

# Genetic Variation, Ecology and Conservation of Asiatic Black Bears (*Ursus thibetanus*) in Annapurna Conservation Area, Nepal

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## Introduction

- Asiatic black bear (*Ursus thibetanus*) is an endangered species in mountain landscape of Nepal but has never been received for conservation importance.
- Retaliatory killing, poaching, climate change and habitat degradation have led to dwindling and scattered bear populations.
- Genetic variation may reduce in isolated population due to inbreeding and genetic drift that impede adaptability of population to new environment.
- It may lead to extirpation of certain populations if timely conservation measures are not undertaken.



Figure 1: Asiatic black bear



Figure 2: Bear habitat



Figure 3: Retaliatory killing of bear

## Objectives

- Assess genetic phylogeny and diversity of Asiatic black bears.
- Explore seasonal food habit.

## Study Area



Figure 4: Global distribution of Asiatic bear (green) and location of study area (red)

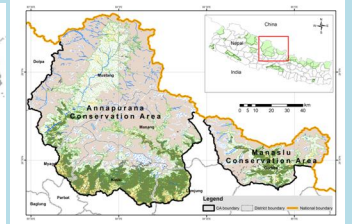


Figure 5: Location map of study area (Annapurna Conservation Area)

- Annapurna conservation Area is the first conservation area and largest protected area (7,629 km<sup>2</sup>) of Nepal.

## Materials and Methods



Bear hair trap

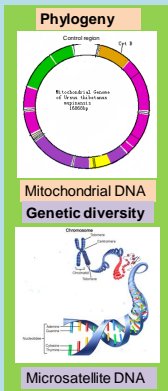


Fresh fecal sample

### Genetics



DNA extraction (tool kit)



### Food Habit



Identification in site



Reference



Diet analysis

- 27 and 68 fecal samples collected for genetics and diet analysis respectively. 10 hair samples collected from fence and tree branches.

- DNA was extracted using QIA amp mini-stool kit (Qiagen) for fecal samples and DNA extractor FM kit (Wako) for hair samples.

## Current Results

### Genetics

- DNA could not be extracted from 10 hair samples which were very old and collected from fence and branches.
- Out of 27 fecal samples, DNA was successfully extracted from 17 samples.

### Food Habit

- The pre-winter season data shows that food of bears contains wild fruits (74%), followed by grasses (21%).

Table 1: Food items in Bear feces

Food items	FO*	PV**	Species No
Wild fruits	85	74	10
Grasses and bamboo	43	21	3
Mammals hair	10	3	ongoing
Insect	4	0.1	3
Agriculture crop	3	2	1

\*FO = Percent Frequency of Occurrence, \*\*PV = Percent Volume

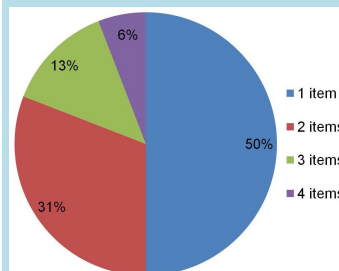


Figure 6: Composition of food items



Figure 7: Some food items

## Discussion

- Wild fruits/nuts are major food of bears followed by grasses whereas small amount of mammal hairs, insects and crop are also recorded in bear feces.

- Fresh feces (1-3 days) should be used for successful extraction of DNA in a non-invasive method.

- Mixed broad-leaved forest is a major habitat of bears due to the availability of a variety of foods.

## Future Plan

- Mitochondrial and microsatellite DNA analysis.
- Collection of additional fecal and hair samples.