



E-ISSN: 2320-7078

P-ISSN: 2349-6800

JEZS 2018; 6(4): 904-912

© 2018 JEZS

Received: 11-05-2018

Accepted: 13-06-2018

A ShariefHigh Altitude Regional Centre,
Zoological Survey of India,
Sapruon, Solan, Himachal
Pradesh, India**S Paliwal**High Altitude Regional Centre,
Zoological Survey of India,
Sapruon, Solan, Himachal
Pradesh, India**AK Sidhu**High Altitude Regional Centre,
Zoological Survey of India,
Sapruon, Solan, Himachal
Pradesh, India**T Kubendran**High Altitude Regional Centre,
Zoological Survey of India,
Sapruon, Solan, Himachal
Pradesh, India**Correspondence****A Sharief**High Altitude Regional Centre,
Zoological Survey of India,
Sapruon, Solan, Himachal
Pradesh, India

Studies on bird diversity of pong dam wildlife sanctuary, Kangra, Himachal Pradesh, India

A Sharief, S Paliwal, AK Sidhu and T Kubendran

Abstract

Himachal Pradesh is known for its rich forests, rugged mountains, great climatic variability, altitudinal variation which supports an amazing faunal diversity especially the bird diversity. The present study deals with the avifaunal diversity of Pong Dam Wildlife Sanctuary which reveals the presence of 169 bird species belonging to 16 orders and 48 families. Family Anatidae dominates among all bird families, representing 17 species of birds with a total count of 36625 individuals. Mean avian density is found to be maximum in winter (1.235 individuals/km²) as compared to summer (0.032 individuals /km²). About 43.19% species of birds observed in the study area are migrants and rests are residents. Moreover the analysis of data also reveals that among all the bird species recorded, most of the birds are listed under the category of Least Concern of IUCN, except a few of them which are threatened. One species white rumped vulture (*Gyps bengalensis*) out of 169 species of birds recorded is listed under category critically endangered; Egyptian vulture (*Nephron percnopterus*) and black bellied tern (*Sterna acuticauda*) are under the category Endangered; Ferruginous duck (*Aythya nyroca*), Himalayan griffon (*Gyps himalayensis*), great thick knee (*Esacus recurvirostris*), river lapwing (*Vanellus duvaucelii*), river tern (*Sterna aurentia*) are the birds which are under the category near threatened; Woolly necked stork (*Ciconia nigra*) and greater spotted eagle (*Clanga clanga*) are listed under category Vulnerable according to IUCN status.

Keywords: Himalaya, avifauna, wildlife sanctuary, status

Introduction

The Himalaya is the most magnificent complex folded mountain chain among the global mountain systems as it occupies a special position not only from the standpoint of providing water to a large part of Indian subcontinent, but also harboring a variety of endemic and exotic flora and fauna. The present study is carried out to assess the bird fauna at Pong Dam Wildlife Sanctuary, Kangra district of Himachal Pradesh. Among vertebrates birds constitute a well-defined group of fauna. Birds occupy an important position in the animal kingdom, especially in relation to man. Due to industrialization and urbanization most of the water bodies are severely polluted, which directly or indirectly affect the aquatic fauna & flora of the aquatic ecosystem. Pong Dam Wildlife Sanctuary is supporting a diverse number of species of birds because of its diverse habitats. Pong Dam is a perennial reservoir situated at 32.017°N latitude and 76.083E° longitude at an elevation of about 450m mean above sea level. It comprises of a total geographical area of 207 sq. Km mainly falling in Nurpur and Dehra forest divisions. Pong Dam Wildlife Sanctuary is divided into two ranges Nagrota Surian & Dhameta and each range is further subdivided into four beats. These beats comes under three physiographic zones viz, foothills of Shiwalik, starting of Dhauladhar range of Himalaya and Northern edge of Indo-Gangetic Plains. Pong Dam proper comes under foothills of Shiwalik; Dhameta, Jawali, Nagrota Surian and Nandpur-Bhatoli lies in the area where Dhauladhar range of Himalaya starts; and Sansarpur Terrace, Dada-siba and Dehra are located at the northern edge of Indo-Gangetic Plains. Most of the species of birds show seasonal migrations which is one of the most spectacular events concerned with birdlife. Many animals perform migration but, birds are the well distinguished creatures to migrate very long distances. The purpose of migration is obvious and logical as migration helps birds to avoid adverse climatic conditions. Wetlands are vital feeding and nesting grounds for waders, feeding areas for fish-eating birds and wintering grounds for migratory birds (Whigham *et al.*, 1994; Kusler *et al.*, 1994) ^[1, 2]. This wetland is the first major wetland which potentially offers a resting reserve for the migratory birds coming from the Trans Himalayan zone in the winter season when the wetlands in the

Europe and North & central Asia become frozen due to onset of winters. Every year from October to March flocks of waterfowls (that breed in Trans Himalayan areas in summer) undertake migration to Pong WLS to spend winter in more affable climatic conditions. Bar headed geese, Common Pochard, Northern Pintail, Brahminy shelduck, Northern Shoveller, etc are some of the bird species which are the winter migrants to Pong Dam Wildlife Sanctuary. The birds of Himachal Pradesh have been well studied by Ali & Ripley (1983 a & b) [3, 4]. Whistler (1926 a & b) studied the birds of Kangra and Kullu districts respectively [5, 6]. Ali (1949) has listed about 225 birds from Western Himalaya [7]. Singh (2011) recorded a total of 103 species from the upper catchment of Ravi river, district Chamba [8]. Pandey 1993; Kumar & Paliwal 2015 studied the birds of Pong dam and adjacent localities and recorded over 415 bird species of 65 families from this area [9, 10]. Besten (2004) enlisted about 555 species from Kangra district [11]. 183 species of avifauna have been reported from Great Himalayan National Park (Gaston *et al.* 1993) [12]. Zoological Survey of India reported the occurrence of 72 species from Pin Valley National Park (Editor-Director 2008) [13]. Population estimation of any species is important in order to know whether a species is declining or increasing so that proper management and conservation can be done to protect the Wildlife. So keeping this in view present study has been carried out to assess the avifauna of Pong Dam Wildlife Sanctuary.

Methodology

An area of about 207 Km² has been explored during the present survey in the months of January in winter & April, 2018 in summers. During winter survey used to start by 9:00 am in the morning due to weather conditions and early morning at 6:00 am in summers. An average 6 to 7 hrs were spent in the field daily to observe the bird species. Birds were observed with an aid of prismatic (10*50 DPS) Olympus field binoculars. Field identifications were carried out with the help of various field guides (Ali and Ripley, 1983; Grimmett *et al.*, 2003; Kazmierczak, 2000) [3, 14, 15]. Boat survey was also carried out to cover the deep water areas. The data recorded in each survey is analyzed for population estimation and status of bird species.

Results and Discussion

During present study on avifauna of Pong Dam wildlife sanctuary district of Himachal Pradesh, 169 species of birds belonging to 48 families and 16 orders have been recorded. Family Anatidae, the well-known family which is famous for its migratory nature & found in large congregations, has been observed to be represented by highest number of species of birds (17 species) in this area, followed by family Motacillidae (11 species). Families Laridae & Muscicapidae has been represented by 10 species each; families Scolopacidae (9 species), Accipitridae & Alaudidae (8 species each), Charadriidae (7 species), Ardeidae & Columbidae (6 species each), Phylloscopidae & Leiothrichidae (5 species each), Rallidae, Corvidae, Cisticolidae & Sturnidae (4 species each) respectively. However families Phasinidae, Megalaimidae, Psittacidae, Dicruridae, Hirundinidae and Passeridae have found to be represented by 3 species each,

and the rest of the families are represented by either 2 species or 1 species each (as given in Table 1). In total, the highest number of individuals of birds has been observed in winter (43203 number of individuals). Out of which bar headed goose (27395 number of individuals) was found to be maximum in numbers followed by common pochards (4083 number of individuals), common coots (3350 number of individuals), northern pintail (1625 number of individuals), common teal (1381) and little cormorant (865 number of individuals) respectively. Dominant family Anatidae represented by 17 species of birds, was with a total count of 36625 individuals. In summer the numbers of individuals of birds were observed less (1105 individuals). Birds sighted during the surveys have been categorized based on their migratory nature as follows: R =Resident, R/PM=Resident with Partial movements, R/SM=Resident with summer influx, SM=Summer Migrant, WM=Winter Migrant, WM/PM=Winter Migrant with Partial Movements, as well as their conservation status following IUCN Red Data list of species (2018 version) [16]. Out of 169 species recorded in the areas surveyed 73 species were migrants to Pong Dam Lake Wildlife Sanctuary and 96 species of birds were resident to this area. Analysis of data on residential status shows that of the 169 bird species 73 species of birds (43.19%) were migrants, & 96 species (56.80%) were found to be residents to Pong Dam Wildlife Sanctuary. Out of the migratory bird species recorded, 30.13% winter migrants/partial migrants, 21.91% were winter migrants, 17.80% summer migrants, 6.84% summer migrant/partial migrant, 5.47% summer migrant/residents, partial migrants & residents/summer migrants, 4.10% summer migrants/winter migrants & 2.7% partial migrants/summer migrants. Moreover the analyses of data also reveal that among all the birds species recorded, most of the birds have been found to be listed under the category of Least concern, few of them threatened. One species white rumped vulture (*Gyps bengalensis*) out of 169 species of birds recorded has been under the category critically endangered. Egyptian vulture (*Nephron percnopterus*) and black bellied tern (*Sterna acuticauda*) under category endangered, Ferruginous duck (*Aythya nyroca*), Himalayan griffon (*Gyps himalayensis*), great thick knee (*Esacus recurvirostris*), river lapwing (*Vanellus duvaucelii*), river tern (*sterna aurentia*) were some of the birds which are observed to be under category near threatened. Woolly necked stork (*Ciconia nigra*) and greater spotted eagle (*Clanga clanga*) have been listed under category Vulnerable according to IUCN status (as given in Table 2). Present studies shows similar results with the earlier works of Gaston *et al.* (1993), Mahabal and Sharma (1992) Mahabal (2000), Thakur *et al.* (2002, 2003, 2006, 2010), Mattu & Thakur (2006), Singh (2011), Donar *et al.* (2012), Singh & Banyal (2013) and Kumar (2015) who also reported the presence of different categories of birds like resident, summer visitors, winter visitors etc from different biogeographical regions [12, 17-23, 8, 24-26]. On the basis of these studies it is concluded that the Lower Himalaya are relatively rich in Avifauna as compared to Middle Himalaya. During winter the maximum birds have been observed due to easy accessibility of food and shelter for migratory birds. Bar Headed Geese were seen in the largest congregations in this wetland.

Table 1: List of Birds observed in Pong Dam Wildlife Sanctuary

S. No	Common Name	Scientific Name	No. of individuals observed	
			Winter	Summer
1	Greater white fronted goose	<i>Anser albifrons</i>	120	0
2	Greyleg goose	<i>Anser anser</i>	451	0
3	Bar headed goose	<i>Anser indicus</i>	27395	30
4	Ruddy shelduck	<i>Tadorna ferruginea</i>	124	6
5	Common shelduck	<i>Tadorna tadorna</i>	38	0
6	Gadwall	<i>Anas strepera</i>	332	6
7	Eurasian wigeon	<i>Anas penelope</i>	215	0
8	Mallard	<i>Anas platyrhynchos</i>	37	0
9	Indian spot billed duck	<i>Anas poecilorhyncha</i>	6	4
10	Northern shoveller	<i>Anas clypeata</i>	390	2
11	Northern pintail	<i>Anas acuta</i>	1625	4
12	Garganey	<i>Anas querquedula</i>	82	8
13	Common teal	<i>Anas crecca</i>	1381	12
14	Red crested pochard	<i>Netta rufina</i>	172	0
15	Common pochard	<i>Aythya ferina</i>	4083	0
16	Ferruginous duck	<i>Aythya nyroca</i>	66	0
17	Tufted duck	<i>Aythya fuligula</i>	108	0
18	Grey Francolin	<i>Francolinus pondicerianus</i>	0	3
19	Red jungle fowl	<i>Gallus gallus</i>	0	2
20	Indian Peafowl	<i>Pavo cristatus</i>	0	2
21	Little grebe	<i>Tachybaptus ruficollis</i>	78	10
22	Great crested grebe	<i>Podiceps cristatus</i>	60	12
23	Woolly necked stork	<i>Ciconia nigra</i>	2	0
24	Little cormorant	<i>Phalacrocorax niger</i>	865	7
25	Great cormorant	<i>Phalacrocorax carbo</i>	349	0
26	Grey heron	<i>Ardea cinerea</i>	13	0
27	Purple heron	<i>Ardea purpurea</i>	1	0
28	Great egret	<i>Ardea alba</i>	6	0
29	Intermediate egret	<i>Mesophoyx intermedia</i>	3	2
30	Little egret	<i>Egretta garzetta</i>	19	23
31	Indian pond heron	<i>Ardeola grayii</i>	7	0
32	Osprey	<i>Pandion haliaetus</i>	3	3
33	Egyptian vulture	<i>Nephron percnopterus</i>	6	12
34	White rumped vulture	<i>Gyps bengalensis</i>	15	6
35	Himalayan griffon	<i>Gyps himalayensis</i>	4	1
36	Greater spotted eagle	<i>Clanga clanga</i>	2	0
37	Booted eagle	<i>Hieraaetus pennatus</i>	1	0
38	Eurasian marsh harrier	<i>Circus aeruginosus</i>	2	0
39	Shikra	<i>Accipiter badius</i>	4	3
40	Pariah kite	<i>Milvus migrans</i>	15	8
41	White breasted water hen	<i>Amaurornis phoenicurus</i>	10	3
42	Purple swamphen	<i>Porphyrio porphyrio</i>	5	1
43	Common moorhen	<i>Gallinule chloropus</i>	1	4
44	Common coots	<i>Fulica atra</i>	3350	56
45	Great thick knee	<i>Esacus recurvirostris</i>	3	0
46	Black winged stilt	<i>Himantopus himantopus</i>	26	15
47	Pied avocet	<i>Recurvirostra avosetta</i>	16	0
48	Northern lapwing	<i>Vanellus vanellus</i>	4	0
49	River lapwing	<i>Vanellus duvaucelii</i>	31	0
50	Red wattled lapwing	<i>Vanellus indicus</i>	0	31
51	Yellow wattled lapwing	<i>Vanellus malabaricus</i>	0	4
52	White tailed lapwing	<i>Vanellus leucurus</i>	1	0
53	Kentish plover	<i>Charadrius alexandrinus</i>	14	0
54	Little ringed plover	<i>Charadrius dubius</i>	137	12
55	Common sandpiper	<i>Actitis hypoleucos</i>	14	2
56	Green sandpiper	<i>Tringa ochrophus</i>	4	0
57	Common greenshank	<i>Tringa nebularia</i>	9	0
58	Marsh sandpiper	<i>Tringa stagnatilis</i>	10	0
59	Wood sandpiper	<i>Tringa glareola</i>	4	0
60	Common redshank	<i>Tringa tetanus</i>	4	0
61	Curlew sandpiper	<i>Calidris ferruginea</i>	1	0
62	Little stint	<i>Calidris minuta</i>	46	55
63	Temminck's stint	<i>Calidris temminckii</i>	72	0
64	Oriental pranticole	<i>Glareola lacteal</i>	0	2
65	Slender billed gull	<i>Chroicocephalus genei</i>	2	0

66	Black headed gull	<i>Chroicocephalus ridibundus</i>	50	6
67	Brown headed gull	<i>Chroicocephalus brunnicephalus</i>	43	2
68	Pallas's gull	<i>Ichthyaetus ichthyaetus</i>	54	0
69	Caspian gull	<i>Larus cachinnanus</i>	25	0
70	Yellow legged gull	<i>Larus michahellis</i>	1	0
71	Little tern	<i>Sternula albifrons</i>	10	0
72	Whiskered tern	<i>Chlidonias hybrid</i>	13	0
73	River tern	<i>Sterna aurantia</i>	108	7
74	Black bellied tern	<i>Sterna acuticauda</i>	1	3
75	Rock pigeon	<i>Columba livia</i>	43	16
76	Oriental turtle dove	<i>Streptopelia orientalis</i>	0	5
77	Eurasian collared dove	<i>Streptopelia decaocta</i>	0	5
78	Spotted dove	<i>Streptopelia tranquebarica</i>	0	5
79	Laughing dove	<i>Streptopelia senegalensis</i>	0	1
80	Common Hawk –cuckoo	<i>Hierococcyx varius</i>	0	1
81	Asian koel	<i>Eudynamys scolopaceus</i>	1	14
82	Greater coucal	<i>Centropus sinensis</i>	1	1
83	White throated kingfisher	<i>Halcyon smyrnensis</i>	1	2
84	Pied kingfisher	<i>Ceryle rudis</i>	8	2
85	Green bee-eater	<i>Merops orientalis</i>	0	2
86	Indian roller	<i>Coracias benghalensis</i>	0	1
87	Eurasian hoopoe	<i>Upupa epops</i>	2	3
88	Indian grey Hornbill	<i>Ocyeros birostris</i>	0	14
89	Great barbet	<i>Megalia virens</i>	0	1
90	Brown headed barbet	<i>Megalaima zeylanica</i>	4	4
91	Copper smith Barbet	<i>Megalia haemacephala</i>	0	2
92	Fulvous-breasted woodpecker	<i>Dendrocopus macei</i>	0	1
93	Peregrine falcon	<i>Falco peregrinus</i>	3	2
94	Rose ringed parakeet	<i>Psittacula krameri</i>	27	26
95	Plum headed parakeet	<i>Psittacula cyanocephala</i>	11	7
96	Slaty headed parakeet	<i>Psittacula himalayana</i>	4	11
97	Long tailed shrike	<i>Pericrocotus erythropygus</i>	2	3
98	Rosy minivet	<i>Lanius tephronotus</i>	0	1
99	Black Drongo	<i>Dicrurus macrocercus</i>	0	8
100	Ashy Drongo	<i>Dicrurus leucophaeus</i>	0	2
101	Sprangled Drongo	<i>Dicrurus aeneus</i>	0	1
102	Asian Paradise flycatcher	<i>Terpsiphone paradisi</i>	0	1
103	Red billed blue magpie	<i>Urocissa erthrorhyncha</i>	0	1
104	Rufous tree pie	<i>Dendrocitta vagabunda</i>	7	12
105	House crow	<i>Corvus splendens</i>	76	3
106	Large billed crow	<i>Corvus macrorhynchos</i>	0	12
107	Indian bushlark	<i>Mirafra erythroptera</i>	10	12
108	Singing bushlark	<i>Mirfra cantillans</i>	6	20
109	Bimaculated lark	<i>Melanocorypha bimaculata</i>	5	4
110	Humes short toed lark	<i>Calandrella acutirostris</i>	9	3
111	Sand lark	<i>Calandrella raytal</i>	56	16
112	Crested lark	<i>Galerida cristata</i>	17	12
113	Eurasian skylark	<i>Aluda arvensis</i>	12	0
114	Oriental skylark	<i>Alauda gulgula</i>	10	4
115	Barn swallow	<i>Hirundo rustica</i>	145	25
116	Wire tailed swallow	<i>Hirundo smithii</i>	0	6
117	Streak throated swallow	<i>Petrochelidon fluvicola</i>	10	4
118	Great tit	<i>Parus major</i>	4	16
119	Red vented bulbul	<i>Pycnonotus cafer</i>	2	13
120	Himalayan bulbul	<i>Pycnotus leucogenys</i>	22	36
121	Pale rumped warbler	<i>Phylloscopus griseolus</i>	6	0
122	Sulphur bellied warbler	<i>Phylloscopus chloronotus</i>	0	1
123	Greenish warbler	<i>Seicercus poliogenys</i>	0	3
124	Whistlers warbler	<i>Seicercus whistleri</i>	0	1
125	Grey cheeked warbler	<i>Phylloscopus trochiloides</i>	1	0
126	Common tailor bird	<i>Orthotomus sutorius</i>	0	6
127	Jungle prinia	<i>Prinia sylvatica</i>	3	1
128	Ashy prinia	<i>Prinia socialis</i>	0	1
129	Grey breasted prinia	<i>Prinia hodgsonii</i>	2	2
130	Yellow eyed babbler	<i>Chrysomma sinense</i>	17	0
131	Oriental white eye	<i>Zosterops palpebrosus</i>	12	12
132	Common babbler	<i>Turdoides caudate</i>	26	7
133	Striated babbler	<i>Turdoides earlei</i>	8	4

134	Jungle babbler	<i>Turdoides striata</i>	41	8
135	Large grey babbler	<i>Turdois malcolmi</i>	0	5
136	Streaked laughing thrush	<i>Trochaloheron lineatum</i>	1	0
137	Indian robin	<i>Copsychus fulvatus</i>	2	18
138	Oriental magpie robin	<i>Copsychus saularis</i>	1	6
139	Blue whistling thrush	<i>Myophonus caeruleus</i>	1	12
140	Plumbeous redstart	<i>Phoenicurus frontalis</i>	1	0
141	White capped redstart	<i>Phoenicurus leucocephalus</i>	2	1
142	Black redstart	<i>Phoenicurus ochruros</i>	0	6
143	Grey bushchat	<i>Saxicola ferrus</i>	6	4
144	Pied bushchat	<i>Saxicola caprata</i>	0	20
145	Indian chat	<i>Ceromela fusca</i>	0	3
146	Pied wheater	<i>Oenanthe pie chanka</i>	0	1
147	Jungle myna	<i>Acridotheres fuscus</i>	0	0
148	Bank myna	<i>Acridotheres ginginianus</i>	10	0
149	Common myna	<i>Acridotheris tristis</i>	117	13
150	Brahminy starling	<i>Temenuchus pagodarum</i>	7	14
151	Pale billed flowerpecker	<i>Dicaeumerythro rhynchos</i>	0	1
152	Purple sunbird	<i>Cinnyris asiaticus</i>	0	35
153	Western yellow wagtail	<i>Motacilla flava</i>	4	5
154	Citrine wagtail	<i>Motacilla citreola</i>	39	20
155	Grey wagtail	<i>Motacilla cinerea</i>	42	0
156	White wagtail	<i>Motacilla alba</i>	135	57
157	White browed wagtail	<i>Motacilla madaraspatensis</i>	23	18
158	Paddyfield pipit	<i>Anthus rufulus</i>	13	40
159	Tawny pipit	<i>Anthus campestris</i>	4	0
160	Upland pipit	<i>Anthus sylvanus</i>	1	0
161	Tree pipit	<i>Anthus trivialis</i>	0	3
162	Water pipit	<i>Anthus spinoletta</i>	26	14
163	Olive backed pipit	<i>Anthus hodgsoni</i>	0	2
164	Crested bunting	<i>Melophus lathami</i>	0	1
165	Rock bunting	<i>Emberiza cia</i>	0	4
166	Fire fronted siren	<i>Serinus pusillus</i>	1	0
167	House sparrow	<i>Passer rutilans</i>	4	40
168	Russet sparrow	<i>Petronia xanthochollis</i>	0	6
169	Chestnut shouldered petronia	<i>Passer domesticus</i>	0	1

Table 2: Status of Bird species observed in Pong dam wildlife Sanctuary

S. No.	Order	Family	Common Name	Scientific Name	Migrato-ry status	IUCN Status
1	Anseriformes	Anatidae	Greater white fronted goose	<i>Anser albifrons</i>	WM	LC
2	Anseriformes	Anatidae	Greyleg goose	<i>Anser anser</i>	WM/PM	LC
3	Anseriformes	Anatidae	Bar headed goose	<i>Anser indicus</i>	WM	LC
4	Anseriformes	Anatidae	Ruddy shelduck	<i>Tadorna ferruginea</i>	WM/PM	LC
5	Anseriformes	Anatidae	Common shelduck	<i>Tadorna tadorna</i>	WM	LC
6	Anseriformes	Anatidae	Gadwall	<i>Anas strepera</i>	WM/PM	LC
7	Anseriformes	Anatidae	Eurasian wigeon	<i>Anas Penelope</i>	WM	LC
8	Anseriformes	Anatidae	Mallard	<i>Anas platyrhynchos</i>	WM/PM	LC
9	Anseriformes	Anatidae	Indian spot billed duck	<i>Anas poecilorhyncha</i>	SM/R	LC
10	Anseriformes	Anatidae	Northern shoveller	<i>Anas clypeata</i>	WM/PM	LC
11	Anseriformes	Anatidae	Northern pintail	<i>Anas acuta</i>	WM/PM	LC
12	Anseriformes	Anatidae	Garganey	<i>Anas querquedula</i>	WM/PM	LC
13	Anseriformes	Anatidae	Common teal	<i>Anas crecca</i>	WM/PM	LC
14	Anseriformes	Anatidae	Red crested pochard	<i>Netta rufina</i>	WM/PM	LC
15	Anseriformes	Anatidae	Common pochard	<i>Aythya ferina</i>	WM/PM	LC
16	Anseriformes	Anatidae	Ferruginous duck	<i>Aythya nyroca</i>	WM/PM	NT
17	Anseriformes	Anatidae	Tufted duck	<i>Aythya fuligula</i>	WM	LC
18	Galliformes	Phasianidae	Grey francolin	<i>Francolinus pondicerianus</i>	R	LC
19	Galliformes	Phasianidae	Red jungle fowl	<i>Gallus gallus</i>	R	LC
20	Galliformes	Phasianidae	Indian peafowl	<i>Pavo cristatus</i>	R	LC
21	Podicipediformes	Podicipedidae	Little grebe	<i>Tachybaptus ruficollis</i>	R/SM	LC
22	Podicipediformes	Podicipedidae	Great crested grebe	<i>Podiceps cristatus</i>	WM	LC
23	Ciconiiformes	Ciconiidae	Woolly necked stork	<i>Ciconia nigra</i>	R	VU
24	Suliformes	Phalacrocoracidae	Little cormorant	<i>Phalacrocorax niger</i>	R	LC
25	Suliformes	Phalacrocoracidae	Great cormorant	<i>Phalacrocorax carbo</i>	R	LC
26	Pelecaniformes	Ardeidae	Grey heron	<i>Ardea cinerea</i>	R	LC
27	Pelecaniformes	Ardeidae	Purple heron	<i>Ardea purpurea</i>	R	LC
28	Pelecaniformes	Ardeidae	Great egret	<i>Ardea alba</i>	R	LC

29	Pelecaniformes	Ardeidae	Intermediate egret	<i>Mesophoyx intermedia</i>	R	LC
30	Pelecaniformes	Ardeidae	Little egret	<i>Egretta garzetta</i>	R	LC
31	Pelecaniformes	Ardeidae	Indian pond heron	<i>Ardeola grayii</i>	R	LC
32	Accipitriformes	Pandionidae	Osprey	<i>Pandion haliaetus</i>	WM/PM	LC
33	Accipitriformes	Accipitridae	Egyptian vulture	<i>Nephron percnopterus</i>	R	EN
34	Accipitriformes	Accipitridae	White rumped vulture	<i>Gyps bengalensis</i>	R	CR
35	Accipitriformes	Pandionidae	Himalayan griffon	<i>Gyps himalayensis</i>	R	NT
36	Accipitriformes	Accipitridae	Greater spotted eagle	<i>Clanga clanga</i>	WM	VU
37	Accipitriformes	Accipitridae	Booted eagle	<i>Hieraaetus pennatus</i>	R	LC
38	Accipitriformes	Accipitridae	Eurasian marsh harrier	<i>Circus aeruginosus</i>	WM/PM	LC
39	Accipitriformes	Accipitridae	Shikra	<i>Accipiter badius</i>	R	LC
40	Accipitriformes	Accipitridae	Pariah kite	<i>Milvus migrans</i>	R	LC
41	Gruiformes	Rallidae	White breasted water hen	<i>Amaurornis phoenicurus</i>	R	LC
42	Gruiformes	Rallidae	Purple swamphen	<i>Porphyrio porphyrio</i>	R	LC
43	Gruiformes	Rallidae	Common moorhen	<i>Gallinule chloropus</i>	R	LC
44	Gruiformes	Rallidae	Common coots	<i>Fulica atra</i>	R	LC
45	Charadriiformes	Burhinidae	Great thick knee	<i>Esacus recurvirostris</i>	R	NT
46	Charadriiformes	Recurvirostridae	Black winged stilt	<i>Himantopus himantopus</i>	R	LC
47	Charadriiformes	Recurvirostridae	Pied avocet	<i>Recurvirostra avosetta</i>	WM	LC
48	Charadriiformes	Charadriidae	Northern lapwing	<i>Vanellus vanellus</i>	WM	LC
49	Charadriiformes	Charadriidae	River lapwing	<i>Vanellus duvaucelii</i>	R	NT
50	Charadriiformes	Charadriidae	Red wattled lapwing	<i>Vanellus indicus</i>	R	LC
51	Charadriiformes	Charadriidae	Yellow wattled lapwing	<i>Vanellus malabaricus</i>	R	LC
52	Charadriiformes	Charadriidae	White tailed lapwing	<i>Vanellus leucurus</i>	WM	LC
53	Charadriiformes	Charadriidae	Kentish plover	<i>Charadrius alexandrinus</i>	WM/PM	LC
54	Charadriiformes	Charadriidae	Little ringed plover	<i>Charadrius dubius</i>	R	LC
55	Charadriiformes	Scolopacidae	Common sandpiper	<i>Actitis hypoleucos</i>	SM	LC
56	Charadriiformes	Scolopacidae	Green sandpiper	<i>Tringa ochrophus</i>	R	LC
57	Charadriiformes	Scolopacidae	Common greenshank	<i>Tringa nebularia</i>	WM/PM	LC
58	Charadriiformes	Scolopacidae	Marsh sandpiper	<i>Tringa stagnatilis</i>	WM/PM	LC
59	Charadriiformes	Scolopacidae	Wood sandpiper	<i>Tringa glareola</i>	PM/SM	LC
60	Charadriiformes	Scolopacidae	Common redshank	<i>Tringa tetanus</i>	WM/SM	LC
61	Charadriiformes	Scolopacidae	Curlew sandpiper	<i>Calidris ferruginea</i>	PM	LC
62	Charadriiformes	Scolopacidae	Little stint	<i>Calidris minuta</i>	WM/PM	LC
63	Charadriiformes	Scolopacidae	Temminck's stint	<i>Calidris tamminkii</i>	WM/PM	LC
64	Charadriiformes	Glareolidae	Oriental pranticole	<i>Glareola lacteal</i>	SM/PM	LC
65	Charadriiformes	Laridae	Slender billed gull	<i>Chroicocephalus genei</i>	WM	LC
66	Charadriiformes	Laridae	Black headed gull	<i>Chroicocephalus ridibundus</i>	WM/PM	LC
67	Charadriiformes	Laridae	Brown headed gull	<i>Chroicocephalus brunnicephalus</i>	WM	LC
68	Charadriiformes	Laridae	Pallas's gull	<i>Ichthyaetus ichthyaetus</i>	WM/PM	LC
69	Charadriiformes	Laridae	Caspian gull	<i>Larus cachinnans</i>	WM	LC
70	Charadriiformes	Laridae	Yellow legged gull	<i>Larus michahellis</i>	WM	LC
71	Charadriiformes	Laridae	Little tern	<i>Sternula albifrons</i>	PM	LC
72	Charadriiformes	Laridae	Whiskered tern	<i>Chlidonias hybrid</i>	PM	LC
73	Charadriiformes	Laridae	River tern	<i>Sterna aurantia</i>	R	NT
74	Charadriiformes	Laridae	Black bellied tern	<i>Sterna acuticauda</i>	R	EN
75	Columbiformes	Columbidae	Rock pigeon	<i>Columba livia</i>	R	LC
76	Columbiformes	Columbidae	Oriental turtle dove	<i>Streptopelia orientalis</i>	R/SM	LC
77	Columbiformes	Columbidae	Eurasian collared dove	<i>Streptopelia decaocta</i>	R/SM	LC
78	Columbiformes	Columbidae	Spotted dove	<i>Streptopelia tranquebarica</i>	SM	LC
79	Columbiformes	Columbidae	Laughing dove	<i>Streptopelia senegalensis</i>	R	LC
80	Columbiformes	Columbidae	Common Hawk -cuckoo	<i>Hierococcyx varius</i>	R	LC
81	Cuculiformes	Cuculidae	Asian koel	<i>Eudynamis scolopaceus</i>	SM	LC
82	Cuculiformes	Cuculidae	Greater coucal	<i>Centropus sinensis</i>	R	LC
83	Coraciiformes	Alcedinidae	White throated kingfisher	<i>Halcyon smyrnensis</i>	R	LC
84	Coraciiformes	Alcedinidae	Pied kingfisher	<i>Ceryle rudis</i>	R/SM	LC
85	Coraciiformes	Coraciidae	Indian roller	<i>Coracias benghalensis</i>	R	LC
86	Coraciiformes	Upupidae	Eurasian hoopoe	<i>Upupa epops</i>	R	LC
87	Coraciiformes	Bucerotidae	Indian grey hornbill	<i>Ocyeros birostris</i>	R	LC
88	Coraciiformes	Meropidae	Green bee-eater	<i>Merops orientalis</i>	R	LC
89	Piciformes	Megalaimidae	Great barbet	<i>Megaliama virens</i>	R	LC
90	Piciformes	Megalaimidae	Brown headed barbet	<i>Megalaima zeylanica</i>	R	LC
91	Piciformes	Megalaimidae	Copper smith barbet	<i>Megaliama haemacephala</i>	R	LC
92	Piciformes	Picidae	Fulvous breasted woodpecker	<i>Dendrocopus macei</i>	R	LC
93	Falconiformes	Falconidae	Peregrine falcon	<i>Falco peregrines</i>	R	LC
94	Psittaciformes	Psittacidae	Rose ringed parakeet	<i>Psittacula krameri</i>	R	LC
95	Psittaciformes	Psittacidae	Plum headed parakeet	<i>Psittacula cyanocephala</i>	R	LC
96	Psittaciformes	Psittacidae	Slaty headed parakeet	<i>Psittacula himalayana</i>	R	LC

97	Passeriformes	Campephagidae	Rosy minivet	<i>Pericrocotus erythropygius</i>	SM	LC
98	Passeriformes	Laniidae	Long tailed shrike	<i>Lanius tephronotus</i>	R	LC
99	Passeriformes	Dicruridae	Black drongo	<i>Dicrurus macrocercus</i>	R	LC
100	Passeriformes	Dicruridae	Ashy drongo	<i>Dicrurus leucophaeus</i>	SM	LC
101	Passeriformes	Dicruridae	Sprangled drongo	<i>Dicrurus aeneus</i>	R	LC
102	Passeriformes	Monarchidae	Asian paradise-Flycatcher	<i>Terpsiphone paradise</i>	SM	LC
103	Passeriformes	Corvidae	Red billed blue magpie	<i>Urocissa erthrorhyncha</i>	R	LC
104	Passeriformes	Corvidae	Rufous tree pie	<i>Dendrocitta vagabunda</i>	R	LC
105	Passeriformes	Corvidae	House crow	<i>Corvus splendens</i>	R	LC
106	Passeriformes	Corvidae	Large billed crow	<i>Corvus macrorhynchos</i>	R	LC
107	Passeriformes	Alaudidae	Indian bushlark	<i>Mirafra erythroptera</i>	R	LC
108	Passeriformes	Alaudidae	Singing bushlark	<i>Mirfra cantillans</i>	R	LC
109	Passeriformes	Alaudidae	Bimaculated lark	<i>Melanocorypha bimaculata</i>	PM	LC
110	Passeriformes	Alaudidae	Humes short toed lark	<i>Calandrella acutirostris</i>	WM	LC
111	Passeriformes	Alaudidae	Sand lark	<i>Calandrella raytal</i>	R	LC
112	Passeriformes	Alaudidae	Crested lark	<i>Galerida cristata</i>	R	LC
113	Passeriformes	Alaudidae	Eurasian skylark	<i>Alauda arvensis</i>	R	LC
114	Passeriformes	Alaudidae	Oriental skylark	<i>Alauda gulgula</i>	R	LC
115	Passeriformes	Hirundinidae	Barn swallow	<i>Hirunda rustica</i>	SM/WM	LC
116	Passeriformes	Hirundinidae	Wire tailed swallow	<i>Hirundo smithii</i>	SM/PM	LC
117	Passeriformes	Hirundinidae	Streak throated swallow	<i>Petrochelidon fluvicola</i>	R	LC
118	Passeriformes	Paridae	Great tit	<i>Parus major</i>	R	LC
119	Passeriformes	Pycnonotidae	Red vented bulbul	<i>Pycnonotus cafer</i>	R	LC
120	Passeriformes	Pycnonotidae	Himalayan bulbul	<i>Pycnotus leucogenys</i>	R	LC
121	Passeriformes	Phylloscopidae	Sulphur bellied warbler	<i>Phylloscopus griseolus</i>	SM	LC
122	Passeriformes	Phylloscopidae	Lemon rumped warbler	<i>Phylloscopus chloronotus</i>	SM/WM	LC
123	Passeriformes	Phylloscopidae	Grey cheeked warbler	<i>Seicercus poliogenys</i>	R	LC
124	Passeriformes	Phylloscopidae	Greenish warbler	<i>Phylloscopus trochiloides</i>	SM	LC
125	Passeriformes	Phylloscopidae	Whistlers warbler	<i>Seicercus whistleri</i>	SM/WM	LC
126	Passeriformes	Cisticolidae	Common tailor bird	<i>Orthotomus sutorius</i>	R	LC
127	Passeriformes	Cisticolidae	Jungle prinia	<i>Prinia sylvatica</i>	R	LC
128	Passeriformes	Cisticolidae	Ashy prinia	<i>Prinia socialis</i>	R	LC
129	Passeriformes	Cisticolidae	Grey breasted prinia	<i>Prinia hodgsonii</i>	R	LC
130	Passeriformes	Paradoxornithidae	Yellow eyed babbler	<i>Chrysomma sinense</i>	R	LC
131	Passeriformes	Zosteropidae	Oriental white eye	<i>Zosterops palpebrosus</i>	R	LC
132	Passeriformes	Leiothrichidae	Common babbler	<i>Turdoides caudate</i>	R	LC
133	Passeriformes	Leiothrichidae	Striated babbler	<i>Turdoides earlei</i>	R	LC
134	Passeriformes	Leiothrichidae	Jungle babbler	<i>Turdoides striata</i>	R	LC
135	Passeriformes	Leiothrichidae	Large grey babbler	<i>Turdois malcolmi</i>	R	LC
136	Passeriformes	Leiothrichidae	Streaked laughing thrush	<i>Trochalopteron lineatum</i>	R	LC
137	Passeriformes	Muscicapidae	Indian robin	<i>Copsychus fulicatus</i>	R	LC
138	Passeriformes	Muscicapidae	Oriental magpie robin	<i>Copsychus saularis</i>	R	LC
139	Passeriformes	Muscicapidae	Blue whistling thrush	<i>Myophonus caeruleus</i>	R	LC
140	Passeriformes	Muscicapidae	Plumbeous redstart	<i>Phoenicurus frontalis</i>	R	LC
141	Passeriformes	Muscicapidae	White capped redstart	<i>Phoenicurus leucocephalus</i>	R	LC
142	Passeriformes	Muscicapidae	Black redstart	<i>Phoenicurus ochruros</i>	SM/PM	LC
143	Passeriformes	Muscicapidae	Grey bushchat	<i>Saxicola ferrus</i>	R	LC
144	Passeriformes	Muscicapidae	Pied bushchat	<i>Saxicola caprata</i>	SM/R	LC
145	Passeriformes	Muscicapidae	Indian chat	<i>Ceromela fusca</i>	R	LC
146	Passeriformes	Muscicapidae	Pied wheater	<i>Oenantheptes chanka</i>	SM	LC
147	Passeriformes	Sturnidae	Jungle myna	<i>Acridotheres fuscus</i>	R	LC
148	Passeriformes	Sturnidae	Bank myna	<i>Acridotheres ginginianus</i>	R	LC
149	Passeriformes	Sturnidae	Common myna	<i>Acridotheris tristis</i>	R	LC
150	Passeriformes	Sturnidae	Brahminy starling	<i>Temenuchus pagodarum</i>	R	LC
151	Passeriformes	Dicaeidae	Pale-billed flowerpecker	<i>Dicaeumerythro rhynchos</i>	R	LC
152	Passeriformes	Nectariniidae	Purple sunbird	<i>Cinnyris asiaticus</i>	SM/R	LC
153	Passeriformes	Motacillidae	Western yellow wagtail	<i>Motacilla flava</i>	WM/PM	LC
154	Passeriformes	Motacillidae	Citrine wagtail	<i>Motacilla citreola</i>	SM	LC
155	Passeriformes	Motacillidae	Grey wagtail	<i>Motacilla cinerea</i>	SM	LC
156	Passeriformes	Motacillidae	White wagtail	<i>Motacilla alba</i>	SM/PM	LC
157	Passeriformes	Motacillidae	White browed wagtail	<i>Motacilla madaraspatensis</i>	R	LC
158	Passeriformes	Motacillidae	Paddyfield pipit	<i>Anthus rufulus</i>	R	LC
159	Passeriformes	Motacillidae	Tawny pipit	<i>Anthus campestris</i>	WM	LC
160	Passeriformes	Motacillidae	Upland pipit	<i>Anthus sylvanus</i>	R	LC
161	Passeriformes	Motacillidae	Tree pipit	<i>Anthus trivialis</i>	PM/SM	LC
162	Passeriformes	Motacillidae	Water pipit	<i>Anthus spinoletta</i>	WM/PM	LC
163	Passeriformes	Motacillidae	Olive backed pipit	<i>Anthus hodgsoni</i>	SM/PM	LC
164	Passeriformes	Emberizidae	Crested bunting	<i>Melophus lathami</i>	SM	LC

165	Passeriformes	Emberizidae	Rock bunting	<i>Emberiza cia</i>	SM/R	LC
166	Passeriformes	Fringillidae	Fire fronted siren	<i>Serinus pusillus</i>	R	LC
167	Passeriformes	Passeridae	Russet sparrow	<i>Passer rutilans</i>	R	LC
168	Passeriformes	Passeridae	Chestnut shouldered petronia	<i>Petronia xanthochollis</i>	SM	LC
169	Passeriformes	Passeridae	House sparrow	<i>Passer domesticus</i>	R	LC

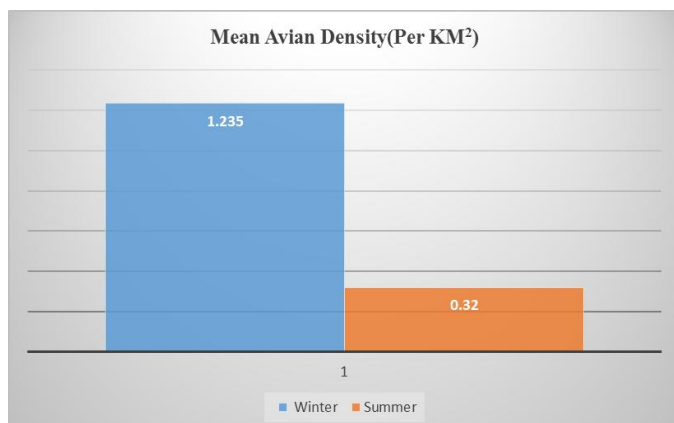


Fig 1: Mean avian density in Pong Dam WLs

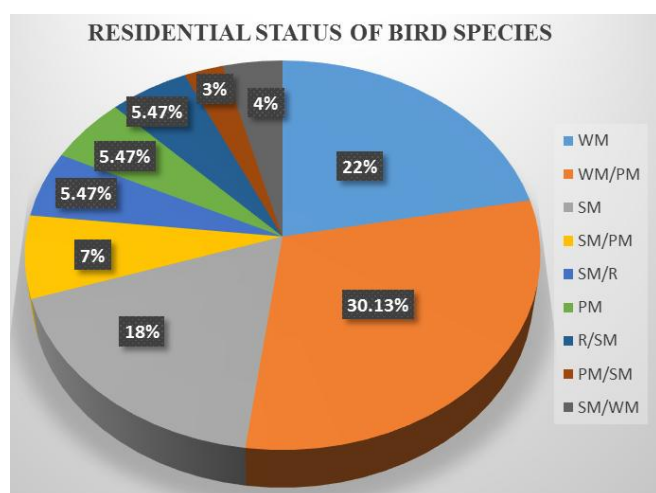


Fig 2: Status of birds observed in Pong Dam WLs.

Conclusion

Present study documented information on avifauna of Pong Dam Wildlife Sanctuary. The analysis of data reveals a total of 44,308 individuals, distributed among 169 species belonging to 48 families and 16 orders recorded from this region. The highest numbers of individuals i.e. 43,203 of birds were observed in winter (with a total number of 126 species of birds belonging to 15 orders and 36 families) as compared to summer with a total of 1105 individuals (with 122 species belonging to 15 orders and 43 families). Due to onset of winters when the wetlands become frozen in Europe and North and Central Asia, some of the migratory bird species like Bar headed goose, Common Shelduck, Brahminy Duck, Common Pochard, Common coots have been observed in highest numbers in winter here as they spend winters in more affable climatic conditions. During winter the maximum numbers of birds have been observed as it is an ideal resting place for migratory birds due to easy accessibility of food and shelter, whereas in summer their number was less in this area because these birds migrate back to their breeding places. Moreover the lower Himalaya is relatively rich in avifauna as compared to middle Himalaya. The life of aquatic birds depends directly on physical and chemical properties of aquatic environment. Hence, the Pong Dam Wildlife

Sanctuary is an important resting and feeding station for migratory bird species, keeping this in view it is our suggestions to protect and conserve this aquatic ecosystem to sustain the bird diversity of this region.

Acknowledgements

The authors are grateful to the Dr. Kailash Chandra (Director of Zoological Survey of India) for his guidance, support and inspiring suggestions. Authors are also thankful to PCCF of Himachal Pradesh and members of Department of Wildlife Division (Hamirpur) for the necessary permission to undertake the studies and providing all kind of facilities during surveys. The authors extend their deepest gratitude to Shri Krishan Kumar (Divisional Forest Officer, Hamirpur) who supported us in every possible way.

References

1. Whigham TD, Bykyjova, Hejny M. (Eds). Wetlands of the world Inventory, Ecology and Management. Kulwer Academic Publishers Dordredht, Netherland, 1993.
2. Kusler JA, Mitsch WJ, Larson JS. Wetlands. Scientific American. 1994; 270: 64-70.
3. Ali S, Ripley SD. Handbook of the birds of India and Pakistan. Compact edition. Oxford University Press: Bombay, 1983a.
4. Ali S, Ripley SD. A pictorial guide to the birds of the Indian Subcontinent. 1st ed. New Delhi: Oxford University Press, 1983b.
5. Whistler H. A note on the Birds of Kangra district, Punjab. Ibis. 1926a; 12:521-581.
6. Whistler H. A note on the Birds of Kullu. Journal of Bombay Natural History Society. 1926b; 31(2):458-485.
7. Ali S. Indian Hill Birds, Oxford University Press, Bombay, 1949, 1-188.
8. Singh AP. Birds of the upper catchment of Ravi River, Chamba district, Himachal Pradesh, India. Indian BIRDS. 2011; 7(4):97-103.
9. Pandey S. Changes in waterbird Diversity due to the conservation of Pong Dam Reservoir, Himachal Pradesh, India. 1993; 66(2):125-130.
10. Kumar A, Paliwal R. Galloanserae and Aquatic Neoaves of Pong Dam Wetland, Himachal Pradesh. Status and Conservation Issues. Aquatic ecosystem: Biodiversity, Conservation & Ecology. Springer, 2015, 307-321.
11. Besten JW. Birds of Kangra. Moonpeak Publishers, Dharamshala, Himachal Pradesh, 2004, 173.
12. Gaston AJ, Garson PJ, Pandey S. Birds recorded in Great Himalayan National Park, Himachal Pradesh. Forktail. 1993; 9:45-57.
13. Editor-Director. Fauna of Pin valley National Park. Conservation area Series. 2008; 34:1-147.
14. Grimmett RC Inskipp, T Inskipp. Birds of the Indian Subcontinent. Oxford University Press: Delhi, 1998.
15. Kazmierczak, K. A field guide to the birds of India, Sri Lanka, Pakistan, Nepal, Bhutan, Bangladesh and the Maldives. New Delhi: Om Book Service, 2000.
16. IUCN. The IUCN Red List of Threatened Species, 2018. <http://www.iucnredlist.org>

17. Mahabal A, Sharma TR. Distribution patterns of birds of Kangra Valley (Himachal Pradesh). *Himalayan Journal of Environment & Zoology*. 1992; 6(2):85-96.
18. Mahabal A. Birds of Talra Wildlife Sanctuary in lower Western Himalaya, Himachal Pradesh, with notes on their status and altitudinal movements. *Zoos' Print Journal*. 2000; 15(10):334-338.
19. Thakur ML, Paliwal R, Tak PC, Mattu VK. Birds of Balh Valley, District Mandi, Himachal Pradesh, India. *Annals of Forestry*. 2003; 11(1):113-126.
20. Thakur ML, Mattu VK, Sharma RM. Bird diversity & status in Tara Devi, Shimla, Himachal Pradesh. In: *Biodiversity and Environment* (Eds. Pandey BN, Kulkarni GK). A.P.H. Pub., New Delhi, 2006.
21. Thakur ML, Mattu VK. Avifauna of Kaza area of spiti (Himachal Pradesh), India. *International Journal of Science & Nature*. 2011; 2(3):483-487
22. Thakur ML, Paliwal R. Avian diversity of Chandigarh (UT). *International Journal of Advanced Biological Research*. 2012; 2(1):103-114.
23. Mattu VK, Thakur ML. Bird diversity and status in Summer Hill, Shimla (Himachal Pradesh). *Indian Forester*. 2006; 132(10):1271-1281
24. Donar AS, Reddy KR, Deshpande DP. Avifaunal diversity of Nipani Reservoir, Belgaum District, Karnataka. *Ecoscan*. 2012; 1:22-33.
25. Singh V, Banyal HS. Avifauna of Khajjiar Lake, District Chamba, Himachal Pradesh, India. *Springer*. 2013; 66(2):130-136.
26. Kumar A. Migratory Water birds of Himachal Pradesh: Status & Conservation. *Water birds of India*, 2015, 258-267.