An ornithological survey of Chenab Valley, Chamoli district, Uttaranchal, including notes on pheasants

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Abstract: An ornithological survey was carried out at Chenab Valley, Chamoli district, Uttaranchal (India), during March–April, 2005. We recorded 113 species of birds represented by 14 families. Bird species diversity was highest in the middle temperate zone (2,300–2,500 m). Species belonging to the Muscicapidae were most abundant and among the Galliformes the Impeyan Monal had a strikingly high encounter rate. Chenab Valley is clearly rich in avifaunal assemblages and given that it is located between Nanda Devi Biosphere Reserve and Kedarnath Wildlife Sanctuary, it has strong conservation significance for avifauna and their habitats in this landscape.

Introduction

The Himalaya is well recognised for its biological diversity and its ecological, hydrological, socio-cultural, and aesthetical values. This enormous mountain chain covers 422,200 km2 (nearly 13% of India's land surface), and has been classified into north-western, western, central, eastern and trans-himalayan biogeographical zones (Rodgers *et al.* 2000). The western himalaya is an important area of regional endemism, and has been designated by BirdLife International as Endemic Bird Area (EBA 128). It also contains 27 Important Bird Areas (IBAs) (Islam & Rahamani 2004). The Western Himalaya EBA extends along the mountain chain from western Nepal (west of the Kali Gandaki Valley) through Uttaranchal, Himachal Pradesh and, Jammu and Kashmir in north-western India. The North-Western and Western Himalayan Biogeographic Zones (2A & 2B) cover 12,1463 km2 and contain 47 Protected Areas (PA) that cover 10,881.02 km2 (Rodgers *et al.* 2000). Substantial areas that are rich in wildlife occur in the reserve forests that buffer these Protected Areas. Chamoli district in Uttaranchal has two national parks (NP), one wildlife sanctuary (WS), one biosphere reserve (BR), and three forest divisions and is rich in wildlife. Baseline information on the avifauna of Western Himalaya can be found in Ali & Ripley (1987), Gaston *et al.* (1981, 1983), Lamba (1987), Tak & Kumar (1987), Gaston & Garson (1992), Sankaran (1995) and, Sathyakumar (2003). Further information exists in the form of studies carried out by Sathyakumar *et al.* (1992), Kumar (1997) in Kedarnath WS, Mishra (1997) in Majhatal WS, Gaston *et al.* (1993), Ramesh *et al.* (2003) in Great Himalayan NP in Himachal Pradesh and, Raza (2006) at Kedarnath WS and Ascot WS in Uttaranchal. Most of these studies have been carried out in PAs.

This paper presents the abundance and distribution pattern of birds in 'Chenab' Valley, Urgam Reserve Forest, Chamoli district, Uttaranchal, which is located between the PAs of Kedarnath WS and Nanda Devi BR. The Urgam Reserve Forest was an unexplored area prior to this study. We carried out an ornithological survey of the reserve forests adjacent to Thang village (30º33'15''–30º34'50''N 79º29'50''–79º31'15''E) (Fig. 1) in Chenab Valley during April 2005.

Study area

The study area is characterised by highly rugged steep mountains with diverse slope, aspect and elevation categories. Altitude of the study area ranges from 1,200m (Lower Mulia Hamlet at the confluence of 2 mountain rivulets) to 4,000m (an unnamed peak, locally called as 'Bhutkuri').

Fig. 1. Map of Chenab Valley & Nanda Devi National Park

About 70% of the study area is covered by forest and the rest comprises rocky grassy slopes. The plant communities are representatives of the temperate, sub-alpine and alpine regions, including broad-leaved oaks (*Quercus floribunda, Q. semecarpifolia, Q. leucotrichophora*), coniferous forest (*Taxus baccata*), riverine forest (*Alnus nepalensis*), high altitude mixed forest, sub-alpine and, alpine pastures (Champion & Seth 1968) (Fig. 2).

Methods

The reconnaissance of the study area, the laying of transects and identification of point count and call count stations were made during March 2005. The field survey was carried out during April 2005. This included systematic coverage of the study area by walking along trails and transects (Burnham *et al.* 1980), by point counts (Bibby *et al.* 1992; Sutherland 1996) and, call counts (Gaston 1980). Bird species encountered during the field survey were recorded along with information on altitude, aspect, habitat and locations. Abundance ranking was given to species based on the frequency of the encounters during point counts. Eleven point count stations (25 m radius each) in different altitudinal zones (2,000–3,500 m) encompassing four habitats were sampled during April 2005. Duration of each point count was 15 minutes for all the stations. During observation, presence of the same individual in the circle on different sides and frequent entry and exit of one individual into and out of the circle were ignored and counted as a single sighting. The encounter rate for Kaleej *Lophura leucomelanos*, Koklass *Pucrasia macrolopha* and Impeyan Monal *Lophophorus impejanus* pheasants were obtained from transect walks. Six transects were walked three times each to estimate the abundance of pheasants in the study area (Table 1). Pre-dawn call counts (n=8) were carried out for Koklass Pheasants, as the males call gregariously during April–May (breeding season) (Fig. 2).

Analysis

Richness and relative abundance, through encounter rate (#/plot), of bird species was calculated by point counts. Abundance of pheasants, encounter rate (# / km walk) or (# male / station), was calculated by transect walks and call counts respectively. Comparisons of encounter rate of pheasants were made with results from other studies (Sathyakumar 2003; Sankaran 1993; Ramesh *et al.*1999; Sathyakumar *et al.* 1992) carried out for pheasants in different protected areas during the same months / seasons of western Himalaya.

Results

During the study period, 106 species of birds were recorded (Appendix). This included two critically endangered, Indian White-backed Vulture *Gyps bengalensis* and Long–billed Vulture *G. indicus* and, one vulnerable Cheer Pheasant *Catreus wallichi* species (IUCN 2006). Four species, Indian White-backed Vulture, Bearded Vulture *Gypaetus barbatus*, Cheer Pheasant, Impeyan Monal *Lophophorus impejanus* are listed in Schedule I Part III of Wildlife (Protection) Act, 1972, amended in 2003 (GoI, 1972, 2003). We could not confirm the identification of Tickell's Warbler *Phylloscopus affinis*, Hume's Warbler *P. humei*, Lesser Cuckoo *Cuculus poliocephalus* and, Spotted-winged Grosbeak *Mycerobas melanozanthos*. Presence of Cheer Pheasant in the study area was confirmed by calls at dawn and dusk and by secondary information.

During a total of five-hour point counts, 569 individuals of 42 species belonging to 14 families were recorded. The encounter rate (# birds per plot) for Muscicapidae was the highest (14.35±1.98), so it was sub-divided into four sub-families and Timalinae (babblers, laughingthrushes) had the highest encounter rate of 7.55±1.14 birds per plot

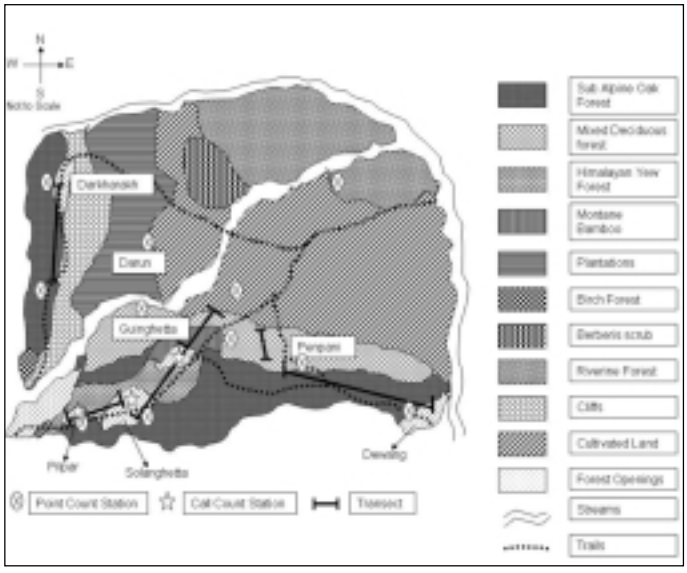

Fig. 2. A sketch of Chenab Valley showing the vegetation types and location of transects, point count & call count stations

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Kaleej Pheasant

followed by Sylvinae (warblers), 3.20±1.05 birds per plot and, Turdinae (thrushes), 2.60±0.50 birds per plot. Besides Muscicapidae, Paridae (tits) also had a high encounter rate of 2.70±1.10 birds per plot, when compared with other families. Families such as Picidae (0.80±0.22 birds per plot), Corvidae (1.00±0.49 birds per plot), Motacillidae (1.50±1.50 birds per plot) and, Columbidae (1.80±0.81 birds per plot), showed a moderate encounter rate. Cuculidae (only calls heard), Capitonidae, Campephagidae, Certhiidae and Nectariniidae—all these had a very low encounter rate (Table 2).

Along the altitudinal gradient, most of the birds were recorded between 2,301–2,400 m, near Penpani, in mixed deciduous forest dominated by Maple *Acer* spp., and Horse Chestnut *Aesculus indica*. A total of 120 individual birds were recorded at Penpani (2,350 m) alone. Other low elevation areas of riverine Alder *Alnus nepalensis* also showed high bird count of 78 individual birds at 2,100 m (Guinghetta) and 74 individual birds at 2,200 m (Darun). At higher altitudes, in Alpine meadows and sub-alpine forest edges, at 3,130 m (Solanghetta–Pilpar), the bird count was 70. Upland meadows of Darkharak (2,810 m) and Dewang (2,735 m) also showed high bird count of 74 and 71 birds respectively. Distribution of bird species in different habitats along the altitudinal gradient showed highest species aggregation in middle temperate zone and lowest in alpine zone (Fig. 3). This is similar to the observations made by Raza (2006) at Kedarnath WS and Ascot WS, where bird diversity was reported to be highest in middle altitude (2,200–2,500 m).

The results of this survey are similar to the results of earlier surveys carried out in the Western Himalaya. Sankaran (1993) reported 112 species during May–June 1993 from Nanda Devi BR. Gaston *et al*. (1993) reported 183 species from Great Himalayan NP. Kumar (1997) recorded 155 species in Kedarnath WS during winter and spring in 1997. Mishra (1997) reported 105 species from Majhatal WS, Himachal Pradesh, during winter and spring of 1993. In the present study the greatest species diversity was recorded in temperate forests (2,300–2,400m) and Muscicapidae, including babblers, flycatchers, warblers and, thrushes were abundant in the study area during April 2005. Presence of water, dense tree cover with *Litsea* undergrowth and abundant food may be the reasons for the presence of several species in that altitudinal zone.

During the survey, additional information was collected on Galliformes. Nine species, namely, Snow Partridge *Lerwa lerwa*, Himalayan Snowcock *Tetraogallus himalayensis*, Chukor *Alectoris chukar*, Black Francolin *Fracolinus francolinus*, Common Hill-Partridge *Arborophila torqueola*, Koklass, Impeyan Monal, Kaleej and Cheer pheasants were recorded during this survey (Table 3). While Kaleej Pheasant was recorded only in the Temperate Mixed Broad-Leaved Forest (Transect No 1) (Table 1), we came across Impeyan Monal and Koklass Pheasant in the remaining five transects.

Abundance of pheasants (encounter rate & call count)

Impeyan Monal was the most frequently sighted (34 sightings) pheasant during the transect walks (n=15) and

Table 1. Characteristics of the Transects laid in Chenab Valley

Transect	Vegetation Type	Length (m)	Elevation (m)
1	Temperate Mixed Broad-leaved Forests	500	2000–2500
2	Temperate Coniferous Himalayan Yew and Oak Forests	750	2500–2800
3	Mixed Coniferous Himalayan Yew and Oak Forests with Montane Bamboo	600	2500–2800
4	Temperate Coniferous Himalayan Yew and Oak Forests and Alpine Meadows	700	2800–3000
5	Mixed Coniferous Himalayan Yew and Oak Forests with Montane Bamboo	700	2800–3000
6	Temperate Coniferous Himalayan Yew and Oak Forests and Alpine Meadows	500	2800-3000

Table 2. Encounter rate (ER) (#/plot) for different families and sub-families of avifauna in Chenab Valley, April 2005

Sl No.	Family	ER (# / plot)±S.E.	Total number seen
1	Columbidae	1.80±0.81	36
2	Cuculidae	0.10±0.01	2
3	Capitonidae	0.40±0.28	8
4	Picidae	0.80±0.22	16
5	Dicruridae	1.30±0.65	26
6	Corvidae	1.00±0.49	20
7	Camphephagidae	0.40±0.27	8
8	Pycnonotidae	1.30±0.59	26
9	Muscicapidae	**14.35±1.98**	**287**
9a	Timalinae	7.55±1.14	151
9b	Muscicapinae	1.00±0.27	20
9c	Sylvinae	3.20±1.05	64
9d	Turdinae	2.60±0.50	52
10	Paridae	2.70±1.10	54
11	Certhiidae	0.30±0.16	6
12	Motacillidae	1.50±1.50	30
13	Nectariniidae	0.10±0.01	2
14	Carduelinae	2.40±1.34	48

the overall encounter rate was 9.39±1.94 / km walked. There were seven sightings of the Koklass Pheasant, all during transect walks (n=15). Their overall encounter rate was 0.77±0.27 / km walked. All the ten sightings of Kaleej Pheasant were from one transect, which was located in the Lower Temperate Zone. Encounter rate in this transect (n=3) was 7.77±0.77 / km. As reported from other parts of Western Himalaya, Kaleej Pheasant occurs mostly in the Lower Temperate Forest (2,000–2,500 m). Encounter rate for Impeyan Monal in Chenab Valley during April 2005 is higher than its encounter rates in Nanda Devi NP during May–July as reported by Sankaran (1993) and Sathyakumar (2003); in Kedarnath WS during April–May (Sathyakumar *et al.* 1992) and, in Great Himalayan NP, Himachal Pradesh, during April–June (Ramesh *et al.* 1999). Encounter rates for Koklass Pheasant in Chenab Valley during April 2005 is less than that reported from Great Himalayan NP, Himachal Pradesh, in April–May (Ramesh *et al.* 1999). Encounter rate for Kaleej Pheasant in Chenab Valley during April 2005 is higher than that reported from Kedarnath WS in April–May (Sathyakumar *et al.* 1992) (Table 4). Heavy snowfall during March 2005 and persistent snow in the Alpine zone (>3000 m) of Chenab Valley in April 2005 may be the reasons for the high abundance of Impeyan Monal in sub-alpine and upper temperate zone during April 2005.

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Himalayansnowcock

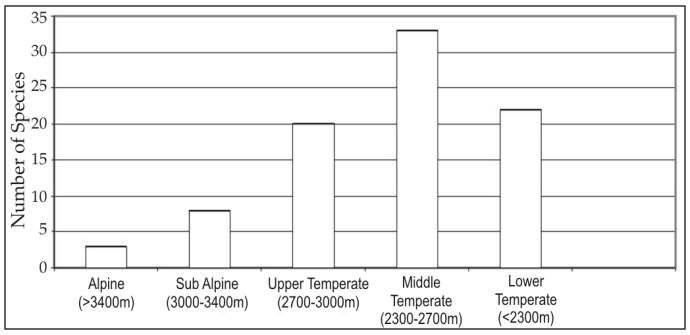

Fig. 3. Number of bird species recorded at different altitudinal zones in Chenab Valley, April 2005.

Table 3. Records of Galliformes in Chenab Valley, April 2005

Species	Sightings (# individuals)	Evidences
Snow Partridge	1 (2)	—
Himalayan Snowcock	1 (4)	—
Chukor	3 (7)	—
Black Francolin	6 (14)	11 (calls)
Common Hill-Partridge	1 (1)	—
Koklass Pheasant	7 (8)	3 (calls)
Impeyan Monal	43 (106)	18 (feathers)
Kaleej Pheasant	10 (12)	—
Cheer Pheasant	—	4 (calls)

The estimate for calling male Koklass Pheasant through call count in April 2005 was 3.12±0.29 males per station. This is comparable with 3.5 males per stations in Rolla (Great Himalayan NP, Himachal Pradesh), in April–May (Ramesh *et al.* 1999).

Conclusions

1. Bird diversity of the Chenab valley is rich and similar to other PAs in the Western Himalaya region.
2. Encounter rates for pheasants indicate relatively high abundance of Impeyan Monal in Chenab Valley when compared with other PAs of the Western Himalaya.
3. The Presence of over one hundred species of birds including some rare birds and others in Chenab Valley makes it an important area for biodiversity conservation. As Chenab Valley is located between the Nanda Devi NP and Kedarnath WS, it has significance and potential for conservation of avifauna and their habitats in this landscape.

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Table 4. Comparison of encounter rate (# / km walk) of pheasants in Chenab Valley with other sites of Western Himalaya

Locality	Chenab Valley	Nanda Devi NP		Great Himalayan NP	Kedarnath WS
Month & year	April 2005[1]	June–July 2003[2]	May–June1993[3]	April–May1999[4]	April–May 1992[5]
Species					
Kaleej Pheasant	7.77	—	—	—	0.4
Impeyan Monal	9.39	0.75-2.28	0.4-1.25	3.4	1.4
Koklass Pheasant	0.77	—	—	1.2	—

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Plumbeous Redstart

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Appendix: List of birds recorded at Chenab Valley, Urgam Reserve Forest, April 2005

[English and scientific names follow Manakadan & Pittie (2001).]

Species	Altitudinal range (m)	Habitat(s)	Abundance ranking
Black Kite *Milvus migrans*	1,500–3,000	3, 6, 7	4
Bearded Vulture *Gypaetus barbatus*	1,500–3,500	1, 2, 5, 6	4
Egyptian Vulture *Neophron percnopterus*	1,500–2,500	7	3
Long-billed Vulture *Gyps indicus*	1,500–3,500	7	4
Indian White-Backed Vulture *G. bengalensis*	1,500–3,000	7	3
Himalayan Griffon *G. himalayensis*	1,500–3,500	1, 2, 3, 5, 6	4
Eurasian Sparrowhawk *Accipiter nisus*	2,500–3,000	3, 6	2
Steppe Eagle *Aquila nipalensis*	2,800–3,200	1, 2, 5, 6	2
Golden Eagle *A. chrysaetos*	2,500–3,000	1, 2	2
Booted Eagle *Hieraaetus pennatus*	2,800–3,200	1, 2	1
Common Kestrel *Falco tinnunculus*	1,500–2,800	1, 2, 7	4
Snow Partridge *Lerwa lerwa*	2,900–3,500	1, 2	3
Himalayan Snowcock *Tetraogallus himalayensis*	3,000–3,500	1	1
Chukor *Alectoris chukar*	2,500–2,800	7	4
Black Francolin *Fracolinus francolinus*	1,500–2,050	7	4
Common Hill-Partridge *Arborophila torqueola*	2,300–2,900	3, 7	3
Koklass Pheasant *Pucrasia macrolopha*	2,500–2,900	2, 3	3
Impeyan Monal *Lophophorus impejanus*	2,600–3,500	1, 2, 3	4
Kaleej Pheasant *Lophura leucomelanos*	2,000–2,500	3, 7	4
Cheer Pheasant *Catreus wallichii**	1,500–2,000	6	1
Blue Rock Pigeon *Columba livia*	1,500–2,500	7	3
Hill Pigeon *C. rupestris*	2,800–2,950	7	3
Snow Pigeon *C. leuconota*	2,950–3,500	1, 2, 4	3
Speckled Wood-Pigeon *C. hodgsonii*	2,800–2,950	3	1
Oriental Turtle-Dove *Streptopelia orientalis*	1,500–3,000	3, 7	4
Slaty-headed Parakeet *Psittacula himalayana*	1,080–2,000	1, 3	2
Large Hawk-Cuckoo *Hierococcyx sparverioides*	2,000–2,900	3,	4
Common Cuckoo *Cuculus canorus*	2,000–2,900	3, 7	4
Oriental Cuckoo *Cuculus saturatus*	2,800–3,000	2, 3	3
?Lesser Cuckoo *Cuculus poliocephalus*	2,050–2,800	5	1
Spotted Scops-Owl *Otus spilocephalus*	2,500–2,800	3	3
Himalayan Swiftlet *Collocalia brevirostris*	2,700–2,900	1, 2	2
Alpine Swift *Tachymarptis melba*	2,900–3,500	1, 4	1
Pacific Swift *Apus pacificus*	2,700–2,900	1, 2	2
Common Hoopoe *Upupa epops*	2,000–2,300	7	4
Great Barbet *Megalaima virens*	1,500 -2,800	3, 6	4
Brown-fronted Pied Woodpecker *Dendrocopos auriceps*	2,300–3,000	3	4
Fulvous-breasted Pied Woodpecker *D. macei*	2,300–2,800	3	2
Himalayan Pied Woodpecker *D. himalayensis*	2,300–3,000	3	4
Large Scaly-bellied Green Woodpecker *Picus squamatus*	2,800 -2,900	3	1
Black-naped Green Woodpecker *P. canus*	2,800 -2,900	3	1
Himalayan Golden-backed Woodpecker *Dinopium shorii*	2,300–2,500	3	1
Eastern Skylark *Alauda gulgula*	2,000–2,300	7	3
Paddyfield Pipit *Anthus rufulus*	2,000–2,300	7	4
Rosy Pipit *A. roseatus*	2,300–2,700	1, 6	2
Upland Pipit *A. sylvanus*	2,900–3,000	1, 3, 6	3
Scarlet Minivet *Pericrocotus flammeus*	2,000–2,700	3	4
Black-crested Bulbul *Pycnonotus melanicterus*	2,300–2,400	3	1
Himalayan Bulbul *Pycnonotus leucogenys*	1,500–2,500	3, 7	3
Black Bulbul *Hypsipetes leucocephalus*	2,000–2,700	3, 4	4
Blue Whistling-Thrush *Myophonus caeruleus*	1,500–2,500	3, 7	4
Plain-backed Thrush *Zoothera mollissima*	2,900–3,500	3, 7	3
Tickell's Thrush *Turdus unicolor*	2,300–2,700	3	1
White-collared Blackbird *T. albocinctus*	2,500–2,800	3	3

Species	Altitudinal range (m)	Habitat(s)	Abundance ranking
Grey-winged Blackbird *T. boulboul*	2,500–2,700	3	3
Himalayan Rubythroat *Luscinia pectoralis*	1,050–2,000	4	1
Orange-flanked Bush-Robin *Tarsiger cyanurus*	2,900–3,000	3, 6	1
Blue-fronted Redstart *Phoenicurus frontalis*	2,900–3,000	3, 6	1
Plumbeous Redstart *Rhyacornis fuliginosus*	1,000–2,500	4	1
Little Forktail *Enicurus scouleri*	1,000–2,500	4	1
Spotted Forktail *E. maculatus*	1,000–2,500	4	3
Grey Bushchat *Saxicola ferrea*	2,050–2,300	3, 7	3
Streaked Laughingthrush *Garrulax lineatus*	2,000–2,850	3, 4, 7	4
Variegated Laughingthrush *G. variegatus*	2,300–2,900	3	4
Red-headed Laughingthrush *G. erythrocephalus*	2,000–2,700	3, 7	2
Red-Billed Leiothrix *Leiothrix lutea*	2,000–2,300	4, 7	1
Bar-throated Minla *Minla strigula*	2,800–2,900	3	1
Rufous Sibia *Heterophasia capistrata*	2,300–2,950	3	4
Yellow-naped Yuhina *Yuhina flavicollis*	2,000–2,300	4, 6	1
Stripe-throated Yuhina *Y. gularis*	2,700–2,900	3, 6	1
?Tickell's Warbler *Phylloscopus affinis*	2,000–2,500	3,4	2
Hume's Warbler *P. humei*	2,000–2,700	3,4, 7	3
Grey-headed Flycatcher-Warbler *Seicercus xanthoschistos*	2,000–2,700	3,4, 6,7	4
Rusty-tailed Flycatcher *Muscicapa ruficauda*	2,050–2,300	7	1
Orange-gorgeted Flycatcher *Ficedula strophiata*	2,000–2,500	3	1
Ultramarine Flycatcher *F. superciliaris*	2,000–2,500	3, 7	3
Verditer Flycatcher *Eumyias thalassina*	2,000–2,700	3, 7	4
Rufous-bellied Niltava *Niltava sundara*	2,300–2,800	3	4
Blue-throated Flycatcher *Cyornis rubeculoides*	2,500–2,700	6	1
Grey-Headed Flycatcher *Culicicapa ceylonensis*	2,300–2,500	3	3
Yellow-bellied Fantail-Flycatcher *Rhipidura hypoxantha*	2,300–2,700	3	3
Red- Headed Tit *Aegithalos concinnus*	2,300–2,800	3, 7	3
Rufous-bellied Crested Tit *Parus rubidiventris*	2,800–3,000	3, 7	1
Spot-winged Tit *P. melanolophus*	2,500–2,800	3, 7	2
Great Tit *P. major*	2,000–2,700	3 4, 7	4
Green-backed Tit *P. monticolus*	2,000–2,800	3, 4, 7	4
White-tailed Nuthatch *Sitta himalayensis*	2,300–2,500	3	1
Bar-tailed Tree-creeper *Certhia himalayana*	2,300–2,800	3	3
Fire-tailed Sunbird *Aethopyga ignicauda*	2,500–2,700	6	1
Rock Bunting *Emberiza cia*	2,000–2,300	7	4
Hodgson's Mountain-Finch *Leucosticte nemoricola*	2,900–3,100	1, 2, 6	2
Common Rosefinch *Carpodacus erythrinus*	2,300–2,900	3, 6	4
Black-and-Yellow Grosbeak *Mycerobas icterioides*	2,800–2,900	3	2
?Spotted-winged Grosbeak *M. melanozanthos*	2,000–2,300	4	1
House Sparrow *Passer domesticus*	1,500–2,000	7	4
Eurasian Tree-Sparrow *Passer montanus*	1,500–2,300	7	3
Black-headed Oriole *Oriolus xanthornus*	2,500–2,700	3	2
Ashy Drongo *Dicrurus leucophaeus*	1,500–2,800	3, 7	4
Eurasian Jay *Garrulus glandarius*	2,300–2,800	3	3
Yellow-billed Blue Magpie *Urocissa flavirostris*	2,050–2,900	3, 7	4
Indian Treepie *Dendrocitta vagabunda*	2,050–2,300	7	2
Grey Treepie *D. formosae*	2,050–2,300	3, 7	3
Red-billed Chough *Pyrrhocorax pyrrhocorax*	2,900–3,000	1, 2, 4	2
Yellow-billed Chough *P. graculus*	2,900–3,000	1, 2, 4	2
House Crow *Corvus splendens*	1,000–2,050	7	3
Jungle Crow *C. macrorhynchos*	2,050–2,900	3, 7	4

Habitat(s): 1=Alpine meadow, 2=Sub-alpine forest, 3=Temperate broad-leaved forest, 4=Watercourse, 5=Cliffs, 6=Boulder-strewn slopes with sparse vegetation, 7=Habitation, cultivated areas / scrub.

Abundance Ranking: 1=Rare, 2=Fairly common, 3=Common, 4=Abundant, ?=Unconfirmed, *=Secondary evidence (Abundance ranking was given on the basis of frequency of presence of a species in daily checklist).