

on the genus-level status of the bird while its species-level split should be recognised. We have proposed, following Ali & Ripley (1987), that the northern species, i.e., found north of the Palghat Gap, be called the Rufous-bellied Shortwing *B. major*, and the southern species, i.e., found south of the Palghat Gap, the White-bellied Shortwing *B. albiventris*.

### Conservation implications

The newly-split northern species of the shortwing now has a much smaller range, and its conservation status will need to be re-examined. One of the larger implications of the study has been the possible impact of climate change on the evolution of this taxon. While one cannot conclusively state what might happen to this species in future climate change scenarios, one can draw broad conclusions, based on the evidence that at the Last Glacial Maxima, with a drying up of the forested habitats, the shortwing populations had crashed. It appears that some populations like the one in the Bababudan Hills (Karnataka), with inherently low population densities, might be the first ones to disappear, should we see any major impact of climate change. It is essential then, that a programme be initiated urgently, and efforts dedicated to monitoring the species in this area in the years to come.

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## Birds of three different forest habitats in Nainital district (Western Himalaya), Uttarakhand, India

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### Abstract

The present study was made to estimate the avifauna in terms of species richness and diversity and guild structure in forest habitats of Nainital district of Uttarakhand (350–2450m asl; 29°N). Field studies were conducted during January 2006 to December 2007. A total of 88, 106 and 95 species, respectively were recorded from Nainital, Bhowali and Haldwani forest habitats. A checklist of 160 avian species was recorded in the Nainital district forest habitats. This study could provide a base line structure for further studies on species distribution in different forest habitats in Nainital district.

### Introduction

On a global scale, the Himalayan regions are rich in biodiversity because of various factors including the diverse forest types such as broad leaf mixed, dry deciduous, moist deciduous and conifer that are found here. Therefore, conservation of forest areas of Himalayan region is imperative. These forests also have a large number of endemic and globally threatened species. The avifauna of this region has been extensively documented from Jerdon's (1862–1864) pioneering investigation to Ali & Ripley's (1983) authoritative *Handbook*. Thereafter, some other studies have also been conducted in recent years to prepare the checklist of the avi fauna in some parts of Uttarakhand state (Sankaran 1995; Sharma *et al.* 2001; Sathyakumar 2003; Singh *et al.* 2004; Sultana *et al.* 2007; Joshi & Bhatt 2009; Naithani & Bhatt 2010; Bhatt & Joshi 2011).

In the context of avian diversity many studies have identified

the factors such as vegetation structure profile, tree diversity, weather conditions, *etc.*, responsible for variation in avifauna from habitat to habitat in India (Beehler *et al.* 1987; Daniels 1989; Johnsingh *et al.* 1986). These studies also emphasised the value of avifaunal studies in quantifying and monitoring forest degradation.

The history of ornithology from this hilly region is brief. The last comprehensive field work in the area was by Hudson (1930) who compiled a checklist. After Hudson, detailed work was carried out by the famous Indian ornithologist Salim Ali, who published his work in a book entitled "Indian Hill Birds" (1984). However, few studies concentrated on the avian species abundance and community structure in forest habitats of the Himalayan region.

In the light of this background, we decided to prepare an avian species checklist for three different forest habitats in Nainital district of Western Himalaya.

### Study sites

The survey was carried out in three different forest habitats in Nainital district of Uttarakhand for a period of two years during January 2006 to December 2007 (Fig. 1. Table 1). The Nainital district occupies the southern portion of the Kumaun division (28°44'N – 30°49'N, 78°45'E – 81°01'E). Geographically Nainital district is heterogeneous; its northern portion consists of hills and the southern portion of the alluvial plain called Bhabar (Valdia & Bartarya 1980).

The study site is dominated by four species of oak: rainj *Quercus lanuginosa*, banj *Q. inacana*, karkshul *Q. semicarpifolia*, and tilonj *Q. dilatata*, Himalayan cypress *Cupressus torulosa* and deodar *Cedrus deodarus*. Among oaks, banj is most common. The forest habitat of Bhowali is rich in chir pine *Pinus roxburghii* and banj oak and the shrub, lantana *Lantana camarana* is wide spread in this area.

Immediately at the foot of the Nainital hills is the Bhabar belt (Haldwani). This belt contains deciduous forest. The Haldwani forest area is dominant with valuable trees such as sal *Shorea robusta*, sain *Terminalia tomentosa* and haldu *Adiva cordifolia*, dhauri *Lagerstroemia parviflora*, shisham *Dalbergia sissoo* and khair *Acacia catechu*. Lantana is widely spread here too.

### Methods

The present study was carried out in three forest habitats of Nainital district namely (A) Nainital, (B) Bhowali, and (C) Haldwani along different sections of the elevational gradient. Forest habitat of the study areas consisted of oak and deodar (Nainital), pine–oak mix (Bhowali) and sal–khair mix (Haldwani).

Field studies were conducted for two years during January 2006 to December 2007 using field binoculars (7x50) and GPS (e-trex Vista). Fixed width line-transect count method (Verner 1985) was used for measuring bird abundance. The method of bird census used in the various habitats was the same. We recorded all birds seen within 50 m on each side of the transect line. Observations on birds in each line transect was made by walking on foot. Transect lines were not necessarily straight; at Bhowali and Nainital forest there were a lot of uphill and downhill tracts. However, transects did not criss-cross one another.

At each study area three transects of one km. each were laid in each habitat and each transect was visited monthly. The total transects laid were 108 [12 months x 3 transects per forest types x 3 study areas = 108]. The same transects were revisited the following year too.

The time of sampling was between 0730–1030 hrs and 0500–0800 hrs in the mornings and 1600–1800 hrs during winter and summer, respectively. Sampling was avoided during rainy days. The identification of birds in the field was based on Grimmett *et al.* (1998).

### Data analysis

Bird species diversity was measured using Shannon's index ( $H'$ ) (MacArthur & MacArthur 1961). The average of monthly mean abundance of both the years was accounted for calculating total abundance of the species. This value was then used to measure BSD and BSR during the study.

To understand the similarity among the species composition in different forest types Sorensen's quantitative index (Magurran 1988) was used. Species can be categorised as rare depending on the criteria used to define rarity. Species that had less than five observations per sighting were categorised as rare (Gaston 1994; Magurran 1988).

To determine the guild structure foraging birds were observed in the field. The frequency of foraging on a given foraging substrate, and whenever possible, types of food obtained were ascertained for each species on the basis of at least ten observations per species. Species were accordingly classified into guilds of insectivores, frugivores, granivores, carnivores, or nectarivores.

### Results

160 bird species belonging to 24 families were recorded in forest habitats (see Appendix). Among these, maximum numbers of species 63 (39.24%) were found in site B (Bhowali forest) and minimum 42 (26.26%) at site A (Nainital forest). Site C (Haldwani forest) supported 55 (34.17%) species. Among the 24 families, Muscicapidae (32.09%) was the most represented followed by Picidae (18.20%), Phasianidae (7.31%), and Accipitridae (4.82%). Table 2 indicates the species diversity indices (BSR and BSD).



Fig.1. Study location map of Nainital district, western Himalaya, India.

The largest number of rare species (19.31%) were found in site A, while the least number of rare species (12.26%) in site B and (13.68%) site C respectively. Maximum similarities of avian species were observed between oak and pine forests (Site A and Site B); followed by pine and sal forests (Site B and Site C) (Table 3). Study of the guild structure revealed that insectivores dominated in the forest types, followed by omnivores. The percentage of carnivores, granivores, frugivores, and nectarivores among forest type habitats (Tables 4, 5), indicate differential availability of the resources in the habitat studied.

**Discussion & conclusion**

The results indicate that pine mixed forest has high number of unique species as compared to other forests. This shows that pine mixed forest has its own bird community. According to Thiollay *et al.* (1988), each forest type has its own species composition. Similarity indices indicate the similarity between species associated with vegetation types. The distribution and abundance of many bird species are determined by the configuration and composition of the vegetation that comprises a major element of their habitat (Cody 1985; Morrison 1992; Block & Brennan 1993). It is interesting to know that the abundance of Red Jungle fowl *Gallus gallus* was good in site C forest showing less human interaction/ poaching in this area.

In this study it was found that insectivore species were dominant in forest habitats, indicating rich abundance and easy availability of insects. The variation in bird community, consistent with the distribution of food resources was also reported by Lefebvre & Poulin (1997). Some studies conducted in the Indian Subcontinent (Johnsingh *et al.* 1994; Kropil 1996; Sharma 2001; Singh 2004) have also shown that the insectivore guild is dominant in forest habitats. We also found that species diversity

fluctuated across seasons among forest types and maximum diversity was found in spring/summer season at mid-elevation forest (Bhowali). Very few studies have been conducted in this area and our knowledge of the avifauna is virtually unknown. Hudson (1930), documented 124 bird species in Nainital (seven hills); Briggs (1931) documented 83 avian species in Ranikhet forest; Tak (1995) documented 127, 94, and 82 species of birds from Nainital, Almora, and Pithoragarh districts, and Sultana (1997) documented 182, 81, and 162 bird species from Almora, Nainital, and Pithoragarh respectively.

The difference observed in species diversity among study areas could be due to elevation and vegetation differences associated with elevation. For example, the Bhowali forest is mixed (e.g. *P. roxburghii*, *Q. leucotrichophora* along with some *Ficus*), providing better food resources for bird communities compared to Nainital or Haldwani forests where mostly *C. deodara* and *S. robusta* trees predominate, respectively. Probably due to this habitat characteristic the Bhowali forest (mid-elevation) supports more avian species compared to low and high elevation forest. Similarity, the positive relationship between habitat characteristics and BSD has been demonstrated by a number of studies (Wines 1989; Wilson & Comet 1996; Raman *et al.* 2005; Vijayan & Gokula 2006). It has also been suggested that species similarity or turnover along elevation is the consequence of vegetation types and climatic conditions (Terborgh 1977; Terborgh & Weske 1975; Rehbeck 1995, 1997).

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**Table 1.** Showing the Vegetation zone and elevation sections of the study areas

Study area	Vegetation zone	Approximate Elevation	Climate Zone	Annual mean temp. (°C)
Nainital	Oak-Conifer forest	1900-2450 m asl	Temperate	14.73
Bhowali	Pine-Oak mixed	1450-1700 m asl	Subtropical	16.03
Haldwani	Broad leaf mixed	350-500 m asl	Tropical	23.45

**Table 2.** Showing the comparative diversity indices of species in forest habitat along elevational gradient (2006-2007)

	Site A	Site B	Site C
	(Nainital forest)	(Bhowali Forest)	(Haldwani forest)
Dominant Tree species	Deodar, Oak	Pine, Oak	Khair, Sal
Shannon's diversity index (H')	3.72	3.86	3.77
Species richness (R)	10.21	11.67	10.43
Exclusive species in forest habitat	26	39	34
Rare species (n<5)	17	13	13
Species individuals (N)	5029	8064	8170

**Table 3.** Matrix of number of species in common (upper right) and percentage similarity (Sorensen's index) (lower left) for birds of different study areas

Study areas forest	Site A	Site B	Site C
A (Nainital)	0	62 (no. of common species)	40 (no. of common species)
B (Bhowali)	49 (% similarity)	0	55 (no. of common species)
C (Haldwani)	31 (% similarity)	43 (% similarity)	0

**Table 4.** Showing the species feeding guilds in forest habitat at different study sites (2006-2007)

Main feeding guilds	Sub feeding guilds	Nainital	Bhowali	Haldwani
Insectivore	6	58 (65.90%)	58 (54.71 %)	51 (53.68 %)
Omnivore	2	9 (10.22 %)	13 (12.26 %)	14 (14.73 %)
Frugivore	2	7 (7.95 %)	9 (8.49 %)	14 (14.73 %)
Carnivore	4	6 (6.81 %)	8 (7.54 %)	7 (7.36 %)
Granivore	2	6 (6.81 %)	15 (14.15 %)	7 (7.36 %)
Nectarivore	2	2 (2.27 %)	3 (2.83 %)	2 (2.10 %)

Table 5. Showing the species sub feeding guilds in forest habitat among different study sites (2005–2006)

Main- & sub-feeding guilds	Site A (Nainital)	Site B (Bhowali)	Site C (Haldwani)
<b>Insectivore</b>			
Aerial insectivore	22 (25%)	20 (18.86%)	19 (20%)
Bark gleaning insectivore	9 (10.22%)	7 (6.60%)	12 (12.63%)
Foliage gleaning insectivore	6 (6.81%)	6 (5.66%)	2 (2.10%)
Sallying insectivore	9 (10.22%)	10 (9.43%)	9 (9.47%)
Under-storey insectivore	8 (9.09%)	9 (8.49%)	5 (5.26%)
Grass land insectivore	4 (4.54%)	6 (5.66%)	4 (4.21%)
<b>Omnivore</b>			
Terrestrial omnivore	4 (4.54%)	7 (6.60%)	6 (6.31%)
Arboreal terrestrial omnivore	5 (5.68%)	6 (5.66%)	8 (8.42%)
<b>Granivore</b>			
Granivore seed eater	4 (4.54%)	9 (8.49%)	4 (4.21%)
Frugivore granivore insectivore seed eater	2 (2.27%)	6 (5.66%)	3 (3.15%)
<b>Frugivore</b>			
Frugivore seed eater	4 (4.54%)	6 (5.66%)	10 (10.52%)
Frugivore insectivore	3 (3.40%)	3 (2.83%)	4 (4.21%)
<b>Carnivore</b>			
Sallying carnivore	1 (1.13%)	4 (3.77%)	4 (4.21%)
Arboreal terrestrial carnivore	2 (2.27%)	1 (0.94%)	1 (1.05%)
Terrestrial carnivore	1 (1.13%)	3 (2.83%)	1 (1.05%)
Wading carnivore	2 (2.27%)	0	1 (1.05%)
<b>Nectarivore</b>			
Nectarivore insectivore	1 (1.13%)	1 (0.94%)	1 (1.05%)
Nectarivore	1 (1.13%)	2 (1.88%)	1 (1.05%)

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## Appendix

Species recorded during the present study (2006–2007)

Species	Feeding guild	Status	Distribution at study sites
<b>Accipitridae</b>			
Black-shouldered Kite <i>Elanus caeruleus</i>	Carnivore	r	H
Black Kite <i>Milvus migrans</i>	Carnivore	r	N; B; H
Egyptian Vulture <i>Neophron percnopterus</i>	Carnivore	r	H
Indian White-backed Vulture <i>Cyps bengalensis</i>	Carnivore	r	N; B
Himalayan Griffon <i>G. himalayensis</i>	Carnivore	r	N
Besra Sparrowhawk* <i>Accipiter virgatus</i>	Carnivore	r	B
Common Buzzard <i>Buteo buteo</i>	Carnivore	ww	N; B
Booted Eagle* <i>Hieraetus pennatus</i>	Carnivore	ww	H
<b>Phasianidae</b>			
Black Francolin <i>Francolinus francolinus</i>	Insectivore	e	B
Common Quail <i>Coturnix coturnix</i>	Insectivore	r	B; H
Koklass Pheasant <i>Pucrasia macrolopha</i>	Insectivore	am	N
Red Junglefowl <i>Gallus gallus</i>	Insectivore	r	H
Kaleej Pheasant <i>Lophura leucomelanos</i>	Insectivore	am	B; N
Cheer Pheasant (*Vocal)* <i>Catreus wallichii</i> *	Insectivore	r	N
Indian Peafowl <i>Pavo cristatus</i>	Insectivore	r	H
<b>Columbidae</b>			
Blue Rock Pigeon <i>Columba livia</i>	Granivore	r	H; B; N
Oriental Turtle-Dove <i>Streptopelia orientalis</i>	Granivore	r	N; B
Spotted Dove <i>S. chinensis</i>	Granivore	r	B; H
Eurasian Collared-Dove <i>S. decacoto</i>	Granivore	r	H
Emerald Dove* <i>Chalcophaps indica</i>	Granivore	r	B
<b>Psittacidae</b>			
Alexandrine Parakeet <i>Psittacula eupatria</i>	Frugivore	r	H
Rose-ringed Parakeet <i>P. krameri</i>	Frugivore	r	H; B
Slaty-headed Parakeet <i>P. himalayana</i>	Frugivore	r	N; B
Plum-headed Parakeet <i>P. cyanocephala</i>	Frugivore	r	B

Species	Feeding guild	Status	Distribution at study sites
<b>Cuculidae</b>			
Pied Crested Cuckoo <i>Clamator jacobinus</i>	Omnivore	sv	H
Indian Cuckoo <i>Cuculus micropterus</i>	Omnivore	r	H-B; N
Common Cuckoo <i>Cuculus canorus</i>	Omnivore	r	H
Asian Koel <i>Eudynamis scolopacea</i>	Omnivore	r	H; B
Greater Coucal <i>Centropus sinensis</i>	Omnivore	r	H
Lesser Coucal <i>Centropus bengalensis</i>	Omnivore	r	H
<b>Capitonidae</b>			
Great Barbet <i>Megalaima virens</i>	Insectivore	r	N; B
Brown-headed Barbet* <i>M. zeylanica</i>	Insectivore	r	B
Lineated Barbet* <i>M. lineata</i>	Insectivore	r	B
Blue-throated Barbet <i>M. asiatica</i>	Insectivore	r	B; H
Coppersmith Barbet* <i>M. haemacephala</i>	Insectivore	r	H
<b>Picidae</b>			
Speckled Piculet <i>Picumnus innominatus</i>	Insectivore	r	N
Brown-capped Pygmy Woodpecker	Insectivore	r/am	B; N
<i>Dendrocopos nanus</i>			
Grey-capped Pygmy Woodpecker			
<i>D. canicapillus</i>	Insectivore	r	N
Brown-fronted Pied Woodpecker <i>D. auriceps</i>	Insectivore	r	B
Fulvous-breasted Pied Woodpecker <i>D. macei</i>	Insectivore	R	B
Rufous-bellied Pied Woodpecker			
<i>D. hyperythrus</i>	Insectivore	R	B; H
Himalayan Pied Woodpecker <i>D. himalayensis</i>	Insectivore	R	H; B
Small Yellow-naped Woodpecker			
<i>Picus chlorolophus</i>	Insectivore	r	N
Little Scaly-bellied Green Woodpecker*			
<i>P. xanthopygaeus</i>	Insectivore	r/am	B
Large Scaly-bellied Green Woodpecker			
<i>P. squamatus</i>	Insectivore	r	N; B
Black-naped Green Woodpecker <i>P. canus</i>	Insectivore	r	B; H

Species	Feeding guild	Status	Distribution at study sites	Species	Feeding guild	Status	Distribution at study sites
Himalayan Golden-backed Woodpecker <i>Dinopium shorii</i>	Insectivore	r	B; N	Greenish Leaf-Warbler <i>P. trochiloides</i>	Insectivore	r	N
Common Golden-backed Woodpecker* <i>D. javanense</i>	Insectivore	sv	H; B	Gold-spectacled Flycatcher-Warbler	Insectivore	r	N
Lesser Golden-backed Woodpecker <i>D. benghalense</i>	Insectivore	r	N; B	<i>Seicercus burkii</i>			
Greater Golden-backed Woodpecker <i>Chrysocolaptes lucidus</i>	Insectivore	r	B	Grey-headed Flycatcher-Warbler	Insectivore	r	N; B
Great Slaty Woodpecker* <i>Mulleripicus pulverulentus</i>	Insectivore	r	B	<i>S. xanthoschistos</i>			
<b>Alaudidae</b>				Common Lesser Whitethroat * <i>Sylvia curruca</i>	Insectivore	r	B
Eurasian Skylark <i>Alauda arvensis</i>	Granivore	ww	H	Asian Brown Flycatcher <i>Muscicapa dauurica</i>	Insectivore	sv	B
Eastern Skylark <i>A. gulgula</i>	Granivore	ww	H	Red-throated Flycatcher <i>Ficedula parva</i>	Insectivore	r/am	N; B
<b>Motacillidae</b>				Little Pied Flycatcher <i>F. westermanni</i>	Insectivore	r	H; B
White Wagtail <i>Motacilla alba</i>	Insectivore	ww	H; B	Verditer Flycatcher <i>Eumyias thalassina</i>	Insectivore	r	N; B; H
Grey Wagtail <i>M. cinerea</i>	Insectivore	ww	H; B	Small Niltava <i>Niltava macgrigoriae</i>	Insectivore	r	B
Eurasian Tree Pipit <i>Anthus trivialis</i>	Granivore	r	H	Rufous-bellied Niltava <i>N. sundara</i>	Insectivore	r/am	B
Upland Pipit <i>A. sylvanus</i>	Granivore	r	H	Blue-throated Flycatcher *	Insectivore	r/am	N
<b>Campephagidae</b>				<i>Cyornis rubeculoides</i>			
Large Cuckoo-Shrike <i>Coracina macei</i>	Insectivore	r	B; H	Grey-head Flycatcher <i>Culicicapa ceylonensis</i>	Insectivore	r	N; B; H
Bar-bellied Cuckoo-Shrike <i>C. striata</i>	Insectivore	ww	H; B	Asian Paradise-Flycatcher <i>Terpsiphone paradisi</i>	Insectivore	ww	B
Small Minivet <i>Pericrocotus cinnamomeus</i>	Insectivore	ww	H; B	Yellow-bellied Fantail <i>Rhipidura hypoxantha</i>	Insectivore	r	N
Long-tailed Minivet <i>P. ethologus</i>	Insectivore	ww	N	White-throated Fantail <i>R. albicollis</i>	Insectivore	r	H; B
Scarlet Minivet <i>P. flammeus</i>	Insectivore	r	B; N	White-browed Fantail <i>R. aureola</i>	Insectivore	r	N; B
Pied Flycatcher-Shrike <i>Hemipus picatus</i>	Insectivore	r/am	B; N	<b>Paridae</b>			
Common Woodshrike	Omnivore	r/am	H; B	Rufous-bellied Crested Tit* <i>Parus rubidiventris</i>	Omnivore	r	N
<i>Tephrodornis pondicerianus</i>				Spot-winged Crested Tit <i>P. melanolophus</i>	Omnivore	r	N
<b>Pycnonotidae</b>				Brown Crested Tit <i>P. dichrous</i>	Omnivore	r	B; N
Red-whiskered Bulbul <i>Pycnonotus jocosus</i>	Frugivore	r	H	Great Tit <i>P. major</i>	Omnivore	r	N
Himalayan Bulbul <i>P. leucogenys</i>	Frugivore	r	H; B; N	Green-backed Tit <i>P. monticolus</i>	Omnivore	r	N
Red-vented Bulbul <i>P. cafer</i>	Frugivore	r	H; B; N	Black-lored Yellow Tit <i>P. xanthogenys</i>	Omnivore	r	N; B
Black Bulbul <i>Hypsipetes leucocephalus</i>	Frugivore	am	N; B	Black-spotted Yellow Tit <i>P. spilonotus</i>	Omnivore	r	N; B; H
<b>Muscicapidae</b>				<b>Sittidae</b>			
Blue-headed Rock-Thrush	Insectivore	ww	B	Chestnut-bellied Nuthatch <i>Sitta castanea</i>	Insectivore	r	N
<i>Monticola cinclorhynchus</i>				<b>Certhiidae</b>			
Blue Whistling-Thrush <i>Myophonus caeruleus</i>	Insectivore	r/am	H; B; N	Eurasian Tree-Creeper <i>Certhia familiaris</i>	Insectivore	r	N; B
Grey-winged Blackbird <i>Turdus boulboul</i>	Insectivore	r/am	N	<b>Dicaeidae</b>			
Himalayan Rubythroat * <i>Luscinia pectoralis</i>	Insectivore	r/am	B	Thick-billed Flowerpecker <i>Dicaeum agile</i>	Insectivore	r	N
Oriental Magpie-Robin <i>Copsychus saularis</i>	Insectivore	sv	H	Fire-breasted Flowerpecker <i>D. ignipectus</i>	Insectivore	r	H
Indian Robin <i>Saxicoloides fulicata</i>	Insectivore	r	H	<b>Nectariniidae</b>			
White-capped Redstart	Insectivore	ww	N; B	Purple Sunbird <i>Nectarinia asiatica</i>	Nectarivore	am	N
<i>Chaimarrornis leucocephalus</i>				Crimson Sunbird <i>Aethopyga siparaja</i>	Nectarivore	r	B; H
Plumbeous Redstart <i>Rhyacornis fuliginosus</i>	Insectivore	ww	B	<b>Fringillidae</b>			
Black-backed Forktail <i>Enicurus immaculatus</i>	Insectivore	r	B	Common Rosefinch <i>Carpodacus erythrinus</i>	Granivore	r/am	H
Common Stonechat <i>Saxicola torquata</i>	Insectivore	ww	H	<b>Passeridae</b>			
Pied Bushchat <i>S. caprata</i>	Insectivore	ww	H; B	Cinnamon Tree Sparrow <i>Passer rutilans</i>	Insectivore	r	H
Grey Bushchat <i>S. ferrea</i>	Insectivore	ww	H	Chestnut-shouldered Petronia	Insectivore	r	N
Indian Chat <i>Cercomela fusca</i>	Insectivore	r/am	H	<i>Petronia xanthocollis</i>			
White-throated Laughingthrush <i>Garrulax albogularis</i>	Insectivore	sv	N	Baya Weaver <i>Ploceus philippinus</i>	Granivore	r	B; N
White-crested Laughingthrush <i>G. leucolophus</i>	Insectivore	ww	B	<b>Sturnidae</b>			
Streaked Laughingthrush <i>G. lineatus</i>	Insectivore	ww	B; N	Chestnut-tailed Starling <i>Sturnus malabarica</i>	Insectivore	am	H; B; N
Rusty-cheeked Scimitar-Babbler <i>Pomatorhinus erythrogeus</i>	Insectivore	ww	B	Brahminy Starling <i>S. pagodarum</i>	Insectivore	am	H
Common Babbler <i>Turdoides caudatus</i>	Insectivore	r	H	Asian Pied Starling <i>S. contra</i>	Insectivore	r	H; B
Striated Babbler <i>T. earlei</i>	Insectivore	r/am	N; B	Common Myna <i>Acridotheres tristis</i>	Omnivore	r	H
Jungle Babbler <i>T. striatus</i>	Insectivore	sv	H	Jungle Myna <i>A. fuscus</i>	Insectivore	r	H
Rufous Sibia <i>Heterophasia capistrata</i>	Insectivore	r/am	N	<b>Oriolidae</b>			
Yellow-naped Yuhnia <i>Yuhina flavicollis</i>	Insectivore	r	N	Indian Oriole <i>Oriolus kundoo</i>	Frugivore	r	H; B
Brown Prinia <i>Prinia crinigera</i>	Insectivore	r/am	B	Black-headed Oriole <i>O. xanthornus</i>	Frugivore	r	H
Black-throated Prinia <i>P. atrogularis</i>	Insectivore	r	B	Common Iora <i>Aegithina tiphia</i>	Omnivore	r	H
Jungle Prinia <i>P. sylvatica</i>	Insectivore	r/am	H	<b>Dicruridae</b>			
Ashy Prinia <i>P. socialis</i>	Insectivore	sv	H	Black Drongo <i>Dicrurus macrocercus</i>	Insectivore	r	H; B
Plain Prinia <i>P. inornata</i>	Insectivore	r	H	Spangled Drongo <i>D. hottentottus</i>	Insectivore	r	N
Blanford's Bush-Warbler <i>Cettia pallidipes</i>	Insectivore	sv	H	<b>Corvidae</b>			
Aberrant Bush-Warbler <i>C. flavolivacea</i>	Insectivore	r	B	Eurasian Jay <i>Garrulus glandarius</i>	Frugivore	r	B; H
Yellow-bellied Bush-Warbler * <i>C. acanthizoides</i>	Insectivore	r	N; B	Black-headed Jay <i>G. lanceolatus</i>	Omnivore	r	H; B; N
Grey-sided Bush-Warbler <i>C. brunnirostris</i>	Insectivore	ww	N; B	Yellow-billed Blue Magpie <i>Urocissa flavirostris</i>	Frugivore	r	N
Common Tailorbird <i>Orthotomus sutorius</i>	Insectivore	r/am	H	Red-billed Blue Magpie <i>U. erythrorhyncha</i>	Frugivore	r	N
Tickell's Leaf-Warbler <i>Phylloscopus affinis</i>	Insectivore	r	N	Indian Treepie <i>Dendrocitta vagabunda</i>	Frugivore	r	N
Orange-barred Leaf-Warbler <i>P. pulcher</i>	Insectivore	ww	B	Grey Treepie <i>D. formosae</i>	Frugivore	r	H -B; N
Grey-faced Leaf-Warbler <i>P. maculipennis</i>	Insectivore	r	B	House Crow <i>Corvus splendens</i>	Frugivore	r	AL -B; N
Lemon-rumped Leaf-Warbler <i>P. chloronotus</i>	Insectivore	r	B; N	Jungle Crow <i>C. macrorhynchus</i>	Omnivore	r	N; B
				Common Raven <i>C. corax</i>	Frugivore	r	N; B

Abbreviations: ai = aerial insectivore, bgi = bark-gleaning insectivore, fgi = foliage-gleaning insectivore, si = sallying insectivore, usi = under-storey insectivore, gli = grassland insectivore, to = terrestrial omnivore, ato = arboreal terrestrial omnivore, gse = granivore seedeater, fgse = frugivore granivore insectivore seedeater, fse = frugivore seedeater, fi = frugivore insectivore, sc = sallying carnivore, atc = arboreal terrestrial carnivore, tc = terrestrial carnivore, wc = wading carnivore, ni = nectarivore insectivore, n = nectarivore, r = resident, am = altitudinal migratory, sv = summer visitor, ww = winter visitor, B= Bhawali, H= Haldwani, N= Nainital.