
WILDLIFE RAIDS ON AGRICULTURAL CROPS: ORDERS OF SPECIES AND FARMERS PERSPECTIVES AT GASHAKA GUMTI NATIONAL PARK NIGERIA

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ABSTRACT

This study investigated the orders of class mammalia and class aves among the species of wildlife that destroyed agricultural crops, at the Gashaka Gumti National Park, and farmer's perception concerning the raids. Order: primates (12.5%), rodentia (18.75%), artiodactyla (50.0%), pholidota (6.25%), and lagomorpha (6.25%) were the major mammalian orders. Order galliformes (6.25%) was the only avian order identified. Farmers perception of the most destructive wildlife species correlated significantly with an independent assessment $r = +0.84$, $df = 5$, $P < 0.05$. Most raids were carried out in the morning and evening however the observed period of raids on crops among farmers differed significantly, $\chi^2 = 23.74$, $df = 6$, $P < 0.05$. 68.42% - 84.21% of farmers guarded their farms as the most common strategy to ward off raids by wild animals, while 84.21% - 94.74% of farmers advocated killing the animals as a control strategy to curb wildlife raids. This indicates that without adequate preventive measures in place, local farmers would extirpate the population of wildlife species that frequently raid grains, tuber and other crops at Gashaka Gumti National Park.

Keywords: primates, rodentia, artiodactyla, pholidota, lagomorpha, galliformes

INTRODUCTION

Frequent reports of wildlife raids and destruction of agricultural crops in farms around national parks, and other protected areas have become common (Gillingham and Lee 2003; Chiyo *et al.*, 2005). Wildlife conservation and land cultivation for food production are each important to humans. Conservation preserves extant floral and faunal species from extinction, maintains exuberant biodiversity for sustainable productivity in the ecosystem for the benefit of both animals and humans. Similarly, land cultivation for the production of agricultural crops also provides food for the survival of both animals and humans. However the establishment of protected areas for conservation in local communities comes with a cost born by the local farmers and

wildlife (Ferraro 2002; Pienaar and Kerapeleswe 2005). This is so because wildlife species could invade and destroy large acreage of farms or crops, leading to heavy losses of farm produce by the farmers. At the same time the invading species could be hunted and killed, by the local farmers thus defeating the very essence of conservation. If the invading wildlife species are identified and their activities understood (Sitati *et al.*, 2003), better control measures by park managers and farmers could be put in place to reduce the harm, or losses that both wildlife and farmers are likely to suffer.

The aims of the present study was to identify the major orders of wildlife species that destroyed crops at Gashaka Gumti National Park, to determine local farmer's perception about these raids, and the

strategies they employ to curb them; with a view to proffering solutions that would further mitigate the cost born by farmers and wildlife.

MATERIALS AND METHODS

Site: survey was conducted in the Gashaka Gumti National Park. 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 (Gashaka Gumti National Park Service). Data was collected from three farming communities, at three different ranges of the park, namely Mayo-Selbe, Gashaka, and Filinga.

Data Collection: data was obtained by means of a questionnaire survey (Gillingham and Lee 2003). Briefly, questionnaires were administered to volunteered farmers on the field and their responses recorded. Independent records of frequency of physical sightings of animals' raids on farms, and barns, or signs left behind after crops were raided such as droppings and foot prints were also gathered with the help of experienced Park rangers. Animals were identified and grouped into orders based on previous publications (Delacour 1977, Parker 1990, Nowak 1991, Myers 2008). 19 farmers each from Mayo-Selbe, Gashaka, and Filinga ranges of the park respectively participated in the study which lasted from January to April 2006.

DATA ANALYSIS

Data analysis was performed with the help of statistical tests available in Microsoft Office Excel 2007. Pearson correlation coefficient was used to correlate responses on farmer's perception of most destructive wildlife

species, and an independent assessment of raiding species around the park. Chi-square was applied for the analysis of categorized frequencies (Singha 1992). The level of significance was set at $P=0.05$.

RESULTS

Animals from two classes of wildlife; class mammalia, and class aves were the dominant species that raided agricultural crops in the park. Among the mammalian species identified were animals from 5 orders. These were the order primates, represented by baboons, *Papio* spp and tantalus monkey, *Ceropithecus tantalus*, these were rated by the local farmers as the greatest raiders of agricultural crops. The order rodentia had animals such as the stripped ground squirrel, *Xerus erythropus*, the giant cane rat *Thryonomys swinderianus*, and the porcupine *Hyrix cristata*. Order artiodactyla, the even toed ungulates was represented by eight different species of animals. These included the bushbuck, *Tragelaphus scriptus*, warthogs *Phacocoerus africanus*, the red flanked duiker, *Cephalophus rufilatus*, the waterbuck *Kobus deffasa*, red river hog, *Potamochoerus porcus*, kobs, *Kobus kob*, the hippopotamus, *Hippopotamus amphibious*, and the roan antelope *Hippotragus equines*.

Two other mammalian orders were represented by one animal each; these were order pholidota which had pangolin, *Manis gigantea*, and order lagomorpha which was represented by the rabbit *Lepus* spp. Guinea fowl, *Numida meliagriss*, the dominant avian species was a representative of the order, galliformes (figure 1).

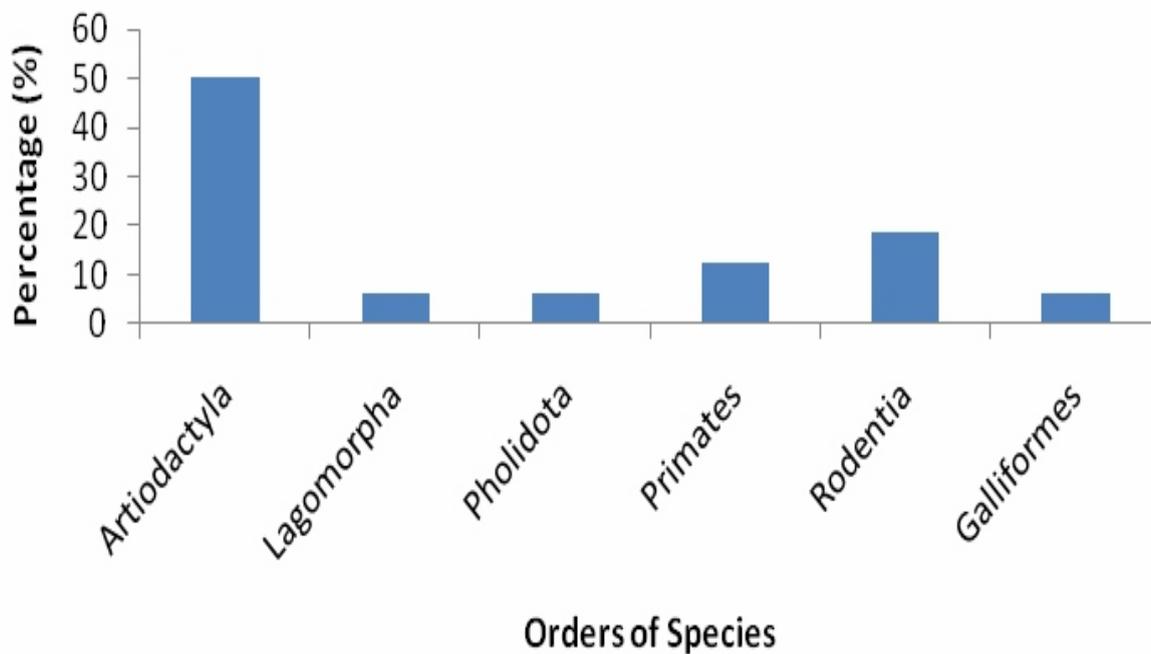


Figure 1. Percentage (%) Composition of Orders of Class Mammalia and Class Aves among Wildlife Species that Raid Agricultural Crops at Gashaka Gumti National Park.

The major agricultural crops destroyed were grains, especially corn, rice, and guinea corn. Tuber crops were cassava, yam, and sweet potato. Ground nuts seeds were also destroyed on a large scale. Other crops such as wheat, banana, okra, beniseed, beans, soya beans, and sugar cane were equally raided but on a relatively small scale.

The single most destructive wildlife species

of agricultural crops, based on the perception by local farmers, and data obtained by an independent assessment calculated on the basis of percentage frequency of sighting of the individual wildlife species raids on agricultural crops was identified as the baboon. Data obtained and correlated from the two sources showed a significant positive correlation $r = +0.84, df = 5, P < 0.05$ (table 1).

Table 1. **Correlation of Farmers and Independent Assessment of Wildlife Species that Cause Most Destruction to Crops at Gashaka Gumti National Park.**

Wildlife crops pests	relative degree of crops destruction (%)	
	farmers	independent assessment
Baboon (<i>Papio spp</i>)	47.83	24.17
Tantulus monkey (<i>Ceropithecus tantalus</i>)	32.61	22.08
Warthogs (<i>Pharcocoerus africanus</i>)	8.70	3.75
Squirrel (<i>Xerus erythropus</i>)	2.17	15.84
Hippopotamus (<i>Hippopotamus ampibius</i>)	1.11	0.42
Duiker (<i>Cephalophus rufilatus</i>)	3.26	3.33
Guinea fowl (<i>Numida meliagris</i>)	4.35	5.42

$$r = + 0.84, df = 5, P < 0.05$$

Most farmers in Gashaka and Filinga ranges reported the morning and evening periods as the preferred periods of wildlife raids on agricultural crops. However in the Mayo-Selbe range area, more farmers were of the opinion that wildlife species preferred to

raid crops during the afternoon and night periods (table 2). Farmers perspectives on the preferred period of raids, among the three range areas was significantly different $\chi^2 = 23.74, df=6, P<0.05$.

Table 2. Farmers Perception of Preferred Period of Wildlife Raids on Agricultural Crops at Gashaka Gumti National Park.

Period of raid	Mayo-Selbe (n = 19)	Gashaka (n = 19)	Filinga (n = 19)
Morning	6 (31.58) %	17 (89.47) %	19 (100.00) %
Afternoon	17 (89.47) %	5 (26.32) %	6 (31.58) %
Evening	9 (47.37) %	18 (94.74) %	19 (100.00) %
Night	13 (68.42) %	5 (26.32) %	11 (57.89) %

$\chi^2 = 23.74, df=6, P<0.05$.

In order to protect and secure their crops from frequent raids by wildlife species, most farmers decided to devote time to physically guard their crops. The use of artificial guards

was also employed, but was not as common as the use of human guards, while some few farmers abandoned their farms to the mercy of the animals (figure 2).

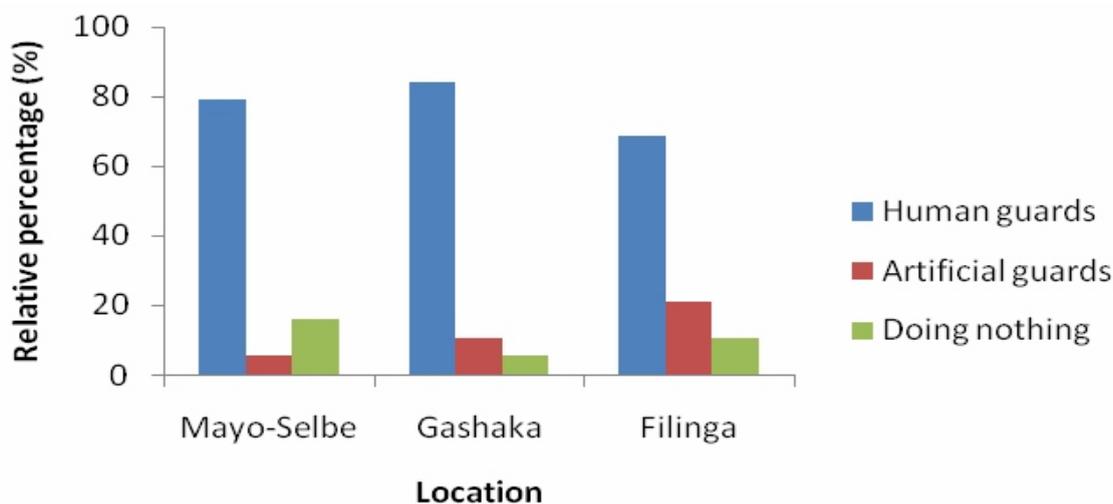


Figure 2. Common Strategies Adopted by Farmers for the Control of Wildlife Raids on Crops at Gashaka Gumti National Park.

Although killing the animals was not mentioned by farmers as a strategy they employed to control wildlife raids on crops, between 84.21% and 94.74% of farmers surveyed among the three range areas of the park suggested that killing the animals was a

better option to curb their frequent raids on agricultural crops. While 5.26% - 15.79% preferred fencing the park, to contain the animals, and prevent them from gaining access to crops on the farms (figure 3).

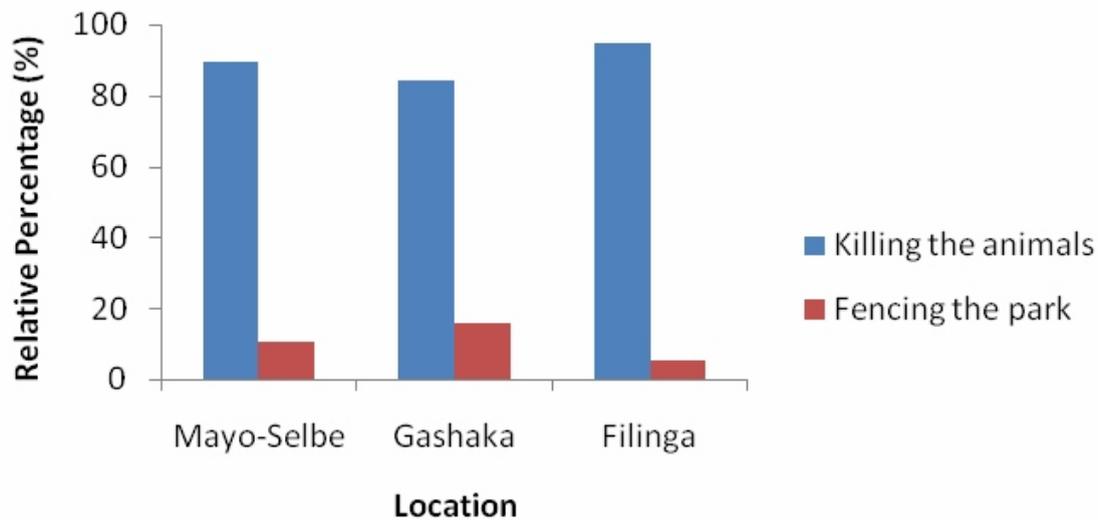


Figure 3. Farmers Suggested Strategies for Controlling Wildlife Raids on Crops at Gashaka Gumti National Park.

DISCUSSION

The present results show that five orders of wildlife species from class mammalia and one order from class aves were responsible for conducting raids on agricultural crops at the Gashaka Gumti National Park. The most diverse species of wildlife implicated in crops raids at the park were derived from the order artiodactyla, making 50.00% of the total number of species that were implicated in the crops raids. The artiodactyls are a large group of even toed ungulates (hoofed mammals) that are mostly herbivores. Many mammals that feed on fruits, seeds, and other types of vegetation are agricultural pests (Wund and Myers 2005). Given their nature, the involvement of these artiodactyls in eating up agricultural crops could be explained on the basis of probable loss or foliage, their natural food requirements which usually dry up in the Gashaka Gumti National Parks; a savannah habit in a period that coincides with the harvest of agricultural crops. Also the wandering of large members of animals from this particular order in apparent search for food could result in the trampling and destruction of farm crops on a large scale,

even if the crops were not physically eaten by such animals.

The order rodentia had three species or 18.75% of 16 wildlife species that were fingered in crops raids at the park. Animals from this order destroyed grains, groundnuts seeds, and cassava tubers, based on the specific requirements of the wildlife species involved. The order pholidota, and lagomorpha each had only one identified species constituting 6.25% each of the total number of wildlife species that were known by farmers to destroy their crops. The identification of the pangolin a pholidota which is an anteater, in crops raids by the local farmers is particularly intriguing because the pangolin is insectivorous (Myers *et al.*, 2008). Thus it might be a case of mistaken identity as local farmers might mistakenly observe the act of picking insects on crops, as feeding on those crops. On the other hand, if the pangolins indeed fed on crops, it would serve to strengthen the idea that natural food depletion available for specific animal species might drive wildlife raids on agricultural crops.

The raids by order, lagomorpha were not as

damaging as those reported by other mammalian orders such as primates, artiodactyla, and rodentia. Based on responses from the local farmers, the order primates made up of 12.50% of wildlife species that raided crops at the park, included animals such as the baboon and tantalus monkey. These animals constituted the greatest threat to agricultural crops in the park particularly the baboon. The primates notably raided and destroyed high energy yielding crops such as corn, yam, and cassava. Fruits such as banana and okra were also destroyed by these animals. The identification of the primates animals as causing major harm to agricultural crops was collaborated by most farmers interviewed in the three range areas of the park that were surveyed. Most farmers fingered the baboon as the most destructive animal, followed by the tantalus monkey (table 1). An independent assessment also reached a similar conclusion with a significant correlation on the levels of different species involvement in crops raid at the park thus further agreeing with the farmers' observations. The baboon has been known to be an opportunistic feeder that eats almost any thing it can lay its hands on (Wund and Myers 2005; Myers *et al.*, 2008). Thus, its qualification as the most destructive wildlife by farmers at Gashaka Gumti National Park implies that it was only living up to its established reputation. However, by such qualification, the baboon and the tantalus monkey may become prime targets for extirpation by poachers who may target to eliminate them not only as sources of meat, but because of their adverse cost to the local farmers (Pienaar and Kerapeleswe 2005).

The order galliformes also had only one avian species-guinea fowl identified by the local farmers as being culpable of crops

destruction. These birds particularly invaded and destroyed grains, and seeds.

The period of raids on crops by different species of wildlife according to farmers differed significantly among the three surveyed range areas of the park. From morning to night, different species reportedly raided crops probably as a result of activity variations among species; however, the morning and evening periods were the peak periods that crops were mostly raided. Thus any control measures to deter the raids that aim to be period specific would be better applied during the morning and evening periods for most effective results.

One of the most important control strategies that the local farmers employed to deter the wildlife raids involved physical human guarding of the farms by the farmers and their wards. This strategy although effective in scaring the invading animals was nonetheless time consuming as it effectively tied the farmers and their wards to the field from morning to evening. Since the period of raids was not uniform, and varied significantly among the surveyed range areas, such durable commitment to guarding farm or crops in the fields effectively prevented the farmers from engaging in other viable farming and economic activities that would have improved the farmer's income, and benefited the family as a whole. The use of artificial guards (Gilsdorf *et al.*, 2002), such as deployment of effigies to guard the farm was not a popular option as personal guarding of farms, while some farmers completely left their farms unguarded. Farms that were not guarded by human or artificial methods such as the use of effigies accordingly reported heavier losses of farm produce compared to those that employed at least one control strategy to deter raids by wildlife (data not included).

One finding of interest was the observation that although none of the farmer identified killing the animals as a control strategy that was being practised on the farms to deter wildlife raids, between 84.21% - 94.74% of the farmers on the three range areas suggested killing the animals as an effective strategy to deter wildlife raids on their crops. This implies that there was an inherent inclination among the local farmers to extirpate the animals, thus given the opportunity without proper surveillance and protection from the park managers, most of the animals would be poached by the local farmers as they would not be deterred by ensuing penalties (Pienaar and Kerapeleswe 2005). Thus there is need on the part of the park managers to increase surveillance activities in the park to deter poaching of these animals.

The present study was not an attempt at detail classification of the wildlife species in the park. Rather, it was an attempt to identify major groups of animals in the park that raided crops so that common control measures which could be applicable for the control of major groups of specific animals can be applied to reduce the produce losses incurred by the farmers. Otherwise, such losses have the potential to increase poverty among the local farmers, as well as famine. The local situation at Gashaka Gumti National Park was compounded because farming activities took place within the park. Since the available land is very vast, farm land could be delineated very far away from the park. The appropriate distance could be determined by experimentation to arrive at mean distances where the impact of wildlife species particularly the primates, and artiodactyls on the crops would be minimal. Such an area would then be designated for farming activities. This would involve relocating the

local communities in some cases. Thereafter, non lethal control measures of wildlife animals such as the use of effigies, scary devices, reflective objects, and guard animals should be explained to the farmers by the park management and encouraged for adoption.

CONCLUSION

In conclusion, this study found that six orders of wildlife species raided crops in Gashaka Gumti national Park. The order artiodactyla had the most diverse species, but order primates harboured the most destructive species as perceived by the local farmers. Crops were raided at all periods of the day, while most farmers personally guarded their crops to reduce potential losses of produce due to wildlife raids. Most of the farmers also hatched a strong desire to kill the wildlife species that invaded their farms, in order to save their crops.

RECOMMENDATIONS

Based on the present findings, it is recommended that an integrated wildlife and poaching control strategies that combine constant patrols, strict enforcement of conservative laws by park rangers, and the use of non lethal wildlife control strategies by farmers should be adopted in order to protect field crops by reducing constant invasion from wildlife species. This approach would also protect the animals from extirpation by preventing poaching from the local farmers, whom it appears have the penchant, and a strong motivation to kill these animals. The farmers can be carried along in this scheme particularly if park managers evolve a local scheme that encourages community participation and rewards the local community efforts in wildlife conservation, rather than extirpation.

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