



Home Range Size and Sleeping Site Use by the Critically Endangered

Cat Ba Langurs (*Trachypithecus poliocephalus*)

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INTRODUCTION

Background: Home range size and habitat utilisation are affected by access to key resources including food, water and sleeping sites, all of which change seasonally.

Limestone langurs are Asian colobines that live on limestone karst hills with shrubby, stunted, and discontinuous vegetation throughout Laos, Vietnam, and China – all are threatened with habitat loss, degradation, and fragmentation as well as poaching¹. Unusual for primates, limestone langurs typically choose rocky ledges and caves as sleeping sites.

Research Aim: This study assesses home range size and sleeping site use in two groups of Critically Endangered Cat Ba langurs (*Trachypithecus poliocephalus*). This is key to conservation management planning, as it can provide a proxy measure of available resources, and, thus, habitat quality, which has implications for reproduction and long term viability.

METHODS

Study Groups: Two study groups from the Cua Dong fjord, southeastern Cat Ba Island, northeastern Vietnam (Figure 1) were studied. Group A had 10-13 individuals (6 adults) while Group B had 7 (3 adults).

Data collection: From Feb 2014 to Jan 2015, we observed the two reproductive groups of langurs on 180 days crossing the wet season (May-Oct) and the dry season (Nov-April), with a total of 73 observations of sleeping site use. We used a GPS and rangefinder to note the langurs' location whenever they moved more than the typical group spread of 20-50m. This information was then mapped into ArcGIS and fitted with a modified minimum convex polygon. When the langurs settled down to sleep for the night, we opportunistically noted the features of the sleeping site.



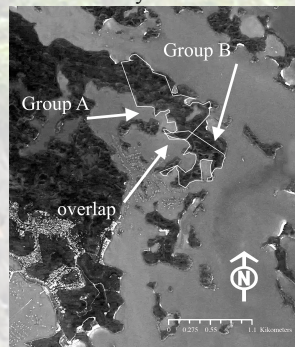
Figure 1: Field site (Cat Ba Island, northeastern Vietnam) in relation to Vietnam and Southeast Asia.

RESULTS

Home range size:

- Group A – 50 ha (0.20-0.26 ind/ha)
- Group B – 22 ha (0.31 ind/ha)
- Overlap – 5 ha (10% Group A and 23% Group B)
- Both groups had larger home range sizes in the wet season than the dry season.

Figure 2: Annual home range size and overlap for two reproductive groups of Cat Ba langurs living in Cua Dong, southeast Cat Ba Island.



Sleeping Sites:

- Group A used 10 sleeping sites on 47 nights of observations and Group B used 13 sites on 26 nights of observations
- Two nights was the longest consecutive use of one site, which was seen four times in Group A. Group B was not observed to reuse sites on consecutive nights.
- 71% of sleeping sites are in the middle of the hill, 19% in the lower third, and 10% in the upper third.
- All sites are on steep cliffs, typically with sparse surrounding vegetation
- There is no evidence of seasonality as caves make up 39% of sleeping sites in the dry, and 35% in the wet, season. Ledges are used at the same rate across seasons (59%).
- Ledges are the most common sleeping sites and most commonly used sleeping sites, although when considered in the context of availability (Table 1) caves (Figure 3a) seem to have been preferentially selected over ledges (Figure 3b).

	sleeping sites available*	sleeping site observations
ledges	61%	49%
caves	17%	27%
ledges + caves	17%	18%
ledges + trees	4%	5%

Table 1: A comparison between the percent of observed sleeping sites used vs. the number of times each sleeping site was used. *Note that this study did not actually determine what type or how many sleeping sites were available in the habitat.

DISCUSSION

Home Range: The Cat Ba langurs live at similar densities as closely related limestone langurs (Figure 4). It may be that these range sizes are larger than historical sizes due to diminished resources in a degraded habitat, necessitating an increase in space per individual in order to search for adequate food. This is seen in the closely related François' and white-headed langurs³ living in poor quality habitat.

The increase in home range sizes in the wet season may reflect the need to spend more time searching for clumped and widely distributed fruit, which is eaten more at this time of year⁸. This seasonal pattern is seen in other Asian colobines⁹⁻¹¹.

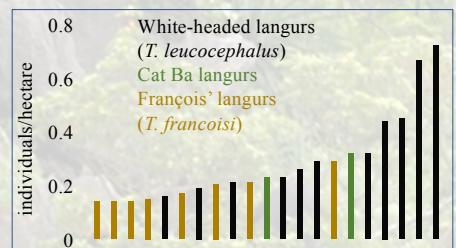


Figure 4: Densities (individuals/hectare) for three limestone langur species²⁻⁷.

Sleeping Sites: The Cat Ba langurs used more sites per group (12.5) than the closely related François' (range: 3-11.5^{2,4,5,7,12}) or white-headed (range: 5.3-9^{13,14}) langurs. Caves appear to be used disproportionately possibly in order to avoid extreme temperatures or predation. The lack of seasonality in site selection, in combination with the lack of reuse on consecutive nights and easy visibility with no surrounding vegetation in the middle of an inaccessible rock face, indicates sites may be chosen to provide safety from predators (primarily human poachers).

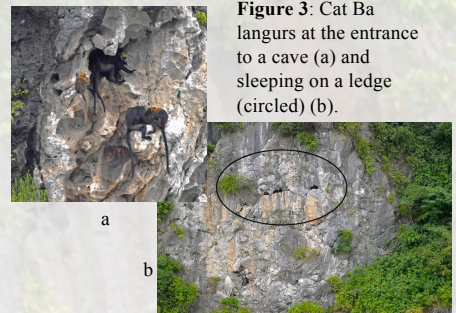


Figure 3: Cat Ba langurs at the entrance to a cave (a) and sleeping on a ledge (circled) (b).

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