

Habitat use of bonobos in Wamba, D.R.Congo: utilization of diverse vegetation including swampy and anthropogenic habitats

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Introduction

Animals utilize habitats in order to obtain resources required for their survival. “Habitat use” characterizes how animals use their habitats according to the animals’ resource requirements and the availability of those resources, and can be characterized by multiple resource selection processes. The understanding of habitat use is especially important for developing effective strategies to conserve endangered species. All African great apes are now endangered due to tropical forest habitat loss and hunting and most great ape populations are increasingly forced to inhabit anthropogenic habitats. Investigating habitat use by great apes in anthropogenic habitats could therefore assist the development of land use planning strategies for conservation of great apes and mitigate human-great ape conflict. Bonobos (*Pan paniscus*) have been relatively less studied compared to other great ape species and their distribution and population size are still unclear. Recent studies have indicated that bonobos may adopt a wider range of ecological habitats than previously considered, such as inundated habitats and open habitat such as forest-savannah mosaic. The aim of this study was to investigate habitat use of bonobos ranging in areas encompassing several forest types, including inundated areas and human-disturbed areas utilizing long-term data on behavioral observations at Wamba in the Luo Scientific Reserve, Democratic Republic of the Congo. Further investigating the habitat use of bonobos could contribute to a better understanding of their ecological niche and assist with for the development of effective conservation planning strategies.

Methods

Using satellite imagery, the study area was classified into three main forest types: 1) primary/old secondary forest, 2) young secondary forest/agricultural land and 3) swamp forest. First, vegetation surveys were conducted to collect data on species composition in the context of food resources for bonobos for trees, climbers and herbs in primary/old secondary forest and swamp forest. Second, the selection of the three forest types by a

bonobo group for ranging, feeding, and night-sleeping was examined by comparing the use of each forest type to its availability within the group's home range. Observational data were collected from tracking the group of bonobos over one year. The effect of fruit availability in primary/ old secondary forest on habitat use was also examined. Finally, I conducted a literature review of habitat availability and use by bonobos, chimpanzees (*Pan troglodytes*) and gorillas (*Gorilla beringei* and *G. gorilla*) whose habitat overlaps the chimpanzee range across several study sites in the Congo basin and summarized my findings on inundated habitat selection.

Results and Discussion

Plant species compositions of each of the three growth forms (trees, climbers and herbs) in primary/old secondary forest and swamp forest were classified into several types. Most of the representative species of each composition type were food species consumed by bonobos. Plant species compositions clearly differed between primary/old secondary forest and swamp forest, indicating that very different food resources were provided by the two forest types. In addition, some areas near villages that had small tree basal area provided specific food resources, including abundant herbs and fruit of specific climber species, possibly due to high frequency of human disturbance.

The bonobo group selectively used primary/old secondary forest for all three activities (ranging, feeding and sleeping). They also used young secondary forest/agricultural land and swamp forest, though less often than expected based on availability. However, the group selected swamp forest for all three activities during one month when their preferred fruit were generally abundant there, indicating that swamp forest can be a main habitat seasonally. The group fed in young secondary forest/agricultural land most often during two months when fruit in primary/old secondary forest were least abundant.

According to the literature review, inundated areas constituted the home ranges of many bonobo populations but most populations used it only on a supplemental basis, not only for feeding but also for nesting. Bonobos living in habitats dominated by inundated areas used these areas more often than bonobos living in habitats dominated by non-inundated areas. This phenomenon has also been observed in chimpanzee populations. Considerable intra- and inter-specific differences exist in the frequency of

inundated habitat use by sympatric chimpanzees and gorillas and most of these differences have been explained by food resource distribution as well as differences in intraspecific feeding strategies related to the fact that chimpanzees are more frugivorous than gorillas.

Conclusion

This study revealed that bonobos mostly use non-inundated mature forest as their main habitat but that they can utilize diverse habitats, including inundated areas and anthropogenic habitats, depending on their resource requirements. Inundated habitats may help sustain bonobo populations by providing them with specific foods and sleeping sites. Human modified open habitats with abundant herbs could also be an important feeding place when fruit are scarce. This study highlighted the importance of examining habitat use of great apes at a fine scale using behavioral data in order to identify habitats that are important for sustaining local populations and of promoting better linkages between behavior ecology and conservation science.