

BEHAVIOURAL PATTERNS OF A TROOP OF OLIVE BABOONS (*Papio anubis*) FORAGING ON MAIZE CROPS AT THE BORDERS OF GASHAKA GUMTI NATIONAL PARK NIGERIA

Ikpa[‡], T.F., Amonum[†], J.I., and Agera[†], S.I.N.

[‡]Department of Wildlife and Range Management, University of Agriculture, P.M.B. 2373 Post Code 970001 Makurdi, Nigeria. E-mail: terwasefsi@yahoo.com. [†]Department of Forest Production and Products, University of Agriculture P.M.B. 2373 Makurdi Nigeria.

ABSTRACT

*Olive baboons forage viciously on agricultural crops causing huge losses of farm produce to farmers. In this study, behavioural pattern of a troop of crop raiding olive baboons, *Papio anubis* which dwell at the periphery of Gashaka Gumti National Park and forage on crops were studied as they raided maize farms. Successful raids were significantly higher than unsuccessful raids ($t = 4.54$, $df = 3$, $P = 0.02$), and increased from early morning hours to peak between 1200-1500hours. The same behavioural activities of the troop differed significantly while raiding maize crops from when not raiding the crops ($\chi^2 = 17.66$, $df = 5$, $P = 0.003$). The adult male olive baboon was the most successful member of the troop that raided maize crops, while the infant baboon was the least successful member of the raiding party. Farmers guarded their farms, and yelled at the baboons, threw stones and chased the baboons as they attempted to raid maize crops, but 73.74 ± 7.43 % of attempted raids were successful indicating that farmers could not prevent the olive baboons from raiding their crops. It was suggested that in order to prevent these raids, farmers should coordinate their activities while guarding farms by constantly moving in groups and communicating with nearby groups, informing them in advance of the direction in which the raiding party is heading; also farms should not be cultivated close to wildlife refuge in the park.*

KEYWORDS: Olive Baboons, Troop, Raids, Maize Crops.

INTRODUCTION

Crop raids by wild primates are common problems that have been experienced by farmers in Africa (Saj *et al.*, 2001, Warren 2009). Many species of wild vertebrates have been documented as crop raiders but the act has been elevated to perfection by species of the primate class (Ikpa *et al.*, 2009). At the Gashaka Gumti National Park, the olive baboons *Papio anubis* particularly the Gangam troop which lives at the periphery of the park has been raiding crops at the edges of the park (Hingam *et al.*, 2009). More than 88% of farmers interviewed in a previous study implicated the

baboons and the tantalus monkeys as the most destructive animals that destroyed farm produce through farm raids, while an independent assessment of the farm raiding capabilities of different wildlife species also corroborated the local farmer's opinion (Ikpa *et al.*, 2009). The sheer scale of successful farm raids embarked upon by the baboons in particular has stalled good harvest and compelled many farmers to waste many useful man hours and energies trying to guard and ward off farm raids to save their crops (Warren 2009). If such time and energy had been channelled to useful productive agriculture; more

food and income would have accrued to the farmers. The incessant farm raids by the baboons have also exposed them as a prime target for elimination, since most farmers' advocated solution to preventing raids was to target and kill the raiding animals (Ikpa *et al.*, 2009).

Baboons are omnivorous feeders, feeding indiscriminately on a wide variety of food items. They have perfected the act of raiding crops to an art because the strategy enables them to feed and obtain sufficient nutrients and energy for their daily activities (Naughton-Treves *et al.*, 1998). Therefore, they have evolved adaptive behaviours that enable them to raid crops efficiently and accomplish this goal (Forthman-Quick and Demment 1988; Hill and Dunbar 1988). If the behaviour of crop raiding wildlife can be predicted, then better control measure to limit the devastating consequences of raids of agricultural crops or farms can be adopted by farmers in order to reduce the loss of farm produce suffered by farmers as a result of these raids. Most farmers at Gashaka Gumti National Park plant maize as a staple crop. Coincidentally, most raids are also target at the maize crops. The aim of the present study was to document the behaviour patterns of the baboons as they raided maize farms so that the information gathered could be used in extension education to farmers to enable them develop local solutions to reducing crop raids in order to reduce produce losses.

MATERIALS AND METHODS

Study Site: the study site was Gashaka village community in the south western edge of Gashaka Gumti National Park. According to the information provided by the Gashaka Gumti National Park Information Service, the park lies in the sub-tropical climatic zone between latitude 6°

55' and 8° 05' North and longitude 11° 11' and 12° 13' East in the south eastern highlands of the savannah belt of Nigeria, south of the River Benue.

Data Collection: the Gamgam troop of crop raiding olive baboons (*Papio anubis*) with mean size 6 ± 4 were followed 6 hours each day for three days per week for 8 weeks during the wet season from July to August 2006 by 5 observers. Two observers each carried a binocular, a stopwatch, a 135mm camera and a population data sheet. Scan sampling (Altmann 1974) was used to observe and record behavioural patterns of the troop at 3 minutes interval. The total time used to scan the troop was 4320 minutes including time not used to raid maize farms. Counts of observed behavioural patterns were recorded or tallied in the data sheet against a check list of selected behavioural characteristics that were previously published (Hamilton and Bulger 1992; Gottfried *et al.*, 2006). When feeding on crops other than maize, behavioural characteristics were also log but in a separate section of the data collection hand book. Specific attention was paid to maize because it was the most common crop cultivated in the area, and the crop was blossoming in the field at the time of study. Besides, losses of maize crop as a result of crop raiding had previously been reported in the area (Warren *et al.*, 2007, Ikpa *et al.*, 2009). The definition of specific characteristics observed were: (i). Precautions taken before or during raids on crops such as climbing higher elevations to scan the farm, increased attention to strange sounds or eye search to detect the presence of humans, raised or bipedal stance (vigilance). (ii). Fighting, competing for/snatching food, making open threats such as flashing of eyelids or yawning to show off teeth (aggression). (iii). Barking/noise making. (iv). Hurried foraging on crops or crop

parts. (v). Hiding stolen food in the cheek pouch (use of cheek pouch). (vi). Removal of food remnants from the fur or body (grooming). A raid was scored as successful if at least one member of the raiding party was sighted to have eaten or made away with a portion of the maize crop even if the party was later driven away by farm guards. When the baboons terminated attempts to raid the crops on their own or were chased away before performing a successful raid, the attempt was scored as unsuccessful. Farmers/guards reactions to deter the raids were also observed and recorded. Data collection in the field always began from 0600 to 1200 hours or from 1200 to 1800 hours on alternate days.

DATA ANALYSIS

Data were entered as raw counts for behavioural attributes into Microsoft Excel 2007, the student's t-test, and chi-square analysis were then performed. The level of significance was defined as $P < 0.05$

RESULT

The results indicated that whenever a raid was initiated, it had at least 63.64 % chance of being successful rather than being thwarted either by self

termination or being chased away by farmers. The mean percentage of successful raids was 73.74 ± 7.43 % (Table 1). Successful raids increased from the early morning hours and peaked between 1200-1500 hours. The number of successful raids were significantly higher than unsuccessful raids ($t = 4.54$, $df = 4$, $P = 0.02$, Table 1). Behavioural attributes observed among the troop of olive baboons while raiding maize crops and when not raiding crops were equally significantly different ($X^2 = 17.66$, $df = 5$, $P = 0.003$, Table 2). Vigilance, aggression, hurried foraging on crops, hiding food in the cheek pouch, and body grooming among the troop were the most observed attitudes while stealing crops compared to when the troop was outside the maize farms. In contrast, barking was minimized, while raiding crops than when the troop was not raiding crops. The most active members of the troop that raided crops were the adult males; this activity decreased among adult females, juvenile, and the infants (Figure 1). Although maize farms were often guarded, this did not deter the olive baboons from successfully executing raids even in the presence of farmers who yelled, threw stones and attempted to chase the raiding party (Table 3).

Table 1. Counts and Percentage (%) of Raids on Fresh Maize Crops by Olive Baboons

Raids	0600-0900hrs	0900-1200hrs	1200-1500hr	1500-1800 hrs
Successful	4 (80.00)	7 (63.64)	11 (78.57)	8 (72.73)
Unsuccessful	1 (20.00)	4 (36.36)	3 (21.43)	3 (27.27)

$t = 4.54$, $df = 3$, $P = 0.02$

Table 2. Comparative Counts and Percentage (%) of Activity Performed when Raiding Maize Farms and when not Raiding Crops

Activity	raiding maize (%)	not raiding crops (%)	Total (%)
Vigilance	15 (71.43)	6 (28.57)	21 (100.00)
Aggression	34 (61.82)	21 (38.18)	55 (100.00)
Barking/noise	9 (25.71)	26 (74.29)	25 (100.00)
Hurried foraging on crops	16 (55.17)	13 (44.83)	29 (100.00)
Hiding food in the cheek pouch	13 (72.22)	5 (27.78)	18 (100.00)
Grooming	36 (52.94)	32 (47.06)	68 (100.00)

$$\chi^2 = 17.66, df = 5, P = 0.003$$

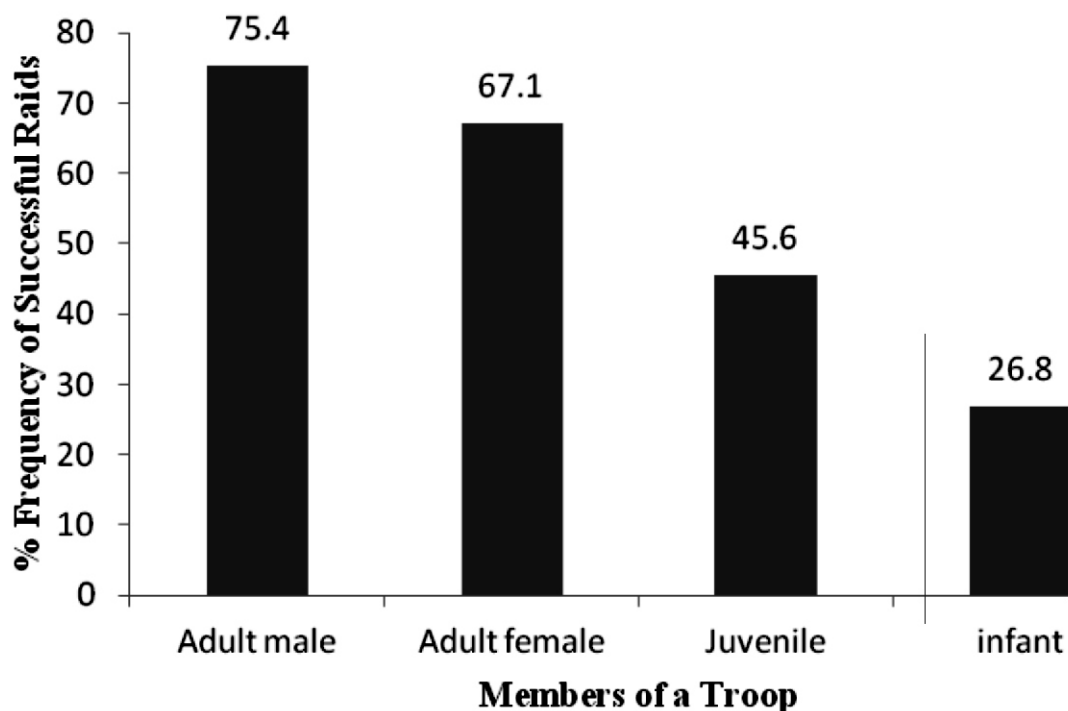
**Figure . Percentage Frequency of Successful Raids by Individual Members of a Raiding Party**

Table 3. Farmers Reaction to Olive Baboon Raids on Maize Crops

Reaction	number of observations	Percentage (%)
Yelling at the baboons	36	40.00
Throwing stones at the baboons	40	44.45
Chasing the baboons	12	13.33
Doing nothing	2	2.22

DISCUSSION

The olive baboons have been identified as very vicious crop raiders that raid a wide variety of crops which they use as food supplement for their diets, and maize has been identified as one of these essential supplements (Naughton-Treves *et al.*, 1998). At the Gashaka Gumti National Park, maize appears to be the most important crop that is cultivated and consumed by almost all the inhabitants of Gashaka village (Warren *et al.*, 2007, Ikpa *et al.*, 2009). It therefore means that the destruction of maize by olive baboons would be of utmost concern to the local inhabitants as less maize grain would translate to less food on their tables. Just like their human primate counterparts, the Gashaka olive baboons (Gamgam troop) which lives at the fringe areas of the park and interact with farms that are close to the wildlife refuge of the park have a penchant for raiding maize among other crops for their diet (Hingam *et al.*, 2009). These raids increased gradually from the early morning hours, peaking in the afternoon between 1200-1500 hours which may coincide with the time some of the farmers/guards became tired of working and guarding the farms and needed to rest (Table 1). The high percentage of successful raids indicated that farmers were

helpless in preventing the olive baboons from raiding their maize crops.

The behavioural patterns exhibited by the troop in the course of these raids enable them to achieve higher levels of successful raids (Table 1) even when the farms were guarded by farmers. For instance while attempting raids, the troop increased vigilance and decreased barking as opposed to when it was not involved in raids (Table 2). This may be adaptive behavioural patterns which the troop has evolved to be able to evade detection by farmers that guard their crops, in order to raid the crops unnoticed. Two particular contradictions were the incessant grooming and aggression noticed within the troop even when they embarked on raids, since such activities could easily give the position of the raiding party away. However, for infighting, this could be explained as an evolutionary adaptation that shapes the survival of the fittest among members of the troop. Male members have to fight always for the female sex in order to mate and reproduce. In addition, food has to be competed for among troop members and many other wildlife species in the wild. The within troop aggression recorded in this study has also been reported as common attribute of the olive

baboons (Cawthon-Lang 2006).

The observation that the male adult members of the troop were the most successful raiders also confirms the dominance attribute of the male adults within the social structure of the olive baboon's hierarchy. At the lower end lie the infant which was mostly dependent and catered for by the adult female (Figure 1). The Gamgam troop size was small as observed by Warren *et al.*, (2007), and Hingam *et al.*, (2009); however the mean troop size of 6 ± 4 members sighted during raids suggests an adaptive style of the olive baboons. It could be that they divide themselves into smaller units that would easily hide and steal crops unnoticed.

The inability of farmers/guards to prevent raids by these primates was aptly demonstrated by their frustration which were manifested by yelling, throwing stones, and attempting to chase the baboons (Table 3), which did not deter the animals, but sometimes provoked retorted barking at the farmers/guards. On two curious occasions, guards watched the baboons plucked maize cobs without reactions, suggesting that they might have baited the animals. This is not unlikely because some farmers had previously advocated the killing of animals that raided their crops as a solution to curbing raids on their farms (Ikpa *et al.*, 2009). Such an approach may be at variance with the interest of wildlife conservation. On the other hand, continuous raids of maize crops would reduce farm produce and may have adverse serious repercussions on food availability among the local farmers, a situation that might even aggravate to famine. For the farmers to properly curb successful raids by the olive baboons, the approach suggested by Warren *et al.*, (2007) may be useful. This model approach suggests that

farmers or guards should not stay in one place to protect their farms as they currently do but should form different mobile groups which should be moving to inspect farms, and be into constant communication with one another, informing other groups in advance of the direction in which the raiding party is heading so that the other group would be ready to frustrate the baboons from raiding crops in their direction. This may not completely solve the problem of crop raids in the future but it would greatly reduce the chances of the wild primates repeatedly raiding and destroying maize farms at will.

Furthermore, if maize and other crops are cultivated far away from wildlife refuge at the Gashaka Gumti National Park, it would also contribute a great deal in reducing crop losses due to wildlife raids on these crops, and ensure better harvest for the farmers.

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