

# Systematic survey on population of *Gyps himalayensis* in Hirpora Wildlife Sanctuary, Jammu and Kashmir, India

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## ABSTRACT

The change in population dynamics of scavenging birds will lead to an ecological imbalance and will increase the chance of disease spread among wildlife and livestock. Keeping in view the absence of baseline data regarding vultures from Kashmir Himalaya, we examined the population status of Himalayan vulture *Gyps himalayensis* in Hirpora Wildlife sanctuary. A total of 289 individuals of Himalayan vulture were sighted during the study period. Among them 75.77% were adults (n=219) and 24.23% were sub-adults (n=70). The mean population of Himalayan vulture was highest during summer season (36.66±2.02), followed by spring (25.00±2.88), autumn (20.33±3.17) and winter (14.33±0.66). Kruskal-Wallis ANOVA was used to test the null hypothesis of randomness. The results showed that there is a significant variation (P<0.05) in population of Himalayan vulture in four different seasons (Spring, Summer, Autumn and Winter) in the area. These variations could be attributed to changes in the availability of day light hours and food during different seasons in Hirpora Wildlife sanctuary.

*Key words* : Survey, Vultures, Hirpora, Population, Kashmir

## Introduction

For proper management and conservation of wildlife, the estimation of population is of utmost importance. When we know the number of a particular species, then the effectiveness of our conservation strategies for that species would be tested and examined. Therefore, it is a key elements in identifying priority areas that need to be taken in for conservation and research purposes.

Vultures, an ecologically important scavenging group of birds, are regarded as the key functional species in cleaning the environment by feeding on and removing the carcasses (Siddique, 2016). These

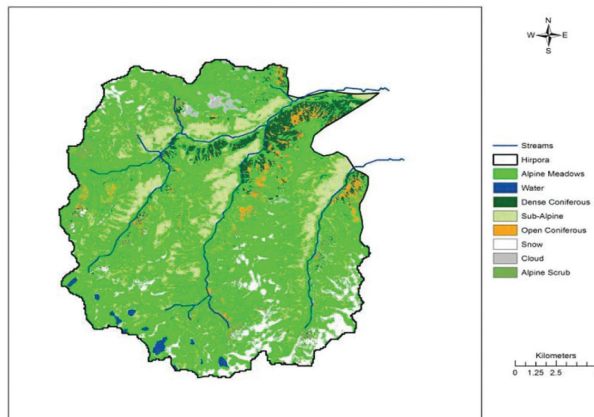
scavengers help in reducing epidemics and in recycling of nutrients by releasing organic matter into the soil. Therefore, the absence or loss of vultures from our ecosystem will result in increased number of other scavenging agents like feral dogs. This change in population dynamics of scavenging faunal elements will increase the probability of disease spread among wildlife and livestock (Wani *et al.*, 2018). Therefore, they need to be conserved and this conservation in-turn requires a robust assessments of long-term demography so as to visualise proper management. The aim of the present study was to investigate the seasonal variation in population of Himalayan vulture in Hirpora WLS as relevant pub-

lished accounts are lacking. The intensive surveys of the study area were undertaken from June 2018 to May 2020 to determine the same.

## Materials and Methods

### Study area

Hirpora Wildlife sanctuary spreads over an area of 341 km<sup>2</sup> in District Shopian, Kashmir. At an altitude of 2546 m from sea level, the sanctuary is located 33°39' 55" N latitude and 74°39' 40" E longitude. The area is renowned for its rich floral and faunal diversity. The vegetation of the area is divided into mixed coniferous forests, deciduous subalpine scrub forests and subalpine pastures. The coniferous forests are dominated by Kail pine, the sub alpine forests by fir (*Abies pindrow*) and the deciduous subalpine scrub forests by Himalayan birch (*Betula utilis*) and Juniper (*Juniperus communis*). Its main faunal elements include- Markhor (*Capra falconeri*), Musk deer (*Moschus leucogaster*) and Himalayan vulture (*Gyps himalayensis*) (Ahmad *et al.*, 2011).



**Fig. 1.** Map of the study area showing different habitat types

Every year (from May to November) hundreds of nomadic families from Pooch, Rajouri and other adjacent areas bring thousands of their domestic livestock to Hirpora Wildlife sanctuary for grazing purpose (Ahmad *et al.*, 2011).

### Methods

Systematic survey on population of Himalayan vulture in Hirpora Wildlife sanctuary were conducted from June 2018 to May 2020 by conducting regular field visits. Vultures were observed and enumerated

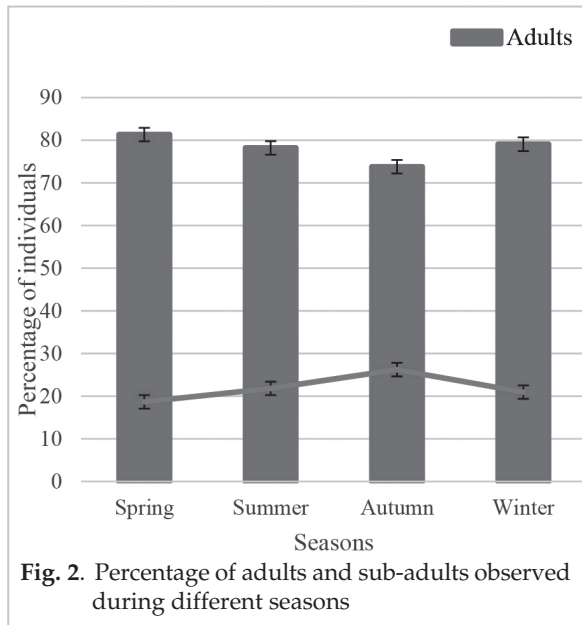
by walking along trails in the sanctuary between 8:00 am and 5:00 pm at a speed of about 3 km/h and the observations were made with the help of 10X binocular. When spotting vultures, their number and age class were recorded. GPS handset was used to record the geographical coordinates of all vulture sightings during the study period (Samson *et al.*, 2016). The entire study period was divided into spring (March, April and May), summer (June, July and August), autumn (September, October and November) and winter (December, January and February). Vultures were identified by using standard field guide (Grimmett *et al.*, 2016). Kruskal-Wallis ANOVA was performed by using MINITAB (Venkitachalam and Senthilnathan, 2016).

## Results and Discussion

Most studies on vultures in South Asia are focussed on white-rumped and Slender billed vultures at lower altitude (Venkitachalam and Senthilnathan, 2016) and very little studies are found regarding cliff breeding Himalayan vulture. This study regarding Himalayan vulture in Kashmir being first study on vultures in Hirpora Wildlife sancture of Kashmir Himalaya has set the foundation for long term study on ecology of these scavengers. During the current study, a total of 289 individuals of Himalayan vulture were sighted in Hirpora wildlife sanctuary. Among them 75.77% were adults (n=219) and 24.23% were sub-adults (n=70) (Fig. 2). The percentage of adults and sub-adults observed during different seasons is shown in Figure 2. A total of 43, 75, 110 and 61 individuals were observed during winter, spring, summer and autumn seasons respectively. The mean population of Himalayan vulture was highest during summer season (36.66±2.02), followed by spring (25.00±2.88), autumn (20.33±3.17)

**Table 1.** Mean no. of Himalayan vulture in different seasons in Hirpora WLS.

| Season               | Himalayan vulture        |            |
|----------------------|--------------------------|------------|
|                      | Total no. of individuals | Mean ± SE  |
| Winter               | 43                       | 14.33±0.66 |
| Spring               | 75                       | 25.00±2.88 |
| Summer               | 110                      | 36.66±2.02 |
| Autumn               | 61                       | 20.33±3.17 |
| Total                | 289                      | 24.08±2.67 |
| Kruskal-Wallis ANOVA | H=9.01, df=3; p=0.029    |            |



and winter ( $14.33 \pm 0.66$ ) (Table 1). The results of Kruskal Wallis ANOVA showed that there is a significant variation ( $P < 0.05$ ) in population status of Himalayan vultures in different seasons in Hirpora Wildlife sanctuary (Table 1). Population size of Himalayan vultures was found to be highest during summer season compared to rest of the three seasons. In summer, the high availability of day light hours, and almost continuous formation of thermal lifts helps breeding as well as non-breeding vultures to disperse and forage. Also, during summer months thousands of livestock remain present in the sanctuary (Ahmad *et al.*, 2011). Therefore, vultures usually soar more frequently in search of livestock carcasses during these months. The vultures start breeding from winter onwards, and variations on the counts could simply reflect less movement by incubating vultures. These findings are similar to studies in Nilgiri North forest division and Sathyamanalam Tiger reserve of Moyar valley, Tamil Nadu showing that there is a seasonal variation in population size of different vulture species in the area (Venkitachalam and Senthilnathan, 2016).

## Conclusion

Hirpora Wildlife sanctuary serves as home to a

good number of Himalayan vultures. This short span of study in the area will act as a starting line for detailed research on various aspects of these scavenging avifaunal elements in the sanctuary. Various emerging threats to birds in general and Himalayan vulture in particular in the area need to be analysed and hence curtailed.

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