

# The co-existence of endangered primate species and ethnic groups in southwest China

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Abstract

## **Background**

China is one of the world's major centers of biodiversity. Twenty-five primate species have been recorded in China living together with fifty-five ethnic minority groups. China is in a unique position for the study of ethno-primateology. The overwhelming majority of primate species are found in southern China as well as the ethnic minority groups. Many species have a long history of co-existence with the local ethnic minority communities. There are great differences between different ethnics and regions when it comes to culture, economy, customs, and the natural environment. Thus, they all keep harmony as the guiding creeds and philosophies to survival in nature.

## **Method**

Firstly, this study was focusing on the management and conservation planning for different endangered monkey species in the southwest part of China under different research background conditions (wild group and provisioned group) and encounter rate situation (frequent encounter, moderate encounter, and low encounter). I also explored the potential of ethno-primateology in China for future conservation and co-existence. Firstly, this study evaluated behavioral differences between provisioned (Ts, 7 individuals) and wild (Tn, 13 individuals) family groups of the endangered François' langur (*Trachypithecus francoisi*) in Mayanghe National Nature Reserve, China. Scan

sampling every 5 min for 12 h daily over 9 months (March 2013 to February 2014) was used to record behaviors in seven categories.

Secondly, information on Yunnan snub-nosed monkey (*Rhinopithecus bieti*) behavioral ecology was examined for contributing to future conservation efforts within the Laojun Mountain National Park by this study. Habitat evaluation procedures were used to quantify the value of land as habitat for this species. Environmental variables were analyzed for hypothesizing to influence habitat suitability for Yunnan snub-nosed monkeys and mapped the distribution of suitable habitat across the study area and adjacent areas. Spatial analysis with GPS data was conducted to investigate the home range change of these monkeys. Predictor variables were generated using ArcMap and R. 34 environmental variables were prepared at 30 m spatial resolution. Maxent was used to analyze environmental variables that contributed to suitability.

In order to definitize the value of ethno-primatology for primate conservation and to provide a way of conservation planning in a relatively new perspective, I also explored a conservation process from an ethno-primatology perspective for nature reserve management. I accumulated attitude and knowledge data on the traditional culture, religion, and current conservation situation from rural and urban groups of Lisu ethnic people who lived in and outside Liju village.

### **Result:**

The François' langur group Tn exhibited three main feeding periods daily, whereas Ts showed more variable behavioral patterns that relied on provisions. The Tn alpha male showed twice the amount of guarding behavior compared with the Ts alpha male. The proportion of each habitat type utilized differed significantly between Tn and Ts ( $\chi^2_{[4]} =$

17,131.4,  $p < 0.01$ ). Additionally, dietary diversity differed between the two groups: Tn fed on 61 plant species, whereas Ts fed on 43 plant species. Tn rarely ate sweet potato and corn other than discarded remnants of human food (0.2% of their total food sources), whereas these foods represented 21.8% of Ts food sources.

The distribution of suitable habitat for Yunnan snub-nosed monkeys in the Jinsichang area of the Laojun Mountains in China was modeled by using satellite remote sensing and GIS. This study did not describe the frequency nor intensity of habitat use. Habitat suitability was affected by several variables, the most influential, as determined by permutation importance, being mean diurnal temperature range (31.6%), precipitation during the wettest quarter of the year (30.4%), average annual precipitation (17%), normalized difference vegetation index (5%), wetness (4.6%), and aspect (4.5%).

The Lisu people's culture, history, and traditions were evaluated from the developing trend of environmentalism perspectives. Although rural and urban Lisu people had different educational backgrounds, they expressed similar sentiments and attitudes toward conservation. Rural (96.6%) and urban (100%) interviewees showed their ardent love for the Yunnan snub-nosed monkey. The rural (90.3%) and urban (89.0%) groups supported the seasonal closing of mountainous areas for conservation.

## **Discussion**

Provisioning changed the activity patterns of François' langurs. Data for the two troops were compared to understand this species' activities under human interference, in particular, and the result suggests that provisioning is not a suitable strategy for their

conservation. This habitat suitability model provides information about the current distribution of Yunnan snub-nosed monkeys, and the results of this study illustrate some important directions for appropriate implementation of conservation actions. During the interviews, the interviewees were not extreme nature protectionists and did not support the destructive utilization of natural resources. This shows the huge value for human-animal conflict optimization and conservation planning not only for LMNP but also for other national parks or nature reserves.

Law enforcement and management are solid foundations for achieving conservation aims, and scientific research has determined its way to achievement. Ethno-primatology can raise conservation up.

### **Conclusion**

Provisioning could be the main cause of increasing human-langur conflicts. It substantially changed the François' langur's natural behaviors and living conditions which aggravated the human-langur conflict. Species distribution modeling provided important information that indicates the Yunnan snub-nosed monkeys of interest on the distribution of suitability, which also contributed conservation projects for this species. Based on the information that I acquired from the Lisu people, harmony is always the guiding values when they live with nature. This attitude greatly improved the compatibility of conservation management and area planning action taken. Ethno-primatological knowledge based conservation project can be a relatively new and targeted perspective for future nature reserve management and area planning, especially for species conservation and co-existence in multiethnic community areas.