

THE BIRDS OF SIKKIM: AN ANALYSIS OF ELEVATIONAL DISTRIBUTION, ENDEMISM AND THREATS

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ABSTRACT

Sikkim, a small state (geographical area 7096 km²) located in the northeast part of India, is a paradise for ornithologists. Many explorers and scientists including famous ornithologist Salim Ali visited Sikkim for study purpose. Most of the publications are based on taxonomy and systematics except a few recent ecological studies. We generated a database of birds of Sikkim based on literature and field studies during 2003-2006 with special reference to elevational distribution, endemism and threat. The state was divided into six zones based on vegetation types and altitudes. Generated database of birds of Sikkim shows a total of 574 species belonging to 253 genera and 55 families under 16 avian orders. Along the elevation gradient, species richness followed unimodal pattern with maximum species at mid-elevation zone. The number of habitat specialist (species occurring in single elevation zone) are more in the lowest and highest zones. A high turnover of species was observed along the elevation gradient with a few species showing wider distribution range. Ten eastern Himalayan endemic species are reported to occur in Sikkim. Of the total species, 17 are threatened (1 Endangered, 3 Critically Endangered and 13 Vulnerable) and 10 near threatened bird species. It is suggested that further study on birds of Sikkim should focus on ecology and habitat requirements of individual species especially of rare, threatened and endemics.

KEYWORDS: *Birds, elevation zone, endemic species, Sikkim, threatened species.*



Red-tailed Minla *Minla ignotincta*: An altitudinal migrant in Sikkim. Prefers moist forest along the river valleys



Red-billed Leiothrix *Leiothrix lutea*: Denizen of the secondary forest and ravines, commonly observed between 1000 to 3000 meters in Sikkim. Sociable and moves in mixed flocks. Photo courtesy: Ganesh Mani Pradhan

INTRODUCTION

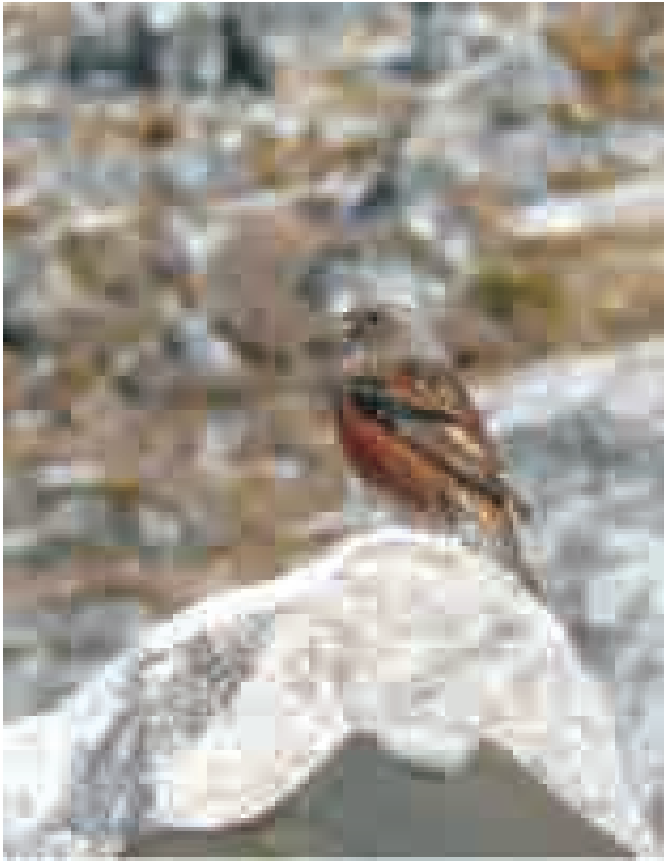
Birds have been the centre of attraction for study in understanding various complex ecological factors. They have been fairly well studied in India and outside. Sikkim (27° 03' to 28° 07' N and 88° 03' to 88° 57' E), a state of India with a total geographical area of 7096 km², is a part of Eastern Himalaya biodiversity hotspot and Endemic Bird Area (Stattersfield et al., 1998; Islam and Rahmani, 2004; Mittermeier et al., 2005). Due to the geographical location, topography, elevational variation and marked zonation of vegetation, Sikkim harbors high avifaunal diversity compared to its small geographical area.

Sikkim has always been difficult for wildlife research because of physical features. Despite this difficulty diverse avifauna attracted many ornithologists to Sikkim during the past century. Systematic study on birds of Sikkim initiated during the 19th century but most of the past studies were based on surveys that focused on taxonomy and systematics. The study by Ali (1962) is the most comprehensive and exhaustive work on birds of Sikkim till date. After Ali (1962), the birds of Sikkim remained out of scientific focus for almost 40 years except some reporting of occasional sightings of some species, most with serious conservation concern (Ganguli-Lachungpa, 1990a, b, c; 1992; 1998a, b, c; Ganguli-Lachungpa and Lucksom, 1998). A few ecological studies have been conducted in different part of the state in recent years. Chettri et al. (2001, 2005) studied the birds of Kanchendzonga Biosphere Reserve in west Sikkim. The Important Bird Area Programme of the BirdLife International identified 11 IBA's in Sikkim (Islam and Rahmani, 2004). Notable bird species, and conservation challenges, threats and management plans of all the IBA's are also available (Ganguli-Lachungpa et al., 2007). The bird communities of the Teesta valley and Shingba Rhododendron wildlife sanctuary in Sikkim have also been studied (Acharya, 2008; Acharya et al., 2010).

We collected the literatures available on birds of Sikkim from various sources. Considerable information is available on bird species inventories, taxonomy, distribution and general habits, but these have not been compiled systematically after Salim Ali. This paper reviews the available information on birds of Sikkim spread in different publications. The records are substantiated by extensive field observations during 2003-2006 in different parts of Sikkim. The occurrence of each species was crosschecked and authenticated with the distribution data and ecological information available in the standard literatures (Ali and Ripley, 2001; Grimmett et al., 2001; Rasmussen and Anderton, 2005). Hence, we made the comprehensive checklist of the bird species found in Sikkim with emphasis on altitudinal distribution. Endemism and IUCN threat status of birds of Sikkim is also highlighted. Here we followed Inskipp et al. (1996) for common and scientific names of birds and IUCN (2009) for IUCN Red List status.

ALTITUDINAL ZONATION OF VEGETATION IN SIKKIM

Sikkim lies at the convergence of the central and eastern Himalaya. However, the state has often been considered as a part of eastern Himalaya (Ali, 1962; Mani, 1974; Hajra and Verma, 1996). It has a varied climate, topography and altitudinal ranges within 7096 km² area. Hooker (1854) categorized the vegetation of Sikkim into three major types-Tropical, Temperate and Alpine. This classification of vegetation has been followed widely in several literatures (Gammie, 1928; Ali, 1962; Mani, 1974; Hajra and Verma, 1996; Singh and Chauhan, 1998; Sudhakar et al., 1998). Broadly, Sikkim can be divided into six botanical zones based on elevation and characteristics of vegetation (see Haribal, 1992; Hajra and Verma, 1996). Distinct transition of vegetation occurs at about 900 m elevation. These zones are: Tropical semi-deciduous forests (<900 m); Tropical moist and broad-leaved forests (900 – 1800 m); Temperate broad-leaved forests (1800 – 2800 m); Temperate coniferous and broad-leaved forests (2800 – 3800 m); Sub-alpine vegetation (3800-4500 m) and Alpine zone (>4500 m). In this paper, the zones are referred as zone I, II, III, IV, V and VI respectively.



Alpine Accentor *Prunella collaris*: A species of the alpine region. Prefers open meadows and rocky pastures in the Himalayas



Besra *Accipiter virgatus*: Raptor of the dense broad-leaved forest in Sikkim



Black Bulbul *Hypsipetes leucocephalus*: A common species found between 400 to 2000 meters elevation in Sikkim. Gregarious and noisy bird usually in a flock of 20 individuals or more



Crimson Sunbird *Aethopyga siparaja*: A very beautiful bird species of the low elevation forest in Sikkim. Feeds on nectar with its long pointed beak.

Photo courtesy: Ganesh Mani Pradhan

Since elevation determines the vegetation in the study area, zones used in this paper refers to elevation zones as well as vegetation types.

ANALYSIS

Compilation of literatures

Ali (1962) extensively reviewed the past studies substantiated by field surveys and published a book containing a comprehensive list of species distributed in Sikkim. The basic information on ecology of some species is also provided. The book also provides a list of 98 species separately, which was reported to occur in Sikkim but were not observed by Salim Ali or his contemporary ornithologists, totaling the list to 524. The reporting of occasional sightings of some species, most with serious conservation concern, are also available and has contributed eight more species to the avifauna of Sikkim (Ganguli-Lachungpa, 1990a, b, c; 1992; 1998a, b, c; Ganguli-Lachungpa and Lucksom, 1998). Chettri (2000) and Chettri et al. (2001, 2005) added 10 more species of birds from the study in Kanchendzonga Biosphere Reserve in the western part of Sikkim. Recent observation adds 12 species (Islam and Rahmani, 2004) and 20 species (Acharya, 2008; Acharya et al., 2010) to the avifaunal wealth of Sikkim totaling to 574 species.

Richness- species and higher taxon

We observed 336 species of birds in our study in Sikkim during 2003-2006 (Appendix). These species when combined with previous record shows that a total of 574 species of birds belonging to 253 genera, 55 families and 16 orders occur in Sikkim (Appendix). *Garrulax* is the most species rich genus (15 species) followed by *Phylloscopus* (14 species), *Carpodacus* (10 species), *Ficedula* and *Turdus* (9 species each), and *Alcippe* (8 species). Most of the genera (128) are represented by single species.

At the family level, Sylviidae represents maximum number of species (116) followed by Muscicapidae (82 species), Corvidae (39 species), Fringillidae (32 species), Accipiteridae (29 species) and Passeridae (28 species). Ten families namely, Cerylidae, Gruidae, Pteroclididae, Indicatoridae, Batrachostomidae, Trogonidae, Tytonidae, Upupidae, Regulidae and Zosteropidae are represented by single species. Out of 55 families, 22 are represented by single genus.

Passeriformes is the most dominant order comprising 380 species, 139 genera and 22 families followed by order Cinconiformes with 61 species, 37 genera and eight families. Avian orders such as Galliformes, Anseriformes, Turniciformes, Bucerotiformes, Upupiformes, Trogoniformes, Psittaciformes, Apodiformes, and Columbiformes are represented by single family. Common Hoopoe *Upupa epops* is the only species observed under the order Upupiformes.

Elevational distribution pattern

Out of 574 species of birds that occur in Sikkim, distribution data of only 483 species is available. Analysis of these dataset depicted unimodal pattern showing peak at mid-elevation zone with declining ends (Fig. 1). Rate of decline is higher at high elevation zone as compared to low elevation zone. Correlation analysis showed significant negative relation between species richness and elevation ($r = -0.81$; $p < 0.05$). Maximum species occur within 900-2800 m elevation with a sharp fall above 2800 m (Table 1). In contrast, the numbers of exclusive bird species (species restricted to single zone) are more in the lowest and highest zones (Table 1). For instance 23% of the birds of alpine zone (>4500 m) does not occur in any other zones.

Most of the bird species have very narrow distribution along the elevation and are restricted to only one or two zones. A total of 79 species (14% of the total birds of Sikkim) are exclusive species (species that occur in a single zone; Table 1). A very few species such as White-capped Water Redstart *Chaimarrornis leucocephalus*, Green Sandpiper *Tringa ochropus*, Brown Wood Owl *Strix leptogrammica* and White Wagtail *Motacilla alba* occur all along the gradient (in all six zones).

Gradual replacement of the species by another species of the the same genus was also observed in some of the avian families such as Cinclidae, Lanidae, Aegithalidae and Phasianidae. For example, out of three species of *Lanius*, *L.*



Oriental Turtle Dove *Streptopelia orientalis*: An altitudinal migrant, breeds in high elevation but descends down as low as 300 meters in winter. Found in open habitat near cultivation and forest edges



Crested Kingfisher *Megaceryle lugubris*: a rare Kingfisher species found in the lower valleys in Sikkim along the streams and rivers. Photo courtesy: Ganesh Mani Pradhan



Streaked Spiderhunter *Arachnothera magna*: A rare bird with a unique beak. A low to mid-elevation species, that occurs in tropical forests having wild banana plants. Photo courtesy: Ganesh Mani Pradhan



Wedge-tailed Green Pigeon *Treron sphenura*: It is an arboreal fruit pigeon commonly observed in the forest between 600 to 1500 meters elevations in Sikkim

cristatus is found in low elevation, *L. schach* in mid-elevation and *L. tephronotus* occur in high elevation regions in Sikkim. Similarly, *Cinclus pallasii* of lower elevation is replaced by *Cinclus cinclus* at higher elevations.

There is considerable overlap of species between different elevation zones with high species similarity especially among consecutive zones. Zone II and III shared 66% species followed by zone I and II (59%). Least overlap is between I and VI (2%). Bird species similarity between two consecutive zones declines with elevation (Table 2).

Endemism

Sikkim lies within the Eastern Himalaya Endemic Bird Area (Islam and Rahmani, 2004). Out of the 22 restricted range species of the Eastern Himalaya Endemic Bird Area, 19 species (including one genus *Sphenocichla*) are confined to this region (Stattersfield et al., 1998; Rasmussen and Anderton, 2005; Jathar and Rahmani, 2006). Of these 19 endemics, ten are reported to occur in Sikkim of which *Arborophila mandellii* is threatened and *Brachypteryx hyperythra* and *Harpactes wardii* are near threatened bird species (Table 3). Although the altitudinal distribution of some of these species is documented, others such as *Harpactes wardii* and *Babax waddelli* have merely a presence-absence data. Species such as *Phylloscopus cantator*, *Yuhina bakeri* and *Arborophila mandellii* have wide altitude ranges, whereas *Spelaornis caudatus* and *Sphenocichla humei* are restricted to very narrow range (Table 3). It is notable that the endemic species are restricted mostly below 2800 m altitude.

IUCN status

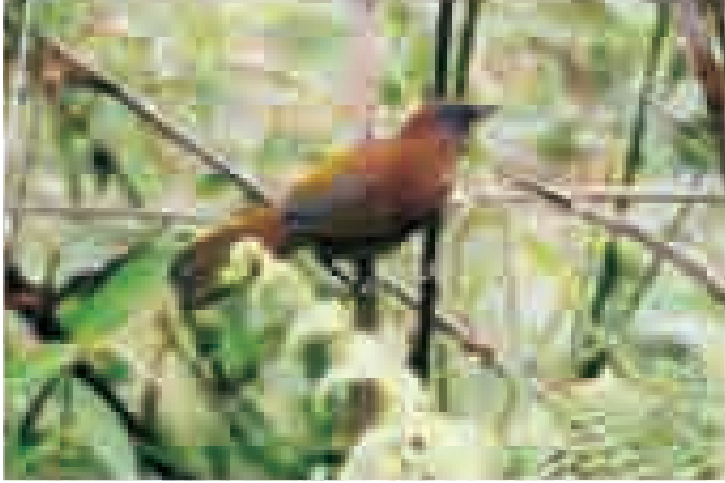
Of the 78 globally threatened bird species of the Indian Subcontinent, 17 threatened (one endangered, three critically endangered and 13 vulnerable) and ten near threatened species (Table 4) occur in Sikkim (IUCN, 2009). The species such as *Haliaeetus leucoryphus*, *Arborophila mandellii*, *Paradoxornis flavirostris*, *Sitta formosa* and *Tragopan satyra* are reported to have wide altitudinal range but the species such as *Grus nigricolis* and *Aythya baeri* are restricted to narrow range. The altitudinal ranges and habitat of many of the threatened and near threatened species are not reported (Table 4). The distribution of some species such as *Tragopan blythii*, *Gallinago nemoricola* and *Aceros nipalensis*, although considered as widespread in other areas, is not documented in Sikkim.

DISCUSSION

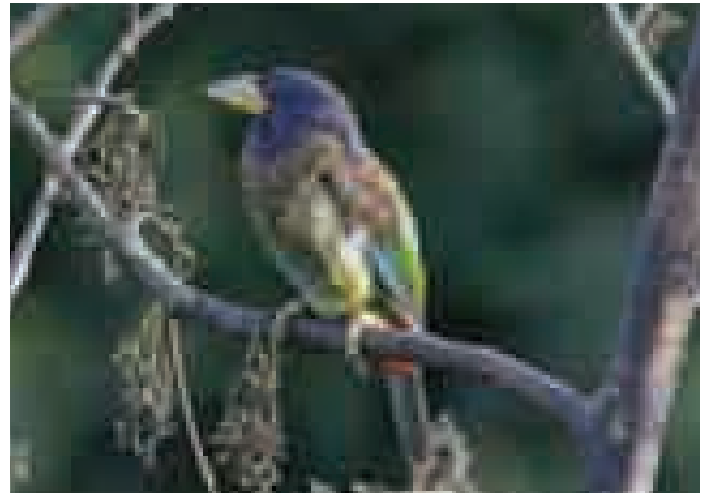
Of the 1295 species of birds reported from Indian Subcontinent (Inskipp et al., 1996) Sikkim harbors 574 species. These species represents 45% of the total birds within 0.21% of the geographical area of India. The compiled database shows that Sikkim perhaps is the richest area of its size for birds anywhere in the world.

The bird fauna of Eastern Himalaya, especially land birds, is enriched compared to the rest of the Indian subcontinent of similar or even larger area (Ali, 1962; Daniels et al., 1992; Ali and Ripley, 2001; Price et al., 2003). The diversity of vegetation, with abrupt variation in elevation and climatic conditions, created diverse habitats allowing many species of birds to co-exist. In addition, the forest in Sikkim, especially lower and middle valleys, is a part of the continuous larger tract of evergreen vegetation of Eastern Himalaya that harbor rich avifauna of evergreen forest. Apart from these, Sikkim is the meeting point of various zoogeographical realms and regimes (Inskipp et al., 1996). The avifauna of Sikkim shows Palearctic affinity towards its northern part, whereas it has Oriental fauna in the southern region. It is noteworthy that Sikkim has more similarity in avifauna with its eastern part than to the west. Sikkim possesses most species that occurs in north-eastern states but has 200 species less than that of Nepal, which is on the western part of the state. Similarly, Nepal does not have around 30 species that occur in Sikkim (Flemming et al., 2000).

Tropical broadleaved and temperate broadleaved forests located at mid elevation (900-2800 m) showed higher bird species richness compared to other vegetation zones. Range extensions from lower and upper zones contribute to the higher avian diversity at mid-elevations (Rahbek, 1997; McCain, 2009). Other factors such as vegetation complexity, diversity and environmental factors, separately or in combination with each other, might be responsible for high avian diversity at middle elevation. Understanding altitudinal distribution of species aids in prioritizing areas for conservation.



Chestnut-crowned Laughingthrush *Garrulax erythrocephalus*: Common among the Laughingthrushes. Found in shrubby undergrowth in the temperate broadleaved forest and coniferous forest



Great Barbet *Megalaima virens*: Frugivorous bird found from low to mid-elevation (upto 2000 meters) forest along the river valleys in Sikkim. Commonly known as 'Nyahul', Great Barbet is the largest among all the barbets. A canopy species but its presence cannot be escaped because of its loud call.

Photo courtesy: Ganesh Mani Pradhan



Long-billed Thrush *Zoothera monticola*: A thrush with huge bill and short tail. It inhabits Rhododendron undergrowth of mixed moist dense forest, mostly above 2500 m.

Photo courtesy: Ganesh Mani Pradhan



White-collared Blackbird *Turdus albocinctus*: A high elevation thrush commonly observed above 3000 meters. Its hard chuckling sound attracts the attention of the observer



Asian Barred Owlet *Glaucidium cuculoides*: Common among the owls, seen along low to mid-elevation areas in Sikkim. Inhabits forest edges near human habitation
Photo courtesy: Ganesh Mani Pradhan



Black-throated Tit *Aegithalos concinnus*: Undergrowth species of temperate forests in Sikkim. Moves in a large flock along with other tits, warblers and smaller parrotbills
Photo courtesy: Ganesh Mani Pradhan



Collared Scops Owl *Otus bakkamoena*: A rare resident of tropical and subtropical forests in Sikkim, this owl is a resident breeder in South Asia. One can notice a wonderful camouflage of bird with the microhabitat that escapes the eye of an observer
Photo courtesy: Ganesh Mani Pradhan



Grey-headed Woodpecker *Picus canus*: It lives in leaf forests and mixed forests mostly below 2000 m. It pecks maggots, beetle larvae and other insects from the tree barks or tree holes
Photo courtesy: Ganesh Mani Pradhan



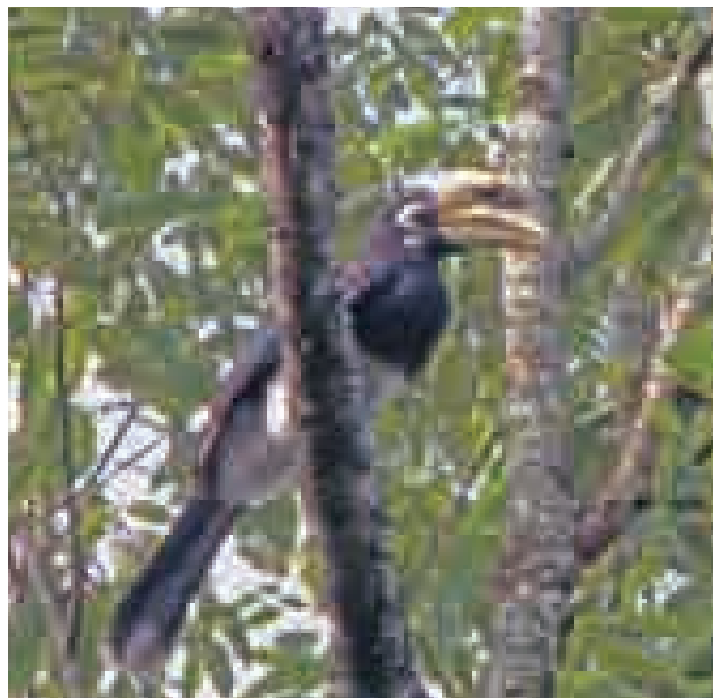
Little Pied Flycatcher *Ficedula westermanni*: Smallest among the flycatchers, Little Pied Flycatcher is a resident breeder of sub-tropical and temperate forests in the eastern Himalayas
 Photo courtesy: Ganesh Mani Pradhan



Long-tailed Broadbill *Psarisomus dalhousiae*: Beautiful species normally moves in noisy parties except during the mating season. Found in broadleaved forests (900-1800 m) in Sikkim but descends down to tropical belt (up to 300 m) during winter
 Photo courtesy: Ganesh Mani Pradhan



Orange-bellied Leafbird *Chloropsis hardwickii*: This bird is a native to the eastern Himalayas and south China to the Malay Peninsula. Inhabits tropical and sub-tropical forests in Sikkim
 Photo courtesy: Ganesh Mani Pradhan



Oriental Pied Hornbill *Anthracoceros albirostris*: Locally called 'Hangrayo', it is a large bird with a gigantic beak and a cylindrical casque. Mostly feeds on Figs, it is found in low elevation forests in Sikkim
 Photo courtesy: Ganesh Mani Pradhan



Pygmy Wren Babbler *Pnoepyga pusilla*: A very small tailless babbler. Its natural habitats are undergrowth of subtropical or tropical moist lowland forests or moist montane forests
Photo courtesy: Ganesh Mani Pradhan



Scaly Laughingthrush *Garrulax subunicolor*: A rarer among the fifteen species of Laughingthrushes that occur in Sikkim. Inhabits undergrowth in moist temperate forests and Rhododendron shrubberies in the Himalayan region
Photo courtesy: Ganesh Mani Pradhan



Streak-breasted Scimitar Babbler *Pomatorhinus ruficollis*: Occupies forest undergrowth and dense scrub from tropical to temperate forests mostly below 2000 m
Photo courtesy: Ganesh Mani Pradhan



Velvet-fronted Nuthatch *Sitta frontalis*: A beautiful small short-tailed songbird with strong feet and a sharp beak. It feeds on small nuts, and insects from the tree barks. Found in forests and forest edges near human habitation in Sikkim up to 2000 m elevation
Photo courtesy: Ganesh Mani Pradhan

Although species richness was high at middle elevation, exclusive species were high at higher and lower elevations. In addition, endemic species are also restricted towards low to mid elevations. Hence, prioritization should also focus on habitat specialists apart from species or higher taxon richness and threatened species.

With the change of vegetation from remnant patches of tropical wet forest at the lower altitude, broadleaved at mid-altitude to cold desert in the higher altitude, the avifaunal assemblage also change rapidly from tropical to subtropical, temperate, alpine and finally to cold desert forms. This rapid transition in floral and geographical characteristics of the area resulted very small distribution ranges of birds.

Altitude <900 m in Sikkim is a very important zone as it harbors maximum number of exclusive species. Further it is the habitat for restricted range species such as *Phylloscopus cantatar*, *Yuhina bakeri* and *Arborophila mandellii*. Threatened species such as *Sitta Formosa*, *Paradoxornis flavirostris* and *Haliaeetus leucoryphus* are the resident of this zone. Zone II, the second species rich zone, is the habitat of many endemics including *Arborophila mandellii*, a vulnerable species. Zone III is the richest zone in terms of species and higher taxon. This zone harbors habitat for most of the endemics and threatened bird of Sikkim. It also harbors many undergrowth bird species such as fulvettas, laughing thrushes, parrotbills and babblers, which are rare or absent in other zones. Among the endemics *Actinodura nipalensis* and *Sphenocichla humei* are restricted to this zone. The higher three zones, although posses relatively low species, is the habitat of many high altitude birds which never descends to lower elevations. These zones are the breeding grounds for many migratory waterfowl including globally threatened species, Black-necked Crane *Grus nigricolis*.

The eastern Himalayan region represents one of the largest concentrations of globally threatened birds in Asia. Habitat fragmentation through anthropogenic pressure is increasing at greater pace in this region (Kumar et al., 2006) and is the major reason for decline of many rare and threatened bird species particularly in Sikkim (Chettri, 2000; Chettri et al., 2001; Acharya and Vijayan, 2007, 2010). Eastern Himalayas have always been difficult for wildlife research and Sikkim is also not an exception. The implementation of conservation measures is handicapped by the non-availability of the detailed ecological information of the species especially those with conservation concern (BirdLife International, 2001; Acharya and Vijayan, 2007, 2010). Many of the species are altitudinal migrants, and since most of the ornithological work is conducted outside the breeding season, it is difficult to asses the breeding habitat requirements and altitudinal ranges of species (Stattersfield et al., 1998). Hence, further study should focus on habitat requirements and breeding ecology of these species.

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Table 1. Bird species richness and exclusive species (species restricted to single zone) in different elevation zones in Sikkim

Elevation zones	No. of species	Exclusive species	% of exclusive species
I (<900m)	236	24	10.2
II (900-1800m)	310	15	4.9
III (1800-2800m)	311	13	4.2
IV (2800-3800m)	198	7	3.5
V (3800-4500m)	132	5	3.8
VI (>4500m)	64	15	23.4

Table 2. Bird species similarity - Jaccard Similarity Index (above the diagonal) and number of species shared (below the diagonal) between different zones in Sikkim

Elevation zones	I	II	III	IV	V	VI
I	-	0.59	0.41	0.15	0.07	0.02
II	202	-	0.66	0.29	0.15	0.05
III	158	246	-	0.47	0.25	0.07
IV	57	114	163	-	0.53	0.16
V	25	58	87	115	-	0.32
VI	5	19	25	36	48	-

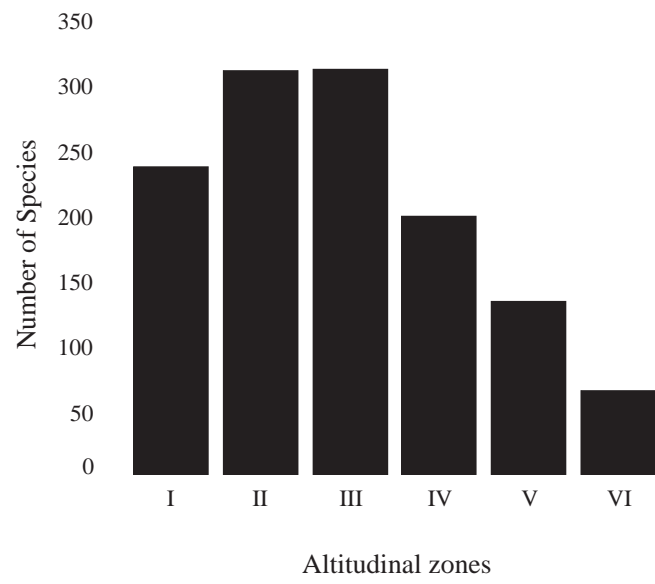
Table 3. Endemic birds of the eastern Himalaya reported from Sikkim and their elevational distribution (* = species present, blank = absent or no data)

Endemic species	Elevational zones					
	I	II	III	IV	V	VI
Broad-billed Warbler <i>Tickellia hodgsoni</i>		*	*	*		
Chestnut-breasted Partridge <i>Arborophila mandellii</i>	*	*	*			
Giant Babax <i>Babax waddelli</i>						
Hoary-throated Barwing <i>Actinodura nipalensis</i>		*	*	*		
Rufous-throated Wren Babbler <i>Spelaeornis caudatus</i>				*		
Rusty-bellied Shortwing <i>Brachypteryx hyperythra</i>			*	*		
Ward's Trogon <i>Harpactes wardii</i>						
Wedge-billed Wren Babbler <i>Sphenocichla humei</i>				*		
White-naped Yuhina <i>Yuhina bakeri</i>	*	*	*			
Yellow-vented Warbler <i>Phylloscopus cantator</i>	*	*	*			

Table 4. Threatened and near threatened birds of Sikkim with information on their elevational distribution (* = No data on elevational range; I, II, III, IV, V, VI = Elevation zone in which species is reported to occur)

Species	IUCN threat status	Reported elevation zone
Long-billed Vulture <i>Gyps indicus</i>	Critical	*
Red-headed Vulture <i>Sarcogyps calvus</i>	Critical	*
White-rumped Vulture <i>Gyps bengalensis</i>	Critical	*
Baer's Pochard <i>Aythya baeri</i>	Endangered	III
Beautiful Nuthatch <i>Sitta formosa</i>	Vulnerable	I, II, III
Black-breasted Parrotbill <i>Paradoxornis flavirostris</i>	Vulnerable	I, II, III
Black-necked Crane <i>Grus nigricolis</i>	Vulnerable	VI
Blyth's Tragopan <i>Tragopan blythii</i>	Vulnerable	*
Chestnut-breasted Partridge <i>Arborophila mandellii</i>	Vulnerable	I, II, III
Greater Spotted Eagle <i>Aquila clanga</i>	Vulnerable	*
Grey-crowned Prinia <i>Prinia cinereocapilla</i>	Vulnerable	I, II
Hodgson's Bushchat <i>Saxicola insignis</i>	Vulnerable	*
Lesser Kestrel <i>Falco naumanni</i>	Vulnerable	*
Palla's Fish Eagle <i>Haliaeetus leucoryphus</i>	Vulnerable	I, II, III, IV
Rufous-necked Hornbill <i>Aceros nipalensis</i>	Vulnerable	*
Slender-billed Babbler <i>Turdoides longirostris</i>	Vulnerable	*
Wood Snipe <i>Gallinago nemoricola</i>	Vulnerable	*
Blyth's Kingfisher <i>Alcedo hercules</i>	Near Threatened	I
Cinereous Vulture <i>Aegypius monachus</i>	Near Threatened	*
Firethroat <i>Luscinia pectardens</i>	Near Threatened	II, III
Giant Babax <i>Babax waddelli</i>	Near Threatened	VI
Great Hornbill <i>Buceros bicornis</i>	Near Threatened	I, II
Rufous-throated Wrenbabbler <i>Spelaeornis caudatus</i>	Near Threatened	IV
Rusty-bellied Shortwing <i>Brachypteryx hyperythra</i>	Near Threatened	III, IV
Satyr Tragopan <i>Tragopan satyra</i>	Near Threatened	III, IV, V
Ward's Trogon <i>Harpactes wardii</i>	Near Threatened	*
Yellow-rumped Honeyguide <i>Indicator xanthonotus</i>	Near Threatened	III

Figure 1. Bird species richness pattern along the elevation gradient in Sikkim



Himalayan Griffon Vulture (*Gyps himalayensis*) - the largest amongst the Sikkim birds, soaring the skies at higher elevations, mostly above 2000 meters

APPENDIX

Checklist of the birds of Sikkim based on literature and field studies. Numeral one (1) under each altitude category represents presence of species and blank denotes absence or no data.

Sl No	Family	Common Name	Scientific Name	Altitude classes (in metres)						
				<900	900	1800	2800	3800	>4500	
				-	-	-	-			
				1800	2800	3800	4500			
1	Phasianidae	Snow Partridge	<i>Lerwa lerwa</i>				1	1		1
2		Tibetan Snowcock	<i>Tetraogallus tibetanus</i>					1		1
3		Himalayan Snowcock	<i>Tetraogallus himalayensis</i>				1			
4		Hill Partridge*	<i>Arborophila torqueola</i>			1	1			
5		Rufous-throated Partridge	<i>Arborophila rufogularis</i>		1	1				
6		Chestnut-breasted Partridge	<i>Arborophila mandellii</i>	1	1	1				
7		Blood Pheasant*	<i>Ithaginis cruentus</i>				1	1		1
8		Satyr Tragopan*	<i>Tragopan satyra</i>			1	1	1		
9		Blyth's Tragopan	<i>Tragopan blythii</i>							
10		Himalayan Monal*	<i>Lophophorus impejanus</i>				1	1		
11		Kalij Pheasant*	<i>Lophura leucomelanos</i>	1	1	1	1			
12		Red Junglefowl*	<i>Gallus gallus</i>	1	1	1				
13		Indian Peafowl	<i>Pavo cristatus</i>	1	1					
14	Anatidae	Bar-headed Goose	<i>Anser indicus</i>					1		1
15		Common Merganser	<i>Mergus merganser</i>							
16		Tufted duck	<i>Aythya fuligula</i>							
17		Northern Pintail	<i>Anas acuta</i>							
18		Common Teal	<i>Anas crecca</i>							
19		Eurasian wigeon	<i>Anas Penelope</i>							
20		Gadwall	<i>Anas strepera</i>							
21		Mallard	<i>Anas platyrhynchos</i>				1			
22		Baer's Pochard	<i>Aythya baeri</i>				1			
23		Common Pochard*	<i>Aythya ferina</i>				1			
24		Ruddy Shelduck*	<i>Tadorna ferruginea</i>					1		1
25	Turnicidae	Small Buttonquail	<i>Turnix sylvatica</i>							
26		Yellow-legged Buttonquail	<i>Turnix tanki</i>							
27		Barred Buttonquail	<i>Turnix suscitator</i>							
28	Indicatoridae	Yellow-rumped Honeyguide	<i>Indicator xanthonotus</i>							
29	Picidae	Eurasian Wryneck	<i>Jynx torquilla</i>							
30		Speckled Piculet	<i>Picumnus innominatus</i>	1	1	1				
31		White-browed Piculet	<i>Sasia ochracea</i>	1	1	1				
32		Rufous Woodpecker*	<i>Celeus brachyurus</i>	1	1	1				
33		Grey-headed Woodpecker	<i>Picus canus</i>	1	1	1				
34		Greater Yellownape*	<i>Picus flavinucha</i>	1	1	1				
35		Lesser Yellownape *	<i>Picus chlorolophus</i>	1	1	1				
36		Himalayan Flameback*	<i>Dinopium shorii</i>	1						
37		Pale-headed Woodpecker*	<i>Gecinulus grantia</i>	1	1					
38		Great Slaty Woodpecker	<i>Mulleripicus pulverulentus</i>	1						
39		Rufous-bellied Woodpecker*	<i>Dendrocopos hyperythrus</i>				1	1	1	
40		Crimson-breasted Woodpecker*	<i>Dendrocopos cathpharius</i>				1	1		

41		Fulvous-breasted Woodpecker*	<i>Dendrocopos macei</i>	1	1		
42		Darjeeling Woodpecker*	<i>Dendrocopos darjellensis</i>			1	1
43		Grey-capped Pygmy Woodpecker*	<i>Dendrocopos canicapillus</i>	1	1	1	
44		Bay Woodpecker*	<i>Blythipicus pyrrhotis</i>	1	1	1	
45		Greater Flameback*	<i>Chrysocolaptes lucidus</i>	1	1		
46		White-naped Woodpecker*	<i>Chrysocolaptes festivus</i>		1		
47	Megalaimidae	Great Barbet*	<i>Megalaima virens</i>	1	1	1	
48		Golden-throated Barbet*	<i>Megalaima franklinii</i>		1	1	
49		Blue-throated Barbet*	<i>Megalaima asiatica</i>	1	1	1	
50		Lineated Barbet	<i>Megalaima lineata</i>				
51		Blue-eared Barbet	<i>Megalaima australis</i>				
52	Bucerotidae	Rufous-necked Hornbill	<i>Aceros nipalensis</i>	1			
53		Great Hornbill	<i>Buceros bicornis</i>	1	1		
54		Oriental Pied Hornbill*	<i>Anthracoseros albirostris</i>	1			
55	Upupidae	Common Hoopoe*	<i>Upupa epops</i>	1	1	1	1
56	Trogonidae	Red-headed Trogon*	<i>Harpactes erythrocephalus</i>	1	1	1	
57		Ward's Trogon	<i>Harpactes wardii</i>				
58	Coraciidae	Dollarbird*	<i>Eurystomus orientalis</i>	1			
59		Indian Roller*	<i>Coracias benghalensis</i>	1			
60	Alcedinidae	Blyth's Kingfisher	<i>Alcedo hercules</i>	1			
61		Common Kingfisher*	<i>Alcedo atthis</i>	1			
62		Blue-eared Kingfisher	<i>Alcedo meninting</i>	1			
63		Oriental Dwarf Kingfisher	<i>Ceyx erithacus</i>	1			
64	Halcyonidae	Stork-billed Kingfisher	<i>Halcyon capensis</i>	1			
65		Ruddy Kingfisher	<i>Halcyon coromanda</i>	1			
66		White-throated Kingfisher*	<i>Halcyon smyrnensis</i>	1	1	1	
67	Cerylidae	Crested Kingfisher*	<i>Megaceryle lugubris</i>	1	1		
68	Meropidae	Blue-bearded Bee-eater	<i>Nyctornis athertoni</i>	1	1		
69		Green Bee-eater	<i>Merops orientalis</i>				
70		Chestnut-headed Bee-eater*	<i>Merops leschenaulti</i>	1			
71	Cuculidae	Pied Cuckoo*	<i>Clamator jacobinus</i>		1		
72		Chestnut-winged Cuckoo*	<i>Clamator coromandus</i>	1			
73		Hodgson's Hawk Cuckoo*	<i>Hierococcyx fugax</i>	1	1	1	
74		Common Hawk Cuckoo*	<i>Hierococcyx varius</i>		1	1	1
75		Large Hawk Cuckoo*	<i>Hierococcyx sparverioides</i>		1	1	
76		Indian Cuckoo*	<i>Cuculus micropterus</i>	1	1	1	
77		Eurasian Cuckoo*	<i>Cuculus canorus</i>	1	1	1	
78		Oriental Cuckoo*	<i>Cuculus saturatus</i>		1	1	1
79		Lesser Cuckoo*	<i>Cuculus Poliocephalus</i>	1	1	1	
80		Plaintive Cuckoo*	<i>Cacomantis merulinus</i>	1	1	1	
81		Grey-bellied Cuckoo*	<i>Cacomantis passerinus</i>			1	
82		Asian Emerald Cuckoo	<i>Chrysococcyx maculatus</i>		1		
83		Drongo Cuckoo	<i>Surniculus lugubris</i>		1	1	
84		Sirkeer Malkoha	<i>Phaenicophaeus leschenaultii</i>				
85		Green-billed Malkoha*	<i>Phaenicophaeus tristis</i>	1	1	1	
86	Centropodidae	Greater Coucal	<i>Centropus sinensis</i>				
87		Lesser Coucal	<i>Centropus bengalensis</i>				
88	Psittacidae	Red-breasted Parakeet	<i>Psittacula alexandri</i>	1	1	1	
89		Slaty-headed Parakeet	<i>Psittacula himalayana</i>		1		
90		Alexandrine Parakeet	<i>Psittacula eupatria</i>				

142		Temminck's Stint	<i>Calidris temminckii</i>							1
143	Charadriidae	Ibisbill*	<i>Ibidorhyncha struthersii</i>			1		1		
144		European Golden Plover	<i>Pluvialis apricaria</i>							
145		Little Ringed Plover	<i>Charadrius dubius</i>							
146		Lesser Sand Plover	<i>Charadrius mongolus</i>							
147		River Lapwing*	<i>Vanellus duvaucelii</i>	1						
148		White-tailed Lapwing	<i>Vanellus leucurus</i>							
149		Red-wattled Lapwing	<i>Vanellus indicus</i>							
150	Accipitridae	Osprey	<i>Pandion haliaetus</i>							
151		Jerdon's Baza	<i>Aviceda jerdoni</i>							
152		Black Baza	<i>Aviceda leuphotes</i>							
153		Oriental Honey-buzzard*	<i>Pernis ptilorhyncus</i>			1				
154		Black-shouldered Kite	<i>Elanus caeruleus</i>							
155		Black Kite	<i>Milvus migrans</i>						1	1
156		Palla's Fish Eagle	<i>Haliaeetus leucoryphus</i>	1	1	1	1			
157		Lammergeier	<i>Gypaetus barbatus</i>			1	1	1	1	1
158		White-rumped Vulture	<i>Gyps bengalensis</i>							
159		Long-billed Vulture	<i>Gyps indicus</i>							
160		Himalayan Griffon	<i>Gyps himalayensis</i>	1	1	1	1	1		1
161		Eurasian Griffon	<i>Gyps fulvus</i>							
162		Cinereous Vulture	<i>Aegypius monachus</i>							
163		Red-headed Vulture	<i>Sarcogyps calvus</i>	1	1	1				
164		Crested Serpent Eagle*	<i>Spilornis cheela</i>	1	1	1				
165		Hen Harrier	<i>Circus cyaneus</i>	1	1	1	1	1		
166		Crested Goshawk*	<i>Accipiter trivirgatus</i>	1	1					
167		Northern Goshawk	<i>Accipiter gentilis</i>					1	1	1
168		Besra*	<i>Accipiter virgatus</i>			1	1			
169		Eurasian Sparrowhawk*	<i>Accipiter nisus</i>			1	1			
170		Long-legged Buzzard	<i>Buteo rufinus</i>			1				
171		Common Buzzard	<i>Buteo buteo</i>	1	1	1				
172		Black Eagle*	<i>Ictinaetus malayensis</i>	1	1	1				
173		Steppe Eagle*	<i>Aquila nipalensis</i>				1			
174		Greater Spotted Eagle	<i>Aquila clanga</i>							
175		Bonelli's Eagle	<i>Hieraaetus fasciatus</i>	1	1	1				
176		Booted Eagle*	<i>Hieraaetus pennatus</i>	1	1	1				
177		Rufous-bellied Eagle	<i>Hieraaetus kienerii</i>							
178		Mountain Hawk Eagle*	<i>Spizaetus nipalensis</i>	1	1	1				
179	Falconidae	Collared Falconet	<i>Microhierax caerulescens</i>	1	1	1				
180		Common Kestrel*	<i>Falco tinnunculus</i>			1	1	1	1	
181		Amur Falcon	<i>Falco amurensis</i>							
182		Merlin*	<i>Falco columbarius</i>	1						
183		Eurasian Hobby	<i>Falco subbuteo</i>							
184		Oriental Hobby	<i>Falco severus</i>							
185		Peregrine Falcon*	<i>Falco peregrinus</i>			1	1	1		
186		Lesser Kestrel	<i>Falco naumanni</i>							
187	Podicipedidae	Little Grebe	<i>Tachybaptus ruficollis</i>							
188		Black-necked Grebe	<i>Podiceps nigricollis</i>							
189	Phalacrocoracidae	Indian Cormorant	<i>Phalacrocorax fuscicollis</i>	1						
190		Great Cormorant*	<i>Phalacrocorax carbo</i>	1						

191	Ardeidae	Goliath Heron	<i>Ardea goliath</i>					
192		Cattle Egret	<i>Bubulcus ibis</i>					
193		Chinese Pond Heron*	<i>Ardeola bacchus</i>	1				
194		Little Heron	<i>Butorides striatus</i>					
195	Pittidae	Blue-naped Pitta*	<i>Pitta nipalensis</i>	1	1	1		
196		Hooded Pitta	<i>Pitta sordida</i>					
197		Indian Pitta	<i>Pitta brachyura</i>					
198	Eurylaimidae	Silver-breasted Broadbill	<i>Serilophus lunatus</i>	1	1			
199		Long-tailed Broadbill*	<i>Psarisomus dalhousiae</i>	1	1	1		
200	Irenidae	Asian Fairy Bluebird	<i>Irena puella</i>	1	1			
201		Golden-fronted Leafbird*	<i>Chloropsis aurifrons</i>	1	1			
202		Orange-bellied Leafbird*	<i>Chloropsis hardwickii</i>	1	1	1		
203	Laniidae	Brown Shrike	<i>Lanius cristatus</i>	1	1			
204		Longed-tailed Shrike*	<i>Lanius schach</i>		1	1		
205		Grey-backed Shrike *	<i>Lanius tephronotus</i>			1	1	1
206	Corvidae	Eurasian Jay*	<i>Garrulus glandarius</i>			1	1	1
207		Yellow-billed Blue Magpie *	<i>Urocissa flavirostris</i>		1	1	1	
208		Red-billed Blue Magpie	<i>Urocissa erythrorhyncha</i>	1	1	1		
209		Common Green Magpie*	<i>Cissa chinensis</i>	1	1	1		
210		Rufous Treepie	<i>Dendrocitta vagabunda</i>					
211		Grey Treepie*	<i>Dendrocitta formosae</i>	1	1	1		
212		Collared Treepie	<i>Dendrocitta frontalis</i>		1			
213		Black-billed Magpie	<i>Pica pica</i>				1	1
214		Hume's Groundpecker	<i>Pseudopodoces humilis</i>					1
215		Spotted Nutcracker*	<i>Nucifraga caryocatactes</i>				1	1
216		Red-billed Chough*	<i>Pyrrhocorax pyrrhocorax</i>				1	1
217		Yellow-billed Chough*	<i>Pyrrhocorax graculus</i>				1	1
218		House Crow*	<i>Corvus splendens</i>		1	1	1	
219		Large-billed Crow*	<i>Corvus macrorhynchos</i>			1	1	1
220		Common Raven*	<i>Corvus corax</i>				1	1
221		Ashy Woodswallow	<i>Artamus fuscus</i>	1	1	1		
222		Eurasian Golden Oriole	<i>Oriolus oriolus</i>					
223		Black-naped Oriole*	<i>Oriolus chinensis</i>			1	1	
224		Maroon Oriole*	<i>Oriolus traillii</i>	1	1	1		
225		Large Cuckooshrike	<i>Coracina macei</i>					
226		Black-winged Cuckooshrike*	<i>Coracina melaschistos</i>	1	1	1		
227		Rosy Minivet	<i>Pericrocotus roseus</i>					
228		Grey-chinned Minivet*	<i>Pericrocotus solaris</i>	1	1	1	1	
229		Long-tailed Minivet*	<i>Pericrocotus ethologus</i>	1	1	1	1	
230		Short-billed Minivet*	<i>Pericrocotus brevirostris</i>	1	1			
231		Scarlet Minivet*	<i>Pericrocotus flammeus</i>	1	1	1		
232		Bar-winged Flycatcher-shrike	<i>Hemipus picatus</i>	1	1			
233		Yellow-bellied Fantail*	<i>Rhipidura hypoxantha</i>	1	1	1	1	1
234		White-throated Fantail*	<i>Rhipidura albicollis</i>	1	1	1	1	
235		White-browed Fantail*	<i>Rhipidura aureola</i>	1	1	1		
236		Black Drongo*	<i>Dicrurus macrocercus</i>	1	1			
237		Ashy Drongo*	<i>Dicrurus leucophaeus</i>	1	1	1	1	
238		Crow-billed Drongo*	<i>Dicrurus annectans</i>	1				
239		Bronzed Drongo*	<i>Dicrurus aeneus</i>	1	1	1		
240		Lesser Racket-tailed Drongo*	<i>Dicrurus remifer</i>	1	1			

241		Spangled Drongo*	<i>Dicrurus hottentottus</i>	1	1	1			
242		Black-naped Monarch	<i>Hypothymis azurea</i>						
243		Common Iora	<i>Aegithina tiphia</i>						
244		Large Woodshrike	<i>Tephrodornis gularis</i>	1	1				
245	Cinclidae	White-throated Dipper*	<i>Cinclus cinclus</i>				1	1	1
246		Brown Dipper*	<i>Cinclus pallasii</i>	1	1	1	1		
247	Muscicapidae	Blue-capped Rock Thrush*	<i>Monticola cinclorhynchus</i>		1	1	1		
248		Chestnut-bellied Rock Thrush*	<i>Monticola rufiventris</i>	1	1	1	1		
249		Blue Rock Thrush*	<i>Monticola solitarius</i>	1	1				
250		Blue Whistling Thrush*	<i>Myophonus caeruleus</i>	1	1	1	1	1	1
251		Chestnut Thrush	<i>Turdus rubrocanus</i>			1	1		
252		Kessler's Thrush	<i>Turdus kessleri</i>				1	1	
253		Dark-throated Thrush	<i>Turdus ruficollis</i>						
254		Eyebrowed Thrush	<i>Turdus obscurus</i>						
255		Dusky Thrush	<i>Turdus naumanni</i>						
256		Tickell's Thrush*	<i>Turdus unicolor</i>			1			
257		Pied Thrush	<i>Zoothera wardii</i>						
258		Orange-headed Thrush	<i>Zoothera citrina</i>		1	1			
259		Plain-backed Thrush*	<i>Zoothera mollissima</i>		1	1	1	1	
260		Long-tailed Thrush*	<i>Zoothera dixonii</i>		1	1	1		
261		Scaly Thrush*	<i>Zoothera dauma</i>		1	1	1	1	
262		Long-billed Thrush*	<i>Zoothera monticola</i>	1	1	1	1		
263		Dark-sided Thrush*	<i>Zoothera marginata</i>	1	1	1			
264		White-collared Blackbird*	<i>Turdus albocinctus</i>			1	1	1	1
265		Grey-winged Blackbird*	<i>Turdus boulboul</i>			1	1		
266		Eurasian Blackbird	<i>Turdus merula</i>					1	
267		Gould's Shortwing*	<i>Brachypteryx stellata</i>				1	1	
268		Rusty-bellied Shortwing*	<i>Brachypteryx hyperythra</i>			1	1		
269		Lesser Shortwing	<i>Brachypteryx leucophrys</i>		1	1	1	1	
270		White-browed Shortwing*	<i>Brachypteryx montana</i>	1	1	1	1		
271		Dark-sided Flycatcher*	<i>Muscicapa sibirica</i>	1	1	1	1	1	
272		Rusty-tailed Flycatcher*	<i>Muscicapa ruficauda</i>	1	1				
273		Ferruginous Flycatcher*	<i>Muscicapa ferruginea</i>		1	1			
274		Yellow-rumped Flycatcher*	<i>Ficedula zanthopygia</i>		1				
275		Brown-breasted Flycatcher*	<i>Muscicapa muttui</i>		1	1			
276		Slaty-backed Flycatcher	<i>Ficedula hodgsonii</i>		1	1	1		
277		Rufous-gorgeted Flycatcher*	<i>Ficedula strophiatea</i>	1	1	1	1	1	
278		White-gorgeted Flycatcher*	<i>Ficedula monileger</i>	1	1	1			
279		Snowy-browed Flycatcher*	<i>Ficedula hyperythra</i>		1	1			
280		Little Pied Flycatcher	<i>Ficedula westermanni</i>		1	1			
281		Ultramarine Flycatcher	<i>Ficedula superciliaris</i>	1	1	1			
282		Slaty-blue Flycatcher*	<i>Ficedula tricolor</i>	1	1	1	1		
283		Sapphire Flycatcher*	<i>Ficedula sapphira</i>	1	1	1			
284		Verditer Flycatcher*	<i>Eumyias thalassina</i>	1	1	1	1		
285		Large Niltava*	<i>Niltava grandis</i>		1	1			
286		Small Niltava*	<i>Niltava macgrigoriae</i>		1	1			
287		Rufous-bellied Niltava*	<i>Niltava sundara</i>	1	1	1	1		
288		Pale Blue Flycatcher*	<i>Cyornis unicolor</i>	1	1	1			
289		Blue-throated Flycatcher	<i>Cyornis rubeculoides</i>	1	1				
290		Pale-chinned Flycatcher	<i>Cyornis poliogenys</i>						

291		Hill Blue Flycatcher*	<i>Cyornis banyumas</i>	1					
292		Tickell's Blue Flycatcher*	<i>Cyornis tickelliae</i>	1	1				
293		Pygmy Blue Flycatcher	<i>Muscicapella hodgsoni</i>	1	1	1	1		
294		Grey-headed Canary Flycatcher*	<i>Culicicapa ceylonensis</i>	1	1	1			
295		Siberian Rubythroat*	<i>Luscinia calliope</i>					1	1
296		White-tailed Rubythroat	<i>Luscinia pectoralis</i>					1	1
297		Firethroat*	<i>Luscinia pectardens</i>	1					
298		Indian Blue Robin	<i>Luscinia brunnea</i>			1	1		
299		Golden Bush Robin*	<i>Tarsiger chrysaesus</i>	1	1	1	1	1	
300		Orange-flanked Bush Robin*	<i>Tarsiger cyanurus</i>		1	1	1	1	
301		White-browed Bush Robin*	<i>Tarsiger indicus</i>	1	1	1	1	1	
302		Rufous-breasted Bush Robin*	<i>Tarsiger hyperythrus</i>		1	1	1	1	
303		Oriental Magpie Robin*	<i>Copsychus saularis</i>	1	1	1			
304		White-rumped Shama	<i>Copsychus malabaricus</i>						
305		Blue-capped Redstart	<i>Phoenicurus coeruleocephalus</i>						1
306		Black Redstart*	<i>Phoenicurus ochruros</i>		1	1	1	1	1
307		Hodgson's Redstart	<i>Phoenicurus hodgsoni</i>	1	1	1			
308		White-throated Redstart*	<i>Phoenicurus schisticeps</i>		1	1	1	1	1
309		Daurian Redstart	<i>Phoenicurus aureoreus</i>						
310		White-winged Redstart*	<i>Phoenicurus erythrogaster</i>			1	1	1	1
311		Blue-fronted Redstart*	<i>Phoenicurus frontalis</i>		1	1	1	1	1
312		White-capped Water Redstart*	<i>Chaimarrornis leucocephalus</i>		1	1	1	1	1
313		Plumbeous Water Redstart*	<i>Rhyacornis fuliginosus</i>	1	1	1	1	1	
314		White-bellied Redstart	<i>Hodgsonius phaenicuroides</i>		1	1	1		
315		White-tailed Robin*	<i>Myiomela leucura</i>	1					
316		Blue-fronted Robin	<i>Cinclidium frontale</i>			1	1		
317		Grandala*	<i>Grandala coelicolor</i>				1	1	1
318		Little Forktail*	<i>Enicurus scouleri</i>	1	1	1	1		
319		Black-backed Forktail*	<i>Enicurus immaculatus</i>		1				
320		Slaty-backed Forktail*	<i>Enicurus schistaceus</i>	1	1	1			
321		White-crowned Forktail	<i>Enicurus leschenaulti</i>	1	1				
322		Spotted Forktail*	<i>Enicurus maculatus</i>	1	1	1	1		
323		Purple Cochoa*	<i>Cochoa purpurea</i>				1		
324		Green Cochoa	<i>Cochoa viridis</i>	1	1				
325		Hodgson's Bushchat	<i>Saxicola insignis</i>						
326		Common Stonechat*	<i>Saxicola torquata</i>		1	1	1	1	
327		Grey Bushchat*	<i>Saxicola ferrea</i>		1	1	1		
328		Pied Bushchat	<i>Saxicola caprata</i>						
329	Sturnidae	Spot-winged Starling	<i>Saroglossa spiloptera</i>	1	1				
330		Chestnut-tailed Starling*	<i>Sturnus malabaricus</i>	1					
331		Common Myna*	<i>Acridotheres tristis</i>	1	1	1			
332		Hill Myna*	<i>Gracula religiosa</i>	1					
333	Sittidae	Kashmir Nuthatch*	<i>Sitta cashmirensis</i>			1			
334		Chestnut-bellied Nuthatch*	<i>Sitta castanea</i>	1	1	1			
335		White-tailed Nuthatch*	<i>Sitta himalayensis</i>		1	1	1		
336		Velvet-fronted Nuthatch*	<i>Sitta frontalis</i>	1	1	1			
337		Beautiful Nuthatch	<i>Sitta formosa</i>	1	1	1			
338		Wallcreeper*	<i>Tichodroma muraria</i>	1	1	1	1	1	1
339	Certhiidae	Eurasian Treecreeper*	<i>Certhia familiaris</i>			1	1	1	
340		Rusty-flanked Treecreeper*	<i>Certhia nipalensis</i>	1	1	1			

341		Brown-throated Treecreeper	<i>Certhia discolor</i>	1	1	1	1	
342		Winter Wren*	<i>Troglodytes troglodytes</i>			1	1	1
343	Paridae	Fire-capped Tit*	<i>Cephalopyrus flammiceps</i>	1	1	1	1	
344		Rufous-naped Tit*	<i>Parus rufonuchalis</i>				1	1
345		Rufous-vented Tit*	<i>Parus rubidiventris</i>				1	1
346		Coal Tit*	<i>Parus ater</i>				1	1
347		Grey-crested Tit*	<i>Parus dichrous</i>				1	1
348		Green-backed Tit*	<i>Parus monticolus</i>	1	1	1	1	
349		Black-lored Tit	<i>Parus xanthogenys</i>		1	1	1	1
350		Yellow-cheeked Tit*	<i>Parus spilonotus</i>			1		
351		Yellow-browed Tit*	<i>Sylviparus modestus</i>		1	1	1	
352		Sultan Tit*	<i>Melanochlora sultanea</i>	1	1	1		
353	Aegithalidae	Black-throated Tit*	<i>Aegithalos concinnus</i>		1	1		
354		Rufous-fronted Tit*	<i>Aegithalos iouschistos</i>			1	1	1
355	Hirundinidae	Plain Martin	<i>Riparia paludicola</i>					
356		Eurasian Crag Martin	<i>Hirundo rupestris</i>					
357		Barn Swallow	<i>Hirundo rustica</i>	1	1	1	1	1
358		Red-rumped Swallow	<i>Hirundo daurica</i>		1	1		
359		Northern House Martin*	<i>Delichon urbica</i>				1	1
360		Nepal House Martin*	<i>Delichon nipalensis</i>	1	1	1		
361	Regulidae	Goldcrest*	<i>Regulus regulus</i>		1	1	1	1
362	Pycnonotidae	Striated Bulbul*	<i>Pycnonotus striatus</i>		1	1		
363		Black-crested Bulbul*	<i>Pycnonotus melanicterus</i>	1	1			
364		Red-whiskered Bulbul	<i>Pycnonotus jocosus</i>					
365		White-eared Bulbul*	<i>Pycnonotus leucotis</i>	1				
366		Himalayan Bulbul*	<i>Pycnonotus leucogenys</i>	1	1	1		
367		Red-vented Bulbul*	<i>Pycnonotus cafer</i>	1	1	1		
368		White-throated Bulbul	<i>Alophoixus flaveolus</i>	1	1			
369		Mountain Bulbul	<i>Hypsipetes mccllellandii</i>		1	1		
370		Ashy Bulbul*	<i>Hemixos flavala</i>	1	1			
371		Black Bulbul*	<i>Hypsipetes leucocephalus</i>		1	1	1	
372	Cisticolidae	Striated Prinia*	<i>Prinia criniger</i>	1	1			
373		Hill Prinia*	<i>Prinia atrogularis</i>		1	1	1	
374		Grey-crowned Prinia*	<i>Prinia cinereocapilla</i>	1	1			
375		Rufescent Prinia*	<i>Prinia rufescens</i>	1	1			
376		Yellow-bellied Prinia*	<i>Prinia flaviventris</i>		1			
377		Ashy Prinia	<i>Prinia socialis</i>					
378		Plain Prinia*	<i>Prinia inornata</i>	1				
379	Zosteropidae	Oriental White-eye*	<i>Zosterops palpebrosus</i>	1	1	1		
380	Sylviidae	Chestnut-headed Tesia*	<i>Tesia castaneocoronata</i>			1	1	1
381		Grey-bellied Tesia *	<i>Tesia cyaniventer</i>	1	1			
382		Slaty-bellied Tesia	<i>Tesia olivea</i>					
383		Pale-footed Bush Warbler	<i>Cettia pallidipes</i>		1			
384		Brownish-flanked Bush Warbler*	<i>Cettia fortipes</i>	1	1	1		
385		Chestnut-crowned Bush Warbler*	<i>Cettia major</i>				1	1
386		Aberrant Bush Warbler*	<i>Cettia flavolivacea</i>		1	1	1	1
387		Yellowish-bellied Bush Warbler*	<i>Cettia acanthizoides</i>				1	
388		Grey-sided Bush Warbler*	<i>Cettia brunnifrons</i>		1	1	1	1
389		Spotted Bush Warbler*	<i>Bradypterus thoracicus</i>		1	1	1	
390		Brown Bush Warbler	<i>Bradypterus luteoventris</i>			1		

391	Grasshopper Warbler	<i>Locustella naevia</i>							
392	Thick-billed Warbler	<i>Acrocephalus aedon</i>							
393	Mountain Tailorbird*	<i>Orthotomus cuculatus</i>						1	
394	Common Tailorbird*	<i>Orthotomus sutorius</i>	1	1	1				
395	Dusky Warbler*	<i>Phylloscopus fuscatus</i>	1						
396	Smoky Warbler*	<i>Phylloscopus fulgiventor</i>							1
397	Tickell's Leaf Warbler*	<i>Phylloscopus affinis</i>					1	1	
398	Buff-barred Warbler*	<i>Phylloscopus pulcher</i>				1	1	1	1
399	Ashy-throated Warbler*	<i>Phylloscopus maculipennis</i>	1	1	1	1			
400	Lemon-rumped Warbler*	<i>Phylloscopus chloronotus</i>	1						
401	Yellow-browed Warbler*	<i>Phylloscopus inornatus</i>			1				
402	Hume's Warbler*	<i>Phylloscopus humei</i>					1	1	
403	Greenish Warbler*	<i>Phylloscopus trochiloides</i>				1	1	1	1
404	Large-billed Leaf Warbler*	<i>Phylloscopus magnirostris</i>					1	1	1
405	Western Crowned Warbler*	<i>Phylloscopus occipitalis</i>	1	1	1	1			
406	Eastern Crowned Warbler*	<i>Phylloscopus coronatus</i>						1	1
407	Blyth's Leaf Warbler*	<i>Phylloscopus reguloides</i>	1	1	1	1			
408	Yellow-vented Warbler*	<i>Phylloscopus cantator</i>	1	1	1				
409	Golden-spectacled Warbler*	<i>Seicercus burkii</i>	1	1	1				
410	Grey-hooded Warbler*	<i>Seicercus xanthoschistos</i>	1	1	1				
411	White-spectacled Warbler*	<i>Seicercus affinis</i>	1	1	1				
412	Grey-cheeked Warbler*	<i>Seicercus poliogenys</i>						1	
413	Chestnut-crowned Warbler*	<i>Seicercus castaniceps</i>	1	1	1				
414	Broad-billed Warbler*	<i>Tickellia hodgsoni</i>				1	1		
415	Rufous-faced Warbler	<i>Abroscopus albogularis</i>							
416	Black-faced Warbler*	<i>Abroscopus schisticeps</i>	1	1	1				
417	Yellow-bellied Warbler	<i>Abroscopus superciliaris</i>	1	1					
418	White-throated Laughingthrush*	<i>Garrulax albogularis</i>					1	1	
419	White-crested Laughingthrush*	<i>Garrulax leucolophus</i>	1	1	1				
420	Lesser Necklaced Laughingthrush	<i>Garrulax monileger</i>	1	1					
421	Greater Necklaced Laughingthrush*	<i>Garrulax pectoralis</i>	1	1	1				
422	Striated Laughingthrush*	<i>Garrulax striatus</i>	1	1	1				
423	Rufous-necked Laughingthrush	<i>Garrulax ruficollis</i>	1	1	1				
424	Rufous-chinned Laughingthrush*	<i>Garrulax rufogularis</i>	1	1	1	1	1	1	
425	Spotted Laughingthrush*	<i>Garrulax ocellatus</i>						1	1
426	Grey-sided Laughingthrush	<i>Garrulax caerulatus</i>				1	1		
427	Streaked Laughingthrush	<i>Garrulax lineatus</i>				1			
428	Blue-winged Laughingthrush*	<i>Garrulax squamatus</i>	1	1	1	1	1	1	
429	Scaly Laughingthrush	<i>Garrulax subunicolor</i>				1	1	1	1
430	Variiegated Laughingthrush	<i>Garrulax variegatus</i>							
431	Black-faced Laughingthrush*	<i>Garrulax affinis</i>					1	1	1
432	Chestnut-crowned Laughingthrush*	<i>Garrulax erythrocephalus</i>					1	1	1
433	Red-faced Liocichla	<i>Liocichla phoenicea</i>	1	1	1				
434	Abbott's Babbler	<i>Malacocincla abbotti</i>							
435	Puff-throated Babbler*	<i>Pellorneum ruficeps</i>	1	1	1	1			
436	Rusty-cheeked Scimitar Babbler	<i>Pomatorhinus erythrogegens</i>	1	1	1				
437	White-browed Scimitar Babbler*	<i>Pomatorhinus schisticeps</i>	1	1	1				
438	Streak-breasted Scimitar Babbler*	<i>Pomatorhinus ruficollis</i>	1	1	1	1			
439	Coral-billed Scimitar Babbler*	<i>Pomatorhinus ferruginosus</i>				1	1	1	1

440	Slender-billed Scimitar Babbler*	<i>Xiphirhynchus superciliaris</i>	1	1		
441	Long-billed Wren Babbler*	<i>Rimator malacoptilus</i>	1			
442	Scaly-breasted Wren Babbler*	<i>Pnoepyga albiventer</i>	1	1	1	1
443	Pygmy Wren Babbler	<i>Pnoepyga pusilla</i>	1	1	1	
444	Rufous-throated Wren Babbler*	<i>Spelaeornis caudatus</i>				1
445	Spotted Wren Babbler	<i>Spelaeornis formosus</i>			1	
446	Wedge-billed Wren Babbler	<i>Sphenocichla humei</i>				
447	Rufous-capped Babbler	<i>Stachyris ruficeps</i>	1	1	1	
448	Rufous-fronted Babbler*	<i>Stachyris rufifrons</i>	1	1		
449	Golden Babbler*	<i>Stachyris chrysaea</i>	1	1	1	
450	Grey-throated Babbler*	<i>Stachyris nigriceps</i>	1	1	1	
451	Striped Tit Babbler	<i>Macronous gularis</i>	1			
452	Chestnut-capped Babbler	<i>Timalia pileata</i>	1	1		
453	Jungle Babbler	<i>Turdoides striatus</i>				
454	Slender-billed Babbler	<i>Turdoides longirostris</i>				
455	Giant Babax	<i>Babax waddellii</i>				1
456	Silver-eared Mesia*	<i>Leiothrix argentauris</i>	1	1	1	
457	Red-billed Leiothrix*	<i>Leiothrix lutea</i>		1	1	
458	Cutia*	<i>Cutia nipalensis</i>		1	1	
459	Black-headed Shrike Babbler	<i>Pteruthius rufiventer</i>			1	
460	White-browed Shrike Babbler*	<i>Pteruthius flaviscapis</i>	1	1	1	1
461	Green Shrike Babbler*	<i>Pteruthius xanthochlorus</i>			1	1
462	Black-eared Shrike Babbler*	<i>Pteruthius melanotis</i>	1	1	1	1
463	White-hooded Babbler	<i>Gampsorhynchus rufulus</i>	1			
464	Hoary-throated Barwing*	<i>Actinodura nipalensis</i>		1	1	1
465	Rusty-fronted Barwing*	<i>Actinodura egertoni</i>		1	1	
466	Red-tailed Minla*	<i>Minla ignotincta</i>	1	1	1	1
467	Chestnut-tailed Minla*	<i>Minla strigula</i>	1	1	1	1
468	Blue-winged Minla*	<i>Minla cyanouroptera</i>	1	1	1	
469	Golden-breasted Fulvetta*	<i>Alcippe chrysotis</i>			1	1
470	Yellow-throated Fulvetta	<i>Alcippe cinerea</i>		1	1	
471	Rufous-winged Fulvetta*	<i>Alcippe castaneiceps</i>		1	1	1
472	White-browed Fulvetta*	<i>Alcippe vinipectus</i>			1	1
473	Brown-throated Fulvetta*	<i>Alcippe ludlowi</i>			1	1
474	Rufous-throated Fulvetta*	<i>Alcippe rufogularis</i>			1	1
475	Rusty-capped Fulvetta*	<i>Alcippe dubia</i>			1	1
476	Nepal Fulvetta*	<i>Alcippe nipalensis</i>	1	1	1	
477	Rufous-backed Sibia	<i>Heterophasia annectans</i>	1	1	1	
478	Rufous Sibia*	<i>Heterophasia capistrata</i>	1	1	1	1
479	Long-tailed Sibia	<i>Heterophasia picaoides</i>	1	1		
480	Striated Yuhina*	<i>Yuhina castaniceps</i>	1	1		
481	White-naped Yuhina*	<i>Yuhina bakeri</i>	1	1	1	
482	Whiskered Yuhina*	<i>Yuhina flavicollis</i>	1	1	1	1
483	Stripe-throated Yuhina*	<i>Yuhina gularis</i>			1	1
484	Rufous-vented Yuhina*	<i>Yuhina occipitalis</i>			1	1
485	Black-chinned Yuhina*	<i>Yuhina nigrimenta</i>	1	1		
486	White-bellied Yuhina	<i>Yuhina zantholeuca</i>	1	1	1	
487	Fire-tailed Myzornis*	<i>Myzornis pyrrhoura</i>			1	1
488	Great Parrotbill*	<i>Conostoma oemodium</i>			1	1
489	Brown Parrotbill*	<i>Paradoxornis unicolor</i>			1	1

490		Grey-headed Parrotbill*	<i>Paradoxornis gularis</i>	1	1			
491		Black-breasted Parrotbill	<i>Paradoxornis flavirostris</i>			1		
492		Fulvous Parrotbill	<i>Paradoxornis fulvifrons</i>				1	1
493		Black-throated Parrotbill*	<i>Paradoxornis nipalensis</i>	1	1	1		
494		Lesser Rufous-headed Parrotbill	<i>Paradoxornis atrosuperciliaris</i>			1		
495		Greater Rufous-headed Parrotbill	<i>Paradoxornis ruficeps</i>	1	1			
496	Alaudidae	Tibetan Lark	<i>Melanocorypha maxima</i>					1
497		Greater Short-toed Lark*	<i>Calandrella brachydactyla</i>					1
498		Hume's Short-toed Lark*	<i>Calandrella acutirostris</i>					1
499		Eurasian Skylark	<i>Alauda arvensis</i>		1			
500		Oriental Skylark	<i>Alauda gulgula</i>					
501		Horned Lark*	<i>Eremophila alpestris</i>					1
502	Nectariniidae	Thick-billed Flowerpecker*	<i>Dicaeum agile</i>			1	1	
503		Yellow -vented Flowerpecker	<i>Dicaeum chrysorrheum</i>					
504		Yellow -bellied Flowerpecker	<i>Dicaeum melanoxanthum</i>		1	1	1	
505		Fire-breasted Flowerpecker*	<i>Dicaeum ignipectus</i>	1	1	1	1	1
506		Scarlet-backed Flowerpecker	<i>Dicaeum cruentatum</i>					
507		Purple sunbird	<i>Nectarinia asiatica</i>					
508		Mrs Gould's Sunbird*	<i>Aethopyga gouldiae</i>		1	1	1	
509		Green-tailed Sunbird*	<i>Aethopyga nipalensis</i>	1	1	1	1	1
510		Black-throated Sunbird*	<i>Aethopyga saturata</i>	1	1	1		
511		Crimson sunbird*	<i>Aethopyga siparaja</i>	1	1			
512		Fire-tailed Sunbird*	<i>Aethopyga ignicauda</i>	1	1	1	1	1
513		Little Spiderhunter	<i>Arachnothera longirostra</i>					
514		Streaked Spiderhunter*	<i>Arachnothera magna</i>	1	1			
515	Passeridae	House Sparrow*	<i>Passer domesticus</i>	1	1	1		
516		Russet Sparrow	<i>Passer rutilans</i>	1	1	1		
517		Eurasian Tree Sparrow	<i>Passer montanus</i>	1	1	1	1	
518		Tibetan Snowfinch*	<i>Montifringilla adamsi</i>					1
519		Small Snowfinch	<i>Pyrgilauda davidiana</i>					1
520		Rufous-necked Snowfinch	<i>Pyrgilauda ruficollis</i>					1
521		Plain-backed Snowfinch	<i>Pyrgilauda blanfordi</i>					1
522		Forest Wagtail	<i>Dendronanthus indicus</i>					
523		White Wagtail*	<i>Motacilla alba</i>	1	1	1	1	1
524		White-browed Wagtail	<i>Motacilla maderaspatensis</i>	1				
525		Citrine Wagtail	<i>Motacilla citreola</i>				1	1
526		Yellow Wagtail*	<i>Motacilla flava</i>	1	1	1	1	1
527		Grey Wagtail*	<i>Motacilla cinerea</i>	1	1	1		
528		Paddyfield Pipit	<i>Anthus rufulus</i>					
529		Blyth's Pipit*	<i>Anthus godlewskii</i>				1	1
530		Long-billed Pipit*	<i>Anthus similis</i>					1
531		Olive-backed Pipit*	<i>Anthus hodgsoni</i>	1	1	1	1	1
532		Rosy Pipit*	<i>Anthus roseatus</i>				1	1
533		Water Pipit	<i>Anthus spinoletta</i>					
534		Alpine Accentor*	<i>Prunella collaris</i>			1	1	1
535		Altai Accentor	<i>Prunella himalayana</i>			1	1	1
536		Robin Accentor*	<i>Prunella rubeculoides</i>		1	1	1	1
537		Rufous-breasted Accentor*	<i>Prunella strophiatea</i>		1	1	1	1
538		Brown Accentor*	<i>Prunella fulvescens</i>					1
539		Maroon-backed Accentor*	<i>Prunella immaculata</i>			1	1	1

540		White-rumped Munia*	<i>Lonchura striata</i>	1	1	1		
541		Scaly-breasted Munia	<i>Lonchura punctulata</i>			1		
542		Black-headed Munia*	<i>Lonchura malacca</i>	1				
543	Fringillidae	Yellow -breasted Greenfinch	<i>Carduelis spinoides</i>		1	1	1	1
544		Tibetan Siskin*	<i>Carduelis thibetana</i>		1	1	1	
545		Twite	<i>Carduelis flavirostris</i>					
546		Plain Mountain Finch*	<i>Leucosticte nemoricola</i>				1	1
547		Brandt's Mountain Finch*	<i>Leucosticte brandti</i>					1
548		Spectacled Finch	<i>Callacanthus burtoni</i>					
549		Blanford's Rosefinch*	<i>Carpodacus rubescens</i>		1	1	1	1
550		Dark-breasted Rosefinch*	<i>Carpodacus nipalensis</i>		1	1	1	1
551		Common Rosefinch*	<i>Carpodacus erythrinus</i>		1	1	1	1
552		Beautiful Rosefinch*	<i>Carpodacus pulcherrimus</i>			1	1	1
553		Pink-browed Rosefinch*	<i>Carpodacus rodochrous</i>				1	
554		Dark-rumped Rosefinch*	<i>Carpodacus edwardsii</i>			1	1	1
555		White-browed Rosefinch*	<i>Carpodacus thura</i>			1	1	1
556		Streaked Rosefinch*	<i>Carpodacus rubicilloides</i>					1
557		Great Rosefinch	<i>Carpodacus rubicilla</i>					
558		Red-fronted Rosefinch*	<i>Carpodacus puniceus</i>					1
559		Crimson-browed Finch	<i>Propryrhula subhimachala</i>				1	1
560		Scarlet Finch*	<i>Haematospiza sipahi</i>	1	1	1	1	
561		Red Crossbill	<i>Loxia curvirostra</i>		1	1	1	
562		Brown Bullfinch	<i>Pyrrhula nipalensis</i>			1	1	1
563		Red-headed Bullfinch*	<i>Pyrrhula erythrocephala</i>			1	1	1
564		Grey-headed Bullfinch	<i>Pyrrhula erythaca</i>			1	1	1
565		Collared Grosbeak*	<i>Mycerobas affinis</i>				1	1
566		Spot-winged Grosbeak*	<i>Mycerobas melanozanthos</i>	1	1	1	1	1
567		White-winged Grosbeak*	<i>Mycerobas carnipis</i>			1	1	1
568		Gold-naped Finch	<i>Pyrrhoptectes epauletta</i>		1	1	1	1
569		Crested Bunting	<i>Melophus lathami</i>	1	1	1		
570		Chestnut-eared Bunting	<i>Emberiza fucata</i>					
571		Little Bunting*	<i>Emberiza pusilla</i>		1	1		
572		Yellow -breasted Bunting	<i>Emberiza aureola</i>					
573		Chestnut Bunting	<i>Emberiza rutila</i>					
574		Black-faced Bunting	<i>Emberiza spodocephala</i>				1	

* Denotes species observed by the authors during 2003-2006

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