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The effect of grazing on Bat-eared foxes, and how farmers in Namibia perceive the Bat-eared fox

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Abstract

Namibia is a country that has serious trouble with overgrazing and drought. Intensive grazing, especially in very dry areas, can lead to large ecological disturbances, which is a threat against several species, and hence also biodiversity. This study shows that grazing on a medium level favours bat-eared foxes, but also that they are negatively affected by grazing when it becomes too intense. However, from this study, it is not possible to tell which specific factor leads to the lower occurrence of bat-eared foxes on intensively grazed areas. The study was done by comparing the relative population density of bat-eared foxes on a grazed farmland with the population density on an ungrazed reserve in the semi-desert in Namibia. Overgrazing is not the only possible threat against the bat-eared foxes. They are also killed in the misbelief that they attack the livestock or killed because they are mistaken for being black-backed jackals. Therefore, by interviewing farmers, this study also aims to assess the awareness of rural farmers to the bat eared fox and how they perceive this animal in terms of being a threat to their cattle and goats.

Table of contents

1. Introduction

Namibia has a growing reputation for its wildlife, some of it uniquely desert adapted, but at the same time a large part of this country faces severe environmental pressure due to drought and overgrazing by livestock (Bojö, 1996). Cultivation is seldom profitable in this dry country and for this reason farmers focus on livestock farming. The herds of livestock are often too large and they overgraze the land (Anon., 2001b), which leads to ecological disturbances like erosion, desertification (Hunter, 2002) and bush encroachment and this has become a big problem in Namibia (Strohbach, 2001). These disturbances are a threat against several species and hence also against the biodiversity. It is not only the biodiversity of grassland and woodlands that are threatened by these ecological changes. Ecosystems which can be considered to be deserts or semi-deserts, like a big part of Namibia (Anon., 2004), are still vulnerable to erosion and desertification and if they are pushed further, their biodiversity is threatened. These dry areas may not have as rich biodiversity and large biomass compared to that of grassland and forests, but they still do have a large and unique set of species relative to true deserts (Hunter, 2002). In Namibia, one of the species that live in these dry areas is the bat-eared fox which is a very specialized mammal both when it comes to desert adaptations and its diet, which consists mainly of termites. Not much is known about the bat-eared fox, especially not in these arid areas (Bothma, 1998). The population in this study is at the edge of their range in western Namibia and the area is one of the driest parts of this animal's range in southern Africa (Skinner 1990). It is therefore of special interest to investigate how this population, that is already exposed to pressure from the harsh environment, is affected by grazing and farming activity.

In the literature, different information about how the bat-eared fox is affected by grazing can be found. In one study, where the bat-eared fox was used as an indicator species to estimate the rehabilitation of former farmlands, Rova (2003) found that bat-eared foxes were present on reserve areas but not on farm areas. Further, Jakobsson (in press) found that the bat-eared fox in Botswana was negatively affected by human activity and farming. When he compared unprotected areas (fenced ranches and communal grazing areas) with protected areas (national park and wildlife management areas) he found a significant difference in densities of bat-eared foxes. In addition, Wallgren (2001) showed that bat-eared foxes are often encountered at long distances from human settlements. As a contradiction to these observations, which imply that the bat-eared fox is negatively affected by grazing and farming activity, observations in Serengeti shows that the bat-eared fox often occurs nearby grazing herds of zebras, wildebeests and buffalos. The author's explanation is that the food resources of the bat-eared fox, e.g. termites and insects, are drawn to areas where the wild ungulates´ grazing has shortened the grass (Malcolm, 1984). However, one must remember that the native grazers´ way of grazing gives the land a chance to recover while livestock are kept in the same area year after year which gives the land little or no chance to recover (Hunter, 2002). Thus, livestock cause larger ecological disturbances than native grazers which may explain the contradiction that the bat-eared fox can be observed nearby herds of native grazers but seems to be missing in areas with grazing livestock. However, other contradictions can also be found. According to Bothma (1998), the bat-eared foxes prefer areas with grass that has been grazed or burnt short, and according to Skinner (1990) they even like overgrazed areas. This surely indicates that the bat-eared fox is favoured by grazing and even by overgrazing. These different facts clearly show that the effect of grazing on the bat-eared fox is still unclear, particularly in the most arid part of this animal's range in Namibia. According to Noy-Meir (1974), some grazing can stimulate the production of biomass, but when grazing becomes intense, especially in arid ecosystems and during long drought, the effects become critical. From this, one could draw the conclusion that the bat-eared fox is favoured by grazing animals to a certain extent, but when the grazing becomes too intense, combined with droughts that are typical in most of Namibia, it creates too big ecological disturbances and neither termites, insects nor the bat-eared foxes are favoured.

In Namibia, overgrazing is not the only possible threat from farming activity for the bat-eared fox. Farmers sometimes kill animals that are a threat (e.g. hyenas, jackals, wild dogs, cheetahs etc.) to their livestock (Frandsen, 1998). Unfortunately, the bat-eared foxes are also killed in the misbelief that they attack livestock or because they are being mistaken for jackals (Smithers). Some farmers also use poisoned carcasses to kill different predators and the bat-eared fox is thereby also killed (Anonymous, 2001a). They are also victims of the farmers' packs of dogs that hunt black-backed jackals. The dogs cannot distinguish between the jackals and the bat-eared foxes which are also killed (Frandsen, 1998).

This study has two objectives: 1) to assess the relative abundance of the bat-eared fox and the resources used by these animals on a farm versus a reserve in the most arid part of this animal's range and by that test the hypothesis that grazing negatively affects the bat eared fox, and 2) to conduct interviews of farmers to assess the awareness of rural farmers on the bat eared fox and how they perceive this animal in terms of being a threat to their livestock. The study is done on the request of Wilderness Safaris Namibia and is a part of the Small Carnivore Project that was started by Wilderness Safaris Namibia in the year 2000. The Small Carnivore Project aims to "increase knowledge on the ecology of arid-adapted small carnivores in Namibia" (Lalley, Description for the Namibian Small Carnivore Project). Part 2 is a minor part of this study and will only be handled shortly in this paper.

2 Material and method

2.1 Study animal; The bat-eared fox, *Otocyon megalotis*

The bat-eared fox, *Otocyon megalotis*, is a small canine. The entire animal, including its bushy tail, is about 80 cm long. The preferred habitat of these animals is open semi-arid country with short grass or much bare ground (Skinner, 1990), but according to Mackie and Nell (1989) they prefer a grass height of 100-250 mm. They do not live in true desert or afforested areas. They are mainly nocturnal but in the Namib Desert they also forage in daylight during cool afternoons or in winter (Bothma, 1998). They use abandoned burrows and adjust these to their requirements, or sometimes they dig their own burrows (Frandsen, 1998). The bat-eared fox in the Namib Desert eats mostly termites, up to 70 % (Malcolm, 1984), with *H. mossambicus* as the most important prey and *Trinervitermes trinervoides* as a second food source (Skinner, 1990). Since the termites are such important food items for the bat-eared fox its habitat usage is at least to some extent dependent on the occurrence of termites (Skinner, 1990). According to Mackie and Nel (1989) and Frandsen (1998) the distributions of the bat-eared fox and the termite *H. mossambicus* are closely correlated to each other. Its diet also includes insects (Malcolm, 1984) and to some extent fruits, scorpions, spiders, millipedes, snakes and lizards (Frandsen, 1998). The bat-eared fox urinates and defecates while foraging and it does not use faeces to scent-mark the boundaries of their home range (Bothma, 1998).

2.2 Study area

The study was conducted between the 3rd of March and the 17th of May 2004 in two different areas located in the southwest of Namibia. The climate for these areas is classified as arid, which means an average rainfall of 50-100mm/year.

The first study site, Kulala Wilderness Reserve, is located in the outer Namib Desert of Namibia in a transition area between hyper-arid and arid desert along the border of the Namib Naukluft Park (E 15° 45’ to E 16° 00’ and S 24° 35’ to S 24° 40’). Since 1996 the reserve has been used for non-consumptive tourism, but before that it was used as a farmland for cattle and sheep. It is now owned by Wilderness Safaris Namibia, an eco-tourism company that is trying to rehabilitate the area into a wildlife reserve. The area is 20 000 ha and the dominant habitat is desert savannah where vegetation consists mainly of patchy annual grass and shrub patches. At the moment four camps are situated in the reserve and accommodate a maximum of 68 persons at the same time. Staff quarters and main buildings (kitchen, storage and bar) are also located on the property (Lalley, Description for the Namibian Small Carnivore Project). Game drives by car and guided tours by foot are performed on the property. Off road driving is strictly forbidden during game drives and guests are not allowed to drive on their own on the property, with the exception of the main road from the gate to the camps. The reserve holds a rich wildlife. Some of the species in the reserve are gemsbok, springbok, ostrich, ground squirrel, black-backed jackal, aardwolf, spotted hyena, bat-eared fox and porcupine.

The second study area, the Hammerstein farm, is situated 50 km southeast of the Kulala Wilderness Reserve. It is mainly a guest farm with lodges and a restaurant, but the owner also keeps cows (280) and goats (1200). The total area of the farm is 14 000 ha, of which 10 000 ha is used as grazing area for the cows and goats. Except for one house, no larger buildings are situated in the area used for grazing. The dominant habitat is, like in the reserve, desert savannah. Guests are allowed to carry out game drives on the farm but, according to the owner, very few of them choose to do that. Except from cows and sheep the farm holds springbok, kudu, giraff (4 individuals that were brought there for the tourists), hyenas, black-backed jackal, bat-eared fox, aardwolf and cheetah.

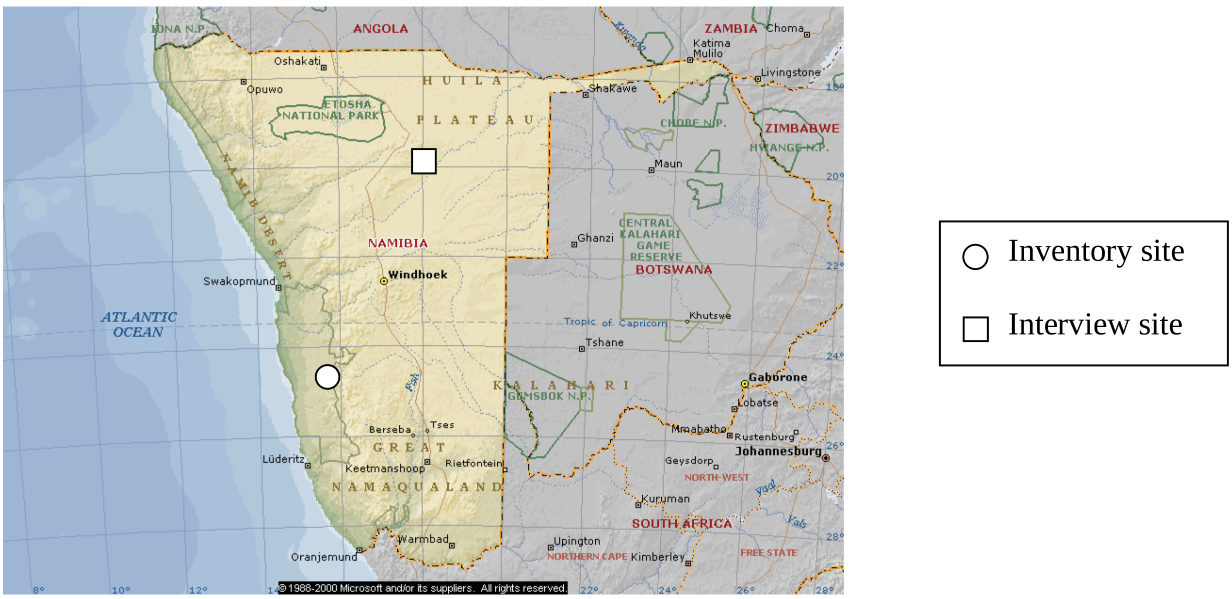

Figure 1. Map over Namibia with the study-sites marked.

2.3 Field methods

To assess if grazing effects the bat-eared fox population in this arid region inventories were carried out on both a farm (Hammerstein farm) with livestock and in a reserve with no livestock activities (Kulala Wilderness reserve). Line transect sampling methods were used to estimate the size of the bat-eared fox populations in these two study areas. Two different types of this method were used. One method was to look for droppings while walking line-transects during daylight hours. Each transect was 1 km long and they were carried out on foot and performed by two observers who walked side by side. The area scanned by each person was 1.5 metres on both sides outwards from the walking line and hence the width of the transect was 6 metres. All droppings from the study animal were marked on a GPS (Garmin 12 or Garmin II plus) and the number of the finding was noted. To keep the transect straight the GPS' compass was used. If possible the transects were walked in the south-north direction, but if that was not possible they were walked in the east-west direction. To be able to randomly sample transects, maps over the areas were divided into 1 km*1 km squares. Squares that were not walkable, for example steep hills were sorted out and the remaining squares were numbered. The squares were then chosen randomly. Due to lack of time, only 40 % of all walkable transects in the areas were done. A total of 82 transects were walked, 57 transects in the reserve and 25 transects on the farm. The start points of the transect were calculated from the map and the GPS was then used to find these points in the field. All transects were walked once.

The other line-transect method was to count all bat-eared foxes at night from a vehicle using a spotlight. One person was driving the car at approximately 20 km/h while the other sat on the roof of the car and scanned the adjacent area with a spotlight. When an animal was spotted the engine was turned off and the species and the individuals were recorded. The animals were usually spotted between 150-300 metres from the vehicle and were therefore identified with binoculars. The distinguishing characterers were the eye reflection and the movement of the animal. Sometimes, however, the animals were spotted nearby the car, so the species determination could be done with the naked eye. Transects of different lengths were used by this method. The transects were restricted to roads since off-road driving was not allowed in the reserve. Suitable transects were therefore picked out by hand and not randomly. A total of 59.2 km were surveyed in the reserve and 29.3 km on the farmland. All transects were driven three times; once in full moon, once in half moon and once in new moon. This was done because it is known that the activity, and hence also the possibility of spotting nocturnal animals, can vary at different moon phases (Elangovan & Marimuthu, 2001).

To be able to exclude the possibility that any differences in population density between the reserve and the farm were due to different contribution of habitat type, the type of habitat was noted while walking the day transect. Three habitat classes were distinguished;

1. Soft ground with grass and bushes
2. Soft ground with only grass
3. Stony ground

To be able to investigate more closely the correlation between grazing and the number of bat-eared fox scats, termite mounds, insects and the degree of grazing (trampling and grazing) were noted while walking the day transects. A three degree scale was used to define the grazing:

Scale	Equivalent to	Definition
1	Little trampling and grazing	<40 % of the transect area trampled, grass height >10 cm
2	Moderate trampling and grazing	40-80 % of the transect area trampled, grass height 5-10 cm
3	Intense trampling and grazing	>80 % of the transect area trampled, grass height <5 cm

The Burnham density method was used to calculate the relative population density.

$D=(n*f(0))/2l$

where;
D = population density
n = number of spotted animals
f(0) = the probability of seeing a animal that is standing on the transect
l = the length of the transect

We accepted f(0) as 1 since we considered that all animals that were straight in front of us or the car were spotted.

One scat was seen as one sighting. This is possible since we did not aim to calculate the absolute number of animals, but only to calculate the relative abundance on both areas and compare these abundances with each other.

Mann-Whitney U-test, Spearman's rank correlation coefficient test and Kruskal-Wallis test were used to analyse the data collected during the day transects. The software Ozi Explorer was used to store and process the GPS-data and to create maps over the areas.

In order to assess the problem with farmers, or farmers' pack of dogs, killing bat-eared foxes twenty communal farmers were interviewed in a pilot study. Two interpreters were used during the interviews. The farmers were shown pictures of bat-eared foxes and black-backed jackals and they were asked if they recognised the animals, if they often saw them, if they knew what they eat, if they meant any troubles for them, and how they usually encountered them. The interviews were conducted in northern Namibia, and not in the same area as the inventories were conducted, because it is known that the problem with killing bat-eared foxes is worse in the north of the country compared to the south (J.S. Lalley, pers. comm.). Time limitations and the availability of interpreters restricted the sample group to one farming community. The results from these interviews will function as an indicator of this problem in a farming community in northern Namibia and provide some insight to possible solutions to the problem.

3. Results

3.1 Population density estimation

There was no difference in the occurrence of habitats between the two study areas (Mann-Whitney W=2341 p=0.26). Soft ground with grass and bushes was the dominant habitat in both Kulala Wilderness Reserve (Figure 2) and on Hammerstein farm (Figure 3). The distribution of termites was not equal in the two different areas (Mann-Whitney W=637.5 p=0.0001). The average number of termite mounds per transect was higher on the farm than in the reserve. The farm had a mean value on 86.5 termite mounds/transect and the reserve had 41 termite mounds/transect (Figure 4). There was no difference in abundance of insects between the farm and reserve (Mann-Whitney W=968 p=0.74).

Both road- and foot-transects showed that the farm had a higher relative bat-eared fox density than the reserve (for calculations, see appendix 1). The results from the day transects showed that the farm had 0.38 individuals/km^2 while the reserve had 0.19 individuals/km^2 (Figure 5). When relative population density was calculated from the road-transect data, the farm had a mean value of 0.12 individuals/km^2 and the reserve had 0.09 individuals/km^2 (Figure 6).

A negative correlation between the level of grazing and the number of bat-eared fox scat was found (Spearman r=0.42 p=0.04 n=25) (Figure 7). No statistical differences in the amount of termites due to the different levels of grazing could be detected (Kruskal-Wallis k=5.16 p=0.08 df=2) (Figure 8), but a negative correlation between the level of grazing and number of insects was found (Spearman r=0.42 p=0.04 n=25).

3.2 The interviews

19 of 20 interviewed farmers recognised the bat-eared fox and the majority (15 out of 20) knew that the bat-eared fox's diet consists of termites and insects. One person thought that they eat only fruits, but he also knew that they do not eat cattle and goats. Hence, the majority (16 out of 20) knew that the bat-eared fox is not a threat against their livestock and they therefore also stated that the bat-eared fox was no trouble for them. The remaining four farmers did not have any idea of what the bat-eared foxes usually eat. Different methods were used to protect the cattle and goats from being attacked by predators. Seven of the farmers used shepherds as protection, nine used sheep-dogs, two used traps, poison and rifles and two did nothing. It should be noted that the farmers used several methods to protect their cattle.

4. Discussion

4.1 Population density estimation

The relative abundance of bat-eared foxes was higher on the farm than in the reserve. This was contrary to the expected since grazing was expected to affect both termites and the termite dependent bat-eared fox negatively, and is not in accordance with other studies that have shown that grazing by livestock and farming activity acts like a threat against the bat-eared fox (Rova 2000, Jakobsson 2005). One explanation for this deviating result might be that the farm simply was not enough grazed to suppress the bat-eared fox population. The farm had a mean value of termites that was twice as high compared with that in the reserve, and from this you could suspect that the grazing on the farm was on a level that favour the termites and hence also the termite dependent bat-eared fox.

According to Noy-Meir (1974), termites and insects seem to be favoured by grazing to a certain extent but not when the grazing becomes too intense and long lasting. In this study no statistical differences in the amount of termites due to the different levels of grazing could be found (Kruskal-Wallis k=5.16 p=0.08 df=2), but scatter plots of the level of grazing and number of termites support Noy-Meir's hypothesis (Figure 8). These plots show that transects classified as little and moderately grazed held large amounts of termites while transects classified as intensively grazed held notably less termites. This means that grazing classified as little or moderate was not enough to suppress the number of termites, while grazing classified as intense was. Since the most common level of grazing on the farm was little or moderate grazing, and since these levels of grazing probably favour the termites, the higher relative abundance of termite dependent bat-eared foxes on the farm is no longer difficult to understand. However, the fact that the scatter plot shows that there is notably less termites on transects classified as intensively grazed also strengthens the idea that grazing will act as a suppressing factor for termites and bat-eared foxes when it becomes too intense. These facts can also explain why no negative correlation could be seen between the level of grazing and the number of termites, although it was expected. Transects classified as intensively grazed were expected to display the lowest number of termites, followed by transects classified as moderately grazed, which in turn were expected to have fewer termites than transects classified as little grazed. This was not the case. Both transects classified as little and moderately grazed held large amounts of termites and there was no notable difference between these two classes. This means that transects classified as little or moderately grazed simply were too similar to each other, and hence no statistical significant differences between the three different classes could be detected.

Although the farm had an unexpected higher abundance of bat-eared foxes relative to the reserve, a negative correlation was found between the level of grazing and number of bat-eared foxes (Spearman r=0.42 p=0.04 n=25) (Figure 7). Since no correlation between number of termites and level of grazing could be found in this study, the negative correlation between grazing and number of bat-eared foxes must be linked to other factors. One such factor could be the grass height. According to Mackie and Nell (1989), the bat-eared fox prefers areas with a grass height of 100-250 mm, and since the intensively grazed areas had shorter grass, this might be the explanation for the negative correlation between grazing and bat-eared foxes. Another reason for finding fewer bat-eared foxes on more intensively grazed areas can be that there are more bushes in these areas. Overgrazing does not only lead to erosion but also to bush encroachment (Strohbach, 2001), and the increased occurrence of bushes should not favour the bat-eared fox since they like open areas with much bare ground (Skinner, 1990). It is also possible that the livestock itself and the human activity that is necessary for livestock farming, and the noise and movements involved, can be disturbing for the bat-eared foxes and they will therefore chose areas that are not that often visited by livestock.

4.2 The interviews

According to the interviews done in this study, the problem with bat-eared foxes getting killed by farmers does not seem to be large in the area where the interviews were done, altough this was expected. Only two of the farmers stated that they killed predators to protect their livestock and the farmers' knowledge about the bat-eared foxes was quite good. From this, one could suppose that they do not kill bat-eared foxes by mistake. One part of the interviewed farmers' consciousness can probably be explained by the fact that a conservation project concerning wild dogs previously had been conducted in the actual area. The project aimed to increase the communal farmers' knowledge about wild dogs, its endangered situation and how to encounter them. This work seems to have increased the awareness of other species as well, including bat-eared foxes, and it is interesting to see that conservation work with one species seems to increase the awareness of other species. Several of the visited communities also had so called conservancies that work with conservation of the environment and wildlife in general and this was probably also one contributing factor to the farmers' consciousness.

Several of the persons interviewed mentioned that they did not kill the bat-eared fox because their conservancy had told them not to do so. These communal conservancies were initiated in 1996 and have since then had a large success and several other countries have adopted the idea with conservancies (Ministry of ecology and tourism, Namibia). However, even since it seems to be no large problem with bat-eared foxes getting killed by mistake by farmers, almost 50 % (9 out of 20) of the farmers also stated that they used sheep-dogs. This can be a problem since sheep-dogs often kill bat-eared foxes because they can not distinguish them from other canines that in fact are a threat towards the livestock (Frandsen, 1998).

4.3 Summary and conclusions

The higher density of bat-eared foxes on the farm implies that the level of grazing in this study does not affect the bat-eared foxes negatively. In fact, it even seems like it affects them positively. Further, no statistical correlation between the number of termites and the level of grazing could be found, but an obvious decrease in amount of termites was noted on the transects classified as intensively grazed. This implies that grazing has a negative effect on the number of termites, and hence probably also on bat-eared foxes, but only when it becomes too intense. Since it is not clear which factors lower the bat-eared fox population on intesively grazed areas further projects are needed. Projects to consider would be to do a similar study on a farmland that is more intensively grazed than the actual farm. It would also be interesting to look at other factors than food sources, such as grass height, bush encroachment and livestock activity. Also, to be able to say more about the problem with bat-eared foxes getting killed unnecessarily, a more extensive interview study must be conducted in several different areas of the country. It would be very interesting to investigate if the conservancies make a difference in consciousness about wildlife.

Nowadays, in Namibia, there are some reserves and parks that can give the bat-eared fox protection. A special research program is now being undertaken (Smithers) and the bat-eared fox is not a strongly endangered species anymore. However, according to this study, intensive grazing effects the bat-eared fox negatively and this might become a threat for the species in the end. This is important since 44 % of Namibia is owned by private landowners, 41% is owned by communal farmers and only 15 % is owned by the state (Bojö, 1996). This means that a huge part of the country is used for grazing, and in combination with the most extreme drought for many years and that the farmers' pack of dogs are killing the bat-eared-foxes, this might become a serious threat against the bat-eared fox.

There are several reasons for maintaining the bat-eared fox population. One such reason is that the termite *H. mossambicus* in fact plays a major role in the destruction of rangeland in Namibia (Mitchell, 2002), particularly during recurrent drought cycles. During such times the combined grazing effect of livestock (or game) and termites virtually denude considerable areas of grassland by exposing the soil to erosion by both wind and water (Plant protection research institute). The farmers should therefor benefit from having bat-eared foxes on their farms since they eat these termites (Smithers). In fact, in South Africa the bat-eared fox is already considered to be an effective means for control of termites (Bothma, 1998). Hence, if the farmers wouldn´t have too big herds that overgraze the land, and if they would accept the bat-eared fox on their farms, then they would have a better soil and hence better vegetation that could be used for many years. In addition, many farmers also have tourism as an extra income since livestock farming is moderately profitable. For example, they have guest farms and they arrange game drives. Guests find it exciting to see exotic animals, including bat-eared foxes, and the farmers can benefit economically from this. According to Bojö (1996), it would be more profitable for the farmers in Namibia to have wildlife arrangements, for example photo safaris and game drives, than to have cattle. In conclusion, farmers can benefit from having bat-eared foxes on their farm, and at the same time, like a bonus, the biodiversity would be maintained.

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Plant protection research institute, ARC-PPRI. www.arc-roodeplaat.agric.za, 10 sep 2004

7. Appendix 1. Calculations and figures

Burnham density method: D=(n*f (0))/2 l

Night transects:

Hammerstein farm:

f(0) = 1
l = 29,3 km
n = see below

	n		**D** (ind./km)
Full moon	5	→	0.09
Half moon	9	→	0.15
New moon	7	→	0.12
Mean value			**0.12**

Kulala Wilderness Reserve:

f(0) = 1
l = 59,2 km
n = see below

	n		**D** (ind./km)
Full moon	9	→	0.08
Half moon	0	→	0.00
New moon	12	→	0.10
Mean value			**0.09**

Day transects:

Hammerstein farm:

f(0) = 1
l = 28 km
n = 21
D = **0.38 ind./km**

Kulala Wilderness Reserve:

f(0) = 1
l = 54
n = 20
D = **0.19 ind./km**

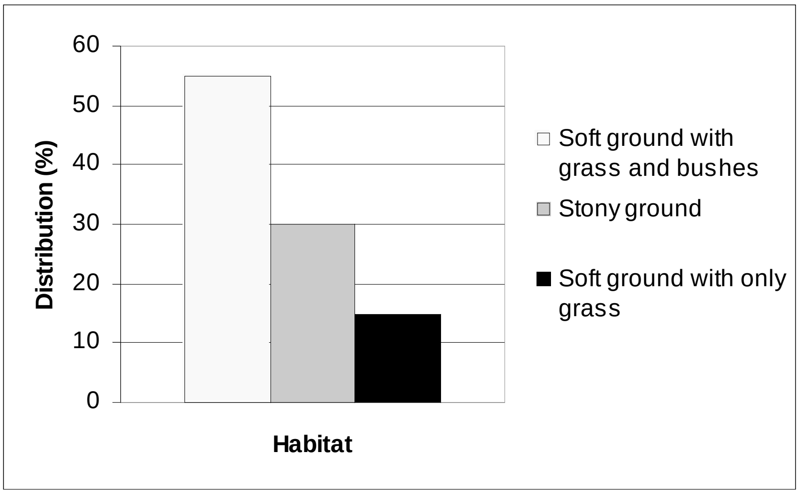

Figure 2. The distribution of habitats in the reserve.

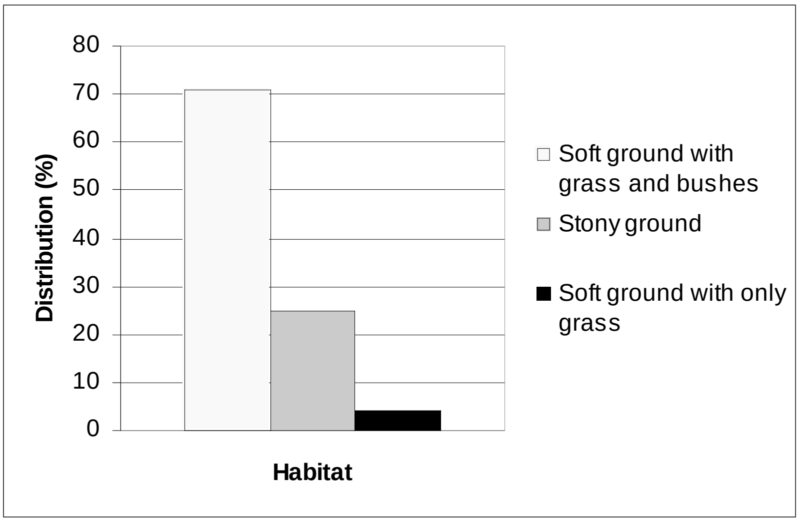

Figure 3. The distribution of habitats on the farm.

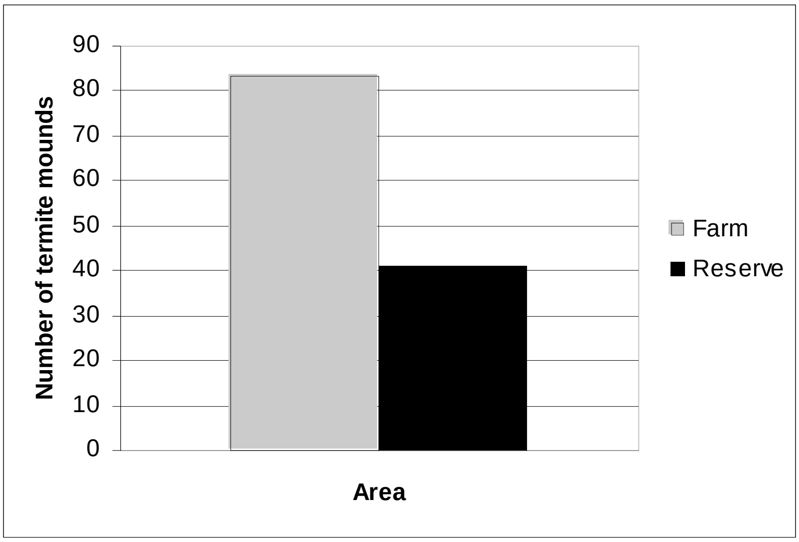

Figure 4. The average number of termite mounds per transect on the farm respectively in the reserve.

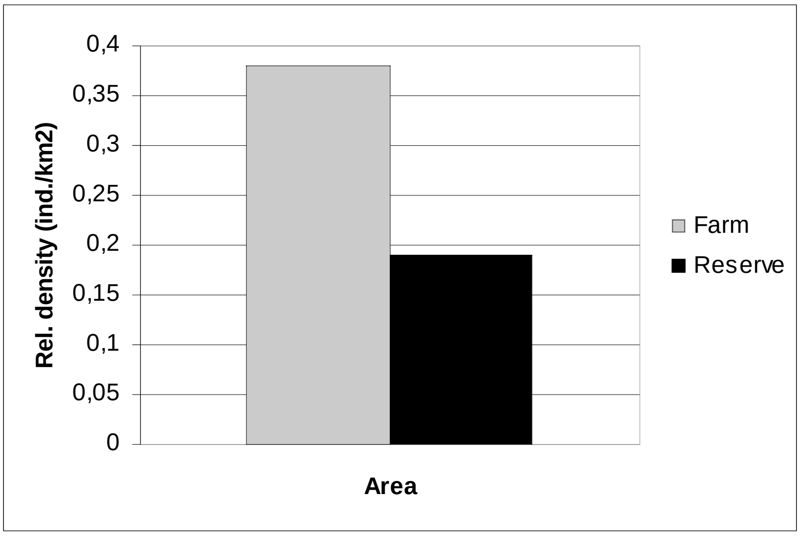

Figure 5. Relative population density of bat-eared foxes on the farm and in the reserve (based on foot-transects).

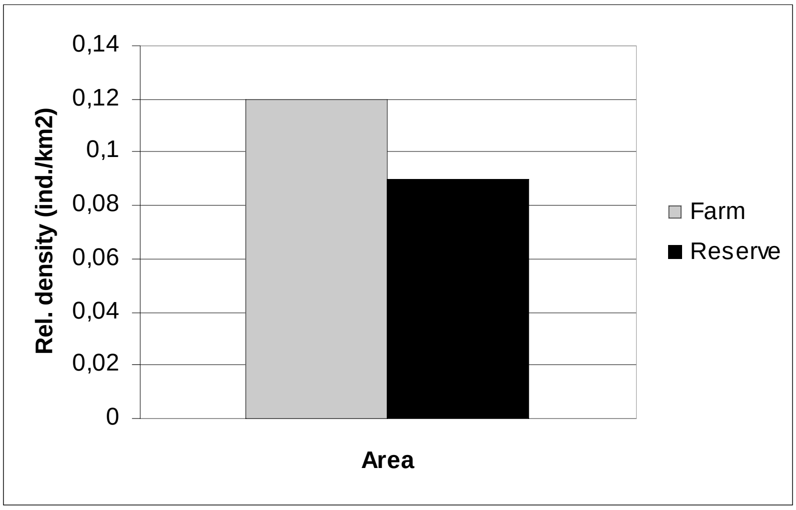

Figure 6. Mean value of the relative population density of bat-eared foxes on the farm and in the reserve. Calculated from the population densities that were calculated from transect driven in three different moon status (based on road-transects).

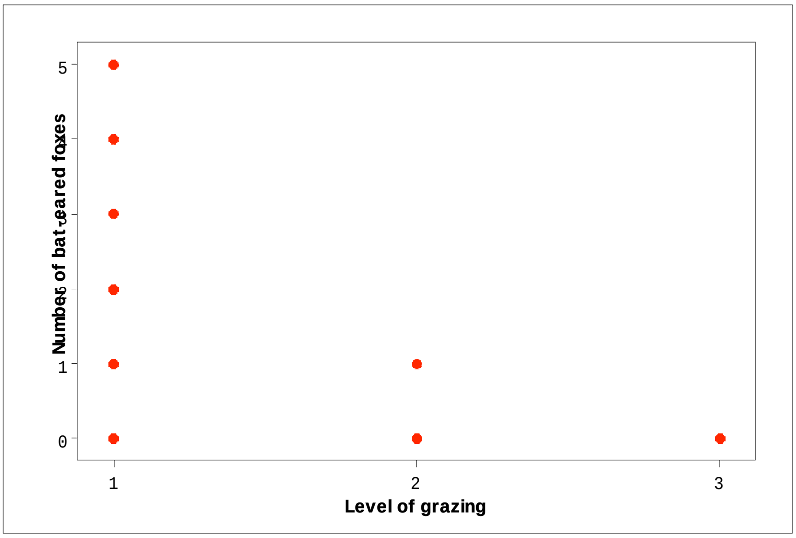

Figure 7. The number of bat-eared foxes at the different levels of grazing.

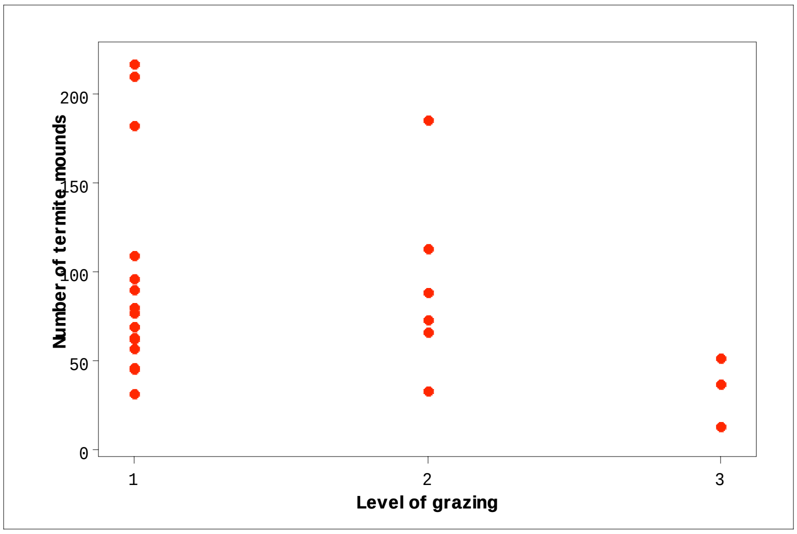

Figure 8. The number of termite mounds at the different levels of grazing.