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BATS

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 was 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

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

**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

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 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 neumayeri*, *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

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. hacabe* 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

Mabuya striata (family Scincidae) is a very common lizard throughout East Africa. The aim of this project was to study some components of the thermoregulatory behaviour of this species. The number of skinks on the walls of four buildings at MUBFS were recorded every hour from 9h00 to 18h00. Air temperature and wall temperature were also recorded every hour. 47 individuals were caught, measured and marked. The time of first appearance of marked skinks were recorded for 3 days. Analogous observations were made of skinks kept in captivity. We recorded as well the time spent exposed to sun of individuals, age class of the individuals and temperature of the wall where they were exposed to sun. We found daily rhythms to be very variable. Wall temperature explains 28.5 % of variation of number of skinks at each hour. We concluded that skinks are selecting the walls with the highest temperature. Our study was inconclusive about the relation between time

spent exposed to sun and wall temperature. Our results support the idea that smaller skinks absorb heat faster but we were unable to prove that they spend less time exposed to sun.

Tamara Burger, University of Vienna, Austria

Joachim Reis, University of Lisbon, Portugal

1998

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 *Acraea alicia* or *Vanessa 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

Anuran niche partitioning in an 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

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

2009

PRIMATES

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

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 Zuerich, Switzerland

Stina Berg, Stockholm University, Sweden

2006

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

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

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 Guenons (*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

RODENTS

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

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
