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RESEARCH ARTICLE

Study on Distribution of Avian Fauna of Dachigam National Park, Kashmir, India

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ABSTRACT

Survey of avian fauna in Dachigam national park, Srinagar, Kashmir was conducted from October 2010 to September 2011. A total of 111 species belonging to 80 genera, 14 orders and 35 families were recorded. Out of these: 74 were resident, 6 were winter visitor, 21 were summer visitor and 10 were local altitudinal migrants. The prominent bird species include wagtails, kingfishers, bulbuls, doves, crows, warblers, chats, thrushes, woodpeckers, flycatchers, tits, magpie, sparrows and buntings. Bird species diversity (Shannon- Weiner Formula) was highest during summer (4.19) followed by spring (4.12). Autumn (3.81) and winter (3.64) seasons witnessed relatively less diversity.

INTRODUCTION

Bird communities have been studied fairy well both in temperate and tropical forests (Blake 2007; Willson and Comet 1996). Understanding the diversity and structure of bird communities is essential to delineate the importance of regional or local landscapes for avian conservation (Kattan and Franco, 2004). Birds are considered good indicators of environmental quality and are frequently being used to monitor environmental and ecosystem health (Centerbury *et al*. 2000). Bird assemblages based on species composition, abundance, richness and diversity along with other attributes such as rarity and endemism are frequently used for ornithological evaluations and assignment of conservation value to sites (Daniels, 1989). The present status of avifauna of Dachigam National Park is unknown. Very little work has been done related to the avifauna of Dachigam National Park. The aim of this study was to generate the baseline informational and to represent the comprehensive picture of bird community structure of Dachigam national park. This information will be help in future for species specific work on avifauna of Dachigam National Park and for launching conservation strategies.

Study Area

Dachigam with a peculiar and interesting topography is in the form of an undulating mountain valley system spread over an area of 141 sq km. Its nearest edge is about 20km from the capital city of Kashmir, the Srinagar and lies in its northeast. It lies between 34°05′-34°12′N longitude and 74°54′-75°09′E latitude. It is approximately 24km in length and 6km in breadth ranging in altitude from 1700m to 4000m (Shah *et al*., 2009). The whole area of the park is distinguishable into lower Dachigam (26km^2) and upper Dachigam (115km^2) by the beginning of fir forest The lower Dachigam valley portion begins as a broad and narrow bent passage. The broad open end of this passage faces the northwest direction and forms the main entrance to the park area. It ends at its southwestern end at Nagharen and at its eastern end at Marsar meadows. Among the meadows of upper alpine Dachigam which are bounded by high ridges on north, northeast and northwest there abodes a glacial oligotrophic water body of Marsar which serves as a source of fresh snow melt drinking water to a portion of the capital city. Dachigam also supplies water to some agricultural lands and is a major feeding source to Dal Lake through Dachigam Dagwan Nallah. There are numerous brooks and other tributaries in the region. Within the natural boundary of Dachigam National Park near its western edges lies the water reservoir of Sarband, making a seasonal lake, adjacent to which is located the Harwan green park. The average climate of Dachigam is sub-mediterranean or sub alpine temperate with 4 distinct seasons a year, Spring (March-May), Summer (June –August), Autumn (September-November) and Winter (December-February). The flora of the park is dominated by species like *Prunus avium, Prunus persica, Malus domesticus, , Juglans regia, Salix alba, Morus alba, Parrotiopsis jacquemontiana, Populus alba, Pinus wallichiana, Quercus robur*, etc. Dachigam forms the only natural home of the famous Hangul deer, *Cervus elaphus hanglu.* The other outstanding mammalian representatives are *Moschus chrysogaster, Ursus arctos, Selenarctos thibetanus, Panthera pardus, Martes flavigula, Lutra lutra, Marmota caudata, Felis chaus, Mustela sibirica* etc.

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METHODOLOGY

For the purpose of bird study, Dachigam National Park was divided into 14 transects, ten in lower Dachigam and four in upper Dachigam, so that majority of the study area was covered. Figure 1. The transects varied in length from 2km to 8km depending on vegetation type and accessibility, and were distributed among four habitat types viz. Mixed forest, Coniferous forest, Riverine and Grassland. Width of the transects varied between 50m to 100m. Transects were walked in a straight manner at a fixed speed to record the birds on or near the line. Investigations were conducted for a period of one year from October 2010 to September 2011 covering all the seasons i.e. spring (March-May), summer (June-August), autumn (September-November), and winter (December-February). Bird Study was carried out by Visual sighting method used by Shah (1984), line transect method (Bhat and Joshi, 2011) and point count method (Bibby, 2000). Another important aspect kept in

consideration was the activity of birds. Since the peak activity in most of the birds lasts 1 or 2 hours after sunrise or before sunset, so monitoring of transects was done either in early morning or late evening hours as used by Thakur, 2010. Birds were observed with the aid 10 x 50 super Zenith field binoculars. Photographs were taken by Canon still camera (with a zoom lens of 70mm to 300mm). Field identifications were carried out with the help of various field guides (Ali, 2001, Grimmet *et al.,* 2004). Seasonal distribution, and residential status of the birds has been worked out and different categories like, resident, local altitudinal migrant, summer visitor and winter visitor have been assigned strictly with reference to the study area on the basis of presence or absence method. Bird species were ranked into following categories (McKinnon and Phillips,1993): very common (VC) - sighted more than ten times, common (C) - sighted seven to nine times, uncommon (UC) - sighted three to six times and occasional (OC)- sighted once or twice.

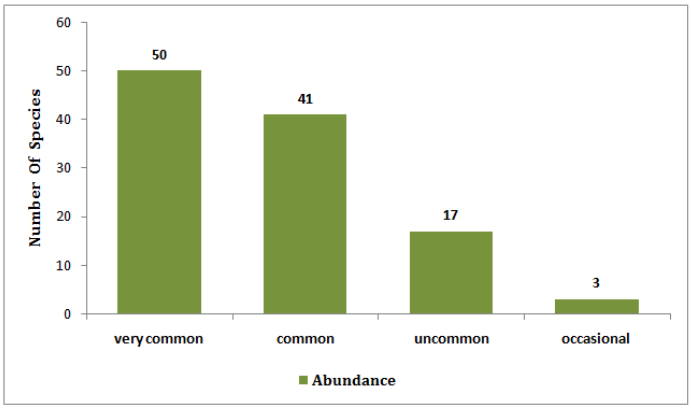

Figure 3. Relative abundance of bird species in Dachigam national park

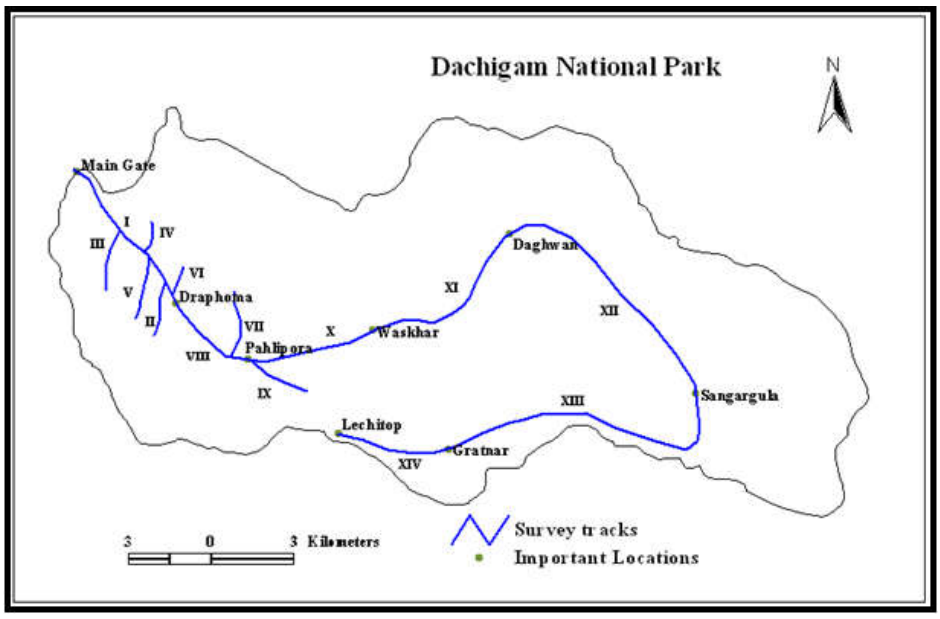

Figure 1. Dachigam national park

RESULTS

The present studies on the bird community structure of Dachigam National Park, Kashmir revealed the presence of 111 species of birds belonging to 80 genera spread over 35 families belonging to 14 orders. Further, it was interesting to note that the passerine birds dominated the diversity with 69 species as compared to non-passerine (42 species). Analysis of the data on the residential status revealed that out of 111 species, 66.66% were resident (74 species), 18.91% were summer visitors (21 species), 5.4% were winter visitors (6 species) and 9 % were local altitudinal migrants (10 species). Fig. 2. On the basis of relative abundance, 50 species were very common, 41 were common, 17 were uncommon and 3 were occasional (Table 1, Fig. 3). The result of this study showed that bird species diversity (Shannon-Weiner's Index) was highest during summer (4.19) followed by spring (4.12). Autumn (3.81) and winter (3.64) seasons witnessed relatively less diversity. (Table 2).

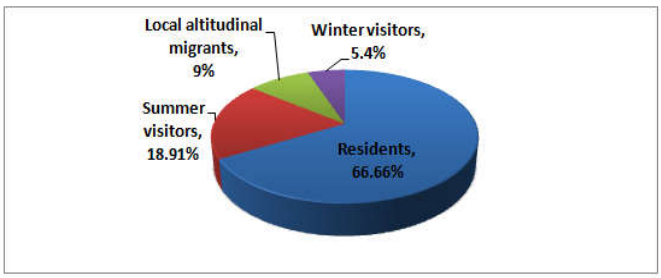

Figure 2. Status of the birds recorded from Dachigam national park

Table 1. Check list of birds recorded from Dachigam National Park

	Taxon	Status	Abundance	Current status as per IUCN, RED DATA Book
	Order: Ciconiiformes			
	Family: Ardeidae			
1	*Egretta garzetta* Little egret	R	VC	Least Concern
2	*Ardea cinerea* Gray heron	R	VC	Least Concern
3	*Ardeola grayii* Indian pond heron	R	VC	Least Concern
	Order: Falconiformes			
	Family: Accipitridae			
4	*Buteo buteo* Common buzzard	R	UC	Least Concern
5	*Gyps himalayensis* Himalayan griffon	R	C	Least Concern
6	*Milvus migrans* Black kite	R	VC	Least Concern
7	*Accipiter badius* Shikra	R	UC	Least Concern
8	*Circus cyaneus* Hen harrier	R	UC	Least Concern
9	*Accipiter nisus* Eurasian sparrow hawk	R	UC	Least Concern
10	*Aquila nipalensis* Steppe eagle	R	C	Least Concern
11	*Spilornis cheela* Crested Serpent eagle	R	OC	Least Concern

	Order: Galliformes			
	Family: Phasianidae			
12	*Alectoris chukar* Chukar	R	VC	Least Concern
13	*Pucrasia macrolopha* Koklass pheasant	R	C	Least Concern
14	*Lophophorus impejanus* Himalayan monal	R	C	Least Concern
15	*Coturnix coturnix* Common quail	R	C	Least Concern
	Order: Columbiformes			
	Family: Columbidae			
16	*Columba livia* Blue rock pigeon	R	VC	Least Concern
17	*Streptopelia decaocto* Eurasian collared dove	SV	VC	Least Concern
18	*Streptopelia orientalis* Oriental turtle dove	R	VC	Least Concern
	Order: Psittaciformes			
	Family: Psittacidae			
19	*Psittacula krameri* Rose ringed parakeet	R	VC	Least Concern
20	*Psittacula himalayana* Slaty headed parakeet	R	C	Least Concern
	Order: Cuciliformes			
	Family: Cuculidae			
21	*Cuculus canorus* Indian cuckoo	SV	C	Least Concern
22	*Cuculus poliocephalus* Lesser cuckoo	SV	C	Least Concern
23	*Eudynamys scolopacea* Asian koel	SV	C	Least Concern
	Order: Strigiformes			
	Family: Strigidae			
24	*Tyto alba* Barn owl	R	UC	Least Concern
	Order: Apodiformes			
	Family:Apodidae			
25	*Apus apus* Common swift	SV	VC	Least Concern
	Order: Coraciiformes			
	Family: Alcedinidae			
26	*Alcedo atthis* Common kingfisher	R	C	Least Concern
	Family: Halcyonidae			
27	*Halcyon smyrinensis* White throated kingfisher	R	C	Least Concern
	Family: Cerylidae			
28	*Ceryle rudis* Pied kingfisher	R	C	Least Concern
29	*Megaceryle lugubris* Crested kingfisher	R	UC	Least Concern
	Family: Meropidae			
30	*Merops apiaster* European bee eater	SV	C	Least Concern
	Family; Upupidae			
31	*Upupa epops* Common hoopoe	SV	VC	Least Concern
	Family: Coraciidae			
32	*Coracias garrulus* Europian roller	SV	OC	Near Threatened
	Order: Piciformes			
	Family: Picidae			
33	*Dendrocopos auriceps* Brown fronted woodpecker	R	C	Least Concern
34	*Dendrocopos himalayensis* Himalayan woodpecker	R	VC	Least Concern
35	*Dendrocopos hyperythrus* Rufous bellied woodpecker	R	C	Least Concern
36	*Picus squamatus* Scaly bellied woodpecker	R	C	Least Concern
37	*Picus canus* Grey headed woodpecker	R	C	Least Concern
38	*Dinopium benghalense* Black rumped flame back	R	UC	Least Concern
	Order: Passeriformes			
	Family: Hirundinidae			
39	*Hirundo rustica* Common swallow	SV	VC	Least Concern
	Family: Motacillidae			
40	*Motacilla alba* White wagtail	R	C	Least Concern
41	*Motacilla flava* Yellow wagtail	R	C	Least Concern
42	*Motacilla cinerea* Grey wagtail	R	C	Least Concern
43	*Motacilla citreola* Citrene wagtail	R	UC	Least Concern
44	*Anthus trivialis* Tree pipit	R	C	Least Concern
	Family: Campephagidae			
45	*Pericrocotus ethologus* Long tailed minivet	SV	C	Least Concern
46	*Pericrocrotus flammeus* Scarlet minivet	SV	UC	Least Concern
	Family: Pycnonotidae			
47	*Pycnonotus leucogenys* Himalayan bulbul	R	VC	Least Concern
48	*Hypsipetes leucocephalus* Black bulbul	LAM	VC	Least Concern
	Family: Laniidae			
49	*Lanius schach* Long tailed shrike	LAM	VC	Least Concern
	Family: Muscicapidae			
	Subfamily: Turdinae			
50	*Turdus ruficollis* Dark throated thrush	WV	C	Least Concern
51	*Turdus unicolor* Tickell's thrush	R	VC	Least Concern
52	*Turdus viscivorus* Mistle thrush	R	C	Least Concern
53	*Zoothera dauma* Scaly thrush	LAM	UC	Least Concern
54	*Turdus boulboul* Grey winged black bird	SV	VC	Least Concern
55	*Enicurus maculatus* Spotted forktail	LAM	VC	Least Concern
56	*Enicurus scouleri* Little forktail	LAM	C	Least Concern
57	*Saxicola torquata* Common stone chat	R	VC	Least Concern
58	*Saxicola ferrea* Grey bushat	R	VC	Least Concern
59	*Tarsiger cyanurus* Orange flanked bush robin	R	C	Least Concern
60	*Chaimarrornis leucocephalus* White capped water redstart	R	VC	Least Concern
61	*Rhyacornis fuliginosus* Plumbeous water red start	R	VC	Least Concern
62	*Myophonus caeruleus* Blue whistling thrush	R	VC	Least Concern
63	*Garrulax variegatus* Variegated laughing thrush	LAM	VC	Least Concern
64	*Garrulax lineatus* Streaked laughing thrush	LAM	VC	Least Concern
	Subfamily: Muscicapinae			
65	*Ficedula subrubra* Kashmir flycatcher	SV	OC	Vulnerable
66	*Ficedula superciliaris* Ultramarine flycatcher	R	C	Least Concern
67	*Eumyias thalassina* Verditer flycatcher	SV	C	Least Concern
68	*Luscinia pectoralis* White tailed ruby throat	SV	C	Least Concern
	Subfamily: Sylviinae			
69	*Cettia fortipes* Brownish flanked bush warbler	R	C	Least Concern
70	*Phylloscopus trochiloides* Greenish warbler	SV	VC	Least Concern
71	*Phylloscopus affinis* Tickell's leaf warbler	R	VC	Least Concern
72	*Seicercus xanthoschistos* Grey hooded warbler	R	UC	Least Concern
73	*Phylloscopus chloronotus* Lemon rumped warbler	R	C	Least Concern

74	***Phylloscopus megnirostris*** **Large billed leaf warbler**	**R**	**VC**	**Least Concern**
75	*Phylloscopus reguloides* Blyth's leaf warbler	R	VC	Least Concern
	Family: Paridae			
76	*Parus major* Great tit	R	VC	Least Concern
77	*Parus melanolophus* Spot winged tit	R	VC	Least Concern
78	*Parus monticolus* Green backed tit	LAM	VC	Least Concern
	Family: Certhiidae			
79	*Certhia himalayana* Bar tailed tree creeper	LAM	C	Least Concern
80	*Troglodytes troglodytes* Winter wren	LAM	C	Least Concern
	Family: Zosteropidae			
81	*Zosterops palpebrosus* Oriental white eye	R	C	Least Concern
	Family: Emberizidae			
82	*Emberiza cia* Rock bunting	R	VC	Least Concern
	Family: Fringillidae			
83	*Leucosticte nemoricola* Plain mountain finch	R	UC	Least Concern
84	*Carpodacus erythrinus* Common rosefinch	SV	C	Least Concern
85	*Mycerobas icterioides* Black and yellow gross beak	R	C	Least Concern
86	*Emberiza fucata* Chest nut eared bunting	R	VC	Least Concern
87	*Carduelis carduelis* European gold finch	R	C	Least Concern
88	*Pyrrhula aurantiaca* Orange bullfinch	R	UC	Least Concern
	Family: Passeridae			
89	*Passer rutilans* Russet sparrow	R	VC	Least Concern
90	*Passer domesticus* Common sparrow	R	VC	Least Concern
91	*Prunella atrogularis* Black accentor	WV	UC	Least Concern
92	*Prunella himalayana* Altai accentor	WV	UC	Least Concern
	Family: Sturnidae			
93	*Acridotheres tristis* Common myna	R	VC	Least Concern
94	*Acridotheres fuscus* Jungle myna	R	C	Least Concern
95	*Sturnus vulgaris* Common starling	SV	VC	Least Concern
	Family: Dicruridae			
96	*Dicrurus leucophaeus* Ashy drongo	SV	VC	Least Concern
	Family: Oriolidae			
97	*Oriolus oriolus* Golden oriole	SV	VC	Least Concern
	Family: Corvidae			
98	*Terpsiphone paradisi* Asian paradise flycatcher	SV	VC	Least Concern
99	*Corvus macrorhynchos* Large billed crow	R	VC	Least Concern
100	*Urocissa flavirostris* Yellow billed blue magpie	R	VC	Least Concern
101	*Corvus monedula* Eurasian jackdaw	R	VC	Least Concern
102	*Pyrrhocorax graculus* Yellow billed chough	R	VC	Least Concern
103	*Pyrrhocorax pyrrhocorax* Red billed chough	R	C	Least Concern
104	*Rhipidura albicollis* White throated fantail	R	C	Least Concern
105	*Nucifraga caryocatactes* Spotted nut cracker	R	C	Least Concern
	Family: Cincilidae			
106	*Cinclus pallasii* Brown dipper	R	VC	Least Concern
107	*Cinclus cinclus* White throated dipper	R	UC	Least Concern
	Order: Anseriformes			
	Family: Anatidae			
108	*Anas platyrhynchos* Mallard duck	WV	VC	Least Concern
109	*Anas acuta* Northern pintail	WV	VC	Least Concern
	Order: Charadriformes			
	Family: Rostratulidae			
110	*Gallinago gallinago* Common snipe	R	C	Least Concern
	Order: Gruiformes			
	Family: Rallidae			
111	*Fulica atra* Common coot	WV	VC	Least Concern

Status: R=resident, SV= summer visitor, WV= winter visitor, LAM= local altitudinal migrant.

Abundance: VC-Very common: C- Common: UC-Uncommon: OC-Occasional.

Table 2. Diversity of birds in relation to Seasons

Season	Diversity(Shannon-Weiner Index)
Spring	4.12865
Summer	4.19808
Autumn	3.81548
Winter	3.64246

The prominent bird species include wagtails, kingfishers, bulbul, doves, crows, warblers, chats, thrushes, woodpeckers, flycatchers, tits, sparrows and buntings. Breeding birds like Kashmir flycatcher and orange bull finch were also encountered from the study area but there occurrence seems accidental and very rare. Common, White Breasted, Pied and Crested kingfishers were found as resident birds from the study area because of the presence of a good number of ponds and ditches formed by Dugwan stream flowing through the year in the park. Rose ringed parakeet was recorded as a resident bird of the study area. This bird was mostly encountered near sheep breeding farm, VIP lodges, Draphama and Panzgama within the National Park. Oriental turtle dove is a summer visitor to the area. This bird was seen perching in pine trees and walking along on the ground usually preferring open habitats inside the park. Bar tailed tree creeper was recorded throughout the period of study. The bird usually preferred areas covered with thick trees. Hoopoe was found to be a summer visitor to the area. It was seen mostly feeding in open grassland patches in the park. Further, two species of birds were also sighted in the study area who are struggling for their existence throughout their distributional range and therefore placed under different threat categories by IUCN (Red data book, http://www.iucnredlist.org). Of these, Kashmir flycatcher, *Ficedula subrubra* has been placed under Vulnerable Category (VU) and European roller, *Coracias garrulus* under near threatened category (NT) Table 1.

DISCUSSION

Family wise analysis showed that family Muscicapidae (26 species) dominated the avifauna followed by Accipitridae and Corvidae (8 each); Picidae and Fringillidae (6 each); Motacillidae (5); Phasianidae and Passeridae (4each); Ardeidae, Columbidae, Cuculidae, Paridae and Sturnidae (3each) whereas Strigidae, Apopidae, Alceidinidae, Halcyonidae, Meropidae, Upopidae, Coracillidae, Hirundinidae, Lannidae, Zoosteropidae, Embrizidae, Dicruridae, Oriolidae, Rostratulidae and Rallidae were poorly represented in the area. (Table 1). Thakur (2010) also found Muscicapidae as the biggest family of birds with 58 species from Himachal Pradesh, so pertinently it appears that Muscicapidae is the most diverse in its overall contribution. The high diversity during summer can be compared with earlier works of Gaston (1995) and Mahabal (2005) who elucidated that Himalayas receive a flood of breeding birds during summer months from adjacent areas. During the present investigation, Northern pintail and Mallard were seen at Gandekadal transect and Sarband water reservoir. Ahmad (1999) has also reported these purely migratory bird species from Harwan reservoir. Himalayan monal and koklass pheasant were encountered from higher areas of Dachigam national park. Reports of pheasants like monal and koklass have been made by Rodgers and Panwar (1988) from Dachigam.

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