



ACTIVITY BUDGETS ON SOCIAL AND REPRODUCTIVE BEHAVIOUR OF OLIVE BABOONS (*PAPIO ANUBIS* F.) AT GASHAKA GUMTI NATIONAL PARK, NIGERIA

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ABSTRACT

*The study was conducted to investigate the activity budgets on social interactions and reproductive behaviour of olive baboon (*Papio anubis*) at Gashaka Gumti National Park (GGNP). A habituated baboon troop referred to as the Gashaka troop, consisting of 16 individuals: 4 adult females, 1 adult male, 1 sub-adult male, 3 juvenile females, 4 juvenile males and 3 infants was studied for a period of 12 months. Time fixed-point focal sampling method was adopted to determine the proportion of time the baboons allocated to various social and reproductive activities. The results obtained indicated the proportion of time baboons spent in various activities as follows: aggression (17.93%), infant handling (9.89%), grooming (33.08%), presentation of hindquarters (26.74%), mount and thrust (7.57%), mount no thrust (4.48%). Results of polyspecific association shows that the baboons spent 14.29% of the time in association with red flanked duikers, 14.29% with black-and-white colobus monkeys, 57.14% with tentalus monkeys and 14.29% with waterbucks. The percentage activity of the baboons when in polyspecific association indicate that 100.0% of the time was spent feeding when in association with red flanked duikers, waterbucks as well as black-and-white colobus monkeys. However, 50.0% of the time was spent feeding during association between baboons and tentalus monkeys. It is recommended that the GGNP Management should intensify effort toward protection of the Park as activities of poachers were frequently encountered during the study period.*

Keywords: Activity, baboon, behaviour, interactions, polyspecific.

INTRODUCTION

Baboons (genus *Papio*) are Old World monkeys of the family *Cercopithecidae* (cheek pouched monkeys) widely distributed across Africa and into the

Arabian Peninsula. Various morphotypes are typically distinguished including Hamadryas, Guinea, Yellow, Chacma, Kinda and Olive baboons (Zinner *et al.*, 2009). Except for Hamadryas, baboon taxa

have a social structure based on female philopatry and male emigration (Baboon Encarta, 2009).

Primates do not live as isolated individuals. All primates maintain networks of social relationships and most spend their lives in social groups. Primates are more gregarious than other mammals. A striking feature of primates compared to other taxa is their strong tendency to live in cohesive groups (Isbel and Young, 2002). Social life affects an individual primate's interactions with its environment and the environment, in turn, may shape the nature of primate social organization (Richard, 1998). Primates can be exceedingly flexible in their social behaviour, and much of this flexibility may be the result of local ecological and social conditions (Isbel and Young, 2002). There is stunning diversity of primate social systems (Janson, 2000; Strier, 2000a). Diversity in social systems is not only evident among species but also exists within species (Heymann, 2000) and even within

populations (Kappeler and van Schaick, 2002).

Climatic conditions can significantly affect the behaviour of animals and constrain their activity or geographic distribution (Majolo *et al.*, 2013). Climatic factors can constrain the activity budgets of an animal (Dunbar *et al.*, 2009). Seasonal differences in activity budgets across the months have been reported in many primate species and they can be a function of seasonal changes of climatic variables (Hill *et al.*, 2003, Sato, 2012, Majolo *et al.*, 2013). Olive baboons (*Papio anubis*) in Gilgal, Kenya, fed or foraged approximately 25% of the time if they had access to garbage and planted crops and almost 50% of the time without such access. The food-enriched Gilgal baboons spent almost twice as much time being passive (Forthman-Quick, 1986), slightly more time socializing, and slightly less time moving than did the unprovisioned animals. Aggression normally interferes with the baboons' activities (such as feeding), and

may also affect the baboons' activity patterns (Majolo *et al.*, 2013).

One of the most obvious features of baboon society is the agonistic interactions that regularly occur between individuals. While many less obvious features of baboon society are equally important, there is no doubt that the dominance relations that arise out of these agonistic interactions have a profound and pervasive influence on many aspects of baboon life (Kappeler and Watts, 2012). Between primate groups, aggression can be rare or it can be frequent. Within primate groups, interactions range from virtual non-interaction to hierarchical aggression, resulting in variation in social relationships within groups. In a strong dominance hierarchy or in female-bonded or nepotistic social relationships, agonistic interactions (particularly over food) are relatively common, and take the form of supplants at feeding sites, or aggression during feeding (Isbel and Young, 2002).

The dietary habits and the availability of food resources determine the degree of competition within a given niche (Tutin *et al.*, 1991). Primates are also known to form temporary associations with members of other species (Peres, 1993b). A polyspecific association is an association between two or more groups of social animals of different species. Such associations are widespread among sympatric non-human primates (Holenweg *et al.*, 1996). Polyspecific associations may be a chance encounter and thus simply a product of two species sharing a range (Waser, 1984) or they may be a result of two species being attracted to the same place at the same time by a common resource (Doncaster, 1990). A genuine polyspecific association is caused by attraction on the side of one or both species that may, for example, provide each other with services that minimize the predation risk or increase food availability (Waser, 1984).

One significant reason for polyspecific association is protection against predators (Noe, 1997). When animals are in a group, the predator can normally be more easily sighted from a distance because there are many eyes and ears. There is also the dilution effect, that is the individual chances of being victimized is decreased in favour of other members of the group. In addition, when there are multiple targets, the predator cannot easily concentrate on one target due to confusion effect (Adanu, 2002). Similarly, larger groups tend to hunt down a prey more easily than a solitary animal because individuals in a group combine their efforts. Also when insectivorous primates are in a group, they have chances of flushing out more insects due to the group's activities (Dunbar, 1988).

MATERIALS AND METHODS

The Study Area

This study was carried out in Gashaka Gumti National Park (GGNP), located between $6^{\circ}55^1 - 8^{\circ}05^1\text{N}$ and $11^{\circ}11^1 -$

$12^{\circ}13^1$ E in the North-Eastern Nigeria. GGNP was established in 1991 and is Nigeria's largest national park covering about 6600 km^2 (Dunn, 1998). From the edge of the Mambilla plateau in Taraba State, GGNP stretches northwards along the international border with Cameroon and on into Adamawa State (Oates *et al.*, 2004). The vegetation is a mosaic of Southern Guinea savannah woodland, open (montane) grassland, lowland forest, swamps and montane forest (Warren, 2003) and is home to a highly diverse number of small and large mammals, including nine primate species. Over 100 species of mammals, at least 480 species of birds, 35 species of fish and 300 species of butterfly are found in the park (Foster, 1998).

The park harbours extensive mountainous areas. Altitude ranges from 350m to over 2,400m above sea level (Dunn, 1993a). The rainy season begins in March or early April and ends in mid November. Rainfall ranges from 1200 mm in the north

to 3000 mm in the south of the park (Dunn, 1993a).

The study troop/group

A habituated baboon troop referred to as the Gamgam/Gashaka troop was studied. At the beginning of the study, there were 16 individuals in the troop comprising 4 adult females, 1 adult male, 1 sub-adult male, 3 juvenile females, 4 juvenile males and 3 infants.

Data Collection

Data on social activities of olive baboons were collected for twelve (12) months on twenty days per month. The time fixed-point focal sampling method as described by Paul and Patrick (1990) was adopted. Data collection was done in the morning between 06:00 and 12:00 hours and in the afternoon between 12:15 and 18:00 hours in alternate manner. The method involved following the focal animals and making observations on behavioural parameters. Social activities viz: aggression, grooming, infant handling, playing and

reproductive behaviours such as presentation of hindquarters, mount with thrust and mount but no thrust were observed and recorded using fifteen-minute focal sampling interval. The activity categories were mutually exclusive; a focal animal (subject) could not be engaged in two of the defined activities simultaneously. The proportion of time baboons spent in association with other wildlife species and the activities performed while in polyspecific association were recorded each time they occurred during the focal sampling.

Data Analysis

The identified social and reproductive behavioural activities viz: grooming, infant handling, playing, aggression, presentation of hindquarters, mount with thrust and mount but no thrust were analysed using descriptive statistics. SPSS version 20 statistical software was used for the analysis.

RESULTS

The results on social and reproductive activities of olive baboons are presented in Figure 1. The following proportion of time in percentages were recorded: aggression (17.93%), presentation of hindquarters (26.74%), mount and thrust (7.57%), mount but no thrust (4.48%), infant handling (9.89%) playing (0.31%) and grooming (33.08%). Results of polyspecific association (Figure 2) showed that olive baboons spent 14.29% of their time in association with red flanked duiker and 14.29% with waterbucks. 57.14% of the time was spent with tantalus monkeys and

14.29% with black-and-white colobus monkeys. Percentage activity of olive baboons when in polyspecific association (Table 1) showed that 100.0% of the time was spent in feeding/foraging when in association with red flanked duikers. Similarly, 100.0% of the time was spent in feeding/foraging when baboons and waterbucks as well as baboons and black and white colobus monkeys were in association. However, in association between baboons with tantalus monkey 50.0% of the time was spent on feeding while 50.0% was spent resting.

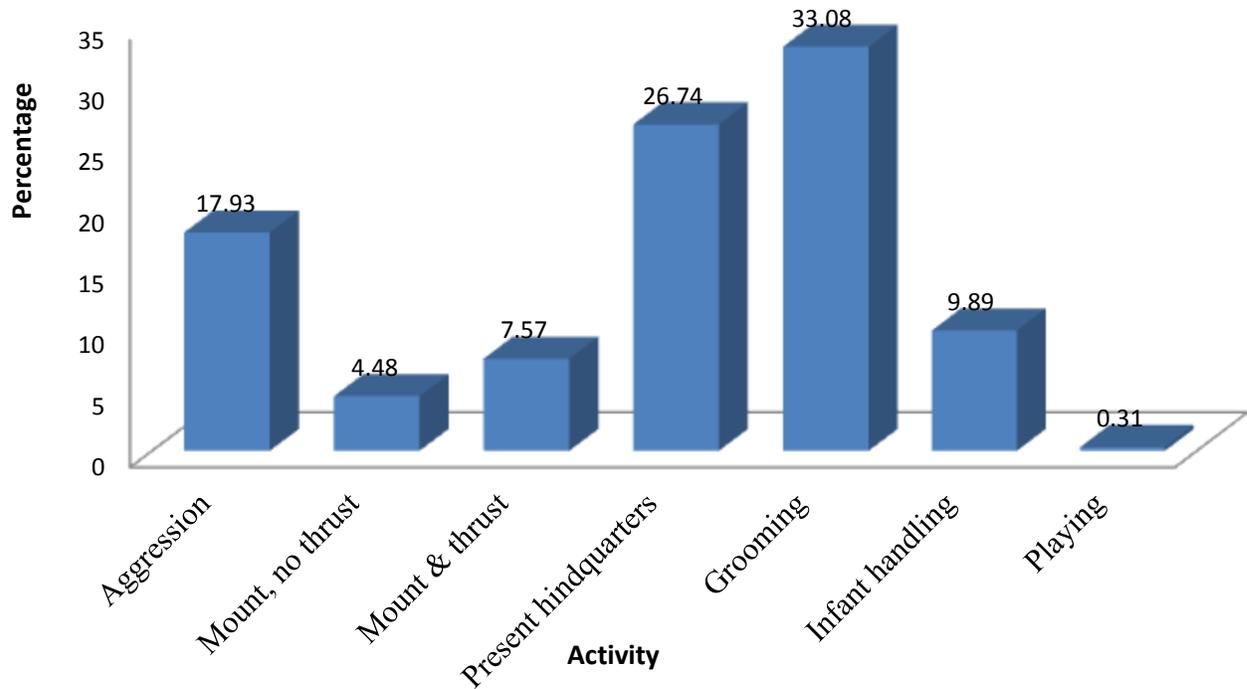


Figure 1: Percentage Social and Reproductive Activities of Olive Baboons (*Papio anubis*) in the Study Area.

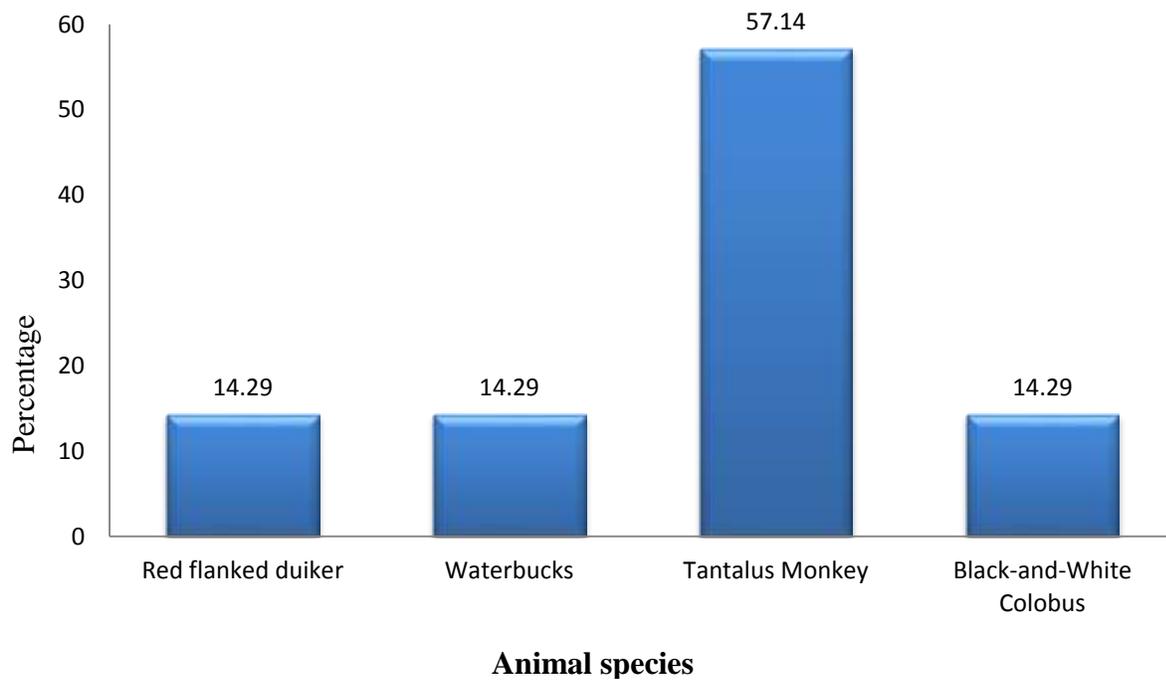


Figure 2: Percentage Sightings of Polyspecific Association of Olive Baboon (*Papio anubis*) in the Study Area.

Table 1: Percentage Activity of Olive Baboons When in Polyspecific Association

Association	Resting	Feeding	Social	Moving
Baboon – Red flanked duiker	0.0%	100.0%	0.0%	0.0%
Baboon – Waterbucks	0.0%	100.0%	0.0%	0.0%
Baboon – Tantalus monkey	50.0%	50.0%	0.0%	0.0%
Baboon - Black and white colobus monkey	0.0%	100.0%	0.0%	0.0%

DISCUSSION

The findings on social activities of olive baboon investigated indicated the following activities with the proportion of time spent on each: playing (0.31%), grooming (33.08%), infant handling (9.89%), presentation of hindquarters (26.74%), mount and thrust (7.57%), mount no thrust (4.48%) and aggression (17.93%). The activities with the highest percentage were grooming, followed by presentation of hindquarters, while playing and mount with no thrust have the lowest percentages.

The findings on polyspecific association showed that olive baboons spent 14.29% of its time in association with

red flanked duiker and 14.29% with waterbucks. In addition, 57.14% of the time was spent with tantalus monkeys and 14.29% with black-and-white colobus monkeys. Polyspecific association was observed mostly between olive baboons and tantalus monkeys (57.14%). On the other hand, the extent or frequency of polyspecific association of baboons with red flanked duikers, waterbucks and black-and-white colobus monkeys were the same (14.29%). This results agree with those of Peres (1993b) and Terborgh (1983) who reported that primates form temporary associations with members of other species. Similarly, Hohenweg *et al.* (1996) reported that association between two or

more groups of social animals of different species are widespread among sympatric non-human primates. In addition, the activities the baboons engage in during polyspecific association was mainly feeding. This is in agreement with Doncaster (1990) who reported that polyspecific association may be a result of two species being attracted to the same place at the same time by a common resource and that polyspecific associations may be a chance encounter or simply a product of two species sharing a range, or they may be a result of two species being attracted to the same place at the same time by a common resource. However, a genuine polyspecific association is caused by attraction on the side of one or both species that may, for example provide each other with services that minimizes the predation risk (Noe, 1997) or increase food availability. When animals live in a group, the predator can normally be more easily sighted from a distance because there are

many eyes and ears watching out (Adanu, 2002; Busse, 1997). Also, when insectivorous primates are in a group, they have chances of flashing out more insects due to the group's activities. The association of baboons with other animal species at GGNP may probably be to enhance foraging efficiency or for defense (i.e. to reduce predation risks). Defence may likely be the reason, considering the fact that the Gashaka baboons are not truly secure from human predators.

Furthermore, the percentage activity of olive baboons when in polyspecific association showed that 100.0% of the time was spent on feeding/foraging when baboons and red flanked duikers were in association. Similarly, 100.0% of the time was spent on feeding/foraging when baboons and waterbucks were in association as well as when they were with black-and-white colobus monkeys. However, in the association between baboons with tantalus

monkeys 50.0% of the time was spent in feeding while 50.0% was spent resting. The result suggests that foraging efficiency is higher when primates are in association, hence less time is spent feeding. It also suggest that the association between the baboons and the antelopes could be for defence, since the antelopes have a good sight perception and could easily sight predators as they approach. Overall, polyspecific association as observed in this study contributes sufficiently to the survival of olive baboons in the study area.

CONCLUSION

The findings on social activities of baboons showed that greater proportion of time was spent grooming and presentation of hindquarters, while the least was allocated for playing and mount with no thrust.

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Baboons in the study area were also found to associate with members of other species. The greatest proportion of time spent by the baboons was with tantalus monkeys. Feeding was the main activity the baboons engaged in when in polyspecific association.

ACKNOWLEDGEMENTS

I would like to express my great appreciation to the Nigeria National Park Service, Abuja for granting me permission to undertake the research at Gashaka Gumti National Park (GGNP. I would particularly like to recognize the contributions of Maikanti Hassan and Ibrahim Usman during data collection on the field. My sincere thanks are due to Prof. Volker Sommer for his help in providing me with accommodation at the field station.

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