



Current Status of Avifauna Diversity in Lahaul and Spiti, Himachal Pradesh: Synthesis from Current and Past Surveys

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Abstract: Birds are the most prominent wildlife species in most forests and ecosystems. We attempted to enlist the existing avifaunal species in trans-Himalayan Lahaul and Spiti, Himachal Pradesh based on our observations, 22 previously published checklists/observations and eBird data. A total of 278 species belonging to 20 orders and 59 families of birds have been reliably recorded in this region. Species that belongs to the Muscipidae family were the most sighted during the study period. We also report six new species for the region: Short-eared owl (*Asio flammeu*), Lesser Cuckoo (*Cuculus poliocephalus*), Large-spotted Nutcracker (*Nucifraga multipunctate*), Scarlet Minivet (*Pericrocotus flammeus*), Blyth's Leaf-warbler (*Phylloscopus reguloides*) and Red-tailed Wheatear (*Oenanthe chrysopygia*). Among these, Large-spotted Nutcracker, Scarlet Minivet and Blyth's Leaf-warbler were sighted frequently during the study period but never been reported previously for the region.

Keywords: Avifauna, New records, Trans-Himalaya, Lahaul-Spiti

The Himalaya is a fragile but biodiversity rich region with a vast repository of floral and faunal diversity (Jodha 2000, Pun and Mares 2000, Rautela and Lakhera 2000, Mishra et al 2006). The Himalaya harbours around 970 (~80%) of the bird species of the Indian Subcontinent (Naithani and Bhatt 2010, Praveen et al 2016). Out of 970 species, 15 endemic species, 11 were reported only from the western Himalaya including Himalayan Quail *Ophrysia superciliosa* (Critically Endangered: CR), Cheer Pheasant *Catreus wallichii* (Vulnerable: VU), and Western Tragopan *Tragopan melanocephalus* (VU) (Stattersfield et al 1998, Naithani and Bhatt 2010). The region is also well known for the presence of globally threatened species like White-rumped Vulture *Gyps bengalensis* (CR), Slender-billed Vulture *Gyps tenuirostris* (CR), Red-headed Vulture *Sarcogyps calvus* (CR) Himalayan Griffon *Gyps himalayensis* (NT) etc, (Chandra et al 2018). Anthropogenic pressure, habitat loss and extensive tourism is a serious concern in the region resulting in depletion of native Himalayan habitat (Samal et al 2003, Pandit et al 2007). Continuous monitoring and long-term datasets on the population status of birds provides an indication for ecological change (Amat and Green 2010). Therefore, this article is an attempt to highlight the avifaunal composition since 1923 to till date in the Lahaul and Spiti Landscape. Lahaul and Spiti has attracted a number of ornithologist's and naturalists over the last eight decades. Over the past several decades numerous locality-specific

avifaunal checklists of Lahaul and Spiti, have been published and contributed significantly to the enhancement of knowledge on birds of the area. Due to large landscape and locality-specific checklists the exact number of bird species present in the entire landscape (defined as only site specific) remained unclear. Most part of the landscape have been explored and baseline information generated through 23 observational records from different localities, however, none of the study provides a complete information on bird assemblage of the whole district. Although, the avifauna of various locations in the region is well known, but we surveyed and compiled all previous checklists since 1923 to make a comprehensive list of birds and compare the past and present scenario in Lahaul, Udaipur and Spiti. As per Bird life International a total of 354 species should be present in the region. In this article an attempt is made to determine the present status of the birds in three localities (Lahaul, Udaipur and Spiti), also present, six new sighting records from Lahaul and Spiti district.

MATERIAL AND METHODS

Study area: Lahaul and Spiti in the Trans-Himalayan region of Himachal Pradesh (13,833 sq. km.) consists of the two formerly separate districts and shares international boundary with Tibet. It lies between 31.74917° to 32.99917° N Latitude and 76.77472° to 78.69278° E Longitude with an altitude ranging from 2240 m to 6400 m above sea level (Fig. 1). The

physical features of these two valleys differs from each other, where Spiti is more barren and rugged with semi-desertic to desertic conditions, on the other hand Lahaul and Udaipur is much greener and has dry temperate to dry alpine conditions with willows and other coniferous forests (Fig. 2). The district have three sub divisions i.e. Keylong in Lahaul valley, Kaza in Spiti valley, Udaipur is the west most part of Lahaul valley. Rainfall occurs mainly in May to mid-September and ranges between 10 mm to 300 mm. From late November to April, winter colds blow here and there is heavy snowfall (120-400 cm), the temperature drops to -19°C (Kumar et al 2014). The extreme environmental conditions of the landscape such as low temperature and rainfall, high wind speed and rough ground topography result in a floral and faunal diversity different from most of India (Wagnon et al 2007).

Methods

The survey was conducted between July and September 2018 and June to August 2019 in three different administrative blocks (Fig. 2, Table 1). During the survey birds were observed using Olympus 10X42 DPSI binoculars, photographed by Canon SX60HS camera and co-ordinates were taken by Garmin eTrex 30. Birds were identified using Ali and Ripley (1983), Rasmussen and Anderton (2012), Grimmett et al (2015). Three methods (*Ad libitum* observations, vantage point watch and call play-back) were used for surveying the birds. In addition, compiled 22 previously published checklists as well as we check the submitted checklists from eBird for the region (<http://www.ebird.org>), because nowadays the emerging field of citizen science useful for knowing the biodiversity.

Ad libitum observations: Observer recorded whatever they saw during the trail walks in the forest as an opportunistic method.

Vantage point watch: This protocol was adopted mainly for observing raptor species. A prominent vantage point (usually on hill tops) were chosen from where all birds of prey were counted. This protocol was only considered when weather was clear and surveys were conducted only during the first half of the day (from 0730 to 1030 hrs).

Call play-back: Recorded songs/calls of a select bird species

were played back using a portable loudspeaker-digital recorder combination to elicit response, mainly from nocturnal birds such as Owls to confirm the presence of species.

RESULTS AND DISCUSSION

The checklist presented here compiles 23 previously published bird lists from the year 1923 (Baker; Whistler) up to 2017 (Rawal et al), observation records submitted in eBird and the birds sighted during the current study period (2018). This revealed 278 bird species (Spiti-236, Lahaul-178 and Udaipur-133) belonging to 20 orders and 59 families (03-EN, 01-VU and 07-NT species) from the three administrative blocks of Lahaul and Spiti district (Table 2). The family Muscicapidae (Old world Flycatchers and Chats) had the most species followed by Fringillidae and Accipitridae (27, 24 and 17 bird species respectively). Six new records of birds for this region are reported. The six birds were identified either with their diagnostic features through photographic evidence or through their vocalization (Figure 3). Details of these first records are given below.

Short-eared Owl (*Asio flammeus* Pontoppidan, 1763): Three individuals of the species were sighted on 29 July 2018 around 17:00 h on the rocks of mountainous terrain near village Kibber (32.35106°N , 77.99989°E ; 4012 m a.s.l.). Individuals were difficult to notice because of camouflage plumage with rocks. Birds were identified from the large and round head with very small tufts and round facial discs. It is a wide spread resident however the species has not been reported from the North-west Himalaya.

Large-spotted Nutcracker (*Nucifraga multipunctata* Gould, 1849): A single individual of the species was encountered in Udaipur (32.71128°N , 76.65772°E ; 3387 m a.s.l.) on 02nd September 2018 on *Cedrus deodara*, but later several individuals were sighted and heard in nearby areas repeatedly. The individuals while making harsh grating calls, often perched on the highest branches of pine trees in Lahaul forests. We identified this bird from the conspicuous white spots throughout its body, heavily spotted under parts reaching the vent. It is different from *N. caryocatactes* which has a non-spotted chocolate brown vent.

Table 1. Lahaul and Spiti district, (A) Lahaul, (B) Udaipur and (C) Spiti where bird survey was carried out during the study period

Lahaul (2200-4,270m) (A)	Udaipur (2,400-3,500m) (B)	Spiti (3,048-4,880m) (C)
Keylong, Tandi, Jispa, Gramphu, Batal, Rarig, Chhatru, Sissu, Yoche, Khoksar	Arat, Bardang, Barur, Bhujund, Chachagoat, Chaling, Changut, Chamrat, Chokhang, Ghari, Karpal, Koraki, Kurched, Nain Gahar, Nalda, Salgaraon, Salpat, Shakoli, Sheiling, Sukto, Miyar Valley, Tindi, Trilokinath, Thanwani, Udaipur, Urgosh	Chandra Taal, Chicham, Demul, Kibber, Hansa, Hikkim, Kaza, Kee, Hinsal, Khanamo, Langza, Mud, Kunzum La, Komic, Lari, Siachin Nala, Sagnam, Losar

Table 2. Checklist (observed during the survey and previous records) and direct sighting from Lahaul and Spiti district of Himachal Pradesh

Species name	Location in 2019	Reference from	Residential Status	WPA (1972)
Order: Galliformes; Family: Phasianidae				
Chukar Partridge * <i>Alectoris chukar</i>	A, B, C	1,3,5,7,11,12,13, 14,16,19,23	R	
Common Quail <i>Coturnix coturnix</i>	A, C	3, 5, 19	W/PM	IV
Snow Partridge * <i>Lerwa lerwa</i>	A, B, C	1, 3, 7, 12, 16, 19, 23	R	IV
Himalayan Monal <i>Lophophorus impejanus</i>	A	23	R	I
Koklass Pheasant * <i>Pucrasia macrolopha</i>	A, B	3,23	R	
Himalayan Snowcock * <i>Tetraogallus himalayensis</i>	A, B, C	1,3,5,12,13,16,19,23	R	I
Tibetan Snowcock <i>Tetraogallus tibetanus</i>	C	16	R	I
Order: Anseriformes; Family: Anatidae				
Northern Pintail <i>Anas acuta</i>	A, C	3,5,19,23	W	IV
Eurasian Teal <i>Anas crecca</i>	A, C	3, 4, 13,19	W	IV
Mallard <i>Anas platyrhynchos</i>	A, B, C	3,4,23	Br/W	IV
Indian Spot-billed Duck <i>Anas poecilorhyncha</i>	C	16	R	IV
Bar-headed Goose <i>Anser indicus</i>	B, C	19,23	W	IV
Tufted Duck <i>Aythya fuligula</i>	B, C	16,23	W	IV
# Ferruginous Duck <i>Aythya nyroca</i>	A	3	W	IV
Gadwall <i>Mareca strepera</i>	A, B, C	23	W	IV
Common merganser <i>Mergus merganser</i>	C	3	W	
### White-headed Duck <i>Oxyura leucocephala</i>	B	23	W	IV
Northern Shoveler <i>Spatula clypeata</i>	A, B, C	16,23	W	IV
Garganey <i>Spatula querquedula</i>	A, C	5,6,19,23	W	IV
Ruddy Shelduck * <i>Tadorna ferruginea</i>	A, C	1,3,5,13,16,19,23	Br/W	IV
Order: Podicipediformes; Family: Podicipedidae				
Little Grebe <i>Tachybaptus ruficollis</i>	C	19	WR	IV
Order: Ciconiiformes; Family: Ciconiidae				
Black Stork <i>Ciconia nigra</i>	A	23	W/PM	
Order: Pelecaniformes; Family: Ardeidae				
Grey Heron * <i>Ardea cinerea</i>	C	13,19	R/PM/W	IV
Indian Pond-Heron * <i>Ardeola grayii</i>	A, C	9,13,19,23	WR	IV
Eurasian Bittern <i>Botaurus stellaris</i>	C	19	W	IV
Little Egret <i>Egretta garzetta</i>	B	23	WR	IV
Order: Suliformes; Family: Phalacrocoracidae				
Great Cormorant * <i>Phalacrocorax carbo</i>	B	23	R	IV
Order: Falconiformes; Family: Falconidae				
Merlin <i>Falco columbarius</i>	C	19	W	
Peregrine Falcon <i>Falco peregrinus</i>	C	23	R/W	I
Eurasian Hobby * <i>Falco subbuteo</i>	A, C	3,19,23	Br/W	
Common Kestrel * <i>Falco tinnunculus</i>	A, B, C	1,3,5,12,13,14,16,19,23	R	
Order: Accipitriformes; Family: Accipitridae				
Shikra * <i>Accipiter badius</i>	B, C	16	WR	I
Eurasian Sparrowhawk * <i>Accipiter nisus</i>	A, B, C	3,5,6,19,23	R/W	I
# Cinereous Vulture <i>Aegypius monachus</i>	A, B, C	12	W	

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Table 2. Checklist (observed during the survey and previous records) and direct sighting from Lahaul and Spiti district of Himachal Pradesh

Species name	Location in 2019	Reference from	Residential Status	WPA (1972)
Golden Eagle * <i>Aquila chrysaetos</i>	A, B, C	3,5,11,13,14,16,19,23	R	I
## Eastern imperial eagle <i>Aquila heliaca</i>	A, B, C	3	W	
### Steppe Eagle <i>Aquila nipalensis</i>	A, C	12,15	W	
Upland Buzzard <i>Buteo hemilasius</i>	C	19,23	W	I
Himalayan Buzzard <i>Buteo refectus</i>	A, B	23	R/W	I
Western Marsh Harrier * <i>Circus aeruginosus</i>	C	5,19	W	I
# Pallid Harrier * <i>Circus macrourus</i>	C	5	W	I
Montagu's Harrier * <i>Circus pygargus</i>	C	5,19	W	I
# Bearded Vulture * <i>Gypaetus barbatus</i>	A, B, C	1,3,5,7,11,12,13,14,16,19,23	R	I
Griffon Vulture * <i>Gyps fulvus</i>	C	1,23	R	I
# Himalayan Vulture * <i>Gyps himalayensis</i>	A, B, C	3,5,7,12,13,14,16,19,23	R	I
### Pallas's Fish Eagle <i>Haliaeetus leucoryphus</i>	C	19,20	R	I
Booted Eagle <i>Hieraaetus pennatus</i>	B	23	Br	I
Black Kite * <i>Milvus migrans</i>	A, B, C	3,5,7,12,14,19,23	R/W	I
Order: Gruiformes; Family: Rallidae				
Corn Crane <i>Crex crex</i>	C	19	V	
Eurasian Coot <i>Fulica atra</i>	B	23	R/W	IV
Eurasian Moorhen <i>Gallinula chloropus</i>	C	5,6,13,19,23	R/W	
Water Rail <i>Rallus aquaticus</i>	C	19	W	IV
Ruddy-breasted Crake <i>Zapornia fusca</i>	C	19	W	
Baillon's Crake <i>Zapornia pusilla</i>	C	5,19	Br	
Order: Charadriiformes; Family: Charadriidae				
Kentish Plover * <i>Charadrius alexandrinus</i>	A, B, C	23	W	I
Lesser Sand-Plover * <i>Charadrius mongolus</i>	A, B, C	1,2,3,5,12,16,19,23	Br	I
Red wattled lapwing <i>Vanellus indicus</i>	C	16	R	
# Northern Lapwing <i>Vanellus vanellus</i>	C	13	W	
Family: Ibisornithidae				
Ibisbill <i>Ibidorhyncha struthersii</i>	A, C	3,5,19	R	I
Family: Recurvirostridae				
Black-winged Stilt * <i>Himantopus himantopus</i>	A, C	6,16,19,23	W	IV
Family: Jacanidae				
Pheasant-tailed jacana <i>Hydrophasianus chirurgus</i>	A	3	R	
Family: Scolopacidae				
Common Sandpiper * <i>Actitis hypoleucos</i>	A, B, C	3,5,19,23	Br	IV
# Curlew Sandpiper <i>Calidris ferruginea</i>	C	19	W	IV
Little stint <i>Calidris minuta</i>	C	16,19	W	IV
Ruff <i>Calidris pugnax</i>	C	5,19	W/PM	
Long-toed Stint <i>Calidris subminuta</i>	C	19	W	IV
Temminck's Stint <i>Calidris temminckii</i>	A, C	5,6,19	W	IV
Common Snipe <i>Gallinago gallinago</i>	C	19	Br	IV
Solitary Snipe * <i>Gallinago solitaria</i>	A, C	3,5,12,14,19,23	R/W	IV
Pin-tailed Snipe <i>Gallinago stenura</i>	C	19	W	IV

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Species name	Location in 2019	Reference from	Residential Status	WPA (1972)
Red-necked Phalarope <i>Phalaropus lobatus</i>	A, C	19,23	W	
Wood Sandpiper <i>Tringa glareola</i>	C	3,5,19	W	
Common Greenshank <i>Tringa nebularia</i>	C	5,19	W	
Green Sandpiper * <i>Tringa ochropus</i>	A, B, C	1,3,5,13,19,23	W	
Common Redshank <i>Tringa totanus</i>	A,C	3,19	Br	
Family: Laridae				
Whiskered Tern <i>Chlidonias hybrida</i>	A,B,C	19,23	W	
Slender-billed Gull <i>Larus genei</i>	C	19	W	
Black-headed Gull <i>Larus ridibundus</i>	B	23	W/PM	
Order: Pteroclitiformes; Family: Pteroclitidae				
Tibetan Sandgrouse <i>Syrrhaptes tibetanus</i>	A,C	3,5,12, 19,23	R	IV
Order: Columbiformes; Family: Columbidae				
Snow Pigeon * <i>Columba leuconota</i>	A,B,C	1,3,5,7,12,13,14,16,19,23	R	IV
Rock Dove * <i>Columba livia</i>	A,B,C	1,3,5,7,12,13,14,16,19,23	R	IV
Hill Pigeon * <i>Columba rupestris</i>	A,B,C	1,3,4,5,7,11,12,13,14,16,19,23	R	IV
Spotted Dove * <i>Spilopelia chinensis</i>	A,B,C	7,12,13,14,23	R	IV
Laughing Dove <i>Spilopelia senegalensis</i>	A,B,C	5,19,23	R	IV
Eurasian Collared Dove <i>Streptopelia decaocto</i>	A,C	3,13	R	IV
Oriental Turtle-Dove * <i>Streptopelia orientalis</i>	A,B,C	3,5,7,14,13,19,23	R/W	IV
Order: Psittaciformes; Family: Psittaculidae				
Rose-ringed Parakeet <i>Psittacula krameri</i>	C	13	R	IV
Order: Cuculiformes; Family: Cuculidae				
Jacobin cuckoo <i>Clamator jacobinus</i>	A,B,C	12	R/ Pr M	
Common Cuckoo * <i>Cuculus canorus</i>	A,B,C	3,5,14,19,23	Br	IV
Lesser Cuckoo * <i>Cuculus poliocephalus</i>	A,B		Br	IV
Himalayan Cuckoo * <i>Cuculus saturatus</i>	B	23	Br	IV
Order: Strigiformes; Family: Strigidae				
Boreal Owl <i>Aegolius funereus</i>	A,B,C	12,23	RR	IV
Short-eared Owl * <i>Asio flammeus</i>	C		R	IV
Northern Long-eared Owl <i>Asio otus</i>	A,C	3,12	W	IV
Little Owl <i>Athene noctua</i>	C	19	R	IV
Eurasian Eagle-owl <i>Bubo bubo</i>	A,B,C	3,12,19	R	IV
Tawny Owl <i>Strix aluco</i>	C	13	R	IV
Himalayan Owl * <i>Strix nivicolium</i>	A,B	23	R	IV
Order: Apodiformes; Family: Apodidae				
Himalayan Swiftlet * <i>Aerodramus brevirostris</i>	C	13,14,23	R	
Little Swift <i>Apus affinis</i>	C	13	WR	
Common Swift * <i>Apus apus</i>	A,C	1,5,13,14,19,23	S	
Pacific Swift <i>Apus pacificus</i>	A	3	Br	
White-throated Needletail <i>Hirundapus caudacutus</i>	C	13	S	
Alpine Swift <i>Tachymarptis melba</i>	C	13	R?	

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Species name	Location in 2019	Reference from	Residential Status	WPA (1972)
Order: Bucerotiformes; Family: Upupidae				
Eurassian Hoopoe* <i>Upupa epops</i>	A,B,C	3,4,5,13,14,16,19,23	S	
Order: Coraciiformes;				
Indian Roller <i>Coracias benghalensis</i>	C	13	R	
European Roller <i>Coracias garrulus</i>	A	6	S	IV
Order: Bucerotiformes; Family: Alcedinidae				
Common Kingfisher <i>Alcedo atthis</i>	A,B,C	3,12,23	R	IV
Order: Piciformes; Family: Picidae				
Himalayan Woodpecker <i>Dendrocopos himalayensis</i>	A,B	23	R	IV
Eurasian Wryneck <i>Jynx torquilla</i>	C	5,13,19	Br	IV
Scaly-bellied Woodpecker <i>Picus squamatus</i>	A,B,C	12	R	IV
Order: Passeriformes; Family: Vangidae				
Common Woodshrike <i>Tephrodornis pondicerianus</i>	A,B,C	12	R	
Family: Campephagidae				
Long-tailed Minivet* <i>Pericrocotus ethologus</i>	A,B	23	Br	IV
Scarlet Minivet* <i>Pericrocotus flammeus</i>	A		R	IV
Family: Laniidae				
Great Grey Shrike <i>Lanius excubitor</i>	B	23	V	
Isabelline Shrike <i>Lanius isabellinus</i>	C	19	W	
Long-tailed Shrike* <i>Lanius schach</i>	A,B,C	3,5,7,8,13,14,19,23	W	
Grey-backed Shrike <i>Lanius tephronotus</i>	A,B,C	11,12,13,14,19,23	Br	
Family: Dicruridae				
Ashy Drongo* <i>Dicrurus leucophaeus</i>	C	13,19,23	Br	IV
Black Drongo <i>Dicrurus macrocercus</i>	B,C	19,23	Isolated records	IV
Family: Oriolidae				
Indian Golden Oriole* <i>Oriolus kundoo</i>	A,B,C	19,23	S	IV
Family: Bombycillidae				
Eurasian Golden Oriole <i>Oriolus oriolus</i>	A,C	5,13,14,23	V	IV
Bohemian Waxwing <i>Bombycilla garrulus</i>	A	21	V	
Family: Rhipiduridae				
White-throated Fantail <i>Rhipidura albicollis</i>	A,C	7,12	R	
Family: Monarchidae				
Indian paradise flycatcher <i>Terpsiphone paradisi</i>	A,C	3,13	R	IV
Family: Corvidae				
Northern Raven* <i>Corvus corax</i>	A,B,C	1,4,7,12,13,14,16,19,23	R	
Large-billed Crow* <i>Corvus macrorhynchos</i>	A,B,C	7,13,14,16,19,23	R	
House Crow <i>Corvus splendens</i>	A,B,C	13,19,23	R	IV
Grey Treepie <i>Dendrocitta formosae</i>	C	14	R	IV
Spotted Nutcracker* <i>Nucifraga caryocatactes</i>	A,B,C	12	R	
Large- Spotted Nutcracker* <i>Nucifraga multipunctata</i>	A,B		R	
Alpine Cough* <i>Pyrhocorax graculus</i>	A,B,C	1,7,11,12,13,14,16,17,19,23	R	

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Species name	Location in 2019	Reference from	Residential Status	WPA (1972)
Red-billed Chough * <i>Pyrrhocorax pyrrhocorax</i>	A,B,C	1,7,11,12,13,14,16,19,23	R	
Family: Paridae				
Fire-capped Tit <i>Cephalopyrus flammiceps</i>	A,C	5,6,19,23	Br	IV
Cinereous Tit <i>Parus cinereus</i>	A,B,C	23		IV
Great Tit * <i>Parus major</i>	A,B,C	3,12,14,23	R	IV
Green-backed Tit <i>Parus monticolus</i>	A,B	23	R	IV
Coal Tit * <i>Periparus ater</i>	A,B,C	23	R	IV
Rufous naped Tit * <i>Periparus rufonuchalis</i>	A,B,C	3,7,14,23	R	IV
Family: Aegithalidae				
White-browed Tit-Warbler <i>Leptopoecile sophiae</i>	C	19,23	R	
Family: Cettidae				
Aberrant Bush Warbler <i>Horornis flavolivaceus</i>	A,B	23	R	
Brown-flanked Bush-Warbler * <i>Horornis fortipes</i>	C	13,14	R	
Family: Phylloscopidae				
Tickell's Leaf Warbler * <i>Phylloscopus affinis</i>	A,B,C	3,7,12,19,23	Br	
Lemon-rumped warbler * <i>Phylloscopus chloronotus</i>	A,B,C	23	Br	
Common Chiffchaff * <i>Phylloscopus collybita</i>	A,C	3,5,6,7,8,13	W	
Sulphur-bellied Warbler * <i>Phylloscopus griseolus</i>	A,C	1,3,7,12,13,14,19,23	Br	
Hume's Leaf Warbler <i>Phylloscopus humei</i>	C	19	Br	
Yellow browed Warbler <i>Phylloscopus inornatus</i>	A	6	W	
Large-billed Leaf Warbler <i>Phylloscopus magnirostris</i>	A	3,7	Br	
Green Warbler <i>Phylloscopus nitidus</i>	C	5	PM	
Western Crowned Warbler <i>Phylloscopus occipitalis</i>	A,B	3,23	Br	
Blyth's Leaf Warbler * <i>Phylloscopus reguloides</i>	A		Br	
Mountain Chiffchaff <i>Phylloscopus sindianus</i>	A,C	19,23	Br	
Greenish Warbler <i>Phylloscopus trochiloides</i>	A,B,C	19,23	Br	
Family: Hirundinidae				
Red-rumped Swallow <i>Cecropis daurica</i>	C	14	R	
Asian House-Martin * <i>Delichon dasypus</i>	C	13,14,19,23	R	
Common House-Martin <i>Delichon urbicum</i>	A,C	1,3,19,23	S	
Barn Swallow * <i>Hirundo rustica</i>	B,C	13,19,23	Br	
Eurasian Crag-Martin * <i>Ptyonoprogne rupestris</i>	A,B,C	1,3,13,14,19,23	R	
Grey-throated Martin <i>Riparia chinensis</i>	C	14	R	
Family: Alaudidae				
Eurasian Skylark <i>Alauda arvensis</i>	A,C	3,5,13,19	W	IV
Oriental Skylark * <i>Alauda gulgula</i>	A,C	7,13,14	R/W	IV
Lesser Short-toed Lark <i>Alaudala rufescens</i>	C	13		IV
Hume's Short-toed Lark <i>Calandrella acutirostris</i>	A,B,C	1,3,5,12,19,23	S	IV
Greater Short-toed Lark <i>Calandrella brachydactyla</i>	C	5,6,19	W	IV
Horned Lark * <i>Eremophila alpestris</i>	A,B,C	1,3,5,7,10,12,13,14,16,17,19,23	R	IV
Family: Pycnonotidae				
Black Bulbul <i>Hypsipetes leucocephalus</i>	A,B	23	R	IV
Himalayan Bulbul <i>Pycnonotus leucogenys</i>	B	23	R	IV

Cont...

Table 2. Checklist (observed during the survey and previous records) and direct sighting from Lahaul and Spiti district of Himachal Pradesh

Species name	Location in 2019	Reference from	Residential Status	WPA (1972)
Family: Acrocephalidae				
Blyth's Reed Warbler <i>Acrocephalus dumetorum</i>	C	19	W/PM	
Booted Warbler <i>Iduna caligata</i>	C	19	W	
Family: Sylviidae				
Yellow-eyed Babbler <i>Chrysomma sinense</i>	A,C	12	RM	IV
Common Whitethroat <i>Sylvia communis</i>	C	19	PM	
Lesser Whitethroat <i>Sylvia curruca</i>	A,B,C	12,19,23	Br	
Family: Leiotrichidae				
Bar-throated Minla <i>Chrysominla strigula</i>	A,B,C	23	R	
Streaked Laughingthrush * <i>Trochalopteron lineatum</i>	A,B,C	3,7,12,23	R	
Variiegated Laughingthrush * <i>Trochalopteron variegatum</i>	A,B,C	3,7,12,23	R	
Family: Zosteropidae				
Whiskered Yuhin <i>Yuhina flavicollis</i>	B	23	R	IV
Oriental White-eye <i>Zosterops palpebrosus</i>	A,B,C	19,23	R	IV
Family: Regulidae				
Goldcrest * <i>Regulus regulus</i>	A,B,C	6,19,23	R	
Family: Troglodytidae				
Eurasian Wren <i>Troglodytes troglodytes</i>	A,B	3,23	R	IV
Family: Cinclidae				
White-throated Dipper * <i>Cinclus cinclus</i>	A,B,C	1,3,4,5,7,12,13,19,23	R	
Brown Dipper * <i>Cinclus pallasii</i>	A,B,C	3,4,7,12,19,23	R	
Family: Sittidae				
White-cheeked Nuthatch * <i>Sitta leucopsis</i>	A,B	19	R	
Wallcreeper * <i>Tichodroma muraria</i>	A,B,C	3,4,7,19,23	R	
Family: Certhiidae				
Eurasian Treecreeper <i>Certhia familiaris</i>	B	23	R	
Bar-tailed Treecreeper * <i>Certhia himalayana</i>	A,B	6,7,23	R	
Hodgson's Treecreeper * <i>Certhia hodgsoni</i>	B	23	R	
Family: Sturnidae				
Rosy Starling <i>Pastor roseus</i>	A,C	3,5,6,19	W	
Brahminy starling <i>Sturnia pagodarum</i>	A	3	MR	IV
Common Starling <i>Sturnus vulgaris</i>	C	19,23	W	
Family: Turdidae				
Grandala <i>Grandala coelicolor</i>	C	19,23	R	
Black-throated Thrush * <i>Turdus atrogularis</i>	A,B,C	6,19,23	W	IV
Tibetan Blackbird <i>Turdus maximus</i>	A,C	6,19	R	
Red-throated Thrush <i>Turdus ruficollis</i>	A,C	5,12	W	IV
Tickell's Thrush <i>Turdus unicolor</i>	A,C	23	S	IV
Mistle Thrush * <i>Turdus viscivorus</i>	A,B,C	3,12,23	R	IV
Family: Muscicapidae				
Siberian Rubythroat <i>Calliope calliope</i>	C	19	W	
Himalayan Rubythroat <i>Calliope pectoralis</i>	A,B,C	3,12,14,19,23	Br	

Cont...

Table 2. Checklist (observed during the survey and previous records) and direct sighting from Lahaul and Spiti district of Himachal Pradesh

Species name	Location in 2019	Reference from	Residential Status	WPA (1972)
Bluethroat <i>Cyanecula svecica</i>	C	14,19,23	S	
Little Forktail <i>Enicurus scouleri</i>	A,B	23	R	
Verditer Flycatcher <i>Eumyias thalassinus</i>	A,B,C	23	S	IV
Rusty-tailed Flycatcher <i>Ficedula ruficauda</i>	A,C	3,12	S	IV
Ultramarine Flycatcher * <i>Ficedula superciliaris</i>	A,B	23	S	IV
Slaty-blue Flycatcher * <i>Ficedula tricolor</i>	C	23	S	IV
Blue Rock-Thrush * <i>Monticola solitarius</i>	A,B,C	1,3,7,13,19,23	R/W	IV
Dark-sided Flycatcher * <i>Muscicapa sibirica</i>	A,B,C	12	Br	IV
Blue Whistling-Thrush * <i>Myophonus caeruleus</i>	A,B,C	19,23	R	IV
Red-tailed Wheatear * <i>Oenanthe chrysopygia</i>	A		W	
Desert Wheatear <i>Oenanthe deserti</i>	A,B,C	3,5,12,13,14,19,23	Br	
Isabelline Wheatear <i>Oenanthe isabellina</i>	C	19	W	
Pied Wheatear <i>Oenanthe pleschanka</i>	A,B,C	3,5,7,12,18,19,23	Br	
Blue-capped Redstart * <i>Phoenicurus coeruleocephala</i>	A,B,C	1,3,7,19,23	R	
Guldenstadt's Redstart * <i>Phoenicurus erythrogastrus</i>	A,B,C	3,11,13,16,19,22,23	R/W	
Blue-fronted Redstart <i>Phoenicurus frontalis</i>	A,B,C	3,7,12,14,23	Br/R	
Plumbeous Water Redstart <i>Phoenicurus fuliginosus</i>	A,B,C	1,6,14,19,23	Br/R	
White-capped redstart* <i>Phoenicurus leucocephalus</i>	A,B,C	3,4,7,12,13,14,19,23	Br/R	
Black Redstart * <i>Phoenicurus ochruros</i>	A,B,C	1,3,7,8,12,13,14,16,17,19,23	Br/R	
Pied bush chat <i>Saxicola caprata</i>	C	3	R	
Grey Bushchat <i>Saxicola ferreus</i>	A,C	14,23	Br/R	
Common Stonechat <i>Saxicola torquatus</i>	C	5	Br	
Orange-flanked Bush-robin <i>Tarsiger cyanurus</i>	C	14	R	
Himalayan Bush-robin * <i>Tarsiger rufilatus</i>	A,B,C	23	Br/R	
Family: Passeridae				
Black-winged Snowfinch * <i>Montifringilla adamsi</i>	A,B,C	1,3,11,12,13,14,16,19,23	R	IV
White-winged snowfinch <i>Montifringilla nivalis</i>	A,C	3,5		
White-rumped snowfinch <i>Onychostruthus taczanowskii</i>	C	13	R?/W	
Russet Sparrow <i>Passer cinnamomeus</i>	A,C	14,23	R	
House Sparrow * <i>Passer domesticus</i>	A,B,C	1,3,5,7,12,13,14,16,19,23	R	
Blanford's Snowfinch <i>Pyrgilauda blanfordi</i>	C	19	R?W	
Family: Estrildidae				
Scaly-breasted Munia <i>Lonchura punctulata</i>	C	1,23	R	IV
Family: Prunellidae				
Black-throated Accentor <i>Prunella atrogularis</i>	A,B,C	23	W	
Alpine Accentor * <i>Prunella collaris</i>	A,B,C	3,16,18,23	R	
Brown Accentor <i>Prunella fulvescens</i>	C	13,19,23	R	
Altai Accentor <i>Prunella himalayana</i>	C	19	W	
Robin Accentor * <i>Prunella rubeculoides</i>	C	1,3,13,19,23	R	
Rufous-breasted Accentor * <i>Prunella strophiata</i>	A,B,C	3,7,11,12,16,19,23	R	
Family: Motacillidae				
Tawny Pipit <i>Anthus campestris</i>	C	19	W	IV

Cont...

Table 2. Checklist (observed during the survey and previous records) and direct sighting from Lahaul and Spiti district of Himachal Pradesh

Species name	Location in 2019	Reference from	Residential Status	WPA (1972)
Olive-backed Pipit <i>Anthus hodgsoni</i>	A	6	Br	IV
Richard's Pipit <i>Anthus richardi</i>	A	3	W	IV
Rosy Pipit * <i>Anthus roseatus</i>	A,C	3,5,7,13,19,23	Br	IV
Buff-bellied Pipit * <i>Anthus rubescens</i>	C	19	W	IV
Water Pipit <i>Anthus spinoletta</i>	C	19	W	IV
Upland Pipit <i>Anthus sylvanus</i>	C	13	R	IV
Tree Pipit * <i>Anthus trivialis</i>	A,B,C	5,12,14,19,23	R/W	IV
White Wagtail * <i>Motacilla alba</i>	A,B,C	1,3,5,7,12,13,14,16,19,23	Br	
Grey Wagtail * <i>Motacilla cinerea</i>	A,B,C	3,5,7,8,13,14,19,23	Br	
Citrine Wagtail * <i>Motacilla citreola</i>	A,B,C	1,3,4,5,7,13,14,16,17,19,23	Br	
Western Yellow Wagtail * <i>Motacilla flava</i>	C	5,6,16,19	W	
White-browed Wagtail <i>Motacilla maderaspatensis</i>	C	13	R	
Family: Fringillidae				
Mongolian Finch <i>Bucanetes mongolicus</i>	C	19	R	
Spectacled Finch * <i>Callacanthus burtoni</i>	A,C	12,19,23	R	
Eastern Goldfinch <i>Carduelis caniceps</i>	A,C	3,5,7		
Common Rosefinch * <i>Carpodacus erythrinus</i>	A,B,C	1,3,5,7,8,13,14,19,23	Br	IV
Blyth's Rosefinch <i>Carpodacus rhodochlamys</i>	A,C	3,5,7,12,14,19,23	PrM / R	
Red-fronted Rosefinch <i>Carpodacus puniceus</i>	A,B,C	1,3,4,5,12,13,19,23	R	IV
Pink-browed Rosefinch <i>Carpodacus rodochroa</i>	A,B,C	1,3,12,23	R	IV
Great Rosefinch * <i>Carpodacus rubicilla</i>	A,B,C	1,3,5,11,12,13,14,19,23	R	IV
Streaked Rosefinch <i>Carpodacus rubicilloides</i>	C	5,19	R	IV
Himalayan White-browed Rosefinch <i>Carpodacus thura</i>	A,B,C	12	R	IV
Yellow-breasted Greenfinch * <i>Chloris spinoides</i>	A,B,C	3,14,19,23	R	IV
Brambling <i>Fringilla montifringilla</i>	B	23	W	IV
Brandt's mountain finch * <i>Leucosticte brandti</i>	A,B,C	1,3,12,14,16,18,23	R	IV
Plain Mountain-Finch * <i>Leucosticte nemoricola</i>	A,B,C	1,3,7,11,13,14,16,19,23	R	IV
Twite * <i>Linaria flavirostris</i>	C	5,12,14,16,19,23	R	
Red Crossbill <i>Loxia curvirostra</i>	A,B,C	3,12	R	
White-winged Grosbeak <i>Mycerobas carnipes</i>	A,B,C	3,7,12,23	R	IV
Spotted-winged Grosbeak <i>Mycerobas melanozanthos</i>	A,C	12	R	IV
Dark-breasted Rosefinch <i>Procarduelis nipalensis</i>	A,B,C	12,23	R	IV
Orange Bullfinch <i>Pyrrhula aurantiaca</i>	A,B,C	23	R	IV
Red-headed Bullfinch <i>Pyrrhula erythrocephala</i>	A,B	3,23	R	IV
Red-fronted Serin * <i>Serinus pusillus</i>	A,B,C	1,3,5,7,12,13,14,16,19,23	R	IV
Family: Emberizidae				
Red-headed Bunting <i>Emberiza bruniceps</i>	A,C	5,12,19	W	IV
Rock Bunting * <i>Emberiza cia</i>	A,B,C	1,3,5,7,8,12,13,14,16,19,23	R	IV
Ortolan Bunting <i>Emberiza hortulana</i>	C	19	V	
Pine Bunting <i>Emberiza leucocephalos</i>	B	23	W	IV
Black-headed Bunting <i>Emberiza melanocephala</i>	A,B,C	12	W	IV
Little Bunting <i>Emberiza pusilla</i>	C	19	W	IV
Chestnut Bunting <i>Emberiza rutila</i>	C	19	W	IV
Chestnut breasted Bunting <i>Emberiza stewarti</i>	A,B,C	23	Br	IV

Note: Location of the recorded birds given as A, B, C, details of the locations given in Table 2. Reference from the literature survey as numerical digits viz. 1,2...23. Residential status abbreviation: R- Residential; W- Winter visitor; PM- Passage migrant; V- Vagrant; R/W- Resident or Winter Visitor; WR- Widespread resident; Br- Breeding; RR- Rare resident; PrM- Partially migrating; ?- Uncertain records. *Denotes species observed by our team members; # Denotes NT-Near Threatened, ## denotes VU-Vulnerable and ### denotes EN-Endangered and "no #" denotes LC-Least Concerned.

Reference from. 1. Whistler (1923) 2. Baker (1923) 3. Whistler (1925) 4. Lowndes (1929) 5. Koelz (1937) 6. Koelz (1939) 7. Alexander (1951) 8. Mahajan (1974) 9. Manjrekar and Mehta (1999) 10. Mishra (2000) 11. Singh (2001) 12. Mahabal A. (2005) 13. Tak PC and Paliwal R. (2008) 14. Thakur and Mattu (2011) 15. Pande et. al (2013) 16. Rana et. al. (2014) 17. Singh (2014) 18. Jha (2014) 19. Himachal State Govt. (2016) 20. Rana (1995) 21. Rawal et. al. (2017) 22. Sangha et. al. (2017) 23. eBird.org

Lesser Cuckoo (*Cuculus poliocephalus* Latham, 1790): A single juvenile individual was observed in Udaipur (32.74061° N, 76.63191° E; 2688 m a.s.l.) repeatedly feeding on caterpillars in an agricultural field at Madgra Village in Udaipur from 26 August 2018 to 30 September 2018. Identified bird to species from its comparatively small size grey head and body, yellow colour on the mandibles and feet, white barred lines in under parts. This species is known to breed in the Himalayas but has not been reported before in this region.

Scarlet Minivet (*Pericrocotus flammeus speciosus* Latham, 1790): This species was observed often in pairs in Udaipur (32.75835° N, 76.44506° E; 2768 m a.s.l.) perched on the *Cedrus deodara* in the month of August 2018. It is a resident bird of the Himalayas but being reported for the first time. It was identified from the scarlet colour of the male with isolated red markings on its secondaries and yellow colour of the female.

Blyth's Leaf-warbler (*Phylloscopus reguloides* Blyth, 1842): Individuals of the species were observed often (September, 2018) in the infringement areas of Udaipur (32.68565° N, 76.67893° E; 3105 m a.s.l.). Individuals were sighted while hopping and perching on the *Pinus wallichiana* and *Cedrus deodara* trees. It was identified from its long pale yellow supercilium, dark olive lores and eye-stripe throat and whitish underparts, tinged yellow, becoming pale yellow on undertail-coverts.

Red-tailed Wheatear (*Oenanthe chrysopygia* De Filippi, 1863): Six individuals of the species in pea agricultural fields in Spiti (32.47119° N, 77.71643° E; 4172 m a.s.l.) between the months of August-September, 2018 were observed. The

species is known as winter visitor to North-West India but unreported from the Lahaul and Spiti landscape. We identified the species from its brown upper body, uniform pale brown underparts rufous-orange rump (visible in flight) and rufous sides to tail.

Although there were numerous inventories were documented since 1920's by Baker et al (1923) and Whistler (1923) up to 2017 by Rawal et al. from different localities of the landscape but none of the studies provided the complete observed avifauna of the landscape. The compiled checklist of 278 species indicates maximum species from Spiti even after being barren and rugged terrains, but that could be due to clear long-distance visibility. Only single study (Editor-Director 2005) that unveils the distribution of avifaunal assemblage in the whole landscape but reported only 74 species. We recorded 102 species (12 orders, 36 families and 71 genera) between July & September during our survey and enlisted 236, 178 and 133 species from Spiti followed by Lahaul and Udaipur respectively. In the presented checklist highest number of species belongs to order Passeriformes represented by 34 families and 174 species, Charadriiformes by 6 families and 24 species, Accipitriformes by Accipitridae and 17 species and Anseriformes by Anatidae and 13 species, Galliformes by Phasianidae and 07 species were among the most abundant in the region.

Out of three localities (*i.e.*, Lahaul, Udaipur and Spiti), Spiti was the most studied locality with 13 published literatures among which seven publication highlighted checklist of species (Whistler 1923, Koelz 1937, Singh et al 2003, Tak and Paliwal 2008, Thakur et al 2011, Rana et al 2014) and six articles are on new sighting records (Rana

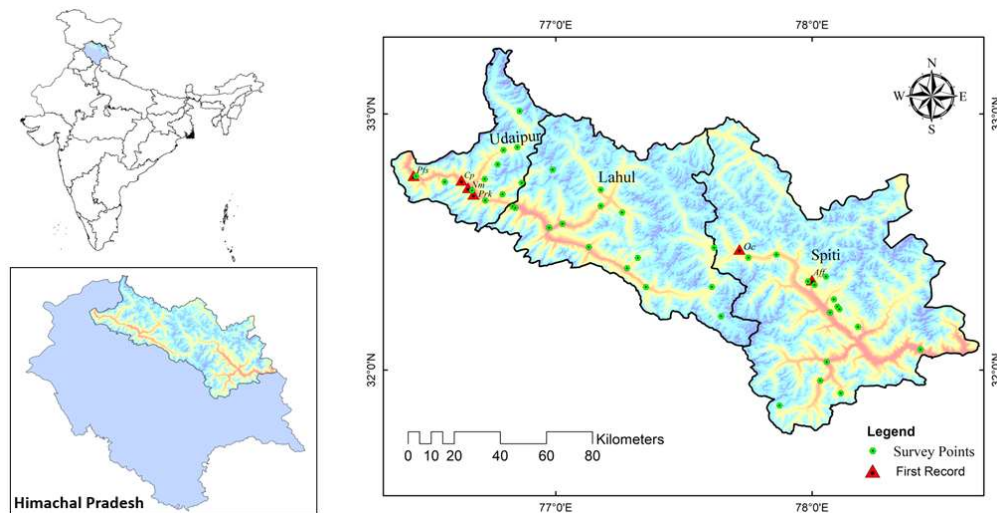


Fig. 1. Map showing the study sites (Lahaul, Udaipur and Spiti) and locations of new records of birds (*Aff-Asio flammeus*, *Nm-Nucifraga multipunctate*, *Cp-Cuculus poliocephalus*, *Pfs-Pericrocotus flammeus*, *Pr-Phylloscopus reguloides*, *Oc-Oenanthe chrysopygia* are marked with triangles)

1995, Manjrekar and Mehta 1999, Mishra 2000, Jha 2014, Singh et al 2014, Sangha et al 2017). In Lahaul, six observational records were available among which four records (Whistler 1925, Lowndes 1929, Koelz 1939, Alexander 1951) were on enlisting species and two articles (Baker 1923, Rawal et al 2017) on new records from the area. The eBird observations (accessed on 30 November 2018) by several observers from different localities also contributed significantly to the existing avifaunal assemblage to all the three localities and also incorporated in the presented checklist.

Spiti Valley in the Indian trans-Himalayan region is known to harbor a fragile ecosystem (both flora and fauna) (Rodgers and Panwar 1988), known for its scanty vegetation. The vegetation of this area has been broadly classified as dry alpine steppe (Champion and Seth 1968) where the average altitude ranges from 3900 m – 4300 m. Very little is known about the trans-Himalayan steppe grasslands which supports a fair number of wildlife including avifauna (Rawat 1998), and this seems to be grievously true till date. These grasslands are home to some of the globally threatened birds' species viz., White-headed Duck (*Oxyura leucocephala*) (EN), Steppe Eagle (*Aquila nipalensis*) (EN), Pallas's Fish Eagle (*Haliaeetus leucoryphus*) (EN), Ferruginous Duck (*Aythya nyroca*) (NT), Cinereous Vulture

(*Aegypius monachus*) (NT), Himalayan Griffon (*Gyps himalayensis*) (NT), Northern Lapwing (*Vanellus vanellus*) (NT), Lammergeier (*Gypaetus barbatus*) (NT) and Curlew Sandpiper (*Calidris ferruginea*) (NT) etc. But the population status and understanding of their ecological needs are not only lacking but also never been a subject of study. The most legit and possible reason for this being the terrain of the landscape itself which is inaccessible due to its ruggedness. Vast stretches of wilderness with no human habitation makes it impossible to carry out prolonged studies. However, some accessible and resource rich areas like the Kibber Wildlife Sanctuary provides habitat to most of the above-mentioned raptors and vultures. On the other hand, water bodies and streams of Pin Valley National Park and Chandertal Wildlife Sanctuary provide foraging and resting ground to water birds distributed in the area. Common Teal (*Anas crecca*), Mallard (*Anas platyrhynchos*), Bar-headed Goose (*Anser indicus*), Tufted Duck (*Aythya fuligula*), Gadwall (*Mareca strepera*) were few among the migratory birds reported from the landscape.

Lahaul Valley on the other hand is bestowed with dense forest patches of Himalayan birch (bhojpatra) and Himalayan cedar (Deodar/ Devdar). Summers lasting from May to



Fig. 2. Image showing the topography of Lahaul (1a and 1b), Udaipur (2a and 2b) and Spiti (3a and 3b)



Fig. 3. Showing the images of six new records of species from the Lahaul, Udaipur and Spiti administrative blocks

October provides lush green agricultural fields and apple orchards, it is drained by the rivers Chandra and Bhaga. There are considerable agglomerations of settlements in the valleys. However, not many research articles are published from this valley which abides by the fact that no protected areas have been established so far in Lahaul Valley. Bohemian Waxwing (*Bombycilla garrulus*) was the last addition to the checklist of the Lahaul and Spiti by Rawal et al (2017). The species known resident from Kazakhstan, Mongolia, Japan, Russia and United States whereas the species is supposed to be winter visitor to the landscape (Grimmett et al 2015). Considering the dearth of information on the avifauna of this opulent landscape this document proves to be of great importance in compiling the baseline data.

In the face of modern-day pressures on already feeble wildlife, feral dogs in Spiti Valley are emerging as a threat (Kumar and Paliwal 2015). They are known to hunt on the livestock of people living there and are seen chasing foxes, hunting on blue sheep, hare and fawns of Ibex (Kumar and Paliwal 2015). We also observed a pack of feral dogs chased a pair of Rudy shelduck (*Tadorna ferruginea*). Out of our six new records of bird from the landscape, Lesser Cuckoo (*Cuculus poliocephalus*) and Blyth's leaf Warbler (*Phylloscopus reguloides*) are known to breed in the Lahaul valley whereas Red-tailed Wheatear (*Oenanthe chrysopygia*), observed in the Spiti Valley is a winter visitor (Rasmussen and Anderton 2012, Grimmett et al 2015). Remaining three species viz., *Nucifraga multipunctata*, *Pericocotus flammeus* and *Asio flammeus* are known to be residents in an area (Grimmett et al 2015).

Besides this, few bird species i.e., Chukar Partridge (*Alectoris chukar*), Snow Pigeon (*Columba leuconota*), Common Hoopoe (*Upupa epops*), Yellow-billed Cough (*Pyrhhorcorax graculus*), Red-billed Cough (*Pyrhhorcorax pyrrhcorax*), Black Redstart (*Phoenicurus ochruros*), Common Rosefinch (*Carpodacus erythrinus*), were among the commonest species which were sighted throughout the study period in different time scale and locality.

It is well known fact that the exact and detailed data on species occurrences are fundamental requirement for the evaluation of conservation and emphasizing on management considerations (Saini et al 2017). This article provides a complete checklist of birds and information on their distribution, current conservation status, migratory/residential information and population trend. We hope our study will help researchers in the future and conservation managers to conserve birds in this region. We recommend further update by conducting systematic and detailed surveys studies in the region as this information are

crucial for preparing conservation and management action plans.

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