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Short note

Himalayan Snowcock (*Tetraogallus himalayensis*) in Dhorpatan Hunting Reserve, Nepal

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The Himalayan Snowcock (*Tetraogallus himalayensis*, Figure 1), locally called "Himali Hiunkukhura", represents one among the 23 terrestrial bird species within the family "Phasianidae" found in Nepal. This diverse bird group also includes species such as Tibetan Snowcock (*Tetraogallus tibetanus*), Cheer Pheasant (*Catreus wallichii*), Kalij Pheasant (*Lophura leucomelanos*), Himalayan Monal (*Lophophorus impejanus*), Indian Peafowl (*Pavo cristatus*), Koklass Pheasant (*Purcasia macrolopha*), Hill Partridge (*Arborophila torqueola*), Common Quail (*Coturnix coturnix*), etc. (Grimmett *et al.*, 2016; Inskipp *et al*., 2016). These species generally engage in foraging behaviors involving the excavation of ground surfaces and leaf litter (Sathyakumar & Sivakumar, 2007) and prefer locomotion over flight or gliding when confronted with potential threats (Grimmett *et al*., 2016). They have a wide range of habitat-from the Terai lowlands to the higher elevations of the Himalayas in Nepal (Grimmett *et al*., 2016; Inskipp *et al*., 2016). Among the pheasant species of Nepal, only one species *viz*. Common Quail (*Coturnix coturnix*) is a migratory one (winter visitor) while the others including Himalayan Snowcock are residential (Grimmett *et al*., 2016).

Figure 1: A Himalayan Snowcock captured on camera trap in Dhorpatan Hunting Reserve, 2022

Himalayan Snowcock is an alpine bird species which is comparatively sedentary in nature, and is restricted to higher altitudes between 3600 and 4,579 m above the msl (Longying *et al*., 2010; BLI, 2018). Globally, the species is distributed in Afghanistan, China, India, Kazakhstan, Kyrgyzstan, Nepal, Pakistan, Tajikistan, Turkmenistan, and Uzbekistan (BLI, 2018). In Nepal, the species is reported between the elevations of 4250–5900 m above the msl, especially in western and mid-western Nepal (Grimmett *et al.*, 2016). Prior to 1990, the presence of the Himalayan Snowcock was documented as far up to the Langtang National Park in eastern Nepal; however, subsequent observations have been indicated that the species has been exclusively recorded in the western region of Annapurna Conservation Area of Nepal (Inskipp *et al*., 2016). Frequently mistaken for its close relative, the Tibetan Snowcock, Himalayan Snowcock has a limited distribution within Nepal (Grimmett *et al*., 2016). This misidentification can be attributed to similarities in plumage and overlapping ranges with the Tibetan Snowcock

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(Grimmett *et al*., 2016; Inskipp *et al*., 2016).

The species is categorized globally as the "least concerned" by the IUCN Red List (BLI, 2018), but under "near threatened" by the National Bird Red Data Book of Nepal (Inskipp *et al.*, 2016). The species faces different anthropogenic threats due to its consumption as a source of food and ethno-medicine among the local communities residing within its habitat (Haq *et al.*, 2020). Despite the potential risks posed by these threats, only a limited research has been conducted on the status of this bird species both globally and in Nepal so far. Definitive information regarding the population status of the species in Nepal remains elusive, primarily due to the scarcity of systematic studies, with many of the available records consisting of opportunistic sightings predating 1990 (Inskipp *et al*., 2016). Therefore, we aimed to identify the current distribution of Himalayan Snowcock in Dhorpatan Hunting Reserve (DHR), Nepal.

Material and methods

Study area

Dhorpatan Hunting Reserve is a highland protected area and the only hunting reserve of Nepal which is attributed to temperate, sub-alpine and alpine vegetation (Figure 2). It was established in 1983, and was officially declared in 1987. It covers an area of 1325 km^2. The altitude of the terrain ranges from 3000 m to 7000m above the msl, and comprises seven distinct blocks- i) Surtibang, ii) Fagune, iii) Barse, iv) Ghustung, v) Dogari, vi) Seng, and vii) Sundaha. In the DHR, the monsoon season

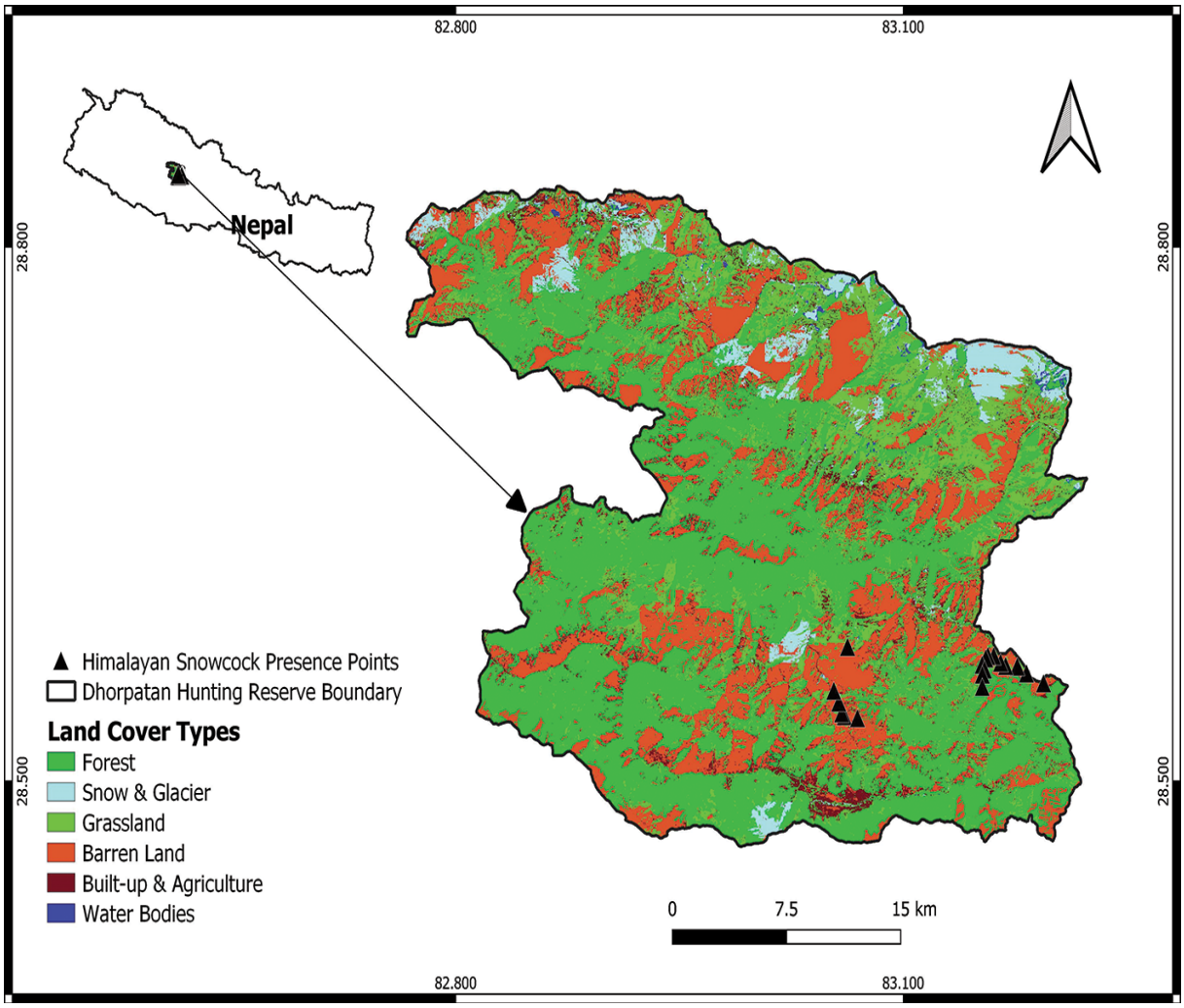

Figure 2: Map showing the locations of Himalayan Snowcock within DHR; location of DHR in the map of Nepal (top-left corner)

transpires from June–October, characterized by an annual precipitation level below 1000 mm. The temperature in the area exhibits variation, with an average of 1.4° C during winter and an average of 24.8° C during summer. It supports the occurrence of mammal species including Snow Leopard (*Panthera uncia*), Barking Deer (*Muntiacus vaginalis*), Blue Sheep (*Pseudois nayaur*), Leopard (*Panthera pardus*), Himalayan Goral (*Naemorhedus goral*), Himalayan Tahr (*Hemitragus jemlachicus*), Himalayan Black Bear (*Ursus thibetanus*), Red Panda (*Ailurus fulgens*), Rhesus Macaque (*Macaca mulatta*), Himalayan Serow (*Capricornis thar*), Wild Boar (*Sus scorfa*), Wolf (*Canis lupus*), and 149 species of avian fauna including Cheer Pheasant (*Catreus wallichi*) and Himalayan Monal (*L. impejanus,* Jnawali *et al*., 2011; Grimmett *et al.*, 2016, Regmi *et al.*, 2023; Sharma *et al.*, 2023).

Data collection

Data on the Himalayan Snowcock were collected during our camera trap monitoring of the mammal species in the DHR following Regmi *et al.* (2023) and Sharma *et al*. (2023). The survey was conducted from March 15 to June 15, 2022, covering three specific blocks viz. i) Fagune, ii) Barshe, and iii) Surtibang. While reviewing the camera trap data, an individual Himalayan Snowcock (Figure 1) was observed at one of the sites. In addition, data on each bird-sighting including the location coordinates and number of the observed individuals throughout the study period were opportunistically documented. Additionally, the ground cover types (barren-land, grassland, shrub-land, and snow) were visually interpreted and recorded for each observation site.

Results

During the course of our survey, we had a total of 34 independent observations of Himalayan Snowcock at 18 different locations within the DHR. The elevational distribution of this bird species was found to be between 3757–4408m above the msl, with an average of 4105.06±153.5461m above the msl. Of the total eight study sites (n=8), only a single individual was observed followed by two individuals at five sites, three at two sites, four & five individuals at two different sites. We found a steady increase in the number of the independent observations with the increase in elevation; the highest number of independent observation (n=5) being at an elevation of 4408m above the msl. The occurrence of Himalayan Snowcock was found to be correlated with elevation (|r|=0.61).

We observed the species in four different habitat types viz. i) barren/cliff, ii) grassland, iii) shrub-land, and v) snow across the observation sites during our study. Of the four habitat types, the species was mostly detected in the grassland where a total of 15 (44.20 %) individuals were observed while the least with only 2 (5.88 %) individuals were detected in the shrub-land. In the case of the snow covered area and barren land, 9 (26.50 %) and 8 (23.50 %) individuals were observed, respectively.

Discussion

This study recorded the occurrence of Himalayan Snowcock in the DHR for the first time, with the increase in the number of observation with the increase in elevation. Himalayan Snowcock belongs to the "Galliformes" group of birds distributed at higher altitudes between 4250–5900 m above the msl both inside and outside the protected areas of Nepal, mainly in western and mid-western Nepal as well as in the Langtang National Park situated in central Himalayan region of Nepal (Grimmett *et al.* 2016). Though the species is reported to be seen nearby the Shey-phoksundo National Park (Kusi *et al.*, 2018) and Annapurna Conservation Area (Baral, 2018), the existence of this species is yet to be confirmed in the DHR. There is a lack of scientific studies on this bird species in the DHR, which might be due to the reason that it is listed as "least concerned" by the IUCN Red List (BLI, 2018). However, this is not the case in the DHR alone as the species is relatively less focused in scientific research globally (BLI, 2018) in comparison to other "Galliformes".

Our study found that the species preferred to reside and roam above 3790 m altitude in the DHR. It is a species with strictly restricted

distribution and is limited mainly by the factors like elevation and habitat type (Chun-hua *et al*., 1992; Luzhang *et al*., 2005) which correlates with the preference of alpine habitat close to snow-line by the species (Bhattacharya *et al*. 2009). However, our observation was contradictory to the study of Grimmett *et al.* (2016) as the species was observed well beyond the elevation range specified for Nepal. This might possibly indicate less focus on the study of this pheasant across Nepal, and indicates the need to reassess the species distribution in the highlands of Nepal.

A significant proportion of our observations of Himalayan Snowcock occurred within the grassland areas; grasslands offer favorable foraging sites rich in potential food resources (Bland & Temple, 1990). This species engages in foraging behaviors characterized by scratching and digging the ground with its claws and beaks, primarily to locate roots and insects (Sathyakumar & Sivakumar, 2007). In addition to grasslands, the Himalayan Snowcock has also been observed foraging in close proximity to cliffs or barren regions (Bland & Temple, 1990). The relatively higher number of detections in snow-covered areas and barren lands can be attributed to the species' preference for alpine habitats (Bhattacharya *et al*., 2009), which not only provide suitable conditions but also potentially serve as a strategy to evade predators (Bland & Temple, 1990).

Conclusion

This study confirmed the presence of Himalayan Snowcock in the DHR for the first time. The study suggests that many rural areas need to be explored for identifying the spatial locations of many faunal species so that the Government of Nepal can develop a species specific management plan.

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Conflict of Interest

The authors declare no conflict of interest.

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