

**Short Communication**

## **The Survey of Avifauna in the natural habitat and their adjoining areas of Harbhajwala, Dehradun, India**

**Rekha Rawat<sup>1</sup>, Dinesh Bhatt<sup>1</sup> and Ashish Kumar Arya<sup>2\*</sup>**

<sup>1</sup>*Avian Diversity and Bioacoustics Laboratory, Department of Zoology and Environmental Science, Gurukula Kangri Vishwavidyalaya, Haridwar-249404 (Uttarakhand), India*

<sup>2</sup>*Department of Environmental Science, Graphic Era University, Dehradun (Uttarakhand), India*

(Received: January 14, 2021; Revised: July 12, 2020; Accepted: July 13, 2021)

### **ABSTRACT**

The present study deals with the observation of avifauna in the Natural habitat and their adjoining areas of Harbhajwala in Dehradun, Uttarakhand. The study was carried out between December 2018 to October 2020. We observed 114 bird species, belonging to 50 families during the study period. Out of these 97 residents and 19 winters, migratory species were identified. The percentage of resident and winter visitor avian species was found to be 84% and 16%. Then the maximum number of species recorded from the family Muscicapidae. During the observation, we observed the Egyptian Vulture and Alexandrine Parakeet as Endangered and near-threatened species respectively according to IUCN. The presence of threatened species indicates the more conservation efforts are needed in the study area.

**Key words:** Avian Species, Natural Habitat, Observation, Threatened species, Harbhajwala

### **INTRODUCTION**

Birds indicate the environmental health of any ecosystem (Collar and Andrew, 1988). Approximately 10,000 bird species have been recorded worldwide and about 13 % of the world's species are found in the Indian sub-continent (Grimmett *et al.*, 2016). As the Study area comes under the region of the Himalayan foothills, the Himalayan region supports the rich avifaunal diversity due to rich floral diversity at different altitudes. (Mohan & Sondhi 2017). The Himalayan region is well known as a biodiversity hotspot, from the avian diversity point of view. (Satterfield *et al.* 1998). Many previous studies showed that 80 % of birds of the Indian Sub-continent found in the Himalayan region including some endemic species (Price *et al.*, 2003). The last decade has been devoted to avian variety and conservation. (Naithani and Bhatt, 2010, Bhatt and Joshi, 2011, Joshi and Bhatt, 2015, Saini *et al.*, 2017, Arya *et al.*, 2019) where studies have been conducted on avifaunal diversity in forest habitat, wetlands, mangroves, and agriculture habitat in India (Singh, 2002). The Himalayan foothills are globally identified as a good biological diversity, supported by the complex and consequent climatic and edaphic conditions. The avifauna of the Western Himalaya, an Endemic Bird Area (Islam and Rahmani 2004) Birds are good indicators because they are ecologically versatile and thrive in all kinds of habitat carnivores, and omnivores. Their presence is an indication of a healthy ecosystem or habitat (Jarvinen and Vaisanen 1979; Jarvinen 1983). Regular interval monitoring of bird species, on the other hand, is useful for understanding changes in the ecosystem and habitat restoration plans. The present study was an observation attempt on

avian species in Harbhajwala sites in Dehradun, Uttarakhand. This area was selected as it shows variation in habitats, including agricultural fields, water bodies, Sal Forest, and shrubs which attracts many birds according to their habitats; we have attempted to fill this gap through field surveys on the avifauna in the study area during December 2018 to October 2020. The preparation of an avian checklist based on abundance data indicates the health of ecosystems.

### **Study Area**

The present study was conducted from December 2018 to October 2020. The study was carried out in the natural habitat and their adjoining areas of Harbhajwala, Dehradun district (30.3165° N, 78.0322° E) Himalayan foothill of Uttarakhand state (Figure 1). The study area is enriched in shrubs, water streams and Sal forest patches, and agricultural land.

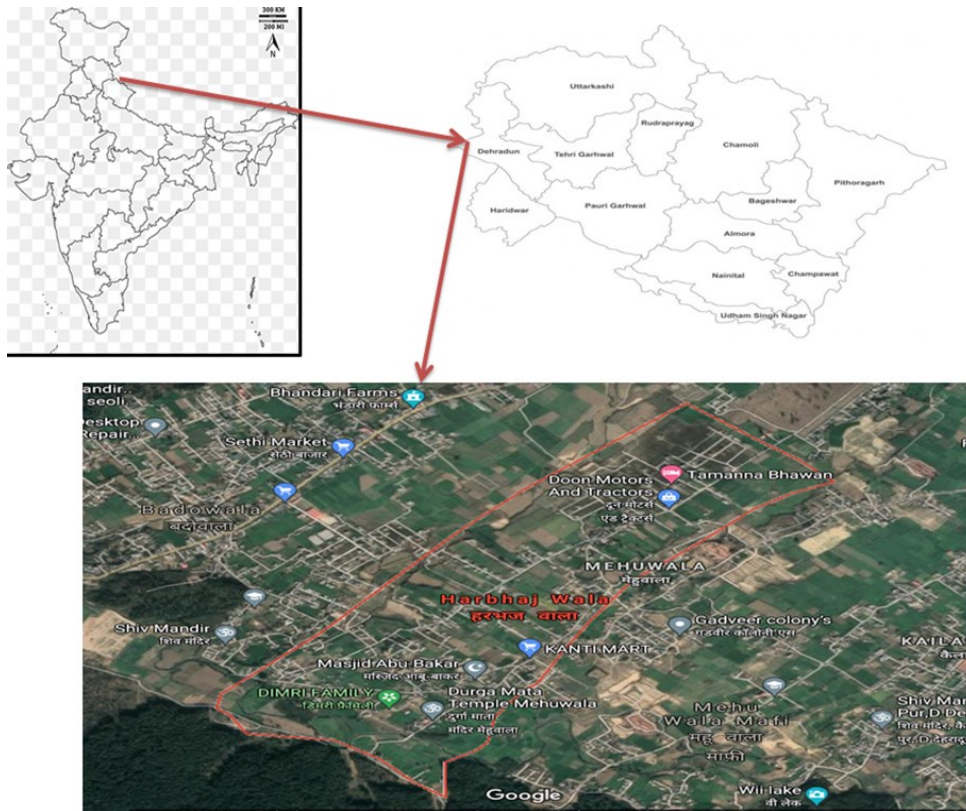
### **MATERIALS AND METHODS**

The avian species survey was conducted from December 2018 to October 2020; the field survey was carried out by using the binoculars (Nikon 10X50) and Nikon Coolpix P 1000 camera. Identification of birds in the field was based on Grimmett *et al.*, 2016 and Ali Ripley 1987. The survey was made from 6 am to 10 am and 4 pm to 6 pm excluding the rainy days.

### **RESULT AND DISCUSSION**

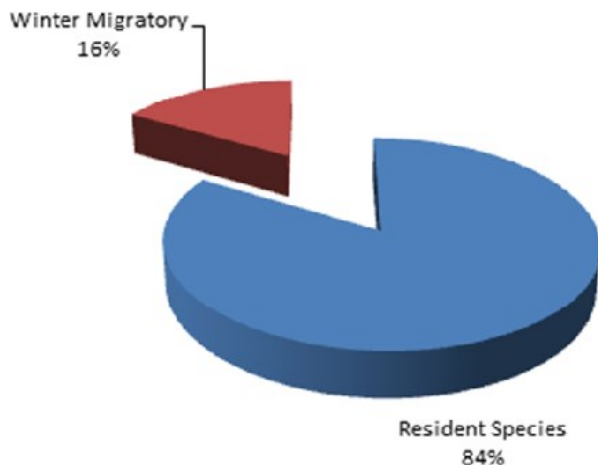
We observed a total of 116 species belonging to the 51 families during the survey (Table 1). Out of these 97 residents and 19 winters, migratory species were

\*Corresponding Author's E-mail: [ashishtyagi.gkv@gmail.com](mailto:ashishtyagi.gkv@gmail.com)



**Figure 1.** Study area in Harbhajwala, Dehradun, Uttarakhand. (Google Maps)

identified. The percentage of resident and winter visitor avian species was found to be 84%, and 16% respectively (Figure 2). The maximum number of species recorded from family Muscicapidae (8) followed by Cuculidae (7) Motacillidae (6) Cisticolidae, (5) Columbidae (5), etc. (Figure 3). Total 2 species fall under the various categories of IUCN including Egyptian Vulture (Plate 1a) and Alexandrine Parakeet (Plate 1c) comes under the Endangered and near-threatened respectively according to the IUCN Red data book. Some of the photographs of bird species observed at study sites are given in Plate 1(a-o). Forest, shrub, and agricultural patches are more significant habitats for avian communities and these types of habitats attract more numbers of avian species due to good sources of food and nesting shelters (Singh *et al.* 2019). Variations in the vegetation structure have



**Fig 2:** Status of bird species in the study area

also impacted species distribution (MacArthur *et al.*, 1962). The presence of endangered species Egyptian vulture in a particular area indicates a significant habitat for this species. Vultures as scavengers have an important ecological role by maintaining equilibrium in the ecosystem. They remove animal waste like carcasses of livestock and wild animals and carrion from the environment (Singh and Bisht, 2019). Water streams provided a suitable habitat for many waterbird species such as kingfishers and duck species (Arya *et al.*, 2019). The study covers some agricultural land and agricultural land to support avian diversity due to some alternative food resources such as seeds and invertebrates (Figueroa & Corales, 2005). Riverine and forest habitats attract many types of avian species and approximately 23% of bird species utilize the river and forest habitat during their life cycle. (Buckton 1998, Sinha *et al.*, 2019). We observed the maximum number of insectivorous species indicating that the study area has a large diversity of insects. The different types of habitat are also responsible to increase insect diversity and their diversity eventually enhances bird diversity and population in particular areas (Terborgh, 1977, Joshi *et al.*, 2021) The conservation initiatives should continue with public involvement in the particular areas and that the researchers should regularly monitor the birds to understand the changes in the species composition (Arya *et al.*, 2020). A long-term study is needed to understand the effect of climatic change and bird species distribution in the study area.

## CONCLUSION

We observed 116 avian species during the study period. As per the result, we found the maximum number of forest birds to indicate the wide variety of vegetation

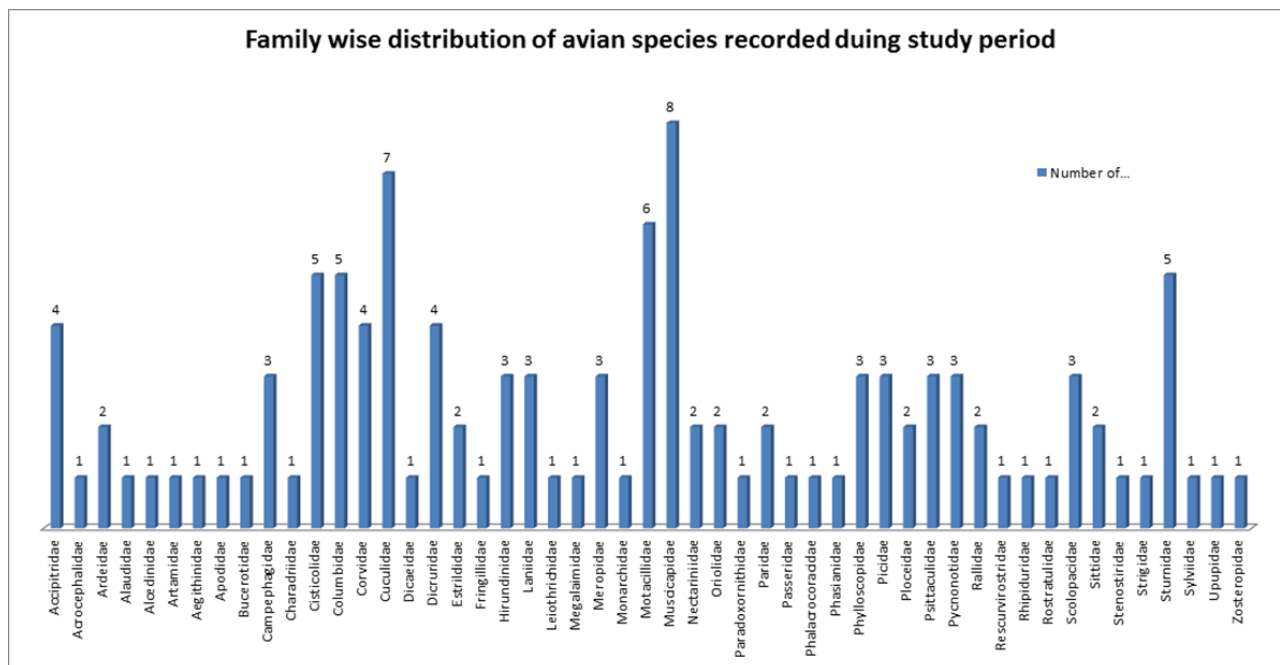
**Table 1.** A checklist of avian species recorded during the study period.

Family	Common Name	Scientific Name	Status	IUCN Status
Accipitridae	Egyptian Vulture	<i>Neophron percnopterus</i>	R	EN
	Crested Serpent-Eagle	<i>Spilornis cheela</i>	R	LC
	Black Kite	<i>Milvus migrans</i>	R	LC
	Black shouldered kite	<i>Elanus axillaris</i>	R	LC
Acrocephalidae	Blyth's Reed Warbler	<i>Acrocephalus dumetorum</i>	WM	LC
Ardeidae	Cattle Egret	<i>Bubulcus ibis</i>	R	LC
	Indian Pond-Heron	<i>Ardeola grayii</i>	R	LC
Alaudidae	Bengal Bushlark	<i>Mirafra assamica</i>	R	LC
Alcedinidae	White-throated Kingfisher	<i>Halcyon smyrnensis</i>	R	LC
Artamidae	Ashy Woodswallow	<i>Artamus fuscus</i>	R	LC
Aegithinidae	Common Iora	<i>Aegithina tiphia</i>	R	LC
Apodidae	Asian Palm-Swift	<i>Cypsiurus balasiensis</i>	R	LC
Bucerotidae	Indian Gray Hornbill	<i>Ocyrceros birostris</i>	R	LC
Campephagidae	Small Minivet	<i>Pericrocotus cinnamomeus</i>	R	LC
	Scarlet Minivet	<i>Pericrocotus speciosus</i>	R	LC
	Rosy Minivet	<i>Pericrocotus roseus</i>	R	LC
Charadriidae	Red-wattled Lapwing	<i>Vanellus indicus</i>	R	LC
Cisticolidae	Common Tailorbird	<i>Orthotomus sutorius</i>	R	LC
	Striated Prinia	<i>Prinia crinigera</i>	R	LC
	Gray-breasted Prinia	<i>Prinia hodgsonii</i>	R	LC
	Jungle Prinia	<i>Prinia sylvatica</i>	R	LC
	Ashy Prinia	<i>Prinia socialis</i>	R	LC
Columbidae	Rock Pigeon	<i>Columba livia</i>	R	LC
	Oriental Turtle-Dove	<i>Streptopelia orientalis</i>	R	LC
	Eurasian Collared-Dove	<i>Streptopelia decaocto</i>	R	LC
	Spotted Dove	<i>Streptopelia chinensis</i>	R	LC
Corvidae	Asian Emerald Dove	<i>Chalcophaps indica</i>	R	LC
	Rufous Treepie	<i>Dendrocitta vagabunda</i>	R	LC
	Gray Treepie	<i>Dendrocitta formosae</i>	R	LC
	House Crow	<i>Corvus splendens</i>	R	LC
Cuculidae	Large-billed Crow	<i>Corvus macrorhynchos</i>	R	LC
	Greater Coucal	<i>Centropus sinensis</i>	R	LC
	Pied Cuckoo	<i>Clamator jacobinus</i>	WM	LC
	Asian Koel	<i>Eudynamys scolopaceus</i>	R	LC
	Gray-bellied Cuckoo	<i>Cacomantis passerinus</i>	R	LC
	Common Hawk-Cuckoo	<i>Hierococyx varius</i>	R	LC
	Indian Cuckoo	<i>Cuculus micropterus</i>	R	LC
Dicaeidae Dicuridae	Common Cuckoo	<i>Cuculus canorus</i>	R	LC
	Thick-billed Flowerpecker	<i>Dicaeum agile</i>	R	LC
	Black Drongo	<i>Dicrurus macrocercus</i>	R	LC
	Ashy Drongo	<i>Dicrurus leucophaeus</i>	WM	LC
	Hair-crested Drongo	<i>Dicrurus hottentottus</i>	WM	LC
Estrildidae	Greater Racket-tailed Drongo	<i>Dicrurus paradiseus</i>	R	LC
	Red Avadavat	<i>Amandava amandava</i>	R	LC
Fringillidae	Scaly-breasted Munia	<i>Lonchura punctulata</i>	R	LC
	Common Rosefinch	<i>Carpodacus erythrinus</i>	WM	LC
Hirundinidae	Dusky Crag-Martin	<i>Ptyonoprogne concolor</i>	R	LC
	Wire-tailed Swallow	<i>Hirundo smithii</i>	WM	LC
	Red-rumped Swallow	<i>Cecropis daurica</i>	WM	LC
Laniidae	Isabelline Shrike	<i>Lanius isabellinus</i>	R	LC
	Long-tailed Shrike	<i>Lanius schach</i>	R	LC
	Gray-backed Shrike	<i>Lanius tephronotus</i>	R	LC
Leiothrichidae	Jungle Babbler	<i>Turdoides striata</i>	R	LC
Megalaimidae	Brown-headed Barbet	<i>Psilopogon zeylanicus</i>	R	LC
	Green Bee-eater	<i>Merops orientalis</i>	R	LC
Meropidae	Blue-tailed Bee-eater	<i>Merops philippinus</i>	R	LC
	Chestnut-headed Bee-eater	<i>Merops leschenaulti</i>	R	LC
Monarchidae	Indian Paradise-Flycatcher	<i>Terpsiphone paradisi</i>	R	LC

Table 1 continued in next page

	Gray Wagtail	<i>Motacilla cinerea</i>	R	LC
	Western Yellow Wagtail	<i>Motacilla flava</i>	R	LC
Motacillidae	White-browed Wagtail	<i>Motacilla maderaspatensis</i>	WM	LC
	White Wagtail	<i>Motacilla alba</i>	WM	LC
	Paddy field Pipit	<i>Anthus rufulus</i>	R	LC
	Tree Pipit	<i>Anthus trivialis</i>	WM	LC
	Indian Robin	<i>Copsychus fulicatus</i>	R	LC
	Oriental Magpie-Robin	<i>Copsychus saularis</i>	R	LC
Muscicapidae	Verditer Flycatcher	<i>Eumyias thalassinus</i>	R	LC
	Bluethroat	<i>Luscinia svecica</i>	WM	LC
	Siberian Stonechat	<i>Saxicola maurus</i>	WM	LC
	Pied Bush chat	<i>Saxicola caprata</i>	R	LC
	Gray Bushchat	<i>Saxicola ferreus</i>	R	LC
	Brown Rock Chat	<i>Oenanthe fusca</i>	R	LC
	Nectariniidae	Purple Sunbird	<i>Cinnyris asiaticus</i>	R
Crimson Sunbird		<i>Aethopyga siparaja</i>	R	LC
Oriolidae	Indian Golden Oriole	<i>Oriolus kundoo</i>	R	LC
	Black-hooded Oriole	<i>Oriolus xanthornus</i>	R	LC
Paradoxornithidae	Yellow-eyed Babbler	<i>Chrysomma sinense</i>	R	LC
Paridae	Green-backed Tit	<i>Parus monticolus</i>	R	LC
	Cinereous Tit	<i>Parus cinereus</i>	R	LC
Passeridae	House Sparrow	<i>Passer domesticus</i>	R	LC
Phalacrocoracidae	Little Cormorant	<i>Microcarbo niger</i>	R	LC
Phasianidae	Red Junglefowl	<i>Gallus gallus</i>	R	LC
Phylloscopidae	Lemon-rumped Warbler	<i>Phylloscopus chloronotus</i>	R	LC
	Greenish Warbler	<i>Phylloscopus trochiloides</i>	WM	LC
	Gray-hooded Warbler	<i>Phylloscopus xanthoschistos</i>	R	LC
Picidae	Eurasian Wryneck	<i>Jynx torquilla</i>	WM	LC
	Black-rumped Flameback	<i>Dinopium benghalense</i>	R	LC
	Streak-throated Woodpecker	<i>Picus xanthopygaeus</i>	R	LC
Ploceidae	Streaked Weaver	<i>Ploceus manyar</i>	R	LC
	Baya Weaver	<i>Ploceus philippinus</i>	R	LC
Psittaculidae	Alexandrine Parakeet	<i>Psittacula eupatria</i>	R	NT
	Rose-ringed Parakeet	<i>Psittacula krameri</i>	R	LC
	Plum-headed Parakeet	<i>Psittacula cyanocephala</i>	R	LC
Pycnonotidae	Red-vented Bulbul	<i>Pycnonotus cafer</i>	R	LC
	Red-whiskered Bulbul	<i>Pycnonotus jocosus</i>	R	LC
	Himalayan Bulbul	<i>Pycnonotus leucogenys</i>	R	LC
Rallidae	Eurasian Moorhen	<i>Gallinula chloropus</i>	R	LC
	White-breasted Waterhen	<i>Amaurornis phoenicurus</i>	R	LC
Rescurvirostridae	Black-winged Stilt	<i>Himantopus himantopus</i>	WM	LC
Rhipiduridae	White-throated Fantail	<i>Rhipidura albicollis</i>	R	LC
Rostratulidae	Greater painted-snipe	<i>Rostratula benghalensis</i>	R	LC
	Common Sandpiper	<i>Actitis hypoleucos</i>	WM	LC
	Common Snipe	<i>Gallinago gallinago</i>	WM	LC
Scolopacidae	Green Sandpiper	<i>Tringa ochropus</i>	WM	LC
	Chestnut-bellied Nuthatch	<i>Sitta cinnamoventris</i>	R	LC
Sittidae	Velvet fronted Nuthatch	<i>Sitta frontalis</i>	R	LC
Stenostiridae	Gray-headed Canary-Flycatcher	<i>Culicicapa ceylonensis</i>	R	LC
Strigidae	Spotted Owlet	<i>Athene brama</i>	R	LC
	Asian Pied Starling	<i>Gracupica contra</i>	R	LC
Sturnidae	Brahminy Starling	<i>Sturnia pagodarum</i>	R	LC
	Chestnut-tailed Starling	<i>Sturnia malabarica</i>	R	LC
	Common Myna	<i>Acridotheres tristis</i>	R	LC
	Jungle Myna	<i>Acridotheres fuscus</i>	R	LC
Sylviidae	Lesser Whitethroat	<i>Sylvia curruca</i>	WM	LC
Upupidae	Eurasian Hoopoe	<i>Upupa epops</i>	R	LC
Zosteropidae	Indian White-eye	<i>Zosterops palpebrosus</i>	R	LC

R = Staying in one place all the year, non-migratory; WM = A winter migrant to India which breeds in Eurasia and visits India in winter, LC= Least Concern, NT= Near Threatened, EN= Endangered, IUCN= International Union for Conservation of Nature



**Figure 3.** Family wise diversity of birds recorded during the study period

cover in particular areas. The presence of near threatened (NT) and endangered species makes it a vital area for biological diversity conservation. As the valley's population grows, the flat areas with farms, orchards, and tea gardens are being covered with concrete. Air pollution from vehicles and limestone kilns is also present in some sections of Dehradun. Rivers are under threat from fishing and bed mining for sand, gravel, and stones, all of which have resulted in habitat depletion for birds and aquatic wildlife. This has caused considerable soil erosion and landslides, making these mountain slopes completely barren. Because the study region is semi-urban and half of the population is still dependent on grasses and farming, collecting fodders by chopping down trees and grasses occasionally affect the habitat and destroys numerous bird nests. Awareness for the conservation of birds among the people residing in the study area is need for an hour.

## ACKNOWLEDGMENT

I thank the Forest Department, Govt. of Uttarakhand for providing permission to access the forest areas. The infrastructural facilities provided by the Department Of Zoology and Environmental Science, GKV, Haridwar are gratefully acknowledged.

## REFERENCES

- Ali S., Ripley S. D. and Dick J. H. 1987. Compact handbook of the birds of India and Pakistan.
- Arya A. K., Bhatt D., Singh A., Saini V., Verma P., Rathi R. and Bhatnagar P. 2019. Diversity and status of migratory and resident wetland birds in Haridwar, Uttarakhand, India. *Journal of Applied and Natural Science* 11(3): 732–737.
- Arya A.K., Joshi K.K., Bachheti A., Raturi V., Dubey V.P., Bhatnagar P. and Rawat R. 2020. Avian Survey at Haiderpur Wetland in Hastinapur Wildlife Sanctuary Uttar Pradesh, India *Journal of Environment and Bio-Sciences* 34 (2): 107 – 114.
- Bhatt D. and Joshi K. K. 2011. Bird assemblages in natural and urbanized habitats along elevational gradient in Nainital district (western Himalaya) of Uttarakhand state, India *Current Zoology* 57(3): 318–329.
- Buckton S. T. 1998. Spatio-temporal patterns in the distribution and ecology of river birds (Doctoral dissertation, University of Wales, Cardiff).
- Collar N. J. and Andrew P. 1988. *Birds to watch*. International Council for Bird Preservation.
- Terborgh J. 1977. Bird species diversity on an Andean elevational gradient. *Ecology* 58(5): 1007-1019.
- Joshi K. K., Bhatt D. and Arya A. K. 2021. Avian diversity in forest, agriculture and water stream habitats of Dehradun Valley, Uttarakhand, India. *Biodiversity Data Journal* e 9.
- Figuroa R. and Corales S. 2005. Seasonal diet of the Aplomado alcon (*Falco femoralis*) in an agricultural area of Araucania, Southern Chile. *Journal of Raptor Research* 39: 135–7
- Grimmett, R., Inskipp, C. and Inskipp, T. 1998. *Birds of the Indian Subcontinent*.
- Islam M. Z. and Rahmani A. R. 2004. Important Bird Areas in India: priority sites for conservation. Bombay Natural History Society, Mumbai.
- Järvinen O. 1983. How should a Finnish monitoring system of bird populations be implemented? *Ornis Fennica* 60(4): 126–128.
- Järvinen, O., Väisänen R. A. 1979. Changes in bird populations as criteria of environmental changes. *Ecography* 2(2): 75–80.
- Joshi K. and Bhatt D. 2015. Avian species distribution along elevation at doon valley (foot hills of western Himalayas), Uttarakhand, and its association with vegetation structure. *Journal of Asia-Pacific Biodiversity* 8(2): 158-167.
- MacArthur R. H., MacArthur J. W. and Preer, J. 1962. On bird species diversity. II. Prediction of bird census from habitat measurements. *The American Naturalist* 96(888): 167–174.

- Mohan D. and Kumar R. 2010. Breeding birds of Kothri valley, eastern Garhwal Himalayan foothills, India. *Forktail* 26: 75-85.
- Mohan D. and Sondhi S. 2017. An updated checklist and bibliography of the birds of Uttarakhand. Dehradun, India: Uttarakhand Forest Department. Pp. i –vi.
- Naithani A. and Bhatt D. 2010. A checklist of birds of Pauri district, Uttarakhand, India. *Indian Birds* 6 (6): 155-157.
- Price, T., Zee, J., Jamdar, K. and Jamdar, N. 2003. Bird species diversity along the Himalaya: A comparison of Himachal Pradesh with Kashmir. *Journal of the Bombay Natural History Society*, 100(2 & 3), 394â.
- Saini V., Joshi K., Bhatt D., Singh A. and Joshi, R. 2017. Waterbird species distribution between natural and manmade wetland in Himalayan foothills of Uttarakhand, India. *Biodiversitas Journal of Biological Diversity* 18(1):334-340.
- Singh V. and Bisht S. S. 2019. Records of Critically Endangered Species of Avian fauna: *Vultures Gyps indicus* (Scopoli, 1786)... and *Sarcogyps calvus* (Scopoli, 1786) from Surai Reserved Forest at Foot Hills of Kumaun Himalaya.
- Sinha A., Hariharan H., Adhikari, B. S. and Krishnamurthy R. 2019. Bird diversity along riverine areas in the Bhagirathi Valley, Uttarakhand, India. *Biodiversity data journal*, 7.
- Stattersfield A. J., Crosby M. J., Long M. J. and Wege D. C. 1998. *Endemic Bird Areas of the World: Priorities for Biodiversity Conservation*. Cambridge, UK: BirdLife International.
- Shannon C.E. and Weaver W. 1949. *The mathematical theory of communication*. University Illinois Press Urbana, IL



**Plate 1. Some bird species observed in the study area (Harbhajwala, Dehradun).**

Egyptian Vulture (*Neophron percnopterus*) (4a), A pair of Egyptian vulture with nesting material on a mobile network tower (4b), Alexandrine Parakeet (*Psittacula eupatria*) (4c), Black-shouldered kite (*Elanus axillaris*) (4d), Indian pond heron or paddybird (*Ardeola grayii*) (4e), Velvet-fronted nuthatch (*Sitta frontalis*) (4f), Ashy prinia or ashy wren-warbler (*Prinia socialis*) (4g), Baya weaver (*Ploceus philippinus*) (4h), Eurasian hoopoe (*Upupa epops*) (4i), Bluethroat (*Luscinia svecica*) (4j), Stork-billed kingfisher (*Pelargopsis capensis*) (4k), Spotted owllet (*Athene brama*) (4l), Verditer flycatcher (*Eumyias thalassinus*) (4m), Greater painted-snipe (*Rostratula benghalensis*) (4n), Isabelline shrike or Daurian shrike (*Lanius isabellinus*) (4o).

