

A Study on Avifaunal Diversity of Kali Bein, Punjab (India)

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ABSTRACT

Kali Bein is a rivulet flow through the districts of Hoshiarpur and Kapurthala for 160 Km into the convergence of the river Satluj and Beas at Harika Pattan in Punjab, India. The ber tree where Guru Nanak Dev Ji used to mediate is also present on the bank of Kali Bein in city of Sultanpur Lodhi, a municipal council under district Kapurthala. The present study was carried out to document the avifaunal diversity of this rivulet. A total of 66 species of avifauna under 15 orders and 35 families were recorded. The bird species recorded during the course of study belonging to 15 orders, maximum bird species i.e. 28 have been recorded from the order Passeriformes which constituted 42.42 % of the total species. The population trend of reported avifauna according to Red Data Book of IUCN was stable for 25, increasing for 15 species, decreasing for 14 and unknown for 12 bird species. Of the total 66 recorded birds species 42 are resident, 13 resident migratory and 11 migratory species.

1. Introduction

Biodiversity is variety and variability of life on earth. Bird's diversity is also an important part of the natural environment. They play an important role in pollination, seed dispersal, scavenger, predators of insects and breaking seed dormancy (Sandhu and Dang, 1980). Birds are very fascinating creatures of nature and are known as masters of air. They play very important role in sustaining the natural balance in food chain (Clout and Hay, 1989). The abundance and distribution of avifauna of a specific area depended on different factors which mainly included roosting, availability of suitable food, and nesting sites (Aggarwal *et al.*, 2008). Depletion in the zone of appropriate habitat resulted in decline in population of avifauna due to decrease in sufficient space for territories, nest sites, etc. (Rolstad, 1991). The dropping of the birds provides nutrients in the water and their occurrence indicates the good health of the ecosystem (Elmberg *et al.*, 1994). Avifauna being an prime component in an ecosystem need to be sustained by protecting their habitats which mainly demands the assessment of birds as a indispensable step (Raman *et al.*, 2005; Sultana *et al.*, 2007). The avifauna of the Indian subcontinent is already credited with over 1250 species (Woodcock, 1980); 1260 species (Ali and Ripley, 1983); 1299 species (Inskipp *et al.*, 1999). These numbers account for about 14 % of world's total number of about 8600 bird species (Sibley and Munroe, 1990). Avifauna in most studies seems to be more sensitive to environmental degradation than other vertebrates (Furness, 1993). With increasing urbanization the number of avifauna species decreased and that the staying behind category of avifauna was dominated by exceedingly abundant species (Edgar and Kershaw 1994). Water avifauna populations may treat as monitoring species for natural and human-made toxicological contamination in the environment. Since 1971, the herring gull (*Larus argentatus*) has been used as a monitoring species for checking the levels of mercury in the Great Lakes ecosystem (Koster *et al.*, 1996). At the level population, pollution in the water body effect the avifauna and it may decline dramatically and even disappeared. As bird is on top in the many food chains, they may be used as monitors of any alteration that accumulates through the chain, but they may

also be sensitive to various heterogeneous factors influencing the food chain. Not only can avifauna monitor local food webs, but also, they can be used to study the exposure to different regions if they are migratory in habitat (Pereira *et al.*, 2009). The structure and abundance of avifaunal communities were determined mainly by the type of vegetation cover (Rotenberry, 1985) and food availability (Sabo, 1980). The high tree diversity and absence of weeds in and around water body support higher avian species richness and abundance (Kaur *et al.*, 2018). Cutting of trees, fishing, anthropogenic pressure and exotic species are the factors affecting the avian diversity (Rai, 2017). Therefore it is utmost important to know avifaunal diversity. Pathfinder work on avifaunal diversity has been carried out by many ornithologist in state of Punjab and India (Ladhar, 2005, Kler, 2009, Chopra *et al.*, 2012 & 2013, Braich, 2016 and Rai *et al.*, 2017). However Kali Bein has not been exhaustively surveyed from bird's diversity angle.

2. Methodology

Study area:

Kali Bein started from Dhanoa village of district Hoshiarpur and flow into the convergence of rivers Satluj and Beas at Harika Pattan in Punjab. It's located at 32°26'33"N and 75°43'43"E. The catchment area of Kali Bein is 945 miles² and its length is 90 miles. Its average slope is 13.5 ft/mile. It flows through the districts of Hoshiarpur and Kapurthala with several towns on its banks. The important role plays by Kali Bein in recharging the water table and in management of flood in its watershed. The Kanjli wetland, a Ramsar site, is supported by the Kali Bein. As a result of the Green Revolution, industrial and agricultural chemicals released into the Kali Bein. Inadequate release of water from Mukerian Hydrel Channel and the non functional of sewage treatment plants led to the death of fishes in masses the Kali Bein in recent times.

Methods:

Proper monthly surveys were conducted to the study areas from March 2017 to February 2018, to document the avifaunal diversity by using direct count and Point

method. Total of four stations were selected. Station 1 (S1), at upstream of the rivulet near Dasuya, district Hoshiarpur, Station 2 (S2), few kilometers downstream (Subhanpur) from station 1 where domestic sewage joins Kali Bein, Station 3 (S3), the area where city sewage and Industrial effluent has confluence with the rivulet near Kapurthala and Station 4 (S4), few kilometers downstream from station 3, which may indicate the revival zone of the river. Field data were collected during stay time from morning to evening. Birds were observed

and snapshots were taken using Canon EOS 700D camera. Various field guides (Ali and Ripley, 1987, Grewal *et al.*, 1995, Inskipp *et al.*, 2001 and Ali, 2002) were used for identification of avifauna. The checklist was prepared according to Manakadan and Pittie 2001. The residential status of avifauna was designated as Resident (R), Resident Migrant (RM) and Migrant (M) categories following Salim Ali 2002. IUCN Red List 2017-3 version 3.1 was used to determine the conservation status of different species of avifauna.



3. Result and discussion

Kali Bein rivulet is religiously very important where Guru Nanak dev Ji promulgated “There is no Hindu and there is no Musalman” support a rich diversity of bird species. During the present course of investigation a total of 66 species of avifauna belonging to 15 orders and 35 families were recorded. A check list of avifauna diversity, their residential status and IUCN conservation status is given in table 1. The bird species recorded under 15 orders during the course of study, maximum bird species i.e. 28 have been recorded from the order Passeriformes which constituted 42.42% of the total species and followed by Pelecaniformes-06, Charadriiformes-05,

Gruiformes-04, Columbiformes, Cuculiformes, Coraciiformes and Suliformes-03 each, Accipitriformes, Anseriformes, Bucerotiformes and Galliformes-02 each and Podicipediformes, Psittaciformes and Strigiformes-01 each. Among the 35 families Motacillidae and Ardeidae were represented by maximum 05 number of species. Rallidae was represented by 04 species and Columbidae, Cuculidae, Hirundinidae, Cistiolidae and Sturnidae were represented by 03 species each. Accipitridae, Anatidae, Scolopacidae, Alcedinidae, Phasianidae, Corvidae, Estrildidae, Muscicapidae, Nectarinidae and Phalacrocoracidae were represented by 02 species each rest 17 families were represented by 01 species.

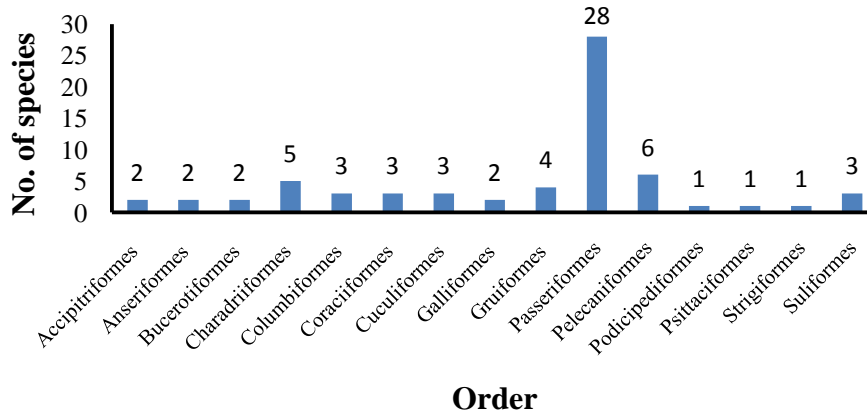


Fig.1 Graphic representation of species in different orders

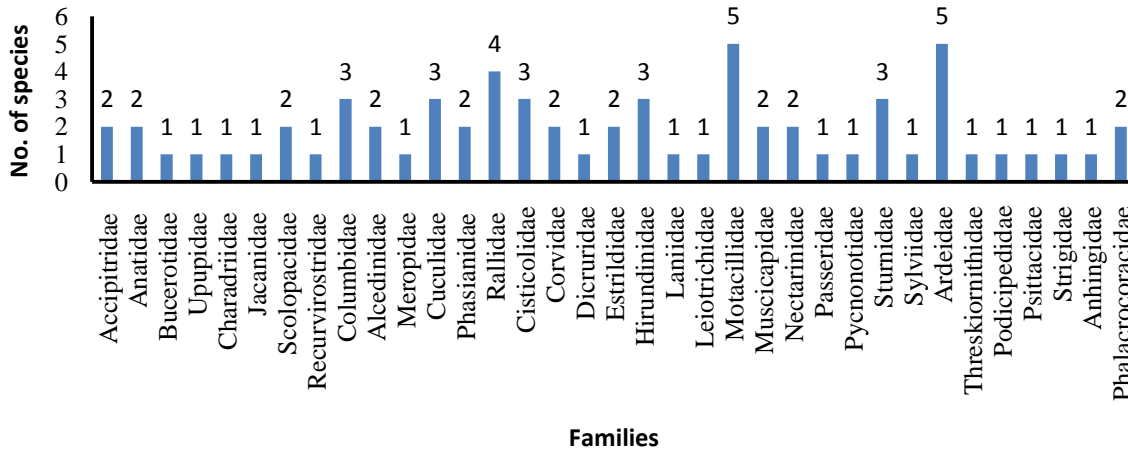


Fig.2 Graphic representation of species in different families

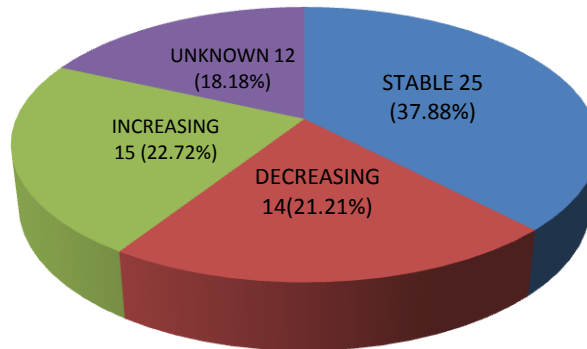


Fig.3 Graphic representation of % population trend of different species

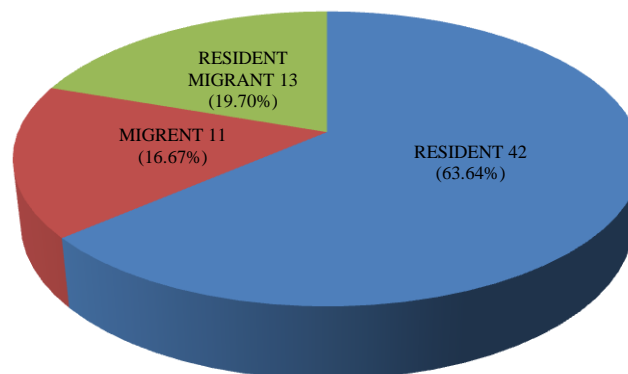


Fig.4 Graphic representation of % residential status of different species

The population trend of reported avifauna according to Red Data Book of IUCN was stable for 25, increasing for 15 species, decreasing for 14 and unknown for 12 bird species. Of the total 66 recorded birds species 42 are resident, 13 resident migratory and 11 migratory species.

Although Kali Bein support a large variety of avifaunal diversity, large number of factors were reported in and around different study sites which are accountable for habitat

deterioration. These factors includes less release of water from Mukerian hydal , cutting of trees, during rainy season pesticides water from agricultural field, presence of water exotic species (Hyacinth), fishing and polluted water from cities and villages discharged into it. All these factors have an effect on the avifaunal diversity of this rivulet. For everlasting management of this rivulet, proper action plan and regulation strategies are required.

Table No.1: IUCN status and population trends of different birds

S. NO.	SCIENTIFIC NAME	COMMAN NAME	ORDER	FAMILY	IUCN STATUS	RESI. STATUS	POP. TREND
1	<i>Accipiter badius</i>	Shikra	Accipitriformes	Accipitridae	LC	R	S
2	<i>Elanus caeruleus</i>	Black shoulder kite	Accipitriformes	Accipitridae	LC	R	S
3	<i>Anas crecca</i>	Common teal	Anseriformes	Anatidae	LC	M	UN
4	<i>Anas poecilorhyncha</i>	Spot billed duck	Anseriformes	Anatidae	LC	RM	D
5	<i>Ocyeros birostris</i>	Indian grey hornbill	Bucerotiformes	Bucerotidae	LC	R	S
6	<i>Upupa epops</i>	Common hoopoe	Bucerotiformes	Upupidae	LC	RM	D
7	<i>Vanellus indicus</i>	Red-wattled lapwin	Charadriiformes	Charadriidae	LC	R	S
8	<i>Hydrophasianus chirurgus</i>	Pheasant-tailed jacana	Charadriiformes	Jacanidae	LC	R	D
9	<i>Actitis hypoleucos</i>	Common sandpiper	Charadriiformes	Scolopacidae	LC	RM	D
10	<i>Tringa nebularia</i>	Common greenshank	Charadriiformes	Scolopacidae	LC	M	I
11	<i>Himantopus himantopus</i>	Black winged stilt	Charadriiformes	Recurvirostridae	LC	R	I
12	<i>Columba livia</i>	Black rock pigeon	Columbiformes	Columbidae	LC	R	D
13	<i>Streptopelia decaocto</i>	Eurasian coller dove	Columbiformes	Columbidae	LC	R	I
14	<i>Streptopelia senegalensis</i>	Little brown dove	Columbiformes	Columbidae	LC	M	S
15	<i>Ceryle rudis</i>	Lesser pied kingfisher	Coraciiformes	Alcedinidae	LC	R	UN
16	<i>Halcyon smyrnensis</i>	White-breasted kingfisher	Coraciiformes	Alcedinidae	LC	R	I
17	<i>Merops persicus</i>	Blue-cheeked bee-eater	Coraciiformes	Meropidae	LC	RM	S
18	<i>Centropus sinensis</i>	Greater coucal	Cuculiformes	Cuculidae	LC	R	S
19	<i>Clamator jacobinus</i>	Pied crested cuckoo	Cuculiformes	Cuculidae	LC	M	S
20	<i>Eudynamys scolopacea</i>	Asian koel	Cuculiformes	Cuculidae	LC	R	S
21	<i>Francolinus francolinus</i>	Black francolin	Galliformes	Phasianidae	LC	R	S
22	<i>Francolinus pondicerianus</i>	Grey francolin	Galliformes	Phasianidae	LC	R	D
23	<i>Amauornis phoenicurus</i>	White-breasted waterhen	Gruiformes	Rallidae	LC	R	UN
24	<i>Fulica atra</i>	Common coot	Gruiformes	Rallidae	LC	RM	I
25	<i>Gallinula chloropus</i>	Common morhen	Gruiformes	Rallidae	LC	RM	S
26	<i>Porphyrio porphyrio</i>	Purpal moorhen	Gruiformes	Rallidae	LC	R	UN
27	<i>Orthotomus sutorius</i>	Common tailorbird	Passeriformes	Cisticolidae	LC	R	S
28	<i>Prinia socialis</i>	Ashy prinia	Passeriformes	Cisticolidae	LC	R	S
29	<i>Prinia sylvatica</i>	Jungle prinia	Passeriformes	Cisticolidae	LC	R	D
30	<i>Corvus splendens</i>	House crow	Passeriformes	Corvidae	LC	R	S
31	<i>Dendrocitta vagabunda</i>	Indian treepie	Passeriformes	Corvidae	LC	R	S
32	<i>Dicrurus macrocercus</i>	Blackdrongo	Passeriformes	Dicruridae	LC	R	UN
33	<i>Lonchura malabarica</i>	White throated munia	Passeriformes	Estrildidae	LC	R	S
34	<i>Lonchura punctulata</i>	Spotted munia	Passeriformes	Estrildidae	LC	R	S
35	<i>Hirundo concolor</i>	Dusky crag martin	Passeriformes	Hirundinidae	LC	R	I

36	<i>Hirundo rustica</i>	Bran swallow	Passeriformes	Hirundinidae	LC	M	D
37	<i>Hirundo smithii</i>	Wire-tailed swallow	Passeriformes	Hirundinidae	LC	R	I
38	<i>Lanius schach</i>	Rufous-backed shrike	Passeriformes	Laniidae	LC	RM	UN
39	<i>Turdoides striata</i>	Jungle babbler	Passeriformes	Leiotrichidae	LC	R	S
40	<i>Dendronanthus indicus</i>	Forest wagtail	Passeriformes	Motacillidae	LC	M	S
41	<i>Motacilla alba</i>	White wagtail	Passeriformes	Motacillidae	LC	M	S
42	<i>Motacilla citreola</i>	Citrine wagtail	Passeriformes	Motacillidae	LC	M	I
43	<i>Motacilla flava</i>	Yellow wagtail	Passeriformes	Motacillidae	LC	RM	D
44	<i>Motacilla maderaspatensis</i>	Large pied wagtail	Passeriformes	Motacillidae	LC	R	S
45	<i>Copsychus saularis</i>	Oriental magpie-robin	Passeriformes	Muscicapidae	LC	R	S
46	<i>Saxicoloides fulicata</i>	Indian robin	Passeriformes	Muscicapidae	LC	R	UN
47	<i>Nectarinia asiatica</i>	Purpal sunbird	Passeriformes	Nectarinidae	LC	R	S
48	<i>Nectarinia zeylonica</i>	Purpul rumped sunbird	Passeriformes	Nectarinidae	LC	R	S
49	<i>Passer domesticus</i>	House sparrow	Passeriformes	Passeridae	LC	R	D
50	<i>Pycnonotus cafer</i>	Red-vented bulbul	Passeriformes	Pycnonotidae	LC	R	I
51	<i>Acridotheres tristis</i>	Indian myna	Passeriformes	Sturnidae	LC	R	I
52	<i>Sturnus contra</i>	Asian pied starling	Passeriformes	Sturnidae	LC	R	I
53	<i>Sturnus pagodarum</i>	Brahminy starling	Passeriformes	Sturnidae	LC	M	UN
54	<i>Sylvia hortensis</i>	Orphean warbler	Passeriformes	Sylviidae	LC	M	I
55	<i>Ardea cinerea</i>	Grey heron	Pelecaniformes	Ardeidae	LC	RM	UN
56	<i>Ardeola grayii</i>	Indian pond heron	Pelecaniformes	Ardeidae	LC	R	UN
57	<i>Bubulcus ibis</i>	Cattle egret	Pelecaniformes	Ardeidae	LC	RM	I
58	<i>Egretta garzetta</i>	Little egret	Pelecaniformes	Ardeidae	LC	R	I
59	<i>Nycticorax nycticorax</i>	Black-crowned night heron	Pelecaniformes	Ardeidae	LC	M	D
60	<i>Plegadis falcinellus</i>	Glossy ibis	Pelecaniformes	Threskiornithidae	LC	RM	D
61	<i>Tachybaptus ruficollis</i>	Little grebe	Podicipediformes	Podicipedidae	LC	R	D
62	<i>Psittacula krameri</i>	Rose-ringed parakeet	Psittaciformes	Psittacidae	LC	R	I
63	<i>Athene brama</i>	Spotted owlet	Strigiformes	Strigidae	LC	R	S
64	<i>Anhinga melanogaster</i>	Darter	Suliformes	Anhingidae	NT	RM	D
65	<i>Microcarbo niger</i>	Little cormoran	Suliformes	Phalacrocoracidae	LC	RM	UN
66	<i>Phalacrocorax fuscicollis</i>	Indian cormorant	Suliformes	Phalacrocoracidae	LC	R	UN

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