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Winter survey of birds at district of the Badin, Pakistan

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ABSTRACT

Introduction: Wetlands offer sites to variety of fauna as well as flora, and are vital habitats for biodiversity of both aquatic and terrestrial fauna and flora. Badin is also an important wetland for the birds. The present study was planned to explore the unexplored data of the avifauna diversity of Badin district, Pakistan.
Materials and Methods: Badin District is an important part of coastal ecosystem of the Sindh. Large numbers of wetlands are located in this district and some have become depleted over the past decades. The climate of is moderate. However, summer months are hot (from 25° to 45° C). Winter months are cold months (from 30° to 10°C). During the research linear count method was used; while direct and indirect methods were applied. For the statistical analysis PAST software was used to find out the diversity indices.
Results: It is noted that 52 species of birds were recorded in Badin district, Sindh, Pakistan. Dominance Index (0.0293), Evenness Index (0.7664), Margalef Index (6.714), Shannon-wiener diversity Index (3.685) and Simpson diversity Index (0.9707) were shown rich diversity in the study area.
Conclusion: It is concluded that 52 avian species were seen and is documented that Badin district having suitable habitat for the diversity.

Key words: Common teal, Transects, Avian, Margalef, Simpson

INTRODUCTION

Wetlands offer sites to variety of fauna as well as flora, and are vital habitats for diversity of both aquatic and terrestrial fauna and flora. Wetlands are classified on the basis of origin, size, age and chemical composition (Gorham and Janssens, 1992). Pakistan has many climatic and vegetation zones within a small country. Various climatic regimes in the Pakistan resulted in different types of wetland systems. There are more than 225 wetlands in Pakistan while out of total only 19 are included in Ramsar list. Pakistan has 780,000 hectares area (74% freshwater and remaining marine water) of wetland which is 9.7 percent of country (IUCN, 1989; Altaf *et al.*, 2014). Out of total six biogeographic regions, three viz. Palearctic, Oriental and Ethiopian are present in Pakistan. Because various types of climatic regimes, vegetation zones, wastelands and biogeographic regions are present in Pakistan, therefore the country represents a unique blend of floral and faunal diversity.

Total 9042 avian species are reported from the whole World (Sibley and Monroe, 1990; Sibley and Monroe Jr, 1993) and out of total, only 668 species of birds are recorded in whole Pakistan (Mirza and Wasiq, 2007). For the efficient management of avian species and population, stressed out on the need of correct knowledge of diversity, distribution (Altaf *et al.*, 2018), classification, conservation (Ali, 20015), protection (Roberts, 1991, 1992) and threats to diversity (Altaf *et al.*, 2013). Large number of bird species and populations is declining in world, 1221 species are included as threatened (Birdlife, 2007). The avian diversity is decreasing due to illegal hunting, conflicts (Azad *et al.*, 2018; Chughtai *et al.*, 2018; Safeer *et al.*, 2018), urbanization, agriculture intensification (Haider *et al.*, 2017; Hakeem *et al.*, 2017; Rauf *et al.*, 2017; Altaf *et al.*, 2018; Bashir *et al.*, 2018; Manzoor *et al.*, 2018), accidental mortality (Chattha *et al.*, 2017), over fishing (Altaf *et al.*, 2011), pollution (including oil spills and pesticide use)

(Umair, 2018), competition, global climate change and predation from non-native invasive species (Ali, 20015). The present study was planned to explore the unexplored data of the avifauna diversity of Badin district, Pakistan.

MATERIALS AND METHODS

This study was started from October 2015 to March 2016 to assessment of diversity of study area. The data were collected on monthly basis at dawn and dusk from the coast line of the Badin district.

Study area: Badin District is an important part of coastal ecosystem of the Sindh. Large numbers of wetlands are located in this district and some have become depleted over the past decades (IUCN, 2006).

Figure 1: Map of the study area.

Climate: The climate of is moderate. However, summer months are hot (from 25° to 45° C). Winter months are cold months (from 30° to 10°C) (IUCN, 2006).

Methodology: The avian diversity of Badin district was recorded through linear count survey method and both, the direct (including physical counts and voices) and indirect (including nests, eggs, feathers, carcasses and questionnaire) methods were used. Field guides (Grimmett, 1998; Mirza and Wasiq, 2007) and books (Roberts, 1991, 1992) were used to identify the birds.

Statistical Analysis: The data was analysis through software (i.e. PAST version 2.17C) and Dominance (abbreviated as; D), Shannon-wiener diversity index (abbreviated as; H'), Simpson Index (abbreviated as; S), Margalef (abbreviated as; R) and Evenness (abbreviated as; E) were recorded following (Hammert, 2001).

RESULTS AND DISCUSSION

During the surveys noted that 52 species and 1991 numbers of birds were present in Badin district, Sindh, Pakistan (Table 1). Dominance Index (D= 0.0293), Evenness Index (E=0.7664), Margalef Index (R=6.714), Shannon-wiener diversity Index (H'=3.685) and Simpson diversity Index (S=0.9707) were shown rich diversity in the study area (Table 2). Ali *et al.* (2017) noted that 51 birds' species and 960 numbers were seen in Banbhore, district Thatta. Dominance Index (0.03134), Evenness Index (0.7575), Margalef Index (7.268), Shannon-wiener diversity Index (3.654) and Simpson diversity Index (0.9687) were also shown high diversity of birds in Banbhore, district Thatta. While Ali *et al.* (2016) reported 49 species and 4280 individuals of birds from the Keti Bunder. Dominance Index (D= 0.06), Shannon-wiener diversity Index (H'=3.23), Simpson Index (S=0.94), Margalef Index (R=5.74) and Evenness Index (E=0.52) were shown diversity in this Keti Bunder. Altaf *et al.* (2015) total of 51 species of birds and 2531 numbers were reported from the head Marala. Dominance Index (D=0.138), Shannon-wiener

diversity index (H'=2.62), Simpson Index (S=0.86), Margalef Index (R=6.38) and Evenness (E=0.27) were also reported.

During the study noted that status of the species was as; two species were Vulnerable (VU), one species was Near Threatened (NT), 49 were Least Concern (LC) (Figure 2). Ali *et al.* (2017) reported that status of the species was as; one species was Vulnerable (VU), 3 species were Near Threatened (NT), 46 are Least Concern (LC) and one species is Not Evaluated (NE).

During the research noted that distribution of birds was recorded as; twenty species were native resident and 32 species were winter visitor (Figure 3). Ali *et al.* (2017) reported that distribution of birds was recorded as; only species is summer breeder, 4 species are winter visitor, 46 are resident.

During the study observed that top ten species of birds were as; cattle egret (104), large egret (108), little egret (85), Northern pintail (75), common teal (91), common sandpiper (73), marsh sandpiper (88), Eurasian spoonbill (77), Dalmatian pelican (65) and great white pelican (72) (Figure 4). Ali *et al.* (2017) reported that top ten species of birds were recorded as; common teal (n=75), black headed gull (n=49), brown headed-gull (n=43), common shelduck (n=42), garganey (n=42), Pallas's gull (n=39), Caspian gull (n=38), Northern pintail (n=37) and Northern shovler (n=35). While Ali *et al.* (2016) reported that top ten species of the Keti Bunder were recorded as; black headed gull, cattle egret, common coot, common shelduck, greater egret, greater flamingo, little egret, little grebe and Pallas's gull.

Table1: Avifauna of district Badin, Sindh, Pakistan.

Sr.	*Scientific Name*	Common Name	Species authority	Population	Status	Distribution
1	*Ardea cinerea*	Grey heron	Linnaeus, 1758	16	LC	NR
2	*Ardea purpurea*	Purple heron	Linnaeus, 1766	8	LC	NR
3	*Ardea grayii*	Pond heron	Sykes, 1832	14	LC	NR
4	*Bubulcus ibis*	Cattle egret	Linnaeus, 1758	104	LC	NR
5	*Egretaa alba*	Large egret	Linnaeus, 1758	108	LC	NR

6	*Egretta garzetta*	Little egret	Linnaeus, 1766)	85	LC	NR
7	*Egretta gularis*	Indian reef heron	Bosc, 1792	12	LC	NR
8	*Nycticorax nycticorax*	Night heron	Linnaeus, 1758	14	LC	NR
9	*Ixobrychus minutes*	Little bittrn heron	Linnaeus, 1766	34	LC	WV
10	*Phoenicopterus ruber*	Greater flamingo	Linnaeus, 1758	38	LC	WV
11	*Phoenicopterus minor*	Lesser flamingo	Saint-Hilaire, 1798	49	LC	WV
12	*Tadorna tadorna*	Common shelduck	Linnaeus, 1758	42	LC	WV
13	*Anas acuta*	Northern Paintail	Linnaeus, 1758	75	LC	WV
14	*Anas crecca*	Common teal	Linnaeus, 1759	91	LC	WV
15	*Anas platyrhynchos*	Mallard	Linnaeus, 1760	26	LC	WV
16	*Anas clypeata*	Northern shovler	Linnaeus, 1758	43	LC	WV
17	*Aythya ferina*	Common pochard	Linnaeus, 1758	15	VU	WV
18	*Anas querquedula*	Garganey	Linnaeus, 1759	14	LC	WV
19	*Haliastur Indus*	Brahminy kite	Boddaert, 1783	15	LC	NR
20	*Accipiter badius*	Shikra	Gmelin, 1788	5	LC	NR
21	*Aquila rapax*	Tawny Eagle	Temminck, 1828	1	VU	NR
22	*Circus aeruginosus*	Marsh harrier	Linnaeus, 1758	2	LC	WV
23	*Vanellus indicus*	Red wetled lapwing	Boddaert, 1783	41	LC	NR
24	*Charadrius hiaticula*	Ringed plover	Linnaeus, 1758	61	LC	WV
25	*Charadrius dubius*	Little ring plover	Scopoli, 1786	35	LC	WV
26	*Charadrius alexandrines*	Kentish plover	Linnaeus, 1758	47	LC	WV
27	*Tringa tetanus*	Common Redshank	Linnaeus, 1759	45	LC	WV
28	*Tringa nebularia*	Common greenshank	Gunnerus, 1767	25	LC	WV
29	*Actitis hypoleucos*	Common sandpiper	Linnaeus, 1758	73	LC	WV
30	*Tringa stagnatilis*	Marsh sandpiper	Bechstein, 1803	88	LC	WV
31	*Gallinago gallinago*	Common snipe	Linnaeus, 1758	48	LC	WV
32	*Lymnocryptes minimus*	Jack Snipe	Brünnich, 1764	8	LC	WV
33	*Calidris minuta*	Little stint	Leisler, 1812	5	LC	WV
34	*Calidris alba*	Sanderling	Pallas, 1764	14	LC	WV
35	*Platalea leucorodia*	Eurasian Spoonbill	Linnaeus, 1758	77	LC	NR
36	*Pelecanus crispus*	Dalmatian Pelican	Bruch, 1832	65	LC	WV
37	*Pelecanus onocrotalus*	Great white Pelican	Linnaeus, 1758	72	LC	WV
38	*Larus cachinnans*	Caspian gull	Pallas, 1811	43	LC	WV
39	*Larus ichthyaetus*	Pallas's gull	Pallas, 1773	48	LC	WV
40	*Larus brunnicephalus*	Brown Headed-gull	Jerdon, 1840	55	LC	WV
41	*Larus ridibundus*	Black Headed gull	Linnaeus, 1766	58	LC	WV
42	*Sternula albifrons*	Little tern	Pallas, 1764	18	LC	WV
43	*Sterna hirundo*	Common tern	Linnaeus, 1758	25	LC	WV

44	*Merops orientalis*	Sindh green bee-eater	Latham, 1802	38	LC	NR
45	*Merops persicus*	Blue-cheeked bee-eater	Pallas, 1773	48	LC	NR
46	*Recurvirostra avosetta*	Pied Avocet	Linnaeus, 1758	48	LC	NR
47	*Cursorius coromandelicus*	Indian Courser	Gmelin, 1789	27	LC	WV
48	*Glareola lacteal*	Small Pratincole	Temminck, 1820	14	LC	NR
49	*Rynchops albicollis*	Indian Skimmer	Swainson, 1838	15	LC	NR
50	*Mycteria leucocephala*	Painted stork	Pennant, 1769	9	NT	NR
51	*Lanius vittatus*	Bay backed shrike	Valenciennes, 1826	16	LC	NR
52	*Lanius tephronotus*	Grey-backed shrike	Vigors, 1831	14	LC	WV

Table 2: Diversity indices of avifauna of the study area.

Diversity Indices	**Values**
Species	52
Individuals	1991
Dominance Index (abbreviated as; D)	0.0293
Simpson Index (abbreviated as; S)	0.9707
Shannon-wiener Index (abbreviated as; H')	3.685
Evenness Index (abbreviated as; E)	0.7664
Margalef Index (abbreviated as; R)	6.714

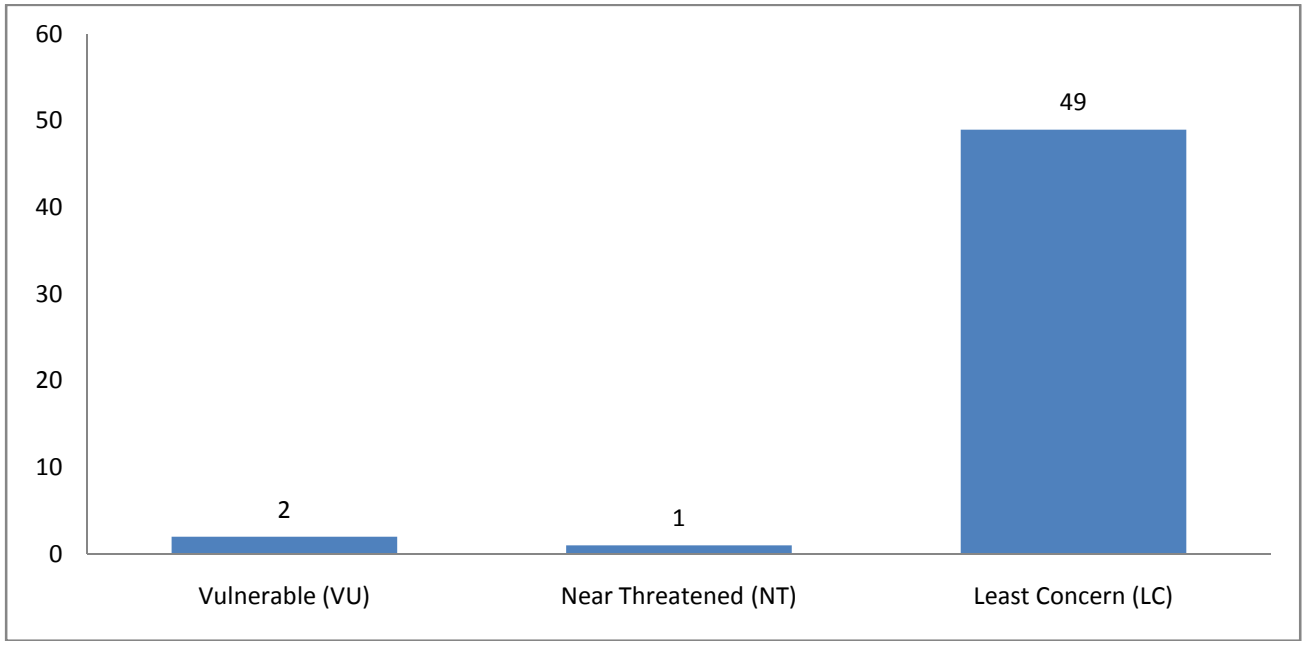

Figure 2: Status of avian species of the study area.

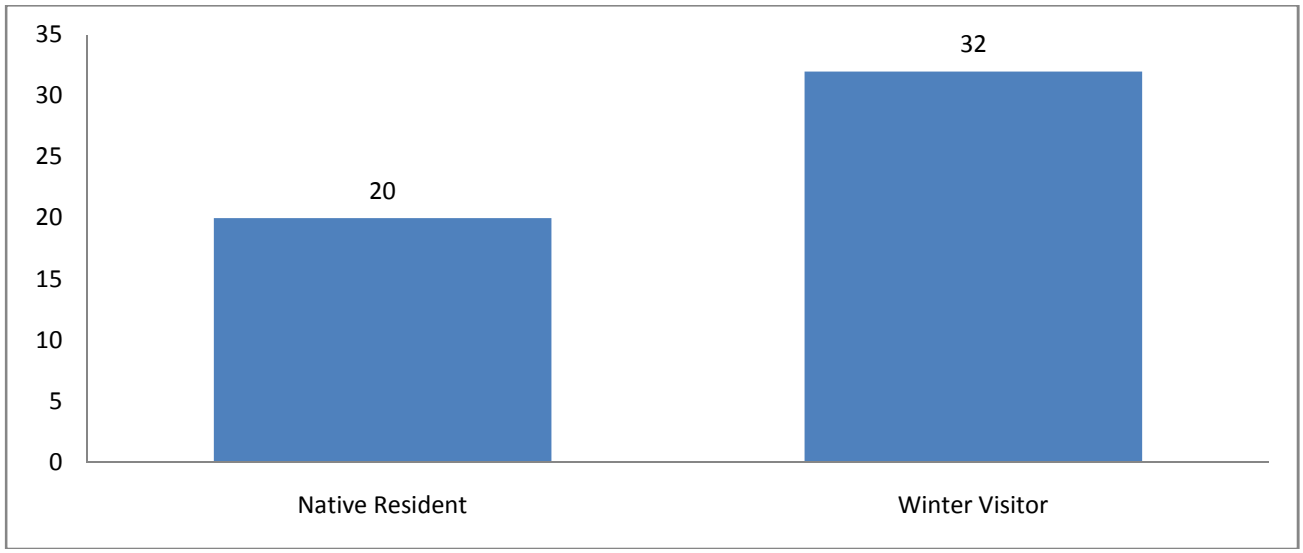

Figure 3: Status of avian species of the study area.

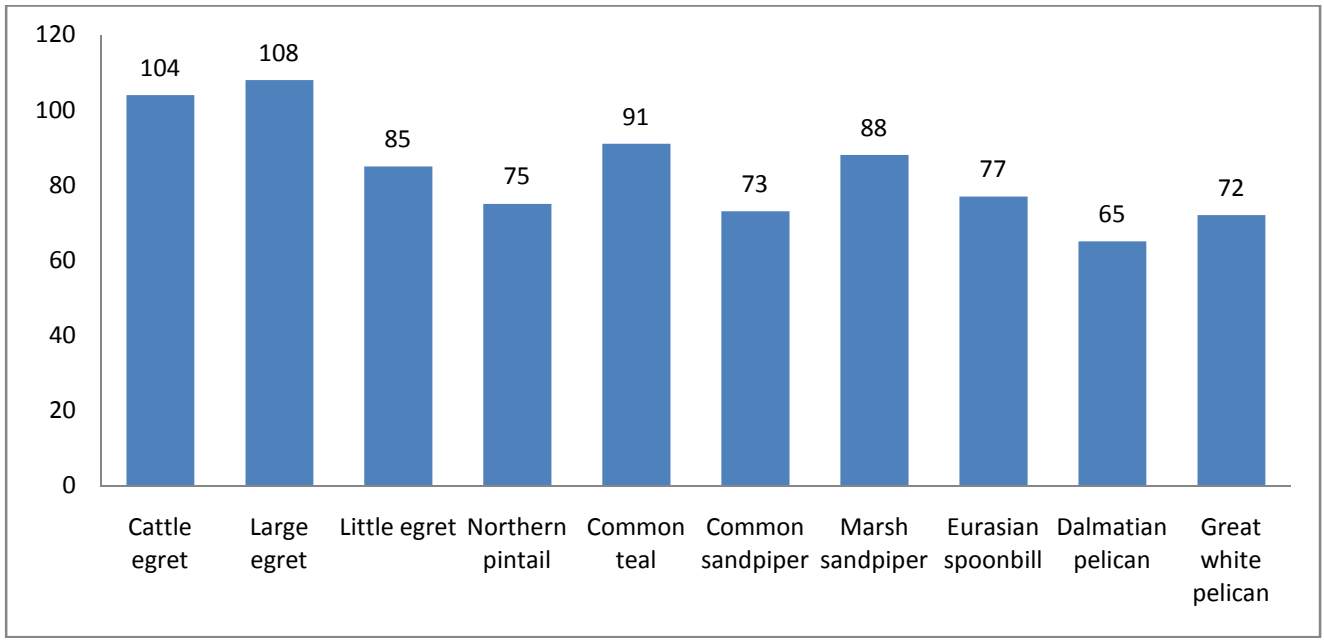

Figure 4: Most abundant avian species of the study area.

Conclusion: It is concluded that 52 avian species were seen and is documented that Badin district having suitable habitat for the diversity.

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Availability of data: We have included all relevant data in the manuscript that were collected during the field survey.

Authors' contributions: Ali this study and also performed the research; Altaf helped in data write up; khan analysis article and approved as final manuscript.

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