CONTENTS

BATS

The influence of Kibale forest trails and past logging activities on the foraging pattern of banana bat (*Neoromicia nanus*)

Abstract

Foraging patterns of bats are influenced by vegetation structure. In this study, the influences of man-made forest trails on foraging activity of the bat species *Neoromicia nanus*, was analysed. *Neoromicia nanus* was using the larger trails frequently with almost no activities on smaller trails or beside trails in the forest. The peak foraging time was 11 pm and the foraging time extended from 8 pm to 1.30 am.

Cristina Maldonado, University of Lisbon, Portugal

Magnus Ellström, University of Lund, Sweden Nicolas

Fasel, University of Fribourg, Switzerland

2009

Can the prey detection and allotonic frequency hypotheses explain the diet composition of *Hipposideros* bats?

Abstract

The differences in echolocation calls and morphology enable insectivorous bats to specialize in foraging strategy and habitat. The prey detection hypothesis links body size of the bat to its diet composition, proposing that small bats have a broad diet by using their full echolocation range, while large bats are restricted to relatively large prey. This is complemented by the allotonic frequency hypothesis, which proposes that several prey types have evolved tympanic ears and can detect bats echolocating between 20-60 kHz, coinciding with frequencies of larger bats. Therefore, it predicts that larger bats will prey more on non-tympanic insects, such as the order Coleoptera, which they are able to digest more efficiently than smaller bats. These two hypotheses are tested during this study on three *Hipposideros* species in Kibale Forest National Park, Western Uganda. Diet composition between *H. cyclops* and *H.ruber* is not different, and the three bat species catch insects well above their minimum detectable prey size. We suggest that bats forage optimally, eating in the size range of insects that is most abundant, to increase their net energy intake. Furthermore, we find a higher amount of Coleoptera exoskeleton in the diet of the largest bat species, supporting the allotonic frequency hypothesis.

James Insell, University of Stockholm, Sweden

Judith Sitters, Wageningen University and Research Centre, The Netherlands

2007

Parasite loading in the fruit bat *Lissonycteris angolensis* in Kibale National Park, Uganda

Abstract

This study looked at parasite loading in fruit bats in Kibale National Park, Uganda. It compared endo- and ectoparasite loading between males and females of *Lissonycteris angolensis*. Our results showed that while there was no significant difference in total endo- and ectoparasite loads between the two sexes there was a difference in the numbers of the ectoparasite Nycteribiidae species (Diptera order), with significantly higher numbers on males than females.

Katie Reeve-Arnold, Trinity College Dublin, Ireland

Kristine Bohmann, Lund University/University of Copenhagen, Denmark

2007

Habitat, echolocation and wing morphology in bats of Western Uganda

Abstract

Echolocation and morphology are important features for bats to cope with their environment. Habitat correlations with call structure and wing morphology for insectivorous bats occurring in the West of Uganda were investigated. From the echolocation call the characteristic frequency gave information about the habitat in which the bats occurred. The wing morphology was investigated for wing loading and aspect ratio. A high characteristic frequency was used by bats that occurred in the forest and a low characteristic frequency for bats that occurred in open areas. Similarly, species that occurred in open areas had a higher wing loading than species that occurred in the forest. Aspect ratio did not differ for bats in open or forest habitats. There is a negative correlation between the characteristic frequency of the call and the wing loading. No correlations were observed for either wing loading or characteristic frequency with aspect ratio. Compared with insectivorous bats, fruit bats had high wing loading. The roosts in the forest and open areas were also investigated. For every roost, a description of its characteristics is given.

Maria Rasmussen, University of Zurich, Switzerland

Denise van der Made, University of Wageningen, the Netherlands

2004

FISH

A comparison of ecological variance of haplochromine cichlids in Lake Saaka and the River Mpanga

Abstract

The haplochromine cichlids of Lake Saaka are believed to be a diversification of a haplochromine species of the connected Mpanga River. We compared the morphology and diet of samples from each population to discover if an adaptive radiation had occurred when the river species entered the lake. We found no difference in variation between the two samples. However, we found that the bees showing the opposite trend. In conclusion we observed both a temporal and spatial separation of the different species of social insects foraging on honeydew, two samples were morphologically and ecologically different. This suggested a scenario where some variation was lost during the

transition from lake to river but that an adaptive radiation still occurred in the lake. The difference in variation was mostly explained by feeding morphology and diet. Any differences between the colour morphs of the lake proved inconclusive due to small sample size.

Aidan MacNamara, Trinity University, Ireland

Kristiina Nygren, University of Uppsala, Sweden

Tanja Nikowitz, University of Vienna, Austria

2003

An experimental test of negative frequent dependent selection by male-male aggression in colour polymorphic haplochromine cichlids of Lake Saaka

Abstract

The studies of haplochromine cichlids have suggested that the males exhibit colour polymorphism, which may lead to competition among them. This study was aimed at testing whether male haplochromine cichlids preferentially attack males of their own colour pattern as opposed to males of other colour. 24 experimental males were caught using baited traps from Lake Saaka, transported to MUBFS and kept in 2 stock aquaria. Each experimental male was tested with 2 different pairs of treatment males alternately. One had a similar colour morph to the experimental male whilst the other a different colour morph. The observations were made with each male interacting for 40 minutes with each pair of males. The behaviours were recorded either as lateral displays, frontal displays or butting. Most of the experimental males showed a preferential aggression on other males of similar colour. This can be said to explain the frequent co-existence of red and blue male types (morphs or species) in haplochromine cichlids.

Edward Okot Omoya, Makerere University, Uganda

Fred Omengo, The National Museums of Kenya, Kenya

2003

Hypoxia tolerance among (Cyprinidae) *Barbus* species

Abstract

Barbus neumayeri is the only one out of several Ugandan river *Barbus* that have formed swamp population with adaptation to low oxygen. In this study, hypoxia tolerance among *Barbus neumeyeri*, *B. cercops*, *B.kerstinii* was compared in terms of Aquatic Surface Respiration (ASR), activity level and latency till first ASR in order to test the hypotheses that non-hypoxia adapted population of neumayeri possess a predisposition to survival in low oxygen compared to the other species. The Barbus species were obtained from normoxic habitat (river) and subjected to hypoxic conditions of swamp water. The results showed that *B. neumayeri* has a lower ASR compared to *B. cercops* and *B. kerstenii* indicating that it has a higher tolerance level for oxygen stress. The data indicate that *B. neumayeri* may lower its metabolic rate by reducing its activity level under oxygen stress. The study also indicated that activity level and latency period are less good measure of oxygen stress than duration of ASR.

Amoussou M. Tatiana, University of Abomey-Calavi, Benin

Harriet Nambozo, Islamic University, Uganda

Mayaki Patience Temitope Abiodun, Ministry of Environment, Nigeria

2003

HERPETOFAUNA

Frog abundance, diversity and community assemblage in ponds and streams at Kibale National Park, Uganda

Abstract

This study focussed on the importance of habitat heterogeneity for frog community diversity and assemblages. We compared frog communities in two different habitat types (stream and pond) in Kibale National Park. Our results showed that some species prefer ponds to streams and vice versa. Even though we did not find any significant difference in species assemblage between the habitats, the study shows that some environmental parameters like pH and dissolved oxygen may significantly affect species assemblages and distribution. Thus it is important for management to conserve a heterogeneous environment with different types of water bodies as well as the surrounding vegetation.

Evelyn Mkandawire, Museums of Malawi, Malawi

Lucie Greuter, University of Bern, Switzerland

Monica Chege, Kenya Wildlife Service, Kenya

2011

Big guys at the waterfront: investigating pre-breeding season calling activity in the tree frog *Leptopelis christyi*

Abstract

Advertisement calling by anuran males at breeding sites is costly. Calling males trade-off potential reproductive reward against higher rates of predation, as well as energetic and lost opportunity costs. In Kibale, Western Uganda however, *Leptopelis christyi* males appear to call without obvious reward: males congregate and call before the onset of the seasonal rains, the subsequent formation of suitable temporary breeding ponds, and the arrival of ovulating females. We investigated this, apparently fruitless, pre-breeding season behaviour and found larger males calling from positions close to breeding ponds. Supported by further observational data, we suggest that males congregate in order to establish breeding territories in anticipation of the mating season.

Jessica E. M. van der Wal, Wageningen University, The Netherlands

Felicity E. Bedford, Oxford University, UK

Erasmus K. H. J. zu Ermgassen, University of Cambridge, UK

2010

A bioacoustic and morphometric account of Albertine Rift litter frog, *Artholeptis schubotzi* (Amphibia: Anura)

Abstract

The biology of East African amphibians are poorly studied, one of which being *Arthroleptis schubotzi*, a small, direct developing frog, characterised with an extremely elongated third digit in males. This study revealed that male *A. schubotzi*, a diurnal leaf litter frog, calls from within the undergrowth at edge habitats in Kibale Forest, West Uganda. These anurans display a peak calling activity in the late afternoon. Morphological measurements indicate that the third finger is not necessarily allometrically scaled to body size and can reach four times the length of neighbouring digits. High site fidelity in males is evident and two calls, an advertisement and an encounter call are described here, both of which

can be readily elicited via playback experiments. Possible proximate functions of the elongated digit in males are also discussed.

H. Christoph Liedtke, Lund University, Sweden

Isabelle Maiditsch, University of Vienna, Austria

Jacob Ng'wava, National Museums of Kenya

2010

Predictions in locomotor abilities and individual assessment in the blue headed tree agama, *Acanthocercus atricollis*, using morphological traits

Abstract

Male blue-headed tree agamas are highly territorial, defending their territories aggressively against the presence of other breeding males. They display high site fidelity and can often be seen in display. The exact communication methods used between individuals is unknown but appears to involve several visual signals, from head bobbing and push up displays to tail wagging. During this study we investigate locomotor ability, morphological characteristics and colouration change and the possible role they may play in social interactions between adult males. Our results suggest that body length and head size and not colouration change are the more important cues in determining social dominance between individuals and that within this species locomotor ability can be predicted using the residual femur to body length.

Brian Bradshaw, NUI Galway, Ireland

Paloma Serrano, Autonoma de Madrid University, Spain

2010

Size does matter: predation vulnerability and response of tadpoles to the presence of *Laccotrephes* sp. (Nepidae)

Abstract

In this study we investigated the effects of tadpole prey size on vulnerability to predation and the response of tadpoles in the presence of a predator. This experiment shows that tadpoles respond by significantly increasing their activity, measured in distance from predator. Smaller tadpoles were found to respond with more distance covered from predator compared to larger tadpoles. Our results show that prey size may increase the vulnerability of predation.

Ciara Quill, Trinity College Dublin, Ireland

Iroro Tanshi, University of Benin, Nigeria

2010

Territoriality in the blue-headed tree agama *(Acanthocerus atricollis)*

Abstract

The presence of a large number of dominant male *Acanthocerus atricollis* was observed on various buildings around the Makerere Biological Field Station, Kibale, Uganda, and the presence of territoriality amongst these populations of agama was tested. There appeared to be distinct site fidelity within observed adult males, as they were shown to spend significantly more time than off their territories. The level of this site fidelity could not be explained by any morphological features of the males. The movement of all classes of agamas (male, female and juvenile) could not be explained by sex or age class, with results suggesting that all sex and age classes were equally likely to be found repeatedly in the same locations.

Katie Dean, University of Plymouth, UK

Kim Warren, University of Nottingham, UK

2010

Anuran niche partitioning in a eucalyptus reforestation area in Kibale National Park

Abstract

Little is known about how amphibians avoid hybridization. Theory predicts that niche partitioning prevents species from interbreeding, i.e. calling anuran males attract their conspecific females by using different activity patterns over time, spatial segregation and different sound characteristics. This study compares these patterns in seven frog species and shows that all three of these ways are used to avoid attracting non-con-specifics.

Markus Böckle, University of Vienna, Austria

Thomas Schwizer, University of Zurich, Switzerland

Ben Kubbinga, University of Leiden, The Netherlands

2005

Where to live and what to dine upon? A striped skink's perspective

Abstract

Distribution of striped skink, *Mabuya striata*, and their prey choice was investigated at MUBFS, Kibale, Uganda. Choice experiments were conducted to discover whether skink distinguish chemically or visually between palatable and unpalatable food. Skink did not prey on *Acrea alicia* or *Vanessula milca* butterflies. Beetles (family: Scarabidae) were chosen with equal priority, 1:1, as grasshoppers (*Acrididae* sp.) and in preference to either butterfly species. Skink can perceive untreated banana, but are not inclined to eat it. Location of skink on buildings can be predicted by amount of sun, building surface area and presence of agama lizards, which was calculated by performing a multiple regression.

Tamzin Hackett, University of Newcastle, UK

Åsa Kestrup, Lund University, Sweden

2002

Feeding behaviour of *Chamaeleo ellioti* (Elliot's Chameleon) on Batesian mimics of butterflies

Abstract

Feeding behaviour of *Chamaeleo ellioti* was investigated with three pairs of butterfly species: A palatable (*Eurema hacabe*) and unpalatable butterfly (*Acraea aurivilli*); a Batesian model (*Acraea johnstoni*) and its mimic (*Neptis melicerta*); and a different Batesian model (*Acraea alicia*) and its mimic (*Vanessula milca*). These were given to individuals of *C. ellioti* in a random series of choice experiments. *C. ellioti* was apparently able to distinguish between *E. habace* and *A. aurivilli*, and between *A. johnstoni* and *N. melicerta* , actively avoiding the unpalatable species. There was no difference in the proportion of *A. alicia*, and its mimic *V. milca* eaten. Fitness of mimics could be related to frequency of model and mimic in the environment, and to palatability of the model. Most of the individuals that ate the unpalatable/model in the first series of experiments avoided them in subsequent 'learning' experiments. Predation behaviour was observed for different prey species. Butterflies tend to behave in a cryptic manner, avoiding predation.

Tiffany Aylett, University of East Anglia, UK

Victor Wasonga, National Museums of Kenya, Kenya

1998

A study of behaviour and territoriality in the tree agama, *Stellio atricolis*, at the Kanyawara Field Station, Kibale National Park, Uganda

Abstract

The aim of this study was to investigate the different behaviour patterns and the territory size of tree agamas, living on the walls of the different buildings on the field station, and to compare the activities of males and females. Nine females, eight males and two sub adults were caught, marked and observed between 9. and 15. July 1998. The data showed no correlation between time of day, sex and time spent in different behaviour patterns. The territories of the different individuals of both sexes were overlapping and no territorial defence activities were observed. An ethogram was compiled for this species and its courtship behaviour described.

Monica N. Wymann, University of Basel, Switzerland

1998

Thermoregulatory behaviour in *Mabuya striata* at Kibale National Park, Uganda

Abstract

The aim of this study was to investigate the different behaviour patterns and the territory size of tree agamas, living on the walls of the different buildings on the field station, and to compare the activities of males and females. Nine females, eight males and two sub adults were caught, marked and observed between 9 and 15 July 1998. The data showed no correlation between time of day, sex and time spent in different behaviour patterns. The territories of the different individuals of both sexes were overlapping and no territorial defence activities were observed. An ethogram was compiled for this species and its courtship behaviour described.

Tamara Burger, University of Vienna, Austria

Joaquim Reis, University of Lisbon, Portugal

1998

PRIMATES

Pre-dispersal seed handling treatment by five sympatric non-human primates in Kibale National Park, Uganda

Abstract

One hundred and ten feacal samples from 5 primate species (*Pan troglodytes, Papio anubis, Procolobus rufomitratis, Colobus guereza* and *Cercopithecus ascanius*) were collected between the 17th-24th July, 2012, in Kibale National Park, Uganda. The aim of this study was to investigate and compare the dispersal potential of these primates, in terms of the number, diversity and quality of seeds. We found that in line with previous literature, *Pan troglodytes* is an important disperser of a diverse number of plant species. Whereas, despite dispersing a large number of different seed species, *Papio anubis* is limited in its role as a major disperser by its restricted range on the forest edges of Kibale. Of important conservation interest was the indication of *Papio anubis* acting as a

potential disperser of the invasive plant species *Lantana camara*.

Peter Fundi, University of Nairobi, Kenya

Gift Sarafadin, University of Juba, South Sudan

Max Berrill, University of Bristol, United Kingdom

2012

Activity patterns and feeding ecology of Red-tailed Guenons and Red Colobus: A comparison of two species in Kibale National Park, Uganda

Abstract

According to the competitive exclusion principle, fundamental niches of species sharing the same habitat should not overlap. As in Kibale forest the primate biomass is very high, we compared the activity patterns and the feeding ecology of the frugivorous/insectivorous Red-tailed Guonons (*Cercopithecus ascanius*) and the folivorous Red Colobus (*Procolobus pennantii*) to detect differences, enabling coexistence between them. We found significant differences in the activity patterns and also in the feeding times spent on different food items. No significant difference could be detected in the feeding rate. In the plant species they fed on, only 3 of 21 species were used by both species. Our conclusion was that due to niche differentiation in the past, no interspecies competition is going on nowadays between the two species.

Mbunya Francis Nkemnyi, Environment & Rural Development Foundation, Cameroon

Janine Quaas, Ludwig-Maximilians University of Munich, Germany

2008

A comparison of the social interactions between uni-male and multi-male groups in the Black-and-white Colobus, *Colobus guereza,* in Kibale forest

Abstract

The Black-and-white Colobus monkey, *Colobus guereza*, lives primarily in small, uni-male groups; however, occasionally, additional adult males may be present. This study compared the social interactions between uni-male and multi-male groups, to investigate differences due to possible competition between males for mating partners. Data on behavioural interactions and spatial proximity of adult males and females was collected for several uni and multi-male groups. The results indicated that adult males had a closer proximity to adult females in uni-male groups. Within multi-male groups differences existed between individual adult males in relation to proximity to adult females. Considerable variation was observed between the individual groups of uni/multi-male in terms of social interactions.

Filipa Alves, University of Lisbon, Portugal

Ibrahim A. Bakarr, Centre for Biodiversity Research, Sierra Leone

Neil Walsh, University College Dublin, Ireland

2006

Activity budget of Black-and-white Colobus (*Colobus guereza*) in mono- and poly-specific associations in relation to predation

Abstract

We investigated differences in activity budget of Black-and-white Colobus (*Colobus guereza*) when

in mono- and poly-specific associations. Scan sampling was used to measure the behaviour of six groups of Black-and-white colobus in Kibale Forest, Uganda. We found that in poly-specific associations, vigilance significantly increases at expense of resting. No significant difference was observed for other behaviours (feeding, moving and socialising) between mono- and poly-specific groups. Furthermore, it seems that mixed-species associations occur at random in Kibale Forest.

Stephanie Rion, University of Fribourg, Switzerland

Martina Ozan, Imperial College, Slovakia

2006

Comparison of parasite load of Black-and-white Colobus (*Colobus guereza*) in two different habitats, Kanyawara, Kibale National Park Uganda

Abstract

In this study, the parasite load in groups of Black-and-white Colobus (*Colobus guereza*) living in two different forest habitats, edge and interior, was compared by analysis of fecal samples. Observations of foraging behaviour were conducted in order to detect possible links to parasite occurrence. Differences in foraging behaviour between the two habitats were found both in time spent foraging and food items eaten but since no difference in parasite load was found it was not possible to establish a link.

Heidi Forsom, Aarhus University, Denmark

Julie Zaehringer, University of Zurich, Switzerland

Stina Berg, Stockholm University, Sweden

2006

Impact of dietary preferences and habits of Black-and-white Colobus (*Colobus guereza*) on some tree species in Kibale National Park

Abstract

The main aim of this study was to examine impact of dietary preferences and habits of the Black-and-white Colobus focusing on five study groups. Plants are defended against herbivores and vary in their palatability. It was found that young leaves were less tough and often preferred to mature leaves. It was also discovered that there was a highest preference for *Celtis durandii*. The preference for young leaves was attributed to low toughness and high defence in mature leaves. We found out that there was a relationship between observed damage and preference for certain plants.

Robinson Orume, Korup National Park, Cameroon

Madalitso Kaferawanthu, Wildlife and Environmental Society, Malawi

2006

Bark stripping of *Celtis africana* by Red Colobus monkey, *Colobus badius tephrosceles* in Kibale National Park, Uganda

Abstract

Many studies in the recent years have focused on the food habits of Colobus monkeys and their concomitant social organisation. Understanding the feeding habits of Red colobus is not only essential to their ecological relation to plants and other animals but may also contribute towards an understanding of their ranging patterns and social organisation (group size, intra-group dispersion and inter-group relations). A six day study was carried in the lower camp area of Kibale National

Park covering the area between grid S2 to D8 on bark stripping of *Celtis africana* by Red Colobus monkey *Colobus badius tephrosceles*. This site is known to have an appreciable population of Red Colobus. The aim of the study was to provide information on possible impacts of bark stripping on *C. africana* and to determine whether the bark of this tree species is an alternative food source of Red colobus monkey. Quadrats were used and all the bark samples collected were counted and grouped into four categories based on time period after been stripped off the tree. These categories were; fresh, recent, old and very old. The proportion of bark eaten was assessed and categorised as either 0-25%, 25-50%, 50-75% or 75-100%. Damage resulting from debarking was also assessed. There were significant differences between the age categories of the bark, the between the number of the barks eaten and those not eaten. There were also significant differences in the proportion of the bark eaten by the colobus. There were significant differences between the lower, middle and upper branches in percentage and the mean number of bark samples was positively correlated to percentage damage. This implied that the bark of *C. africana* is a seasonal food for Red colobus monkey, and that bark stripping by the colobus has an impact on the tree.

Simon Longonje, Wildlife Conservation Society, Cameroon

Kiptoo arap Kosgey, Moi University, Kenya

1998

RODENTS

Density and diet of *Praomys jacksoni* (Jackson's soft-furred mouse) and *Lophuromys sikapusi* (Rusty-bellied brush-furred rat) in two different habitats in the Kibale Forest National Park, Uganda

Abstract

There has been very little research on rodents in the Kibale Forest National Park with the latest papers dating well over 20 years ago. To understand the relationship between habitat type and density (also habitat and diet) of two common species, we did a mark-recapture study, using 25 Sherman traps in both the forest and outside habitat. We found out that the density and the BMI of *P.jacksoni* is higher in the forest habitat. Additionally, *L. sikapusi* only appeared in the outside area with a lower estimate population size than *P.jacksoni*.

Helen Allinson, Anglia Ruskin University, UK

Anastasia Kotlubei, University of Vienna, Austria

Diede Melsen, Wageningen University, Netherlands

2014

A comparison of arboreal and terrestrial small rodent abundance in two different habitats of Kibale Forest National Park, Uganda

Abstract

This study compared small rodent diversity and abundance in a regenerating *Eucalyptus grandis* plantation and mature forest site within Kibale Forest National Park and found that both, the species richness and density of rodents was higher in a regenerating *Eucalyptus grandis* plantation than in mature forest. In both sites arboreal and terrestrial caught numbers were compared but no significant difference was found. There was a highly significant difference between the captures in

the two sites. Six species were captured over both sites. *Hybomys univittatus* was the most abundant species in the *Eucalyptus grandis* plantation. Four (4) species were caught in the mature forest, where *Praomys stella* was the most abundant species.

Helena Greter, Université de Fribourg, Switzerland

Fredrick Lala Odock, Kenya Wildlife Service, Kenya

Edward Kakungu Chilufya, Zambia Wildlife Authority, Zambia

2008

Comparisons of rodent ecology between mature forest and eucalyptus plantations in Kibale National Park

Abstract

Previous forest management policy favoured the planting of monospecific plantations within areas that now have protected status. The effect of this on rodent diversity and seed dispersal by rodents has not previously been studied. Eucalyptus plantations and mature forest plots were compared for differences in rodent diversity using live trapping methods. Levels of seed predation and dispersal were also measured using feeding stations. Plantations had fewer rodent species and individuals and no seed predation, which has implications for regeneration efforts.

Isis Mogut, Universität Karlsruhe, Germany

Magnus Mosha, Frankfurt Zoological Society, Tanzania

Andrew Rodrigues, Université de Montpellier II, France

2007

OTHER INVERTERBRATES

Does trail density and trail width affect the habitat use of *Loxodonta africana* in Kibale National Park, Uganda?

Abstract

The Kanyawara section of Kibale National Park is affected by human-wildlife conflicts, especially caused by elephants leaving the park borders. This study was carried out to assess whether trail density and trail width in the forest reserve influence the habitat use and movement of elephants. In nine sampled plots of 4 ha the width and length of trails was recorded, as well as the piles of elephant dung and evidence of elephant activities. The trail width ranged from 0.58 m to 4.12 m and the total trail length in a plot from 806 m to 2,243 m. We found no relation between trail density and elephant occurrence but did find that the width does influence the habitat use of elephants with them preferring trails with a width of $\geq$ 1.70 m.

Iris van der Meer, Wageningen University, The Netherlands

Sonja Johanna Schmidt, Hamburg University, Germany

2007