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Report on an overall survey of the Cao Vit gibbon population (*Nomascus* sp. cf. *nasutus*) in Trung Khanh District, Cao Bang Province (second overall survey)

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Cao Vit black crested gibbon in Phong Nam - Ngoc Khe forest, Trung Khanh, Cao Bang (photo: Tilo Nadler)

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Introduction

The critically endangered black crested gibbon has traditionally been regarded as a single species, *Nomascus concolor* (Groves, 1972; Marshall & Sugardjito, 1986). Recently, however, Geissmann (1996, 1997) demonstrated that two species have to be recognized based on their vocal differences, with the western black crested gibbon (*Nomascus concolor*) occuring west of the Red River, and the eastern black crested gibbon (*Nomascus* sp. cf. *nasutus*) being distributed east of the Red River. Furthermore, the author suggested that as many as three different subspecies originally existed of the eastern species (2 in Northeastern Vietnam and 1 on Hainan Island). However, the Hainan population has been reduced to less than 20 individuals and there was no confirmed occurrence of the Vietnamese forms since the 1960's, making this species the rarest primate species of the world (Geissmann, 1997). As a result of these discoveries, numerous surveys were carried out with the goal of discovering a surviving population of the species in Vietnam (Dang Ngoc Can *et al*., 2002; Geissmann & Vu Ngoc Thanh, 2000; Goldthorpe *et al*., 2002; La Quang Trung, 05/2002; La Quang Trung & Trinh Dinh Hoang, 2001a, b; Le Khac Quyet & La Quang Trung, 03-04/2001; Le Xuan Canh & Pham Nhat, 1997; Ngo Van Tri & Lormée, 2000; Phung Van Khoa & Lorméee, 2000; Tordoff et al., 2000; Trinh Dinh Hoang, 05/2001). Unfortunately, no live gibbons were heard or sighted during any of these surveys, and only few unconfirmed reports of the species' occurrence (Geissmann *et al*., 2000). Two recent surveys by FFI, however, provided first evidence for the continued existence of a small population of the eastern black crested gibbon in Trung Khanh District, Cao Bang Province, close to the Chinese border ().

The present survey was undertaken in order to obtain more accurate information on the size of the population and collect preliminary data on group structure and behavioral ecology.

Methods

The survey was undertaken in the time period of 14-30 August 2002, of which the actual data collection occurred during 17-29 August 2002 (see Results section). The study area consisted of limestone forest and was densely packed with very steep Karst mountain peaks. Altitude ranged from 500 to 900 m a.s.l.. The area is limited by the Chinese border in the north and northeast, and by two arms of the Quay Son River in the west, south and southeast. The size of the area amounts to roughly 3,000 ha. Our campsite was situated in the

center of the area, in the middle of a valley with the local name Lung Day (22°54' N, 106°31'E).

The survey team consisted of two scientists from FFI (Fauna & Flora International), Hanoi, three from IEBR (Institute of Ecological and Biology Resources), Hanoi, and one from the Tierärztliche Hochschule Hannover, Germany.

The survey occurred during the rainy season. Inspite of this, it rained only during six of 13 survey days, and rainfall usually lasted less than two hours. As a result, surveys could be carried out daily, although they occasionally had to be interrupted temporarily. Daily maximum temperatures ranged between 23-33°C and nightly minimum temperatures between 19-23°C, respectively.

Air humidity during the day reached minima of 42-85% and maxima of 91-99% during the night.

Vocal data of the gibbon were collected from fixed listening points (LP). LPs were located on mountain peaks or elevated crests, where audibility of gibbon songs was optimal. Six main LPs were selected, each of which was used for 5 to 12 days. In addition, 5 additional LPs were used only occasionally. On any day, an average of 3.2 main LPs (range 2-4) was used simultaneously. The net of main LPs was designed to be dense enough so that each LP had at least one other LP as “nearest neighbor” within a distance of less than 400 m. This enabled observers to hear the same gibbon songs from more than one LP simultaneously and, thus, to triangulate the exact locality of the callers.

In order to hear all gibbon songs in the study area, monitoring time at each LP typically started at 05:30 hours and ended at 11:30 hours, but occasional surveys occurred until 15:00 in order to cover the whole activity period of the gibbons.

Dawn was defined as the time of the morning when the colour of leaves near the forest ground was recognizable as being green instead of grey. Mean dawn time during this study occurred at 05:20 hours. Sunrise was defined as the time when either the sun was first seen on the horizon or when sunrays reached the first trees visible from the LP, whichever happened earlier. Average time of sunrise occurred at 05:57 hours during this study.

Of each gibbon song bout, observers recorded starting time, ending time, direction to the nearest degree, a distance estimate, call type, and the number of individuals producing male-type calls and great-calls. Call types included duet song bouts, male solo song bouts,

female solo song bouts, isolated great-calls, and alarm call. Different song bouts or isolated great-calls were separated by an arbitrarily defined interval of at least 5 minutes.

During gibbon sightings, observers noted begin and end time of the sighting, age and sex class of all animals seen, direction and distance of the gibbons, and the activity of all visible individuals (except infants). Activity classes included feeding, foraging, travelling, grooming, calling, resting and playing. In addition, during feeding activities, food classes were also recorded, including fruits, leaves, and animal matter. When possible, an identification of food species was attempted.

Results

A total number of 42 song bouts were heard during the survey days. The average daily number of song bouts heard varied among the LPs from 1.6-2.6 song bouts (range 0-5). The earliest song bout started at 05:24 hours, the last at 12:50 hours. Songs were clearly concentrated, however, on the early morning hours right after dawn (05:20 hours), with exactly 50% (n=20) of all song bouts starting between 05:20-06:30 hours. Most song bouts were duets, but 14 of 42 song bouts were female solo song bouts. Most of these were recorded from one small area and were probably produced by the same group (Group 4).

Gibbons were sighted almost daily and usually several times per day. Based on overlapping song bouts of groups, on sightings at the same time, on simultaneous sightings of different groups and on distinct group compositions, it was possible to distinguish at least 5 gibbon groups in the area with a total individual count of at least 26 gibbons (Table 1). A group with only 3 individuals (a pair with 1 juvenile) may also occur in the area. Because it was seen only once, for a few seconds, in an area believed to be inhabited by a larger group, it can not be ruled out that only a group fragment was observed on that occasion. Therefore this individual count was excluded from the analysis. Group size ranged from 5-6 individuals, with a mean value of 5.2-5.6 individuals. Three of the 5 groups included more than one yellow-coloured female. Six of 8 presumably adult females were carrying a black infant. In one group, this included each of the two female group members (Table 1). Age classes were based on size and remain only tentative.

Table 1. Gibbon group composition observed in the present study.

Group No.	Composition					Total
	Adult male	Adult female	Subadult	Juvenile	Infant	
1	1	2		1	1	**5**
2	2	1		1 (2)	1	**5 (6)**
3	1 (2)	1		2	1	**5 (6)**
4	1	2	2		1	**6**
5	2	2			2	**5**
Total	**6 (7)**	**8**	**2**	**4 (5)**	**6**	**26 (28)**

Groups appeared to live in separate territories, but one instance of a meeting between two groups (Groups 3 and 4) was observed on 27 August, when up to 10 gibbons where gathering near the common boundary of their respective territories. Although the 10 individuals were seen together for only 5 minutes, members of both groups remained in close proximity for at least one hour. There were no visual signs of agonism among the gibbons. Group members were repeatedly grooming each other, the juveniles of Group 3 were observed playing with each other. The sub-adult-size individuals of Group 4 repeatedly moved back and forth between the two trees in which the groups were gathered. The adult of Group 3 also repeatedly visited the female of Group 4 and even touched her. All three females of the two groups were observed sitting in close proximity of only few meters without exhibiting signs of agonism. An unusually high number of 6 song bouts was heard during this day. Five of these were produced in the area of the group meeting and four of these were female solo song bouts.

The home ranges of the five gibbon groups are all located in the center of northern third of the study area (as defined in the method section) and cover a collective area of less than 4 square kilometers, although larger area of forest would be available. The elevation of the gibbon ranges is around 640-800 m above sea level.

Because of the dense configuration of mountain peaks it was often possible to observe gibbons situated on opposite slopes. More than 8 hours (494 minutes) of behavioral observations were collected during this survey. Most of this time, the gibbons were seen eating (36.5%); the other behavioral activities include: grooming (20.1%), foraging (17.7%), travelling (11.9%), calling (8.5%), resting (4.3%), and playing (1.0%).

Most of the feeding time was spent eating fruit (86.6%), whereas other food categories appeared to play a minor role: leaves (4.7%), animal matter (0.5%), undetermined food class (8.2%). Of the 156 minutes the gibbons were observed feeding on fruit, more than half the time (51.6%) was spent feeding on fruits from one single tree species which, however, remains unidentified.

Discussion

Although we were able to document that the gibbon population in Trung Khanh is larger than the previous surveys suggested, a population of 5 groups and about 26 individuals is still extremely small and vulnerable, and its future seems highly uncertain. Not only is the size of their remaining area very small, but the gibbons are highly threatened by illegal logging for firewood and for charcoal production, both from the neighboring villages as well as from the neighboring Chinese communities, and by hunting. In order to save the Cao Vit, FFI is proposing to create a Species/Habitat Conservation Area for this forest and to develop a joint forest protection system with local communities.

The little amount of behavioral data was collected on unhabitated gibbons, which were usually located up to 500 m away. As a result, these observations can only be regarded as very preliminary and probably biased. The gibbons are most easily detected while calling, jumping or entering a known food tree, but once the animals were detected, most behavioral data tend to consist of stationary behaviors such as feeding and grooming. Locomotion items such as traveling and foraging, on the other hand, may be underrepresented, because gibbons will easily move out of sight in the forest.

With these reservations in mind it still appears that the study animals were dominantly frugivorous. Because our observations were carried out during the rainy season, when fruits are abundant, it will be interesting to find out whether the finding can be confirmed for the dry season as well, when fruits are less common. It is also relevant that more than 50% of the fruit feeding time was devoted to fruit from just one tree species.

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