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## Review

## Current status and conservation of the gray snub-nosed monkey *Rhinopithecus brelichi* (Colobinae) in Guizhou, China

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## ABSTRACT

Gray snub-nosed monkeys *Rhinopithecus brelichi* (Colobinae), categorized as endangered on the IUCN Red List, are endemic to Guizhou, China. To evaluate the species' current status we surveyed five sites in the Mt Fanjing area between August 2007 and June 2008. These sites were identified from previous surveys and interviews with local officials and villagers. Four sub-populations, with a total of ca. 750 individuals, were located in mixed deciduous and evergreen broad leaf forest at 800–2200 m asl. Identified threats to the species include (1) accidentally injured or killed by poaching, (2) loss or alteration of habitat through wood extraction, and (3) loss or alteration of habitat through economic activities, such as building projects and illegal mining. We recommend that several actions can be taken to alleviate the anthropogenic pressure on the ecosystem including: (1) designating specific forest reserve for sustainable wood extraction, (2) utilizing biogas to reduce firewood demands, (3) introducing local people to bamboo utilization for generate greater cash income, (4) educating for young people and encouraging them to work in developed areas, and (5) encouraging the villagers to move out the mountain.

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## 1. Introduction

The gray or Guizhou snub-nosed monkey *Rhinopithecus brelichi* (Colobinae) was categorized as an endangered species by The World Conservation Union (IUCN, 2007), and was also listed as a Category I species under the Chinese Wild Animal Protection Law. At present, *R. brelichi* is restricted to a small region at Mt. Fanjing in northwest Guizhou province, China, with a total range of 275 km<sup>2</sup> in Fanjingshan National Nature Reserve (FNNR) (Yang et al., 2002).

*R. brelichi* was originally described from a single hunter's skin, which was probably collected from the Mt Fanjing area by Henry Brelich and later described by Thomas (1903), but see (Allen, 1938). It was later thought to be extinct as no further information was reported following its initial discovery. The confirmation that the species was extant came in 1962 when a skull was obtained (Peng et al., 1965), and in 1967 one female specimen. However, conservation-related work on *R. brelichi* was not implemented until the FNNR was founded in 1978. Although a few population surveys were carried out in the early 1980s (Quan and Xie, 1981; Xie et al., 1982; Xie et al., 1986; Li and Huang, 1993), none were conducted over the entire range of the species until 1988. From 1988 to 1993, one systematic survey, which focused on population distribution, size and ecology, was carried out by the FNNR (Yang et al., 2002). Nevertheless, no further surveys have been conducted over the last 15 years. Mt. Fanjing is a popular Chinese tourist center and many people travel there to holiday. Even given the protected status of other sub-nosed monkeys in China, there are still potential threats on *R. bieti* (Xiao et al., 2003; Xiang et al., 2007) and *R. roxellana* (Li et al., 2003), including poaching and habitat destruction. However, there is little information on the conservation status of *R. brelichi*, and the susceptibility of this species needs to be evaluated.

Here we: (1) provide information on the distribution and size of *R. brelichi* populations, (2) evaluate the present conservation status and factors threatening *R. brelichi*, and (3) recommend conservation strategies for a sustainable ecosystem where both people and *R. brelichi* can coexist. These results will be fundamental to the understanding and protection of the gray snub-nosed monkey.

## 2. Materials and methods

### 2.1. Study area and habitat

This study was conducted in the Mt Fanjing area (Fig. 1, 27°40'–28°10'N, 108°30'–108°55') in northeast Guizhou prov-

ince, China, in which may be the only remaining site for *R. brelichi*. Fanjingshan National Nature Reserve (FNNR) was founded in 1978 and accepted as a member of Man and Biosphere Program by the United Nations Educational, Scientific and Cultural Organization in 1987 (Yang et al., 2002). FNNR, focusing on conservation of *R. brelichi*, Dove trees (*Davidia involucrata*) and its representative terrestrial ecosystems, consists of 41,900 ha of mountainous terrain stretching from below 800 to 2570 m asl, with a 26,667 ha core area. In fact, FNNR is the only good conservation site in the Mt Fanjing area and like an island is surrounded by the villages and fragmented forest. In addition to some secondary woodland patches (700–900 m asl), there are five primary forest types in the FNNR (Zhou et al., 2006). The different strata include: (i) natural bamboo and/or artificial fir forest (<900 m asl)–with dominant species moso bamboo (*Phyllostachys pubescens*) and/or China fir (*Cunninghamia lanceolata*); (ii) evergreen broad leaf forest (900–1300 m asl)–with *Cantansopsis* spp., *Cyclobalanopsis* spp. and *Lithocar* spp.; (iii) evergreen-deciduous broad leaf forest (1300–2200 m asl)–including *Fagus* spp., *Eurya* spp. and *Schima* spp.; (iv) subalpine conifer–evergreen forest (2200–2350 m asl)–with *Abies georgei*, *Abies fanjingshanensis*, *Acer flabellatum*, and *Enkianthus chinensis*; and (v) subalpine brushes and meadow (2300–2570 m asl)–featuring *Rhododendron guizhouense*, *Rhododendron oreonastes*, and *Bashania fangiana*. Dwarf bamboo (*Sinarundinaria* spp.), whose density can reach 1,000,000/ha, forms a dense and nearly impenetrable ground cover in many areas. Generally, the monkeys utilize evergreen broad leaf forest and evergreen–deciduous broad leaf forest (Yang et al., 2002). The monkeys have seldom observed to use the habitats where human activities regularly occur, or secondary forest (Xiang ZF, personal observation).

### 2.2. Population status and threats

The primate survey method was similar to that used in examinations of the black-and-white snub-nosed monkey (*R. bieti*) (Long et al., 1994; Xiang et al., 2007). A random transect method was deemed ineffective for *R. brelichi* because: (1) low monkey density render a very low possibility of meeting the groups by transect; (2) steep topography and dense bamboo shrub make it difficult to set transect lines; and (3) the large group/band social organization of snub-nosed monkeys makes it easy to detect them in protruding trees, cliffs, and mountain ridges. Generally, the survey was performed along existing trails or ridges where it was relative easy to find traces (e.g., feces of the gray snub-nosed monkeys look like abacus beads and are easy to distinguish from the droppings of other animals).

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