

Short Communication

The current status of the Hainan black-crested gibbon *Nomascus sp. cf. nasutus hainanus* in Bawangling National Nature Reserve, Hainan, China

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Abstract The Hainan black-crested gibbon *Nomascus sp. cf. nasutus hainanus* is on the verge of extinction. Following studies in the late 1980s and early 1990s only limited observations were made of the remaining population in the Bawangling National Nature Reserve on Hainan Island, China, and the most optimistic estimation of the population size was 23 individuals. To determine the present status of this gibbon, we surveyed the western part of the Reserve, from where the gibbons were previously known, using transects (November–December 2001), listening post (February–April 2002) and interviews with reserve staff (November–December 2001 and February–April 2002). Three groups of gibbons were sighted comprising at least 10–12 individuals including juveniles and infants. A fourth group, possibly

comprising 2–7 individuals, was heard but not seen. Compared to an unpublished survey by reserve staff in 2000, the population appears to have decreased. Surveying of this gibbon population will continue, in particular to determine the composition of the one group that was heard but not seen and to carry out a survey of the eastern part of the Reserve to determine whether or not any gibbons survive there. The Forestry Bureau of Hainan is applying to the Central Government for an enlargement of the area of the reserve and more staff to help prevent illegal poaching and logging.

Keywords Bawangling National Nature Reserve, China, Hainan black-crested gibbon, *Nomascus sp. cf. nasutus hainanus*.

Gibbons were once widely distributed in China (Ma *et al.*, 1988) but are now restricted to south and south-west Yunnan (Haimoff, 1987; Jiang & Wang, 1999) and Hainan Island (Liu *et al.*, 1984, 1989; Ma *et al.*, 1988). In the early 1950s >2,000 Hainan gibbons were distributed in 866,000 ha of forests across 12 counties of Hainan Island (Wang & Quan, 1986) (Fig. 1). By 1983 only 200,000 ha of forest remained and gibbons could only be found in two locations: Futouling Mountain in the counties of

Changjiang and Baisha, and Limuling Mountain in the counties of Baisha, Qiongzong and Ledong (Liu *et al.*, 1984). Liu *et al.* (1984) and Tan (1985) reported that poaching of the remnant gibbon populations was continuing. In late 1988 only 21 gibbons survived on Hainan, found only in the Bawangling National Nature Reserve (Liu *et al.*, 1989). In 1998 only 16–17 gibbons were observed in the Reserve (Song *et al.*, 1999; KFBC, 2001). Information available before our surveys suggested that no more than 23 individuals remained in this reserve, but the status of the population was unclear (Han Jianzhun, pers. comm.).

The black-crested gibbon has been variously referred to as *Nomascus concolor* (Liu *et al.*, 1984; Ma & Wang, 1986; Ma *et al.*, 1988; Ma, 1997; Department of Wildlife Conservation, 2000), *Nomascus nasutus* (Geissmann, 2002; Geissmann *et al.*, 2002–2003; Brandon-Jones *et al.*, 2004) and *Hylobates (Nomascus) hainanus* (Groves, 2001). Here we refer to the species as *Nomascus sp. cf. nasutus hainanus*. The Hainan black-crested gibbon is threatened throughout its range in China and northern Vietnam (Bleisch & Chen, 1990). As *Nomascus concolor* the species is categorized as Endangered on the IUCN Red List (IUCN, 2003) and is a Class I protected species in China

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Fig. 1 Changes in the distribution of the Hainan black-crested gibbon on Hainan Island between 1950 and 1980 (after Liu *et al.*, 1989).

(Department of Wildlife Conservation, 2000). Here we present the results of a survey of the Hainan black-crested gibbon in Bawangling National Nature Reserve during November–December 2001 and February–April 2002 along with previously unpublished data collected by Reserve staff in 2000. Our aim was to determine the status of this population in comparison with earlier studies, and to obtain information on the species' ecology to facilitate its conservation.

The 66 km² Bawangling National Nature Reserve is located in west-central Hainan (Fig. 1). It has a core area of 21 km², and its altitude range is 200–1,438 m; the climate and vegetation have been described by Liu & Tan (1990). The reserve has three field stations, which were used during this project (Fig. 2).

During November–December 2001 the survey team spent 20 days (71 man-days) in the field. Eleven transect lines, totalling 69.5 km, were walked once each, following the method of Green (1978). During February–April 2002, 71 days (223 man-days) were spent in the field. The team was divided into several smaller teams, and each

made point counts from listening posts (Brockelman & Ali, 1987; Brockelman & Srikosamatara, 1993), occupying posts prior to sunrise. On hearing gibbons' calls, observations were made to determine the location and structure of the group. Contact duration, location of sighting, sex and age classes (identified according to the criteria of Liu *et al.*, 1989) were recorded. Because these gibbons are shy it was not always possible to get close enough to identify the sex and age of individuals, and in such cases the animals were counted as black-haired individuals (i.e. adult males and both genders of subadults and juveniles). Calls were recorded using a tape recorder and parabolic microphone and sightings were filmed with a video camera.

Gibbons were located, either visually or aurally, in five of the 11 transects walked in November–December 2001. Four gibbon vocalizations were heard in the region of Dong'er. We observed one group of four individuals (three black-haired and one adult female) in Dong'er and two individuals (one black-haired and one adult female) in Nanchahe. During February–April 2002, gibbons

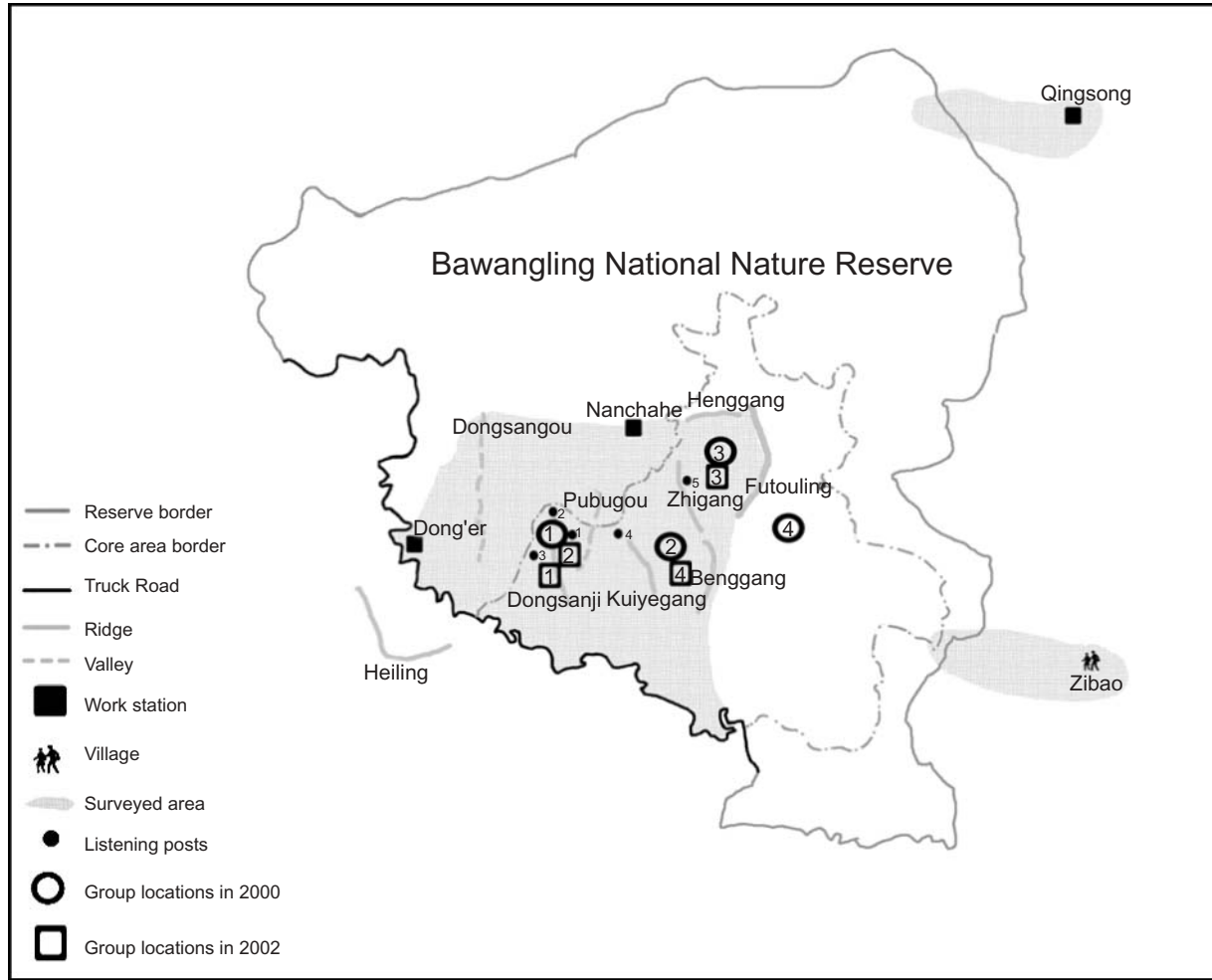


Fig. 2 Locations of groups of Hainan black-crested gibbons (see Table 1) located in 2000 (by Reserve staff) and 2002 (this survey) in Bawangling National Nature Reserve, Hainan Island.

Table 1 Composition of Hainan black-crested gibbon groups in 2000 (unpublished data from Reserve staff) and 2002 (this study) in Bawangling National Nature Reserve, Hainan Island.

Group name (no. of sightings/duration of sightings in minutes)	Group composition				
	Total number	Adult male	Adult female	Juvenile	Infant
2000 ₁	6	1	2	2	1
2000 ₂	3	1	1	1	0
2000 ₃	7	1	2	2	2
2000 ₄	7	1	1	4	1
<i>Total</i>	23	4	6	9	4
2002 ₁ (9/114)	4–5	1	1–2	2	0
2002 ₂ (7/72)	3	1	1	1	0
2002 ₃ (1/?)	3–4	1	2	0	0–1
2002 ₄ (heard but not seen)	Unknown	Unknown	Unknown	Unknown	Unknown
<i>Total</i>	≥10–12	≥3	≥6–7	≥3	≥0–1

were observed 16 times at five sites. The groups seen comprised 2–5 individuals with one or two adult females, and 1–3 black-haired individuals (Table 1). The

calls heard were both solos and duets and lasted for 6–35 minutes; the mean duration of sightings was 14.3 minutes (Table 1).

Using the visual data and audio and video recordings from these two surveys, and interviews with reserve staff, we were able to determine the location and composition of the gibbon groups. Four groups of gibbons were located in the Reserve, with a total of 10–12 individuals sighted in three groups and no direct observation of the fourth group (Table 1). Group 2002₁ (4–5 individuals) and group 2002₂ (three individuals) shared the same activity range around the Dongsanji Ridge. Group 2002₃ (3–4 individuals) was located between Henggang Ridge and Zhigang Ridge. Group 2002₄ (which was only heard) was located between Kuiyegang Ridge and Benggang Ridge (Fig. 2). On Dongsanji Ridge in 2000 there was only one group (2000₁) of six individuals, while in 2002 two groups (2002₁ and 2002₂) were sighted with a total of 7–8 individuals. Because gibbons are commonly considered territorial (Leighton, 1987) we speculate that either two groups emerged from the same group of 2000 but were not completely divided and shared the same activity range, or the area of the reserve is so small that both groups have to share it. The location and composition of group 2002₁ suggests that it could correspond to the group recorded by KFBG (2001).

Breeding was confirmed by the presence of both juveniles and infants (Table 1). At least one group consists of two females. Their loud calls showed they were adults, and Reserve staff indicated that they had both probably given birth. Although gibbons are generally considered monogamous (Leighton, 1987), this has been queried (Sommer & Reichard, 2000). Both monogyny and polygyny as well as strict polygyny (Haimoff *et al.*, 1987) have been observed in the black-crested gibbon in Yunnan Province (Lan, 1989; Jiang *et al.*, 1994, 1999). According to our observations and those of Liu *et al.* (1989), polygyny could be the normal pattern in the Hainan black-crested gibbon. Bleisch & Chen (1991) refer to a video of Hainan black-crested gibbons from the Bawangling National Nature Reserve that shows two females from the same group with infants. They considered this to be ‘familial polygyny’, which could occur as a result of subadults having difficulty finding an appropriate mate. Another explanation could be the lack of suitable territory.

More than 30,000 residents live in the areas adjacent to the Reserve, including *c.* 2,600 individuals in the Reserve’s buffer zone. Although living conditions are relatively poor, with dependence on hunting and foraging as well as agriculture, no poaching of gibbons has been reported since 1993. On the contrary, the poaching of other species (wild boar *Sus scrofa*, sambar *Cervus unicolor* and Rhesus macaque *Macaca mulata*) is heavy. In 2001 a dam was built inside the Reserve and noise from this might have disturbed the gibbons; according to the local people, no gibbon vocalizations were heard during the 4 months of construction. Johns (1985) observed that

the singing behaviour of *Hylobates lar* was modified by disturbance from logging.

Our results demonstrate that the Hainan black-crested gibbon is threatened with extinction. In 1988 Liu *et al.* (1989) observed 21 individuals in four groups. Hainan became a new province of China in 1988, and from 1989 to 1993 the Reserve was not managed. Wang (1995) reported that only 10 Hainan black-crested gibbons in two groups were seen during this period. In 2000, 23 individuals were counted by Reserve staff but since this time the population has apparently decreased again and, according to our survey results, might now comprise only 12–19 individuals (considering the 10–12 sighted individuals and the fourth group that was not sighted, which may comprise 2–7 individuals). The gibbon population is limited to the western part of the core area of the Reserve, probably because of disturbance. West to Futouling Ridge canopy connectivity is good but the situation east and south-east of this ridge is unknown, and illegal logging and poaching probably occur because of the lack of regular patrols in this area. The suitable habitat for the gibbons could be <10 km². According to Liu *et al.* (1989), the four Hainan black-crested gibbon groups utilized *c.* 1,200 ha with some overlapping of territories. The carrying capacity of the part of the reserve in which there are regular patrols is probably limiting the growth of the population.

More research is needed in order to understand how intraspecific, environmental and anthropological factors are affecting this small population. Our plan is to extend the survey of the Hainan black-crested gibbon and in particular to determine the composition of the one group that was heard but not seen, and to carry out a survey of the eastern part of the Reserve to determine whether or not any gibbons survive there. In order to conserve the Hainan black-crested gibbon the Forestry Bureau of Hainan is applying to the Central Government for an enlargement of the area of the Reserve, and more staff to help prevent illegal poaching and logging.

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