

# Interim Report

## **Distribution, ecology and habitat use of the Himalayan gray langur *Semnopithecus ajax* in Jammu and Kashmir, India.**

### Background

Himalayan gray langur, *Semnopithecus ajax*, is considered endangered due to its endemism to the Himalayan region and its declining population size (Groves and Molur, 2008). This primate was formerly considered a subspecies of *Semnopithecus entellus* (Brandon-Jones 2004, Brandon-Jones and others 2004; and Napier 1985). However, recent studies confirm its status as a species, *Semnopithecus ajax* (Groves 2001; Ashalakshmi 2015). Due to pre-existing confusion in taxonomy, its current distribution and conservation status are poorly understood. An assessment of (1) geographical distribution and population status, (2) conservation status, and (3) habitat use and feeding ecology are the need of the hour to develop conservation action plans for this species, across its natural range.

The very first sighting record of this species was likely from Sikkim at 2700m in 1855 (Hooker 1855). Later it has been recorded in various other parts of the Himalayas, e.g., in Nepal (Bishop 1975), Himachal Pradesh (Sugiyama 1976), Pakistan (Roberts 1997) and Kashmir (Lawrence 1895; Brandon-Jones 2004; Molur 2008). In this study, I propose to assess the geographical distribution, status, habitat use and feeding ecology of the Himalayan gray langur in Kashmir.

Kashmir (32° N, 72° E; Jammu & Kashmir state), in north western India, is an oval-shaped valley surrounded with a chain of mountains ranging from 1600m to 5000m and above. The valley has a mix of forests, orchards, croplands, and human habitation. Due to altitudinal variation, there is variation in temperature and vegetation type. The region has four distinct seasons, winter (Dec-Feb), spring (March-May), summer (June-August) and autumn (Sept-Nov). Average annual precipitation is about 664-700mm and the average temperature is around 24°C in summer and -5°C in winter (Charoo 2009). Spring is the wettest season while autumn is the driest. The entire region receives snow during the winter season.

Kashmir is home to many large mammals, such as Asiatic black bear (Saberwal 1989; Sathyakumar and Choudhary 2008), common leopard, markhor (Schaller and Amanatullah, 1975; Ranjitsinh 2005; Bhatnagar 2009), goral (Sathyakumar 2002), musk deer (Duckworth and MacKinnon 2008; Sathyakumar 2013) and hangul (Schaller 1969). Most of the population of these animals are now restricted to protected areas and surroundings due to human settlements and logging of forests. But relatively little is known about the gray langur.

### Study objectives:

- 1) To map the occurrence and spatial distribution of Himalayan gray langur in Kashmir.
- 2) To assess the feeding ecology of Himalayan gray langur.

## Introduction

The geographic range represents the distribution of animals in space. Potential distribution range can be determined by a number of factors, such as terrain characteristics, forest type and vegetation cover. However, actual distribution can be restricted by other factors, such as anthropogenic disturbances which also affect the abundance and distribution of animals.

The Himalayan gray langur is thought to inhabit a wide altitude range from 1500m-3200m (IUCN 2015, Sugiyama 1976, Gaston et al 1983, Sayers 2008). They are folivorous primates with capacity of foregut fermentation using gut microbes in their sacculated stomach (Ayer 1948). There has been no detailed long term study on *S. ajax*. Only information we have from the variants of Himalayan langur are from the works on *S. schistaceu* by Bishop 1975, Boggess 1976, Curtin 1975 and Sayers 2008. Sugiyama collected seasonal data over 5 months on Himalayan langur diet from the Himachal Pradesh, India and included a list of foods taken (Sugiyama 1976). He reported troops travel different distances in different seasons. During December they move 1km per day with a moving range of 100-500ha/troop. In Kashmir, it is known to occur in the protected areas of Dachigam National Park (forest management Plan DNP 2011-2016) and Kishtwar National Park. However, there has been no systematic study of the current distribution of Himalayan gray langur in Kashmir. This study aims to obtain geographical information on the distribution of *S. ajax* across Kashmir region of the Himalayas. This map obtained will serve as the current distribution range of langurs in Kashmir region and can be used for conservation management. It serves as the baseline data for the distribution of endangered Himalayan gray langur in Kashmir region which is not known yet.

When prior information on distribution is scant, or is lacking, survey-based methods provide the first approximation. Information obtained from systematic surveys can then be used to develop more detailed models, and refine management objectives. Therefore, in this study, survey-based methods will be used to map the occurrence and spatial distribution of Himalayan gray langur in Kashmir.

## Methods

On a potential distribution basemap areas were surveyed extensively for the distribution of Himalayan langur. Using a grid based method, 42 cells were found to be potential area of interest. The grids were randomly chosen and visited once and people such as local residents, forest guards, researchers, etc interviewed. These set of people were interviewed for the presence/absence of langur in nearby village, any conflict or crop raiding (frequency of crop raid) by the langurs and the kind of response from humans (killing, chasing, etc). The confirmed locations within these areas were marked using a handheld GPS and later overlaid on the base map. The highly potential sites obtained from interviews were surveyed for direct and indirect evidences. The surveys validated both the presence and absence of langurs obtained from interviews.

Observational sampling: Standard sampling methods, such as group scans were performed to observe and record individuals for every 5 minutes with 5 minute intervals for species of

plant, type of food eaten (fruits, leaves, seeds, bark, buds). Binoculars and video recorders were used to record these activities.

## Results

Out of the 42 sampling grids, we were able to visit and survey 16 grids. 9 out of 16 grids were reported for the presence and 7 grids were reported for the absence of langurs. A total of 53 interviews were recorded in these areas. From the interviews, people from areas close to protected forests reported of human-langur conflict, when langurs raided crops. Moreover, langurs raided crops more during winter and early spring and not in summer. Table 1 is a list of plant species consumed by langurs during winter season. Figure 1 shows the distribution of Himalayan gray langur in Kashmir region.

S.No	Name of plant consumed	Family	Type	Part consumed
1	<i>Morus sp.</i>	Moraceae	Tree	Leaves, Flower
2	<i>Prunus sp.</i>	Rosaceae	Tree	Leaves, flowers, fruits
3	<i>Quercus robur</i>	Fagaceae	Tree	Leaves, fruit
4	<i>Robinia pseudoacacia</i>	Fabaceae	Tree	Leaves
5	<i>Ulmus wallichiana</i>	Ulmaceae	Tree	Bark, buds
6	<i>Hedera nepalensis</i>	Araliaceae	Climber	Leaves, fruit
7	<i>Populus ciliata</i>	Salicaceae	Tree	Bark, buds
8	<i>Rhus succedanea</i>	Anacardiaceae	Tree	Seeds
9	<i>Aesculus indica</i>	Sapindaceae	Tree	Fruit, bark, buds

**Table 1: List of the plant species, plant part consumed by himalayan gray langur during winter season**

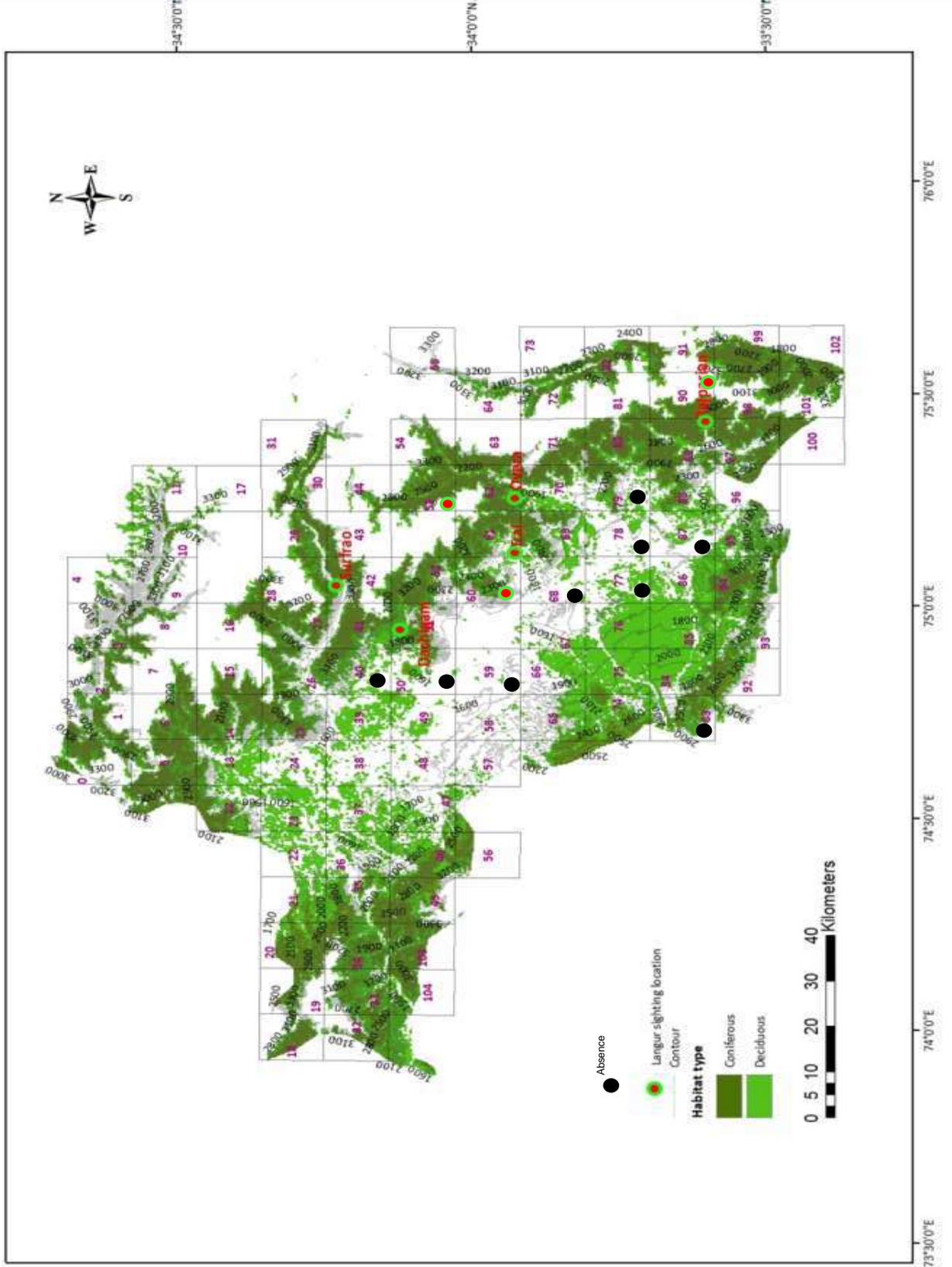


Figure 2 Map showing the distribution of Himalayan gray langur based on presence/absence in Jammu and Kashmir, India.

## **Discussion**

From the surveys conducted, results suggest langur presence in at least 5 different places. All of these sites are mostly protected forest blocks. These sites are part of a continuous mountain chain. It is expected that the movement is somehow restricted to this range only. Disturbances from the livestock grazing which occurs extensively during summer in certain areas greatly affect the distribution of langurs. From field surveys all these five sites occur at an elevation range from 1700-2300m. No occurrence was reported from lower elevation of 1400-1600m. Also in urban areas no langur presence was reported, whereas in areas surrounding the protected forests where human settlement existed, there were reports of human-langur conflicts. Two such sites were New-Theed (village close to Dachigam National Park) and Bothu, Bandipora. Although this data needs to be validated by conducting more such surveys in various other sites. The areas reported of crop raiding were more in winter and early spring and not in summer.

Interview based approach offers information on the following dimensions (i) historical distribution, (ii) current distribution, (iii) perceived trend in population and distribution, (iv) conflict with farmers.

In conclusion, this objective not only provides a baseline for conducting extensive ecological studies but also is helpful in predicting the future distribution of Himalayan gray langur. Keeping in mind the endimicity, endangered status of langurs in Kashmir proper conservation management policies are need of the hour. For the same a detailed distribution map was achieved. There is an urgent need for surveys to be done to determine the whereabouts of the viable populations of endangered Himalayan gray langur as no such studies have been done previously. Given this species limited range size, shy nature, climate change and susceptibility to human disturbances it is more likely to face extinction if not monitored at the right time.

