

AVIFAUNAL DIVERSITY OF TOLIPIR NATIONAL PARK AZAD JAMMU AND KASHMIR PAKISTAN

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ABSTRACT

In present study, we examined the wetlands avifaunal diversity of the Tolipir National Park to provide the baseline data of about species composition, and distribution. Field surveys were conducted during February 2013 to February 2014. Data was collected by point count method. In total, a total of 202 bird species belonging to 55 families two vulnerable (*Tragopan melanocephalus*, *Catreus wallichii*), one near threatened (*Coracias garrulous*), one endangered (*Falco peregrines*), and one rear species (*Falco cherrug milvipes*). Various diversity indices Simpson index (0.0067), Shannon Wiener index (2.22) were also calculated. We assume that focusing the conservation practices upon these species will promote the preservation of a wide range of organisms inhabiting Tolipir National Park.

Key words: Avifauna, diversity, National Park, Endangered.

INTRODUCTION

Birds are conspicuous, ubiquitous, and arguably the best studied group of vertebrates on the planet (Whelan *et al.* 2008). Birds are highly mobile, occur globally in nearly all habitats and fill many ecological roles (Daniel, 2011). The activities of birds provide links within and between ecosystems and can have large effects on other species. Birds provide all ecosystem services such as provisioning services refer to natural products that are directly used by humans for food, clothing, medicines, tools, or other uses (Carver, 2009). Cultural services provide recreational opportunities, inspiration for art and music, and spiritual value (Mynott, 2009). Regulating services include pest control and carcass removal (Whelan *et al.* 2010). Supporting services, such as pollination, seed dispersal, water purification, and nutrient cycling, provide processes essential for ecological communities and agricultural ecosystems (Brenner *et al.* 2010).

One of the most general features of life on earth is changes of abundance and diversity of organisms along the earth's major environmental gradients, including elevation (Brown, 2001). Bird communities are correlated with topography, precipitation, latitude, altitude and with plant communities (Rabhek and Graves 2001). The composition and diversity of birds vary at every 1000 m altitude due to change in precipitation (Price *et al.* 2003). Birds serve as bio-indicators and suggest the status of biodiversity in general (Urfi, 2011). Biodiversity assessment provides valuable guidelines for the prioritization of reserves and protected areas for the resource conservation and planning accordingly at state

and regional level (Badola and Aitken, 2010). In biodiversity conservation efforts, the assessment and evaluation of bird communities have been considered as important tools (Shafiq *et al.* 1997). In understanding biodiversity, altitudinal gradients for the bird distribution provide highly useful clues (McCain, 2009).

No specific study is available for the area under Tolipir National Park, or even for the general Tolipir tract. The specific reference to the presence or distribution of different birds' species is also lacking even in books/reviews. Inferences on the possible presence of different species birds species can, however, be drawn from the available literature on the habitat, biology and distribution range of different species for Pakistan/ Indian subcontinent (Birds: Roberts, 1992, Grewal *et al.* 2002), depending upon available variation in altitude, habitat and associated biotic/ abiotic factors. The aim of the study was to measure avifaunal diversity at Tolipir National Park, by measuring Simpson index and Shannon-Weiner Diversity Index.

MATERIALS AND METHODS

Tolipir (33°NL, 73°E, top altitudes 2600 - 3100 m asl) area presents a Y-shaped hill fold (located around the mausoleum of a saint) falling in the Pir Panjal Hills, constituting the western reaches of the Himalayan Range. This is a famous hill-station having a mixture of the highland pastures, hill slopes, dense coniferous forests, ravines and water channels; dotted with human settlements and agriculture fields, especially on the south-facing slopes, north-facing slopes having denser forested growth of vegetation.

The study site was systematically divided into observation plots forming grid cells of 1 km × 1 km. Five (5) grids were positioned horizontally and data collection was conducted in each grid. Subplots of observation were systematically selected in each grid and were regularly arranged so that distance between subplots was 500 m. Each subplot was checked in the field with reference to a handheld Global Positioning System (GPS, Garmin 12XL) for correct placement and site accessibility. At each subplot, the surveyor wait for 5 min (settling down period) before starting the counts during 3 hr. morning session starting just before sun rise. Birds observed within 50m fixed radius were recorded visually or acoustically. Each subplot point was visited twice under favorable weather conditions. Bird abundance was judged as encounter rates of each species in point counts. The bird fauna was observed using Binocular (12X 50X) and identified using available keys (Ali and Ripley, 1983; Roberts 1991).

Simpson's Diversity Index: It was calculated by $D = \sum (n - 1) / N(N - 1)$

where N = the total number of organisms of all species and n = the total number of organisms of a particular species from which Simpson's Diversity Index, 1 – D, is found.

Shannon – Wiener diversity index: The diversity index was calculated by using the Shannon – Wiener diversity index (1949). Diversity index = $H = - \sum P_i \ln P_i$ where $P_i = S / N$

S = number of individuals of one species N = total number of all individuals in the sample.

ln = logarithm to base e

RESULTS AND DISCUSSION

A total of 202 bird species have been recorded, which exploit the TNP tracts to different degrees in different ways (Table 1). Keeping to the size of the TNP area (some 50 km²), it is a high diversity, which can be expected under the available diversity in the available habitat conditions, ascribable to the altitudinal variation (>1,200 m); all grades between grasslands and thick forested vegetation; natural vegetation, cultivated fields and human settlements running side by side; and hill tops, slopes and deep ravines; and presence of small hill streams at places. Twenty one species (Wood Sandpiper, Cattle Egret, Great Bittern, Ibis Bill, Masked Wagtail, Red-wattled Lapwing, Ruff, Common Moorhen, Northern Lapwing, Black-winged Stilt, Brown Dipper, Grey Heron, Indian Pond Heron, Little Egret, Common Kingfisher, Common Sandpiper, White-capped Redstart, Plumbeous Redstart, Northern Shoveler, Speckled Wood Pigeon, Marsh Harrier, Citrine Wagtail, and Short-eared Owl) of this list have a stronger association with aquatic habitat. Keeping in view the fact that well defined aquatic

habitat is lacking in TNP, these species may not be regularly exploiting of the TNP area and may be regarded as occasional visitors, yet contribute to the total avian biodiversity of TNP.

The majority of species (196) representing the bird fauna of TNP, have been regarded as least concern species on a global scale by IUCN. Therefore, the major part of the avifauna of TNP is not of a direct international concern. However, the area is important from the bird watchers stand point, where students and wildlife enthusiasts can capture a glimpse of these species. At a global level, Spotted Owlet and White-Rumped Vulture have been regarded as critically endangered; Asian Paradise Flycatcher and European Roller near threatened; Cheer Pheasant and Tragopan vulnerable; Saker Falcon and Egyptian Vulture endangered; while Shangar Falcon is rare. Recent information on the status of Eurasian Griffon Vulture, Himalayan Griffon Vulture and Cinereous Vulture in TNP is not known, but the species have declined to very low levels in the adjacent tracts. There are indications of presence of Khalij Pheasant, Koklass Pheasant, Himalayan Monal Pheasant, Snow Partridge, Common Quail and Chukar in/ and around TNP, which needs to be protected and can add to the beauty of the area.

A majority of the bird fauna is summer visitor to TNP, and visit the area after spending the winter in the relatively southern parts located at lower altitude and latitudes. The area is thus a breeding ground for a large number of bird species. Most of the animal species have a very narrow range of tolerance for all the different biotic and abiotic potential during the breeding season. An availability of an undisturbed environment in the summering grounds of such species in the TNP will provide favorable breeding habitat for such species. The summers can attract a higher number of the visitors into TNP, which will allow them to enjoy the bird diversity. However, such visitors will be required to be managed in such a way that they do not enter the privacy of the birds or cause a disturbance in the natural habitat of the breeding birds.

The winter diversity in the avifauna is contributed by the residents and winter visitors. Jackdaw, Eurasian Tree Creeper, Jungle Crow, White-cheeked Nuthatch, Baya Weaver, Asian Brown Flycatcher, Grey-breasted Prinia, Collared Pygmy Owlet, Long-billed Pipit, Wedge-tailed Green Pigeon, Black Bulbul, Common Babbler, Rufous Dove, Oriental White Eye, Ashy Wood Pigeon, Himalayan Bulbul, Red-vented Bulbul, Eurasian Tree Sparrow, Pied Stone Chat, Blue-Tailed Bee-eater, Speckled Wood Pigeon, Black Drongo, Coppersmith Barbet, Laughing Dove, Eagle Owl, Green Backed Tit, Spotted Owlet, Black Kite, Common Wood Pigeon, Slaty Blue Flycatcher, White Throated Needle Tail, Great Tit or Grey Tit, Long Tailed Minivet, Mountain Hawk Eagle, Bank Mynah, Spotted Forktail,

Table 1: List of bird species in Tolipir National PARK (TNP)

Sr	Avivorous Species	Sighting	Sr.no	species	Sighting	Sr.no	species	Sighting
1	<i>Hodgsonius phoenicuroides</i>	15	5	<i>Botaurus stellaris</i>	4	9	<i>Falco cherrug</i>	13
2	<i>Lophophorus imejanus</i>	9	6	<i>Accipiter badius</i>	36	10	<i>Falco cherrug milvipes</i>	13
3	<i>Parus melanolophus</i>	33	7	<i>Accipiter gentiles</i>	15	11	<i>Falco peregrinus</i>	20
4	<i>Prinia criniger</i>	12	8	<i>Accipiter nisus melaschistos</i>	47	12	<i>Falco subbuteo</i>	24
Carnivorous								
13	<i>Aegypius monachus</i>	11	22	<i>Ardea cinerea</i>	9	31	<i>Bubo bubo hemachalana</i>	23
14	<i>Anas clypeata</i>	19	23	<i>Ardeola rayii</i>	11	32	<i>Buteo buteo</i>	11
15	<i>Aquila chrysaetos</i>	21	24	<i>Asio flammeus</i>	41	33	<i>Cinclus pallasii</i>	8
16	<i>Aquila nipalensis</i>	17	25	<i>Athene brama</i>	22	34	<i>Circus aeruginosus</i>	23
17	<i>Coracias garrulous</i>	12	26	<i>Gyps bengalensis</i>	17	35	<i>Hieraaetus pennatus</i>	11
18	<i>Elanus caeruleus</i>	11	27	<i>Gyps fulvus</i>	47	36	<i>Milvus migrans</i>	31
19	<i>Falco tinnunculus</i>	19	28	<i>Gyps himalayensis</i>	16	37	<i>Neophron percnopterus</i>	6
20	<i>Spizaetus nipalensis</i>	33	29	<i>Strix aluco</i>	32			
21	<i>Urocissa flavirostris</i>	53	30	<i>Tringa glareola</i>	6			
Frugivorous species								
38	<i>Megalaima haemacephala</i>	21	42	<i>Psittacula cyanocephala</i>	31	44	<i>Sturnus pogodarum</i>	1
39	<i>Megalaima virens</i>	20	43	<i>Psittacula himalayana</i>	40	45	<i>Psittacula eupatria</i>	41
40	<i>Phoenicurus erythrogaster</i>	18						
Granivorous								
46	<i>Catreus wallichii</i>	14	52	<i>Columba livia</i>	58	58	<i>Lophura leucomelanos</i>	31
47	<i>Columba pulchric</i>	16	53	<i>Coturnix coturnix</i>	9	59	<i>Mycerobas icteroides</i>	10
48	<i>Columba hodgsonii</i>	20	54	<i>Garrulus lanceolatus</i>	38	60	<i>Passer domesticus indicus</i>	36
49	<i>Passer hispaniolensis</i>	24	55	<i>Passer montanus</i>	18	61	<i>Pucrasia macrolopha</i>	11
50	<i>Streptopelia orientalis</i>	14	56	<i>Passer rutilans</i>	73	62	<i>Streptopelia decaocto</i>	27
51	<i>Streptopelia senegalensis</i>	22	57	<i>Treron sphenura</i>	13	64	<i>Sitta leucosis</i>	11
Omnivorous								
65	<i>Corvus corax</i>	1	68	<i>Turdus merula</i>	13	71	<i>Monticola solitarius</i>	21
66	<i>Corvus frugilegus</i>	1	69	<i>Monticola saxatilis</i>	9	72	<i>Dendrocitta vagabunda</i>	47
67	<i>Corvus macrorhynchos</i>	10	70	<i>Corvus monedula</i>	1			
Herbivorous								
73	<i>Alectoris chukar</i>	7	75	<i>Gallinula chloropus</i>	6	77	<i>Lerwa lerwa</i>	9
74	<i>Columba palumbus</i>	28	76	<i>Tragopan melanocephalus</i>	6			
Molluscivorous								
78	<i>Actitis hypoleucos</i>	17	80	<i>Luscinia svecica</i>	13	81	<i>Myophonus caeruleus</i>	36
79	<i>Tringa ochropus</i>	13						
Nectivorous								
82	<i>Zosterornis melanocephalus</i>	15						
Piscivorous								
83	<i>Alcedo atthis</i>	17	85	<i>Egretta garzetta</i>	17	87	<i>Enicurus maculatus</i>	32
84	<i>Ficedula tricolor</i>	28	86	<i>Pericrocotus ethologus</i>	34			

Insectivorous								
88	<i>Acridotheres fuscus</i>	1	129	<i>Carduelis carduelis</i>	12	169	<i>Copsychus saularis</i>	15
89	<i>Acridotheres ginginianus</i>	33	130	<i>Carduelis spinoides</i>	18	170	<i>Cuculus canorus</i>	8
90	<i>Acridotheres tristis</i>	1	131	<i>Carpodacus puniceus</i>	10	171	<i>Cyornis rubeculoides</i>	18
91	<i>Anthus roseatus</i>	11	132	<i>Cephalopyrus flammiceps</i>	12	172	<i>Delichon urbica</i>	8
92	<i>Anthus similis</i>	12	133	<i>Certhia familiaris</i>	9	173	<i>Dendrocopos auriceps</i>	13
94	<i>Anthus trivialis</i>	24	134	<i>Certhia himalayana</i>	29	174	<i>Dendrocopos himalayensis</i>	18
95	<i>Bubulcus ibis</i>	5	135	<i>Cettia brunnifrons</i>	16	175	<i>Dendrocopos mahrattensis</i>	15
96	<i>Calidris minuta</i>	13	136	<i>Cettia fortipes</i>	24	17	<i>Dicrurus macrocercus</i>	20
97	<i>Callacanthis burtoni</i>	9	137	<i>Chaimarrornis leucocephalus</i>	18	17	<i>Dinopium benghalense</i>	20
98	<i>Caprimulgus europaeus</i>	5	138	<i>Charadrius dubius</i>	20	17	<i>Emberiza cia</i>	22
99	<i>Emberiza fucata</i>	15	139	<i>Glaucidium cuculoides</i>	48	17	<i>Lanius vittatus</i>	10
100	<i>Emberiza leucocephalos</i>	34	140	<i>Heterophasia capistrata</i>	17	17	<i>Leucosticte brandti</i>	18
101	<i>Emberiza stewarti</i>	18	141	<i>Himantopus himantopus</i>	8	180	<i>Leucosticte nemoricola</i>	16
102	<i>Enicurus scouleri</i>	26	142	<i>Hirundapus caudactus</i>	28	18	<i>Luscinia brunnea</i>	18
103	<i>Eumyias thalassina</i>	13	143	<i>Hirundo daurica</i>	9	18	<i>Luscinia pectoralis</i>	10
104	<i>Ficedula superciliaris</i>	15	144	<i>Hirundo rupestris</i>	15	18	<i>Melophus lathami</i>	14
105	<i>Garrulax albogularis</i>	11	145	<i>Hypsipetes madagascariensis</i>	13	18	<i>Merops apiaster</i>	5
106	<i>Garrulax lineatus</i>	25	146	<i>Ibidorhyncha struthersii</i>	3	18	<i>Merops philippinus</i>	20
107	<i>Garrulax variegates</i>	16	147	<i>Ixobrychus minutus</i>	10	18	<i>Monticola cinclorhynchus</i>	18
108	<i>Glaucidium brodiei</i>	12	148	<i>Jynx torquilla</i>	6	18	<i>Monticola rufiventris</i>	13
109	<i>Motacilla alba personata</i>	15	149	<i>Phylloscopus collybita</i>	22	18	<i>Phoenicurus ochruros</i>	9
110	<i>Motacilla citreola</i>	26	150	<i>Picumnus innominatus</i>	6	18	<i>Phylloscopus affinis</i>	26
111	<i>Motacilla flava</i>	19	151	<i>Picus squamatus</i>	8	190	<i>Phylloscopus chloronotus</i>	12
112	<i>Muscicapa dauuric</i>	11	152	<i>Ploceus philippinus</i>	10	191	<i>Phylloscopus humei</i>	16
113	<i>Muscicapa ruficauda</i>	13	153	<i>Porzana fusca</i>	3	192	<i>Phylloscopus inornatus</i>	16
114	<i>Muscicapa sibirica</i>	29	154	<i>Porzana pusilla</i>	11	193	<i>Phylloscopus magnirostris</i>	6
115	<i>Muscicapa thalassina</i>	8	155	<i>Prinia hodgsonii</i>	12	194	<i>Phylloscopus occipitalis</i>	17
116	<i>Parus major</i>	27	156	<i>Prunella atrogularis</i>	25	195	<i>Phylloscopus proregulus</i>	7
117	<i>Parus monticolus</i>	23	157	<i>Prunella strophiatea</i>	8	196	<i>Phylloscopus sindianus</i>	30
118	<i>Philomachus pugnax</i>	7	158	<i>Pteruthius xanthochlorus</i>	38	197	<i>Phylloscopus tytleri</i>	15
119	<i>Pycnonotus cafer</i>	17	159	<i>Saxicola caprata</i>	20	198	<i>Streptopelia chinensis</i>	34
120	<i>Pycnonotus leucogenys</i>	16	160	<i>Saxicola torquata</i>	35	199	<i>Sylvia curruca</i>	11
121	<i>Pyrrhula aurantiaca</i>	8	161	<i>Saxicoloides fulicata</i>	20	200	<i>Tachymarptis melba</i>	11
122	<i>Regulus regulus</i>	7	162	<i>Scolopax rusticola</i>	6	201	<i>Tarsiger cyanurus</i>	24
123	<i>Rhyacornis fuliginosus</i>	19	163	<i>Seicercus xanthoschistos</i>	20	201	<i>Terpsiphone paradisi</i>	15
124	<i>Tichodroma muraria</i>	15	164	<i>Turdoides striatus</i>	16	202	<i>Turdus ruficollis atrogutaris</i>	13
125	<i>Troglodytes troglodytes</i>	23	165	<i>Turdus boulboul</i>	3			
126	<i>Turdoides caudatus</i>	14	166	<i>Turdus rubrocanus</i>	7			
127	<i>Upupa epops</i>	71	167	<i>Vanellus vanellus</i>	8			
128	<i>Vanellus indica</i>	6	168	<i>Zoothera dauma</i>	13			

Tawny Owl, Shikra, Black-headed Jay, Slaty-headed Parakeet, Alexandrine Parakeet, Asian Barred Owlet, and Common Hoopoe are the resident bird species of TNP. The populations of these species also increase during summers, attracting the birds from the lower latitudes through local movements. The winter visitors are also relatively few in the number, which include: Short-eared Owl, Pine Bunting, Long Tailed Minivet, Mountain Chiffchaff, Citrine Wagtail, Black-throated Accentor, Tree Pipit, Spanish Sparrow, Common Chiffchaff, Indian Robin, Northern Shoveler, Yellow Wagtail, Steppe Eagle, Hume's Warble, Yellow-browed Warbler, Rufous Dove, Dark-throated Thrush, Lesser White Throat, Rosy Pipit, Black Redstart, Eurasian Woodcock, and Rook.

These species were categorized according to their feeding preferences into ten different types (Table 2). The highest percentage was found to be of insectivorous birds which were 58.1 %, followed carnivore birds 12.3%, 8.3% granivorous 5.9% Avivorous, 4.4% omnivores, 3.4% frugivore, 2.4% herbivores, 2.4 piscivores, 1.9% molluscivore and nectivore 0.4%.

Table 2. Classification of birds on feeding habits

S #	Type	% Population	Birds (n)
1	Insectivorous	58.1	118
2	Carnivorous	12.3	25
3	Granivorous	8.3	17
4	Avivorous	5.9	12
5	Omnivorous	4.4	9
6	Frugivorous	3.4	7
7	Herbivorous	2.4	5
8	Piscivorous	2.4	5
9	Molluscivorous	1.9	4
10	Nectivorous	0.4	1

The value of the Simpson Index is (0.0067), which represents lower diversity because this index ranges from 0-1, with 0 representing infinite diversity and 1 representing no diversity. Mature and stable communities have high diversity values (0.6 to 0.9), while the communities under stress conditions, exhibiting low diversity, usually show close to a zero value (Dash, 2003). The Simpson diversity index is always higher where the community is dominated by fewer species and when the dominance is shared by a large number of species (Whittaker, 1965).

Typical values of the Shannon Index are between 1.5 and 3.5 in most ecological studies, so a value above 3 signifies stable environmental conditions and our Shannon Index results (2.22) indicate satisfactory diversity.

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