Scientific Reports in Life Sciences 2 (4): 47-53

DOI: http://dx.doi.org/10.22034/srls.2021.247949

The avifauna of Takht-i-Sulaiman hill forest, Boulevard Srinagar, Kashmir

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Received: 29 September 2021 / Revised: 18 November 2021 / Accepted: 20 November 2021 / Published online: 13 December 2021.

How to cite: Mushtaq, D., Ali, M (2021). The avifauna of Takht-i-Sulaiman Hill Forest, Boulevard Srinagar, Kashmir, Scientific Reports in Life Sciences 2(4), 47-53. **DOI: http://dx.doi.org/10.22034/srls.2021.247949**

Abstract

During the present study which was carried out fortnightly from April to July 2019, a total of 19 species of birds were recorded from the study area 'Takhat-i-Sulaiman' forest located in the Srinagar city of Kashmir. The study area was surveyed for recording avifaunal diversity by applying the point count method. A total of 49 point counts were performed during the survey period and the time spent for sampling at each location was of 10 minutes duration. The species recorded also included Kashmir Flycatcher (*Ficedula subrubra*) and Tytler's Leaf Warbler (*Phylloscopus tytleri*) which are endemic to Kashmir and have also been placed in the IUCN Red List of Threatened Species as vulnerable and near-threatened species respectively. Kashmir Flycatcher and Tytler's Leaf Warbler are presently having diminished populations throughout the Kashmir region. Therefore, it is recommended that Takhat-i-Sulaiman should be designated as a wildlife sanctuary.

Keywords: Bird survey, conservation, endemic, Kashmir Flycatcher, point count method, threatened species, Tytler's Leaf Warbler

Introduction

Kashmir is home to rich biodiversity including a large number of bird species, many of which are unique to Kashmir. Renowned ornithologist Salim Ali once called Kashmir "heaven on earth for migratory birds".

Indeed there is much more awareness about migratory ducks and geese rather than the resident species and not much seems to have changed from the 1890's when W.R. Lawrence commented that "birds have a happy and carefree existence in the country". Over a million migratory waterfowl from Siberia, Central Asia and Japan use the wetlands in Kashmir as transitory camps enroute to their wintering quarters in the plains of neighboring countries (Ali & Ripley 1974, 1996; Lawrence 1895).

Owing to its distinct climate and physiography, the Jammu & Kashmir Himalaya comprises an impressive avifaunal diversity unique to higher altitudes (Rahmani *et al.* 2013) with 21 important bird areas (IBAs) (Islam & Rahmani 2004) and seven potential IBAs (Rahmani 2012) home to 12 globally threatened bird species and six near threatened species (Rahmani *et al.* 2013) mostly restricted to Kashmir and Ladakh.

Birds are among the best-known parts of the Earth's biodiversity. But nevertheless soundly quantified knowledge is far from complete for most species and regions. Many of the principles are common to any method applied to any species or habitat (Bibby *et al.* 1998, Sutherland, 1996.). Density and diversity are very useful attributes and valuable indicators of habitat quality (Javed 1996) and have great significance from the management perspective. The point count is one of the most common methods to survey birds in forest ecosystems (Hutto *et al.* 1986). During the present study, point count methodology was used to study the birds of the Takhat-i-Sulaiman forest in the Srinagar City of Kashmir (Jammu & Kashmir).

Materials and Methods

Study area

The study was carried out at Takhat-i-Sulaiman also known as Koh-i-Sulaiman (Hill of Solomon) forest located in the Srinagar city of Kashmir (Figure 1). One of the coordinate locations atop of the hill is 34°4′44″N & 74°50′37″E. Before 1940, the forest occurring on this hill was depleted due to the removal of fuelwood, timber, and fodder. A stage came when this hill became virtually devoid of trees. Thereafter, a massive afforestation and rehabilitation program was taken to increase the tree cover, which was met with considerable success. Today, the Hill supports a good forest cover. Geologically, the hillock is a dormant volcano and can erupt at any time.

The pyramid-shaped hill is a landmark site in Kashmir located to the northeast of Srinagar City. Its summit stands 1100 ft above ground level and offers a panoramic view of the city. On its north and north-west is the world-famous Dal Lake and on its south flows the Jhelum River. On the Jhelum side its foot is known as Gupkar where the elite of government administration resides.

Study Site

The study was conducted atop of the Takhat-i-Sulaiman hill forest located in the vicinity of Dal lake along the boulevard road (Figure 1).

Methodology

The study area was surveyed for recording avifaunal diversity by applying the point count method (Verner 1985, Sutherland 1996). The surveys were carried out from April to July 2019 after every fortnight during the morning (for 1-2 hours) when birds are more active. Birds were counted in the 10 m radius zone. The birds falling outside the radius were also counted and recorded. A total of 49 point counts were performed

during the survey period. The time for sampling at each point was 10 minutes. Performing point counts in days with rain and strong winds were avoided.

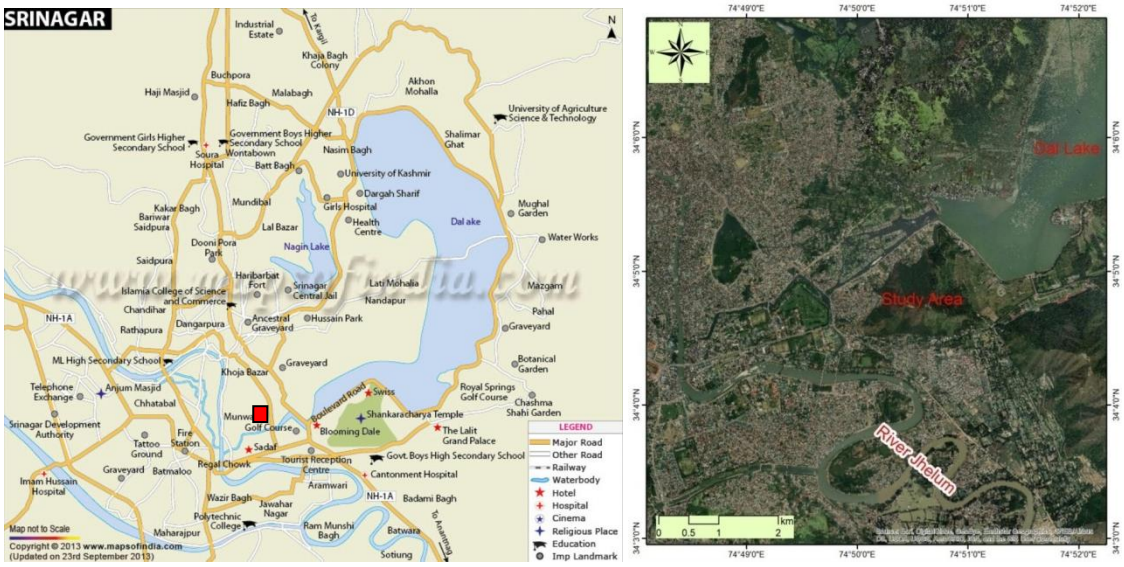

Figure 1: Map of Srinagar city showing the location of the study area Takht- Sulaiman hill forest [■] along the boulevard shore of Dal lake

The following formula was used to estimate mean denity in the area:

$$\text{Density} = \frac{n1 + n2}{\pi r^2 m} \ln\left(\frac{n1 + n2}{n2}\right)$$

Where,

r = radius of first zone (the second zone extends from r to infinity)

n1= number of birds counted within r

n2 = number of birds counted beyond r

m = number of replicate points in the set

Grimmett *et al.* (1998) was used for identification of the bird species besides confirmation from wildlife experts.

Result and Discussion

The combined record of the bird sightings and density during the study period April to July 2019 using the point count method is given in Table 1. A total of 49 counts were undertaken with 10 minutes time duration for each count. During 8 occasions of bird counts, no sightings of any birds were observed.

Kashmir Flycatcher, Rusty-tailed Flycatcher, Great Barbet, Spotted Piculet, and Tytler's Leaf Warbler were found to be at very low densities in the habitat.

The migratory status of avifauna revealed that 15 species (78.95%) were residents, 4 species (21.05%) were summer migrants and there were no winter visitors encountered during the study period - April to July 2019.

Table 1: A combined record of sightings and density of various bird species in the Takhat-i-Sulaiman forest habitat during April to July 2019 using point count method (Total counts = 49; Time duration for each count = 10 minutes; Number of counts yielding no sightings of any birds = 8)

S. No.	Bird Species	Numbers		Density, *birds/ha*
		Within 10m radius zone	***Beyond 10m radius zone***	
1.	*Acridotheres tristis* (Common Myna)	2	0	1.3
2.	*Aegithalos niveogularis* (White-throated Tit)	6	3	6.42
3.	*Alectoris chukar* (Chukar partridge)	2	0	1.3
4.	*Corvus macrorynchos* (Jungle or Large-billed Crow)	2	2	1.8
5.	*Corvus splendens* (House Crow)	10	11	8.81
6.	*Dendrocopos himalayensis* (Himalayan Woodpecker)	6	5	5.63
7.	*Dicrurus leucophaeus* (Ashy Drongo)	2	4	1.58
8.	*Ficedula subrubra* (Kashmir Flycatcher)	1	0	0.65
9.	*Garrulax lineatus* (Streaked Laughingthrush)	26	22	24.31
10.	*Hypsipetes leucophalus* (Black Bulbul)	17	14	16
11.	*Megalaima virens* (Great Barbet)	1	0	0.65
12.	*Milvus migrans* (Black Kite)	7	15	5.47
13.	*Muscicapa ruficauda* (Rusty-tailed Flycatcher)	1	0	0.65
14.	*Parus major* (Great Tit)	11	9	10.37
15.	*Passer domesticus* (House Sparrow)	4	0	2.6
16.	*Phoenicurus coeruleocephalus* (Blue-capped Redstart)	36	22	36.5
17.	*Phylloscopus tytleri* (Tytler's Leaf Warbler)	1	0	0.65
18.	*Picumnus innominatus* (Spotted Piculet)	1	0	0.65
19.	*Pycnonotus leucogenys* (Himalayan Bulbul)	6	4	5.95

Figure 2: Chukar partridge (*Alectoris chukar*) in Takhat-i-Sulaiman forest habitat

Baseline information is a prerequisite for conservation endeavors for any ecosystem and to understand the consequences of habitat destruction and deterioration (Llanos *et al.* 2011). Bird surveys provide useful information for basic and applied ecology and are useful for identifying priority areas for conservation (Daniels *et al.* 1991; Peterson *et al.* 2000).

Point counts are essentially stripped transects of zero length in which the observer performs the count in a 360º arc around a fixed survey station. Point counts are especially useful in difficult terrain where it is not possible to establish practical transects or perform counts while traveling along the transect line. Because point count observers are sedentary, they may be more likely to detect shy species that would otherwise hide and escape detection when mobile and conspicuous strip transect observers approach (Bibby *et al.* 2000). A well-spaced sample series of points in an area will provide more representative data than a few transects (Javed & Kaul 2002).

Bird diversity in Jammu & Kashmir varies seasonally and as many as 554 species belonging to 13 orders have been recorded. 262 species have been reported from the temperate and alpine regions of the Kashmir Valley (average annual rainfall - 733mm), 225 species have been reported from the cold high-level desert of Ladakh (having an average annual rainfall of 160 mm) and 183 species have been reported from the sub-tropical plains of Jammu (average annual rainfall - 1124mm) (JKTD 2020).

The study carried out during 2007-2009 in Srinagar city by Kait *et al.* (2014) recorded 54 species of birds. The migratory status of avifauna they recorded revealed that 25 species (46.3%) were residents, 17 species (31.5%) were summer migrants and 12 species (22.2%) were winter migrants.

During the present study which was carried out fortnightly from April to July, 2019, a total of 19 species of birds were recorded from the study area. Two species amongst these - Kashmir Flycatcher (*Ficedula subrubra*) and Tytler's Leaf Warbler (*Phylloscopus tytleri*) are endemic to Kashmir and have also been placed under the IUCN Red List of Threatened Species and categorized as vulnerable and near threatened respectively. Moreover, it is pertinent to mention that the said species have now low numbers throughout the Kashmir region. Therefore, it is recommended that Takhat-i-Sulaiman should be designated as a wildlife sanctuary.

Declarations

- **Ethics approval and consent to participate**

"Not applicable". The birds have been observed in the natural environment and do not include any capturing or harassment. Permissions for entry were not required because the place is yet to be declared as a conservation area.

- **Consent for publication**

"Not applicable". All authors in this publication consent to its publication by the journal.

- **Availability of data and material**

"Not applicable". The datasets generated and analyzed during the current study are available from the corresponding author on reasonable request.

- **Competing interests**

"The authors declare that they have no competing interests"

- **Funding**

"No funding was received for this academic research study"

- **Authors' contributions**

"DM performed the field studies and collected the necessary data, and was a major contributor in writing the manuscript. MA supervised the research, analyzed and interpreted the data. All authors read and approved the final manuscript."

References

Ali, S. & S.D. Ripley, 1974. The Handbook of Birds of India and Pakistan. Volumes I – X, Oxford University Press, Bombay.

Ali, S. & S.D. Ripley, 1996. A Pictorial Guide to the Birds of Indian Sub-Continent. Bombay Natural History Society, Mumbai, pp:1-172.

Bibby, C.J.; N.D. Burgess; D.A. Hill & S.H. Mustoe 2000. Bird Census Techniques. 2nd Edn., Academic Press, London.

Bibby, C.; M. Jones & S. Marsden 1998. Expedition Field Techniques: Bird Surveys. Expedition Advisory Centre, Royal Geographical Society, London.

Daniels, R.J.R.; M. Hegde; N.V. Joshi & M. Gadgil 1991. Assigning conservation value: a case study from India. Conservation Biology 5(4): 464–475.

Grimmett, R.; C. Inskipp & T. Inskipp 2011. Birds of the Indian Subcontinent. 2nd Edn., Oxford University Press and Christopher Helm, London, pp: 528.

Hutto, R.L.; M. Pletschet & P. Hendricks 1986. A fixed-radius point count method for nonbreeding and breeding season use. Auk 103: 593-602.

Islam, M.Z. & A.R. Rahmani 2004. Important Bird Areas in India: Priority Sites for Conservation. Indian Bird Conservation Network, Bombay Natural History Society, and Birdlife International, UK, pp: xvii+1133.

Javed, S. 1996. Study on Bird Community Structure of Terai Forest in Dudwa National Park. Ph.D. Thesis, Aligarh Muslim University, Aligarh, India.

Javed, S. & R. Kaul 2002. Field Methods for Bird Surveys. Bombay National History Society, Mumbai, pp: 63.

JKTD 2020. Jammu and Kashmir Tourism Department. URL: http://jktourism.org/ things-to-do/activities/bird-watching

Kait, R.; R. Manhas; S. Aggrwal & D.N. Sahi 2014. Birds of Srinagar City, Jammu and Kashmir. International Journal of Biodiversity and Conservation 6(3): 217-221.

Lawrence, W.R. 1895. The Valley of Kashmir. Frowde, London.

Llanos, F.A.; M. Failla; G.J. García; P.M. Giovine; M. Carbajal; P.M. González; D.P. Barreto; P. Quillfeldt & J.F. Masello 2011. Birds from the endangered Monte, the Steppes and Coastal biomes of the province of Río Negro, northern Patagonia, Argentina. Checklist 7(6): 782–797.

Peterson, A.T.; L.G. Ball & K.W. Brady 2000. Distribution of the birds of the Philippines: Biogeography and conservation priorities. Bird Conservation International 10(2): 149–167.

Rahmani, A.R. 2012. Threatened Birds of India – their Conservation Requirements. Indian Bird Conservation Network, Bombay Natural History Society, Royal Society for the Protection of Birds, and Birdlife International. Oxford University Press, pp: xvi+864.

Rahmani, A.R.; I. Suhail; P. Chandan; K. Ahmad & A.A. Zarri 2013. Threatened Birds of Jammu & Kashmir. Indian Bird Conservation Network, Bombay Natural History Society, Royal Society for the Protection of Birds, and Birdlife International. Oxford University Press, pp: xiv+150.

Sutherland, W.J. 1996. Ecological Census Techniques. 2nd Edn., Cambridge University Press, United Kingdom, pp: 337.

Verner, J. 1985. Assessment of counting techniques. Current Ornithology 2**:** 247-302.