

editor) that were used in daytime (1, 2, 3, 4), only one report for each species described the ground beds used for sleeping at night (1, 3). This report describes newly observed ground beds and discusses related factors.

Methods

We made bed censuses on 11 line transects covering 51,500 m in total in the Kalinzu Forest, Uganda (5). We found 2060 beds during preparatory censuses from August 4 to October 15, 1997, and 1392 beds during the main censuses, which were repeated 10 times between October 16, 1997 and March 12, 1998. A bed group was defined as a collection of beds of the same age class, where each is not more than 30 m apart from the next nearest one (6).

Results

The modal height of the beds found during the main censuses was 6 to 8 m, and the average height was 9.5 m (Fig. 1).

We found 3 bed groups, 2 in the preparatory censuses and the other in a main census, which included beds made on the ground. The first bed group consisted of 4 beds, and one of them was made on the ground using the bent branches of a tree (*Leptonychia mildbraedii*, 2.5-cm DBH). The second consisted of 7 beds, and 2 of them were made on the ground using the bent branches of a fallen tree (*Uvariopsis congensis*, 2-cm DBH) (Fig. 2). The third consisted of 7 beds, and one of them was made on the ground using the bent branches of a tree (*U. congensis*, 3.8-cm DBH). As with other bed groups that were confirmed to have been used at night, all of the beds in these 3 groups were made at short distances apart from one another, and were elaborately made using bent and broken branches.

When we followed chimpanzees, we sometimes found cushions made on the ground that were used for resting in daytime. They were all simple ones made of ferns (Fig. 3). Furthermore, when resting in the daytime, not many individuals made beds in the vicinity. Thus the ground beds described above seemed to be used for sleeping at night.

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Ground Beds of Chimpanzees in the Kalinzu Forest, Uganda

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Introduction

Although there have been some reports on the ground beds of chimpanzees and bonobos (=bilias,

Discussion

Authors who researched the ground beds of chimpanzees and bonobos described two types (1, 3). Simple ones made of leaves were assumed to be used for resting in daytime, and some of the more elaborate ones made of bent and broken branches were assumed to be used for sleeping at night. The current study also found the same two types. All of ground beds confirmed to be used in daytime were simple cushions made of ferns, and all of those made of branches were members of typical bed groups for sleeping at night.

On Mt. Nimba, Cote d'Ivoire, more than one-third of the beds were found on the ground (1). The authors conjectured that such a high proportion of ground beds was due to the lack of tall trees in that high-altitude area, to the heavy wind, and to the absence of large carnivores. In Kalinzu, however, there are many tall trees that could be used for making

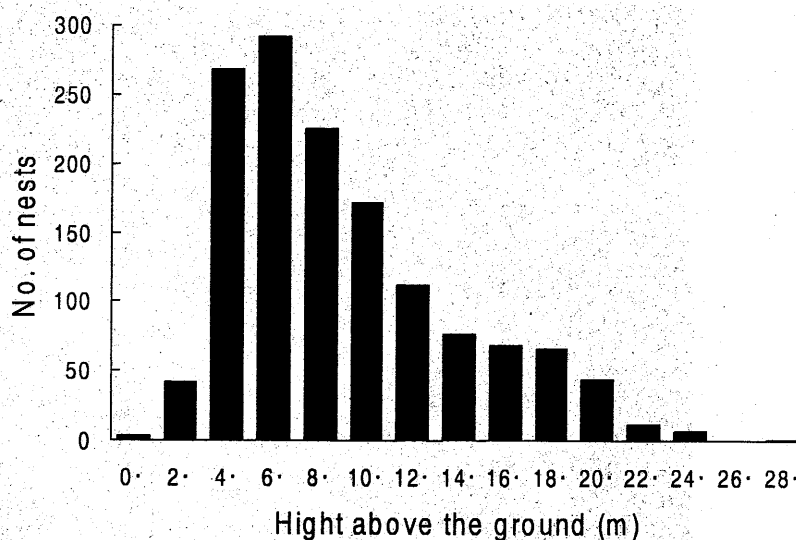


Figure 1. Height of beds found in the main censuses.

beds (6), but chimpanzees made many beds on the low trees. Of the 5 favorite tree species used for making beds (*Carapa grandiflora*, *Musanga leorrerae*, *Craterispermum laurinum*, *Drytpetes* spp, *Uvariopsis congensis*) (7), *Craterispermum* and *Uvariopsis* were lower-story trees. The average height of the beds in Kalinzu was at the lowest end of the range of average heights reported from many chimpanzee and bonobo sites (8).

A possible explanation for the low height of beds and the existence of ground beds in Kalinzu is the low density of large carnivores. Cases of predation on chimpanzees by lions or leopards were reported from several sites (9, 10, Furuichi, this volume), but those carnivores were not observed, and their footprints were only found twice during a census of more than 1,000 km taken in 1997. The average height of beds was the highest (23.2 m) in Tai Forest (8) where the most frequent predation by leopards was reported. Baldwin and others (11) have reported that chimpanzee beds were made at higher positions in savanna-woodland with more carnivores on Mt. Assirik than in the rain forest in Equatorial Guinea. Further studies on the bed height and existence of ground beds are expected to confirm the relationship between the bed-building behavior and risk of predation.



Figure 2. A ground bed made with bent branches.



Figure 3. A cushion used for resting in daytime.

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References

- (1) Matsuzawa T, Yamakoshi G 1994. Chimpanzees in Mt Nimba, Cote d'Ivoire: New finding of ground nests. *Primate Research* 10:131.
- (2) Hirata S, Myowa M, Matsuzawa T 1998. Use of leaves as cushions to sit on wet ground by wild chimpanzees. *Amer. J. Primatol.* 44:215-220.
- (3) Kano T 1983. An ecological study of the pygmy chimpanzees (*Pan paniscus*) of Yalosidi, Republic of Zaire. *Int. J. Primatol.* 4:1-31.
- (4) Horn AD 1980. Some observation on the ecology of the bonobo chimpanzee (*Pan paniscus*, schwarz 1929) near Lake Tumba, Zaire. *Folia Primatol.* 34:145-169.
- (5) Hashimoto C, Furuichi T, Tashiro Y, Kimura D 1999. Vegetation of the Kalinzu Forest, Uganda: ordination of forest types using principal component analysis. *African Study Monographs* 20:229-239.
- (6) Furuichi T, Hashimoto C, Tashiro Y (in press). Extended application of marked nest census method to examine seasonal changes in habitat use by chimpanzees. *Int. J. Primatol.*
- (7) Hashimoto C 1995. Population census of the chimpanzees in the Kalinzu Forest, Uganda: Comparison between methods with nest counts. *Primates* 36:477-488.
- (8) Fruth B, Hohmann G 1994. Comparative analyses of nest building behavior in bonobos and chimpanzees. In Wrangham, R.W., McGrew, W.C., deWaal, F.B.M., and Heltne, P.G. (eds.), *Chimpanzee Cultures*, Harvard Univ. Press, pp. 109-128.
- (9) Tsukahara T 1993. Lions eat chimpanzees: the first evidence of predation by lions on wild chimpanzees. *Amer. J. Primatol.* 29:1-11.
- (10) Boesch C 1991. The effects of leopard predation on grouping patterns in forest chimpanzees. *Behaviour* 117:220-242.
- (11) Baldwin PJ, Sabater Pi J, McGrew WC 1981. Comparisons of nests made by different populations of chimpanzees (*Pan troglodytes*). *Primates* 22:474-486.