



Mänsklig påverkan av födoval och dygnsrytm hos blå markattor (*Cercopithecus mitis sthulmanni*)

*Human impact on food choice and diurnal behaviour in blue monkeys (*Cercopithecus mitis sthulmanni*)*

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Examensarbete D-nivå 45 hp

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1. Abstract

The blue monkey is a forest-dwelling guenon, divided in to many subspecies spread in many different habitats in south, east and central Africa. They are one of the biggest guenons and one of the most arboreal. As an omnivore blue monkeys mostly feed on fruit, leaves and insects among others and seem to be highly adaptable towards its environment. They may live and forage close to human settlements, as in this case close to a lodge that was built in the monkey's natural habitat. In my study, the monkeys gained food from trash bins in the staff area and around the kitchen. Measured in feeding time, their food consisted to a third of trash, mainly ugali (a kind of cornflower mixture) but also fruits. Blue monkeys have in general a feeding pattern with activity around dusk and dawn with resting in the middle of the day. Our monkeys had additionally to the morning and afternoon activity another peak around lunch when the kitchen opened and staff threw away the left-over food in the open trash bins. I suggest that this was because the monkeys had easy access to the human food around that time of day. The monkeys seem to have adapted their choices of food as well as their diurnal rhythm to the human environment. However, all through they had good access to human food they foraged mostly food from their natural food sources.

2. Samanfatning

Den blå apan är en skogslevande guenon som delas in i många underarter, som lever i östra och centrala Afrika. De är en av de största och mest aboreala guenonerna. Som omnivour består den blå apans föda till mestadels av frukt, blad och insekter. De verkar ha mycket lätt att anpassa sig till sin omgivning. De kan leva och söka föda nära mänsklig bebyggelse, som i detta fall, nära ett hotell som är byggt i apornas naturliga habitat. I min studie, tog aporna slängd mat ur soptunnor i områdena där hotellets personal bodde och runt köket. Mätt i födotid, bestod deras föda till en tredjedel av mat från av människor slängd mat, mestadels ugali (en mix av majs mjöl, vatten och salt) men även frukt. Den blå apan har generellt ett födomönster i gryning och i skymning och vila under dygnets varma timmar, mitt på dagen. Våra apor har förutom aktiviteter under morgon och sen eftermiddag även aktiviteter runt lunchtid då köket har öppet och personalen slänger rester i soptunnorna. Jag föreslår att denna ökade aktiviteten under dagen beror på den lättillgängliga födan runt den tiden på dagen. Aporna verkar ha anpassat sitt val av föda såväl som dygnsrytm efter den mänskliga miljön. Men även om de har tillgång till mänsklig mat, äter de till största del föda från deras naturliga födokällor.

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4.0 Introduction

4.1 General description of Blue monkey

The blue monkey (*Cercopithecus mitis*) is a forest guenon belonging to the old world monkeys (Estes, 1992; Kingdon, 1971). Depending on subspecies, age and gender they range from 107 to 152 cm in total length (Kingdon, 1971), have a tail length that range between 44 - 67 cm, and weigh between 3.5 - 7 kg. In rare cases the male can weigh up to 12 kg (Estes, 1992; Kingdon, 1971). There are ten subspecies of *C. mitis*, of which two are hybrids (Kingdon, 1971); all of them in south, east and central Africa (Dandelot and Prévost, 1972; Wolfheim, 1982). The focal subspecies I have studied, *Cercopithecus mitis stuhlmanni*, lives in Uganda and western Kenya (Kingdon, 1971).

Blue monkeys can cope with a high variety of different habitats, types of forests and weather conditions (Lewis, 1990; Twinomugisha et al., 2006). They appear in various forest types from rain forests at up to 3000 m, coastal mangrove forests, forest patches on the savannah (Estes, 1992; Kingdon, 1971) to evergreen semi-deciduous forest (Mnason et al., 2001).

As their habitat the natural food sources of guenons also varies greatly (Cords, 1986; Kaplin & Moermond, 2000; Lambert, 2001). *C. mitis* monkeys are omnivores (Rudran, 1978; Estes, 1992). Besides fruit they eat leaves, invertebrates, flowers, seed, bark and shoots (Fairgrieve & Muhumuza, 2003). They obtain liquids from food or from holes in trees (Rudran, 1978; Estes, 1992). Most studies on African forest guenons feeding ecology have come to the conclusion that these guenons spend a lot of time feeding on fruits and fibrous food (Cords, 1986; Butynski, 1990; Lawes, 1991; Kapplin et al., 1998; Chapman et al., 2002; Yasuko Tashiro, 2006) and almost no invertebrates compared to food from plants (Chapman et al., 2002; Tashiro, 2006). On the contrary, blue monkeys in the Kalinzu forest in Uganda (Tashiro, 2006) spend much more time feeding on invertebrates than shown in any other study. e.g. Butynski (1990), Cords (1986), Kaplin and Moermond (2000) (Tashiro, 2006). It seems that the blue monkeys' diet is as varied as their habitat distribution.

4.2 Diurnal rhythm

Almost all animals have a diurnal pattern and they may be more active during the day or at night and use the hours of the day for different activities. Some reasons for this are direct factors such as light and weather but also indirect factors like diurnal rhythms of predators and conspecifics? (REF). Blue monkeys are diurnal (Kingdon, 1971) arboreal guenons (Kaplin & Moermond, 1998; Kaplin, 2001). Mnson & Obura (2001) found that blue monkeys fed 75% of the daytime rested less than 20% and spent 5% of their time with social activities. This diurnal rhythm of blue monkeys in natural habitats might be changed by human interference, like visiting tourists or people that produce garbage with food left-over.

4.3 Sharing the home range with humans

Food is the single most important factor of determining the budget of an animal's time it spends with particular activities (Stock & Hofeditz, 1996; Adeyemo, 1997; Baldellou & Adan, 1997; Orams, 2002). In the majority of cases where wild animals share home range and receive food from humans conflicts arise and the effects are often described as having a negative impact on the animals (Orams, 2002). When animals receive food from humans they may spend less time searching for food and are free to spend their day with other activities like socialising and resting (Doenier, Delgiudice, & Riggs, /et al., 1997; Orams, 2002). It could also decrease the home range of a population and increase the number and density of individuals (Eifer, 1996; Orams, 2002). Feeding of wild animals often leads to problems as the population may increase since individuals may become more aggressive and therefore more likely to get access to human food (Orams, 2002). In other words, the diurnal feeding and moving patterns of the monkeys could change because of

the presence and availability of human food.

4.4 Aim of the study

I recorded the diurnal feeding patterns of female blue monkeys to assess the impact of a tourist lodge on food choice and diurnal rhythm. The study focuses also on which food items the monkeys ingest.

5.0 Material and Methods

5.1 Study area

The Maasai Mara National Reserve (MMNR) in the northern part of the Serengeti-Mara ecosystem in south-western Kenya was formed in 1965 and forms an area of 1,368 km² (Brotten & Said, 1995; Norton-Griffiths, 1995). The MMNR is important for wildlife due to high rainfall, permanent water and high grassland productivity. The annual migrants of zebras, wildebeest and Thomson's gazelles stay for about four months from July to October every year (Brotten & Said, 1995). Other large animals in the area are African buffalos, cheetahs, elephants, giraffes, hippopotamus, leopards and Nile crocodiles.

The temperature is relatively constant with a monthly mean maximum temperature of 27 - 28° C, and with minimum temperatures varying from 16° C in October to March to 13° C during May to August. Rain usually follows a bimodal pattern with long rains from March to May and short rains in November and December. The main dry period is from mid-June to mid-October, with a lesser dry spell in January and February. Rainfall in the MMNR average 1,200 mm per year (Sinclair, 1995).

The monkeys' forest belonged to the Kichwa Tembo Tented Camp which is situated at the western border of the MMNR at the base of the Oloololo escarpment alongside the Sabaringo River (35° E, 1.2° S, 1620 m.a.s.l.). The lodge is surrounded by the Sabaringo forest which occupies an area of 0.24 km². The entire Sabaringo forest is protected since 13 years ago by an electric fence that prevents larger herbivores like elephants and hippopotamus to enter the area. The fence may even reduce the number of predators, although leopards, hyenas and snakes might cross it easily. Within the lodge area there are 34 tents and a few houses for tourists, a restaurant and bar with adherent kitchen, a pool, a reception, the main office, two management houses and a staff quarter with adherent football field. In the south-eastern corner of the forest is a more private lodge situated, the Bateleur Camp. A wooden fence separates the two lodges. New tents are under construction in both lodges. We were allowed to follow the monkeys all over the fenced area with the exception of the Bateleur Camp. When a focal animal moved in to the Bateleur Camp or over the fences surrounding the lodge we stopped the observation.

Perhaps due to the decreased predation pressure, several large animals besides the blue monkey inhabits the area, like red-tailed monkey, *Cercopithecus ascanius*, warthog, *Phacochoerus aethiopicus*, banded mangos, *Mungos mungo*, tree hyrax, *Dendrohyrax Dorsalis*, in addition to several bird species.

The forest is a semi-dry deciduous forest, the tallest trees being approximately 20 metres, and a dense undergrowth of different shrubs. Vines are frequent as well. Scattered within the forest area holes have been dug to handle the sewage and the area around the staff quarters are visibly affected by the staff's presence, i.e. of paths and garbage. Open trash bins are to be found around the lodge in which leftovers and other eatable things are put.

5.2 Focal animals

The focal group of blue monkeys, *Cercopithecus mitis stuhlmanni*, consisted of approximately 50 individuals. We could not recognize the individual animals but estimated them to be 6-8 lactating females with one offspring each and 10-12 non-lactating adult females (non-lactating females were recognized by having visible nipples and no offspring). The rest of the group consisted of one

dominant male plus juveniles. The monkeys were used to the vicinity of tourists and tolerated our presence when observing them.

5.3 Animal observations

After habituating the monkeys to our presence for ten days, we conducted data collection from the 1st to 27th of July 2006. Recordings of the monkeys' behaviours were made on foot between 8:00 and 18:00 by one to three parallel working observation teams. Depending on the focal animals and habitat, each team consisted of one to three observers and one writer who recorded all data on a paper sheet. Each team observed one adult female monkey, either non-lactating or lactating. The lactating females were observed together with their offspring. If the focal animal was lost, that particular observation stopped and a new observation with a different focal animal was started. The observations lasted in average 2:40 h (range 30 min – 5 h) for non-lactating females and 3:55 h (range 30 min – 9.5 h) for lactating females, respectively. Due to the smaller amount of lactating females and greater difficulties to find them, we often stopped an observation with a non-lactating female when a lactating female was found nearby. This explains the difference in duration of observations. Recordings shorter than 30 min were discarded. No upper time limit was used. A total of 165 hours evenly spread between the ten observations hours were made on each category of monkeys (non-lactating, lactating and offspring), i.e. 495 hours.

5.4 Environmental data

Every full hour we recorded the air temperature (C°) and the percentage of air humidity. Additionally, weather was recorded as clear (clear sky with no sunshine occurring in the mornings), sunny (clear sky with sunshine and occasional clouds), cloudy (little or no visible sun) or the combination of sunny and cloudy. No recordings were made during heavy rain. Every fifteen minutes the positions of the focal animals were recorded with a GPS (Geographical Positioning System) to register their diurnal moving patterns and use of the forest.

5.5 Behavioural recordings

Interval recordings of the focal animal's behaviour were made each minute. First, the monkey's position on an object was recorded as ground, human made (tent, building, trash bin, telephone cord), shrub, tree or vine. When on a tree (but not on shrubs or vines), the tree species was recorded as well. Then, one of the following behaviours was recorded: foraging, carried on mother, standing, sitting, lying, moving, playing, self grooming, grooming others, receiving grooming, other social behaviour or missing observation. In case of grooming others, receiving grooming and social behaviour, the partner was recorded as mother, offspring, other adults, other infant, or juvenile. When the monkey was scanning either sitting, standing or lying was recorded in combination with scanning

5.5.1 Behavioural definitions

Foraging: Chewing, gathering or manipulating potential food. The object was recorded as bark, flower (including flower buds), fruit (including seeds, buds, ripe and unripe fruits), invertebrate, leaf (including mature and young leaves, shoots and buds), trash (specified) or unidentified object. When a food item from a tree was foraged, the tree species was recorded. When chewing from the cheek pouches the food item was recorded as the last object observed. If no observation of the foraged item had been made it was recorded as unknown.

Carried on mother: Offspring carried by the mother with or without suckling.

Standing: Standing up on four limbs alternatively upright on its rear limbs.

Sitting: Sitting on its bottom.

Lying: The monkey's torso leaning against an object.

Scanning: Actively attentively observing the surroundings.

Moving: Walking, running or jumping at a certain direction with all four limbs in motion.

Playing: Undirected movements with another individual or by itself. If playing with another

monkey, the partner was recorded as mother, different adult, offspring, other infant or juvenile.
Self grooming: Manipulating own fur with hands, such as scratching and picking.
Grooming other: Manipulating other monkey's fur by mouth or hands.
Receiving grooming: Manipulation of the focal animal's fur by other monkey's mouth or hands.
Other social behaviour: Agonistic or sexual behaviour.
Missing observation: Behaviour was not possible to identify or monkey was out of sight.

5.0 Data analysis

All results are presented as means \pm standard error of the means (SEM). Data were tested for normal distribution of residuals. When normally distributed, statistical significance was tested with ANOVA GLM and Tukey Simultaneous Test. When not normally distributed, statistical significance was tested with the non-parametric Kruskal-Wallis Test or Wilcoxon Signed Rank Test. [The diurnal data was poled hour by hour.](#)

6.0 Results

6.1 Foraging in general

The monkeys eating time was allocated to 30.7 % to leaves, 41.9 % to fruits and 26.4 % to human-provided food, and only to 0.4 % invertebrates, 0.3 to % flowers and 0.3 % to bark.

% trash eaten

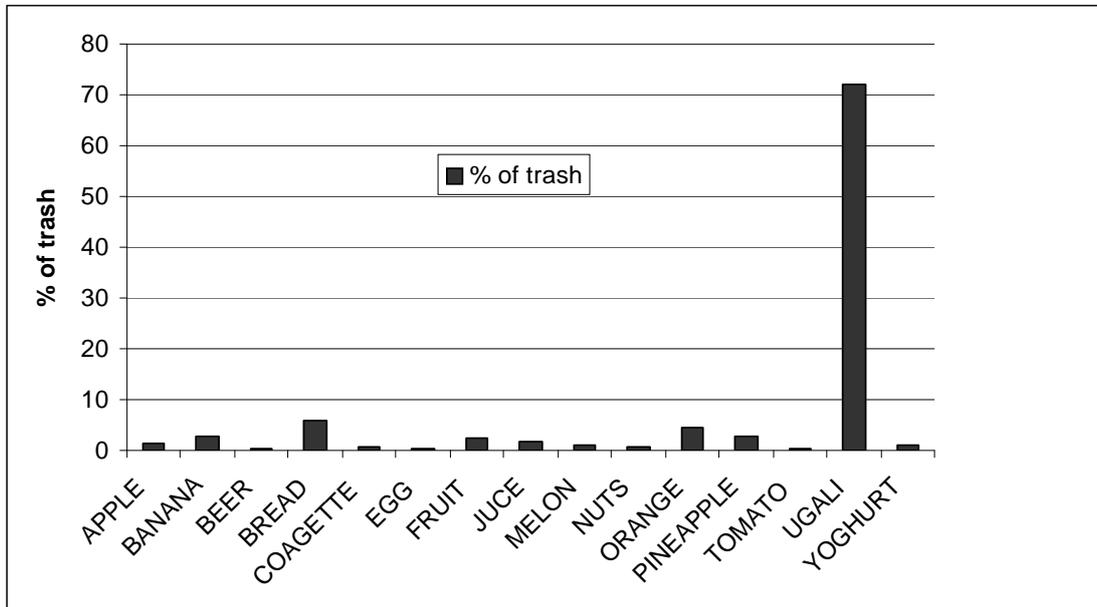


Figure 1: Percentage of time spent eating different human-provided food.

The most common eaten human food was ugali (a combination of white corn flower and water and salt). In total of the known human food eaten, 78% was products with flower (bread and ugali) around 18% fruit and vegetables and 2% egg and yogurt and 2% drinks (beer and juice); all numbers in % of time spent eating.

6.2 Diurnal foraging and moving patterns

In total the monkeys ate $12.9 \pm 0.9\%$, stood $5.5 \pm 0.3\%$, sat $65.4 \pm 1.0\%$, lying $4.8 \pm 0.4\%$ and moved $11.4 \pm 0.4\%$ during the study period.

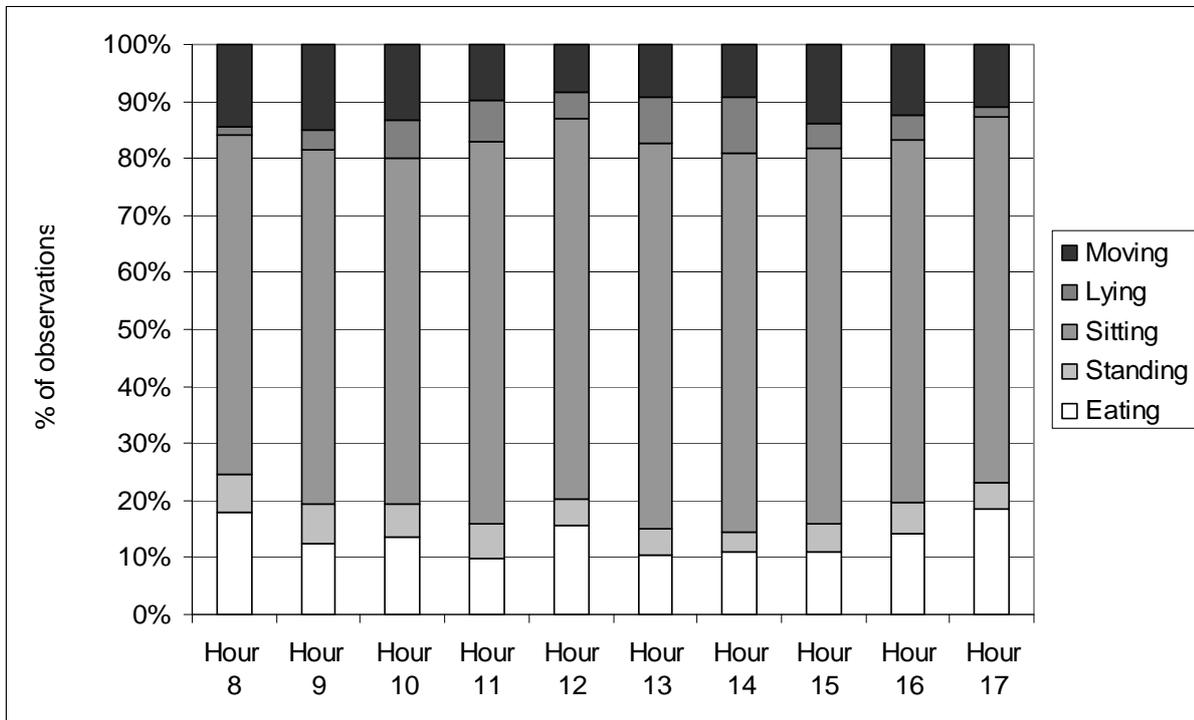


Figure 2: The diurnal eating, moving and resting (Sitting, Standing and Lying) patterns in total of blue monkeys during the period of our study.

The diurnal feeding activity was highest in the morning block (8-10 hours), lowest at the midday block (11-14 hours) and slightly lower in the afternoon block (15-17 hours) than in the morning block (figure 2). The frequency of eating was between 8-10 hours with $16.4 \pm 1.4\%$ higher than in the midday between 11-14 hours ($13.1 \pm 1.1\%$) and at hours 15-17 ($17.7 \pm 1.5\%$); these differences were significant ($P = 0.027$, $H = 7.24$, Kruskal-Wallis Test). In the morning and afternoon block the monkeys spend almost no time laying down compared to the midday block when they were laying the most.

Regarding moving we can clearly see a pattern since the monkeys were moving mostly in the morning block, least in the mid block and more than in midday in the afternoon block. The frequencies of sitting were similar during all three blocks.

6.3 Diurnal foraging

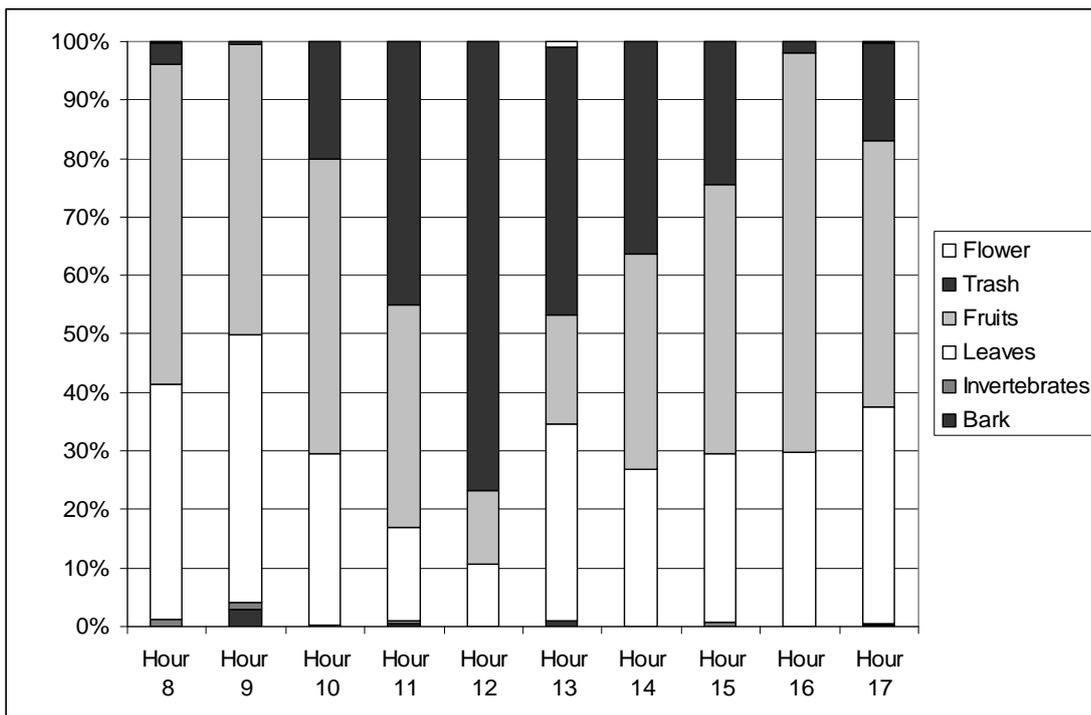


Figure 3: Diurnal feeding activity of trash, fruits and leaves etc. in percent every hour of the day.

The diurnal feeding activity with the most eaten food-categories is shown in fig 3. The monkeys ate considerably more human-provided food around midday than in the afternoon and the morning block. In the morning they ate mainly fruits and leaves of the natural vegetation whereas around midday they preferred human-provided food. In the afternoon they slowly return to natural food sources again.

6.4. Diurnal temperature, humidity and sunlight

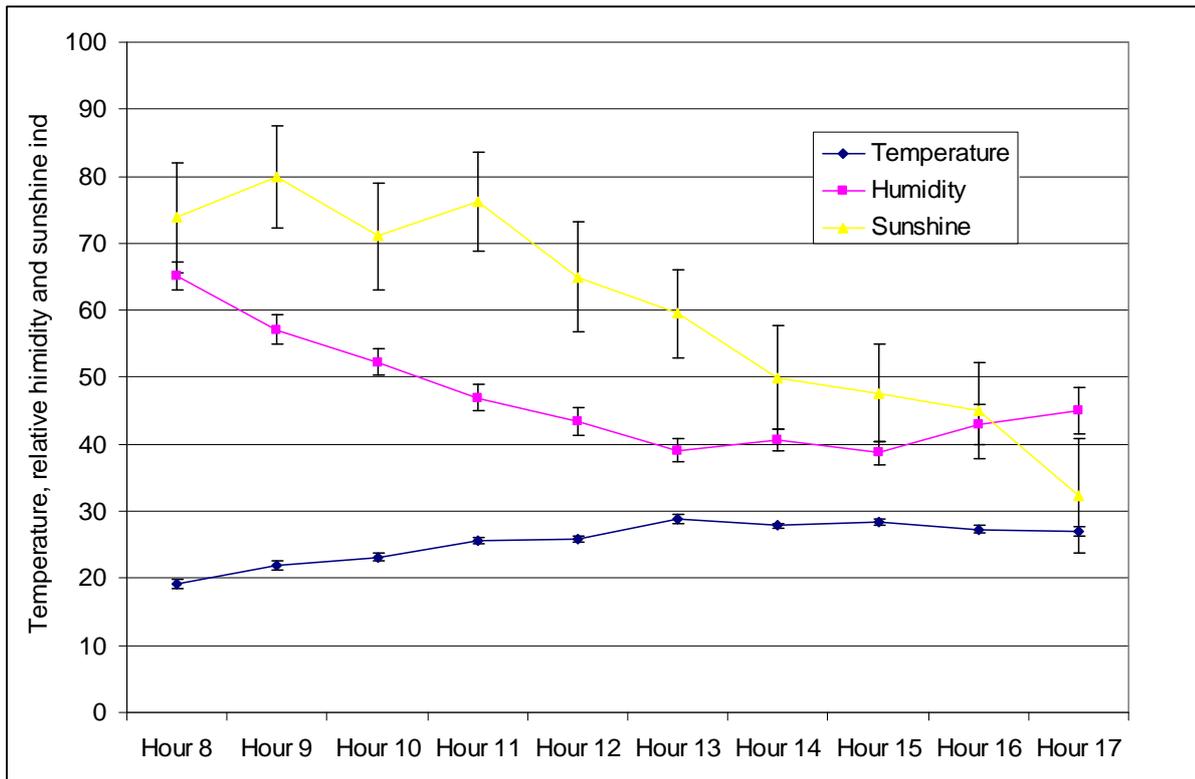


Figure 4: Diurnal temperature (°C), humidity (relative %) and sunshine frequency (%).

The temperature increased during the morning and evened out from midday with a slight decrease in the late afternoon. Sunshine decreased during the entire day. Humidity decreased in the morning and early midday block, evened out and increased slowly in the afternoon block.

6.5 Diurnal map

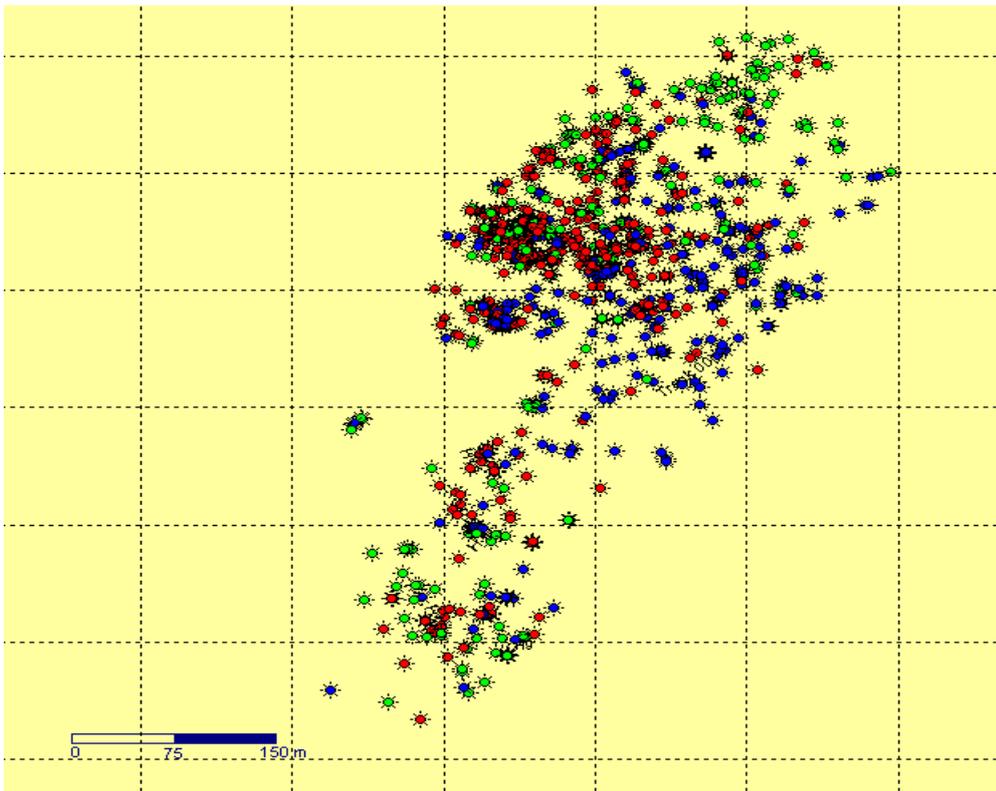


Fig 5: Position of the monkeys at morning (8-10, green dots), at midday (11-13, red dots) and at the evening (14-17, blue dot).

The monkeys were located at the edges in the forest in the morning hours. At midday the monkeys were clearly more centred on staff canteen and in the evening they were more scattered over the entire area.

7.0 Discussion

7.1 Choice of food

Our blue monkey population spent a third of their foraging time with human provided food. This is much more than blue monkeys in other studies, e.g. in Kakamega forest, simply because our population had access to it. As in Kakamega forest, the natural part of our monkeys' diet consisted mainly of fruits and leaves. Unlike blue monkeys in Kalinzu forest (Tashiro, 2006) our population ate almost no insects at all, perhaps because there were not many insects at this time of the year. The consumption of bark was almost zero, possibly because blue monkeys choose to eat bark only when other food items are scarce (Kolla upp detta!) With the exception of human provided food, our blue monkeys had a diet quite similar to those in other studies, e.g. in Butynski (1990), Cords (1986) as well as in Kaplin and Moermond 2000. The diet of guenons differs depending on what habitat they live in. Our population ate mainly fruits (41%) as blue monkeys in most of the previous studies (Chapman et al., 2002; Tashiro, 2006). However, they also ate a considerable amount of leaves (31%) as well, maybe because the availability of leaves was better than of fruits during this time of year.

7.2 Diurnal rhythm

In a study conducted on blue monkeys by Mnson & Obura (2001) the morning hours until 11 hours were spent on feeding and the afternoons on resting and socializing; after 11 hours feeding was resumed but in a slower rate than in the morning (Mnson & Obura, 2001). The diurnal feeding patterns are similar with the related vervet monkey (Baldellou & Adan, 1997). We observed the monkeys between 8:00 and 18:00 hours. Within this period they clearly showed a diurnal rhythm with feeding peaks at the start, middle and end of the observation time, and with resting periods in the middle of the day. We did not record behaviour at night. However, literature implies that most primates sleep at night (e.g. Kingdon, 1971). This might be due to poor eyesight and difficulties to find food at night. Also at night they may get hurt easier if they do not see where they are moving in the forest trees. On the other hand they might get easily detected by predators at daytime. Moreover, blue monkeys might need light to see each other when grooming, playing and foraging. Blue monkeys live in groups and are dependent on each other to survive; some animals often feel more secure when they synchronise behaviour with other group members. Many animals might forage together because the conditions are the best at the time or just because all the other members are doing it. This might favour a diurnal rhythm and increase odds for survival. The diurnal feeding and moving patterns were different compared to other studies like Mnson & Obua (2001). As in other populations, our monkeys were most active in early morning and late afternoon. However, whilst other blue monkeys rest around noon hours our monkeys had another peak in feeding activity, except the ones in morning and at the end of the day which also other populations have. They also lied down a lot more at midday than in the morning and afternoon, when they moved a lot instead. Our monkeys rested mostly during the hottest hour (13:00) right after the peak in feeding human food, maybe because they were satisfied and needed to digest the food.

Whilst our monkeys foraged in the early morning on natural food only, their feeding of human-provided food increased during lunch. Around lunch, they spent up to 80 % of their feeding time with human-provided food. Also in late afternoon they spent considerable time with human-provided food. I suggest that this was due to lunch and dinner opening hours of the kitchen. Orams (2002) states that an animal's ranging area are correlated with their access to food, which is supported by my study. The monkeys appear to be where the food is since they stay in the forest in the morning to feed on fruits and leaves and move at midday to the kitchen and eat human-provided food.

The monkeys feeding and moving activity can be affected by the weather both directly and indirectly by affecting productivity of food and availability of drinking water (Bronikowski & Altmann, 1996). Sunlight and humidity decreased during the day whereas temperature increased. In

the lodge area water is no problem, with access to a natural stream but also human-provided water. The monkeys frequently drank from outdoor sinks, water tanks and pipes (personal observation). The monkeys came out of the forest and in to the partly open staff area during the hottest and driest hours of the day.

Other savannah animals like zebras, wildebeest and Thomson gazelles have much more problems with both water supply and shadow. In contrary to the better adapted Thomson gazelles wildebeest and zebras seek shadow under trees to rest (Jung & Eriksson, submitted). Maybe blue monkeys are more tolerant to sunlight and heat because they can go into the dense and cooler forest whenever they want. Hence, they can afford to gather human-provided food even at the hottest hours of the day.

7.3 Human impact

In and close to the borders of the Maasai Mara Reserve live several animal species close to humans at lodges, like baboons (*Papio cynosephalus*), rock hyrax (*Heterohyrax brucei*), tree hyraxes (*Dendrohyrax spp.*), warthogs (*Phacochoerus africanus*), and bushbucks (*Tragelaphus scriptus*) (personal observations).

In the wild populations of non-human primates will have non or very little contact with humans and therefore also with food provided by humans (Fa & Southwick, 1988; Saj et al., 1999), which is often more rich in calories, easier to digest and more abundant (Forthman-Quick & Demment, 1988; Parker, 1984; Saj et al., 1999). In (Saj, 1998) vervet monkeys (*Cercopithecus aethiops*) spent 36% of their foraging time on food from a kitchen. The most frequently eaten human-provided food items were fruits, vegetables, bread, maize, porridge and peanuts. The monkeys also spent 8.7% of the time consuming food from crop raiding and 5.7% of the feeding time on food given to them by humans. The natural food they consumed accounted for 49.8% and that included insects, grass, herbs, flowers, fruit and berries, leaves and other food (Saj 1998; Saj et al 1999). The monkeys in our study on the other hand only ate 26.4 % human food from the kitchen and trash bins; mostly ugali and fruit but also some drinks, yogurt and eggs. There were no evidence that the monkeys ate from the lodge gardens (there are three gardens in which the staff grow their own vegetables), and there were also no crops near the lodge so the monkeys kept to the trash bins.

The access to human food means an increased energy input per unit of food and this means that the metabolic demands will be reached faster than if eating only natural food. This will improve the monkeys' efficiency to forage and this will in turn set more time free for other activities like grooming or playing (Saj, 1999; Orams, 2002). However, none of this was observed in our study. The monkeys might stay around the kitchen area because they have learned that the people at the lodge are no threat to them and they sometimes can get food here even when natural food is rare. Studies on monkeys ranging area have shown that the ordinary daily ranging distances can be reduced in response to the predictable distribution of human food (Altmann and Muruthi, 1988; Brennan et al., 1985; Fa, 1986; Saj, 1999) like the ones in our lodge. Because the ranging area of primates are closely related to the search of food (Buzzard, 2006) we assume that our monkeys have a concentrated and possible decreased ranging area to stay close to the third biggest food source they have, human made food. If this particularly group of blue monkeys have a decreased range area we could only answer if we had conducted studies on the group before and after the lodge was present. But according to our GPS recordings the monkeys kept on the lodge area or close to it during the study. Which means that they have a range area on about 12 ha which is quite small compared to the range area of the wild blue monkeys in Nyungwe Forest Reserve, Rwanda which had a monthly home range area of around 25.0 ha (Kaplin, 2001). This does not mean that our group did not move over a larger area than the lodge, but the forest is quite limited and if they would like they could move outside the fence and follow the forest along the river. This is what I suspect that the group of red-tailed monkeys which also live at the lodge did, because they were rarely seen at the lodge area. It could be that the blue monkeys just adapted to this small range area because of comfort, big and slow as they are compared to other *Cercopithecus* monkeys.

7.3.1 Aggressive behaviour

Unlike some monkeys in other studies that get food directly from humans, e.g. macaques at Gibraltar (Fa, 1992), our monkeys have not developed any aggressive behaviour against humans. I did not find any studies on aggressive behaviour against humans; Cercopithecus monkeys might just be a non-aggressive species. You would think that many years of feeding by humans, like in Gibraltar, would maybe have altered their behaviour to be aggressive. But our monkeys were not directly feed by the humans; they seek the food themselves and take it. Also, humans (staff and guests) did not disturb the monkeys by following them or trying to touch them. Because of this modest relationship with humans the monkeys are aloud to live their own lives without interference and disturbance from humans if they like, in their natural habitat. They have space to do what they pleas and only sometimes choose to walk among the tents and even then it is only the juveniles that seams slightly curious about the humans. This curiosity could lead to increased human contact but if the guests follow the rules of the lodge, which they seem to do, of not to touch or feed the monkeys, the monkeys will keep their distance. On the other hand these guenons might just take longer time to develop aggressive behaviour, but that will only show in further studies of the group. It is a fact that the most negative effects have happened when tourist are actively feeding the animals (Orams, 2002).

7.3.2 Monkeys health and adaptation

The monkeys seemed to be in good health and unlike the macaques at Gibraltar they did keep their distance from humans and seem to still have awareness against humans which is a good sign. The behaviour of animals are always changing in response to their environment, this is a rule of adaptation (Orams, 2002) otherwise the animals would not survive. In many cases wild animals are already introduced to humans in one way or another and will simply be replaced by tourists instead of other human settlements (Orams, 2002). This might be the case with our monkeys because the lodge area has long been a hunting station an before that the Maasai owned the land.

8.0 Conclusions

The human environment has an effect on the monkeys feeding and moving patterns. The relationships with humans are not negative to anyone, from what can be seen, the humans benefit from the monkeys presence, because guests come and see monkeys in their fairly natural environment. This will bring money to the lodge and as long as the lodge is there it protects the forest from being cut down by farmers (the area is outside the Maasai Mara reserve borders). That is why the monkeys might benefit from it; their forest is protected, the predator pressure is decreased and there is access to food all year around. There are no visible (or of us not possible to investigate) negative effects yet that could hurt the population as for example the population may get more dense because of the easy access to food which can bring more aggressions and diseases within the population. The monkeys' diurnal rhythms maybe have changed but it seems to have been doing so in a slow and propitious paste so that the monkeys could adapt well to the environment. Maybe it is naiv to assume that the monkeys do not suffer from any negative consequences by this relationship but it is a fact that many endangered species have been recovering because of supplementary feeding (Orams, 2002) by humans. In this case I could say that more and longer studies need to be conducted before I can state that this relationship between humans and monkeys are actually hurting/negative or benefit the monkeys. But what I have seen in my study they are not in any immediate danger.

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