were selected and visited at regular monthly intervals for a period of 10 months. (March 2009-December 2009).

Study Area

Karachi is largest and metropolitan city of Pakistan, located on the coast of Arabian Sea between latitude 25° North and longitude 67°

East. Most of the city is covered by residential and commercial buildings and open field and water resources are constantly polluted by the industrial and domestic waste discharges, and anthropogenic byproducts.

Safari park

Safari Park is located in Gulshan-e-Iqbal near University Road in front of N.E.D University and covering an area of about 400 acres. the area harbours a number of trees, small plants, herbs and shrubs like *Euphorbia species*, *Euclaptous*, *Delonix regia*, *Bauhinia variegata*, *Ficus species*, *Hibiscus rosa sinensis*, *Guaiacum afficinale*, *Syzygium cumini*, *Polyalthia longifolia*, *Morous species*, *Tthuja species*, *Thespesia populanea*, *Pphonix dactylifera*, *Zizyphus numilaria*, *Zyzyphus jajoba*, *Ttamoridus indica*, *Cocos nueifera*, *Musa perdisic*, *Psidium guajava*, *Azadirachta indica*, *Acacia nilotica*, *Acacia senegal*, *Aclotropis procera*, *Crocus tenuifolia*, *Carica papaya*, *Capparis decidua*, *Bougainvilla glabra*, *Clerodendrum indicum*, *Bombay ceba* and *Cactus species*.

Karachi University

The Karachi University campus is situated in Gulshan-e-Iqbal, Karachi and covering an area of 1200 acres. This campus supports a variety of plant species like *Azadirachta indica*, *Acacia nilotica*, *Acacia senegal*, *Aclotropis procera*, *Crocus tenuifolia*, *Carica papaya*, *Capparis decidua*, *Bougainvilla glabra*, *Clerodendrum indicum*, *Bombay ceba*, *Cactus species*, *Euphorbia species*, *Euclaptous*, *Delonix regia*, *Bauhinia variegata*, *Ficus species*, *Hibiscus rosa sinensis*, *Guaiacum afficinale*, *Syzygium cumini*, *Polyalthia longifolia*, *Morous species*, *Tthuja species*, *Thespesia populanea*, *Pphonix dactylifera*, *Zizyphus numilaria*, *Zyzyphus jajoba*, *Ttamoridus indica*, *Cocos nueifera*, *Musa perdisic* and *Psidium guajava*.

The vegetation of both study sites is almost same but Safari Park Karachi is dominantly occupied by the shrubs and Karachi university campus harbours vegetative fruit plants like pine, mango, banana trees etc. The difference between both study sites is that there are almost 50 plus buildings/Departments in University of Karachi

while Safari Park contains large and wide open land most of the area covered with bushes. Secondly there is an artificial small lake present in Safari Park that harbours water fowls like pelicans, egrets, ducks, geese etc. while University of Karachi does not contains such a water body.

Methodology

Ground surveys were carried out during the current study, which is most reliable for counting birds (Danson 1981 and Howes and Backwell 1989).

To observe the birds' optical equipment, such as binoculars, Pentax (10x50), (Nekula, 07* 35) and spotting scopes (SWAROVSKI 20x60) were used. Furthermore the birds were photographed with the digital camera Sony DSLR A 200 where it was possible. Three field guides viz. "Birds of the Indian subcontinent" by (Richard Grimmit, 2001), "The Book of Indian Birds" by (Salim Ali, 2002) and "A field guide to the Birds of India, Sri Lanka, Pakistan, Nepal, Bhutan, Bangladesh and the Maldives" by (Krys Kazmierczak, 2006) were used in the field for identification of birds.

Birds counting criteria

The study area was divided into sub units and following steps were taken:

For the population estimation Birds were normally counted by point counting, line transect and look and see methods as earlier these methodologies were used by (Sarkar *et al.*, 2009) in Dhaka, Bangladesh, line transect and point count methods (Bibby *et al.* 1992) in India and (Ghalib *et al.*, 2008) in Hingol National Park, Balochistan, Pakistan.

A spotting scope mounted on a tripod was employed for counting and identification of species of birds. Birds counting were undertaken early in the morning (5:00-10:00 A.M) and in the evening time (4:00-7:00 P.M) keeping in mind the active period of birds. Birds counting were made at the roosting time as well as after one hour of foraging time.

Diversity of Birds in study areas

In the present investigation, population and diversity of avifauna was studied. Over all 44 species belonging to 29 families were recorded from both study areas. Out of which 26 species were recorded common in both Karachi University and Safari park. A total of 37 species of birds including the species that were common in both study areas were recorded from Karachi University Campus whereas from wild habitat of Safari Park 32 species of birds were recorded (Table 1).

Population of birds in study areas

According to the field survey during March 2009 to December 2009, (Table 2 & 3) a total of (N=176579) individuals were recorded from Karachi University and Safari Park. Out of which ($n_1=119986$) (Table 2) individuals were recorded from Karachi University. Of which 10063 individuals were recorded during March, 10469 during April, 10562 during May, 10997 during June, 11552 during July, 12376 during August, 13768 during September, 13593 during October, 13738 during November and 12868 during December.

While from Wild habitat of Safari Park area a total of ($n_2=56593$) (Table 3) individuals of birds were recorded. Out of these 4838 individuals were recorded during March, 4500 during April, 4675 during May, 4910 during June, 6150 during July, 6532 during August, 6525 during September, 7069 during October, 5842 during November and 5552 during December.

The collected data indicated that order Passeriformes have large number of species in addition to its larger population size among all other identified species whereas birds belonging to order Galliformes were found in least number in Karachi University campus.

Birds found in the study area facing a number of threats like habitat loss and fragmentation due to development and changing land use patterns, excessive shooting (especially the water fowls and game birds), trapping, poaching, use of pesticides in fruit orchards and use of chemical fertilizers in the agricultural fields (Karachi University campus), etc.

Table 1: Birds recorded in the study area Karachi University Campus and Safari park

No.	Common Name	Scientific Name	Karachi University	Safari Park Karachi
Family Pelicanidae				
1	Great white pelican	<i>Pelicanus onocrotalus</i>	×	✓
Family Anatidae				
2	Mallard	<i>Anas platyrhynchos</i>	×	✓
3	Common goose	<i>Anser anser</i>	×	✓
Family Ardeidae				
4	Little egret	<i>Egretta garzetta</i>	✓	✓
5	Pond heron	<i>Ardeola grayii grayii</i>	✓	✓
Family Accipitridae				
6	Pariah kite	<i>Milvus igrant govinda</i>	✓	✓
Family Charadriidae				
7	Red wattled lapwing	<i>Vanellus indica</i>	✓	✓
Family Columbidae				
8	Blue rock pigeon	<i>Columbia livia intermedia</i>	✓	✓
9	Little brown dove	<i>Streptopelia senegalensis senegalensis</i>	✓	✓
Family Psittacidae				
10	Rose ring parakeet	<i>Psittacula krameri borealis</i>	✓	✓
Family Scolopacidae				
11	Koel	<i>Eudynamis scolopacea scolopacea</i>	✓	✓
Family Alcedinidae				
12	White breasted king fisher	<i>Halcyon smyrnensis smyrnensis</i>	✓	✓
13	Little green bee eater	<i>Merops orientalis beludschius</i>	×	✓
Family Coraciidae				
14	Blue jay	<i>Coracias begalensis bengalensis</i>	✓	✓
Family Upapidae				
15	Hoopoe	<i>Upapa epops</i>	✓	✓
Family Corvidae				
16	House crow	<i>Corvus splendens zugmayeri</i>	×	✓
17	Indian tree pie	<i>Dendricitta vagabunda vagabunda</i>	✓	×
18	House crow	<i>Corvus splendens zugmayeri</i>	✓	×
Family Campephagidae				
19	Bulbul shrike (Grey Hypocolis)	<i>Hypocolius ampelius</i>	×	✓
20	Bay backed shrike	<i>Lanius vittatus vittatus</i>	✓	✓
21	Rufous backed shrike	<i>Lanius schach erythronotus</i>	✓	×
22	Great grey shrike	<i>Lanius vittatus nargianus</i>	✓	×
Family Dicruridae				
23	Black drongo	<i>Dicrurus adsimilis albirictus</i>	✓	✓
Family Estrildidae				
24	White throat munia	<i>Lonchura malabarica malabarica</i>	✓	✓
25	Spotted munia	<i>Lonchura Punctatus</i>	✓	×
Family Artamidae				
26	Common swallow	<i>Hirudo rustica rustica</i>	✓	✓
Family Motacilidae				
27	White wagtail	<i>Motacilla alba dukhunensis</i>	✓	✓
28	Yellow wagtail	<i>Motacilla flavia taivana</i>	✓	×
Family Nectariniidae				
29	Sind purple sun bird	<i>Nectariana asiatica brevirostris</i>	✓	✓
Family Passerinae				
30	Indian house sparrow	<i>Passer domesticus indicus</i>	✓	✓
Family Pycnonotidae				
31	Red vented bulbul	<i>Pycnonotus cafer humayuni</i>	✓	✓
32	White eared bulbul	<i>Pycnonotus leucogenys leucotis</i>	✓	×
Family Sturnidae				
33	Common myna	<i>Acridotheris tris tris</i>	✓	✓
34	Bank myna	<i>Acridotheris giginianus</i>	✓	✓
35	Rosy pastor	<i>Sturnus roseus</i>	✓	✓
Family Turnidae				
36	Pied bush chat	<i>Saxicola caprata</i>	✓	✓
37	Indian robin bird	<i>Saxicola fulvicata cambaiensis</i>	✓	✓
Family Timaliinae				
38	Common babbler	<i>Turdoides cuadatus cuadatus</i>	✓	✓
Family Muscipapinae				
39	Streaked wren warbler	<i>Prinia gracilis</i>	✓	✓
Family Falconidae				
40	Shikra (Indian sparrow hawk)	<i>Accipiter badius chonchroides</i>	✓	×
Family Phasianidae				
41	Common quail	<i>Coturnix coturnix</i>	✓	×
Family Meropidae				
42	Little green bee eater	<i>Merops orientalis beludschius</i>	✓	×
Family Alaudidae				
43	Common sky lark	<i>Alauda arvensis dulcivox</i>	✓	×
Family Oriolidae				
44	Golden oriole	<i>Oriolus oriolus kundoo</i>	✓	×

Where, ✓=Present ×=Absent

Table 2: Birds of Karachi university campus during study period (March-December, 2009).

Birds Species	March	April	May	June	July	August	Sep.	Oct.	Nov.	Dec.
Indian Pond heron	-	-	-	2	2	3	3	4	2	3
Little egret	-	3	7	-	8	4	6	-	2	1
Pariah kite	437	424	428	475	454	695	985	1246	1612	1419
Red wattled lapwing	34	35	34	50	58	58	59	53	42	40
Indian sparrow hawk	-	-	2	-	-	1	2	2	2	3
Quail	-	-	6	11	8	6	5	-	-	-
Rock pigeon	1219	1361	1306	1293	1206	1655	1969	1881	1876	1806
Little brown dove	243	211	198	259	274	254	262	239	241	224
Rose ring Parakeet	121	119	123	123	125	131	140	129	122	140
Indian koel	79	81	73	68	91	98	96	103	98	93
White breasted king fisher	1	1	1	1	2	2	2	1	1	1
Indian roller	-	-	-	1	2	1	2	1	1	1
Little green bee eater	210	221	207	196	187	213	204	227	230	181
Hoopoe	4	3	6	8	6	6	7	9	4	7
Sky lark	-	-	2	4	2	4	3	-	-	-
Indian house crow	3316	3251	3412	3157	3263	3497	3612	3633	3761	3928
Indian tree pie	-	3	5	4	3	6	8	4	3	3
Black drongo	17	19	16	13	15	19	21	24	23	24
Spotted Munia	12	27	14	16	17	23	13	0	0	0
White throated munia	156	149	142	144	176	164	172	161	132	64
Common swallow	31	42	51	68	49	63	71	59	64	26
Bay-backed shrike	-	-	1	2	-	4	3	3	-	1
Rufous backed shrike	-	3	4	8	6	7	4	6	3	5
Great grey shrike	-	-	-	-	3	2	1	-	-	2
White wagtail	2	-	2	-	4	9	5	6	3	4
Yellow wagtail	-	-	-	2	2	6	9	7	4	6
Sindh purple sun bird	56	48	53	61	65	69	75	52	47	42
Golden oriole	-	-	1	3	3	4	3	2	-	-
Indian house sparrow	1296	1219	1263	1314	1383	1269	1281	1197	1276	1063
Red vented bulbul	96	106	115	111	108	131	123	101	98	93
White eared bulbul	49	52	44	36	43	65	49	40	46	49
Bank myna	-	-	140	214	170	231	583	193	209	307
Common myna	2168	2454	2213	2158	2516	2270	2419	2770	2831	2741
Rosy pastor	-	140	230	659	783	856	995	834	411	-
Pied bush chat	21	17	13	18	19	20	20	18	16	13
Indian Robin	51	57	53	62	53	72	74	61	79	66
Common babbler	311	332	310	372	348	351	370	407	393	409
Streak wren warbler	133	91	87	84	98	107	112	120	106	103
Total	10063	10469	10562	10997	11552	12376	13768	13593	13738	12868

Table 3: Birds of Safari Park during Study Period (March-December, 2009).

Birds Species	March	April	May	June	July	August	Sep.	Oct.	Nov.	Dec.
Great white pelican	1	1	1	1	1	1	1	1	1	1
Common geese	67	69	69	69	70	69	68	68	68	68
Mallard	125	125	125	124	125	125	134	134	134	134
Indian Pond heron	1	2	1	—	3	2	2	3	1	2
Little egret	4	3	5	4	10	6	5	3	2	2
Pariah kite	794	713	689	693	761	891	976	1236	1209	1326
Red wattled lapwing	17	7	19	10	13	25	16	20	14	15
Rock pigeon	143	119	138	107	136	171	123	106	137	161
Little brown dove	69	57	71	73	67	113	102	86	110	93
Rose ring Parakeet	6	9	14	8	10	19	11	14	12	8
Indian koel	7	6	4	3	5	6	8	6	5	7
White breasted king fisher	1	1	1	1	2	1	1	1	1	1
Indian roller	-	1	-	-	1	1	1	1	-	1
Little green bee eater	117	109	130	124	186	192	146	151	139	112
Hoopoe	-	-	5	7	4	5	9	4	5	7
Grey hypocolius	-	-	-	-	3	2	-	1	-	2
Indian house crow	2136	1869	1793	1697	2461	2192	2370	2112	2243	2267
Black drongo	2	1	1	3	2	3	2	1	1	2
White throated munia	-	-	12	17	19	23	21	13	16	9
Common swallow	-	12	37	41	20	17	-	21	37	6
Bay-backed shrike	-	-	3	2	1	4	5	3	2	2
White wagtail	6	4	7	13	9	11	12	8	6	13
Sindh purple sun bird	9	6	7	4	12	13	18	17	13	6
Indian house sparrow	719	669	697	793	912	671	621	814	511	504
Red vented bulbul	17	14	13	15	19	21	16	20	7	19
Bank myna	-	-	61	53	60	71	42	62	51	-
Common myna	513	619	579	809	604	934	987	1009	993	679
Rosy pastor	-	-	92	136	513	806	702	1013	-	-
Pied bush chat	2	3	5	7	6	12	4	6	7	6
Indian robin	8	6	9	11	14	13	6	16	20	8
Common babbler	51	54	63	64	67	76	82	89	71	63
Streak wren warbler	23	21	24	21	34	36	34	30	26	28
Total	4838	4500	4675	4910	6150	6532	6525	7069	5842	5552

Where Sep=September, Oct=October, Nov=November, Dec=December.

CONCLUSIONS

According to the field survey from March 2009 to December 2009, serious threat to the bird was found to be the habitat degradation and alteration. In both study areas new buildings were under construction in addition to making roads and tracks which directly or indirectly threatened the bird of Karachi University and Safari Park Karachi. There was no proper discharge of chemicals in Karachi University and no any proper garbage discharge system was

found in Safari Park due to which the avian diversity is exposed to chemical sprays while feeding on them and burning of garbage containing polythene bags cause suffocation of birds thus avoid such habitats. The objective of the study was to document the base line data about birds of the study areas and to spread awareness about the importance of healthy habitat for birds. Although the Karachi University Campus and Safari Park have similar climatic conditions but vegetation cover is a bit

different, Safari Park Karachi mostly covered with wild plant species and shrubs while Karachi University Campus with relatively more number of cultivated fruit trees. In addition to this there a small lake in Safari Park that provides a suitable habitat for water fowls. Following are the few ideas of conservation strategy which ensure the safety of birds and other living flora and fauna of observed sites.

- Basic educational and training materials for bird identification and monitoring are provided to the students and people who visit the area frequently.
- Building up the national capacity for bird identification, research and bird watching at both sites.
- Continue to support research to fill data gaps that focus on declines in waterfowl in studied sites.
- In order to update database for the birds species, proper and continue field survey is required.
- Strict ban on dumping of waste materials in open areas and in water bodies.

CONFLICT OF INTEREST

The authors declare that there are no conflicts of interests associated with this article.

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