Volume 14

October 2007

African Bat Conservation News

ISSN 1812-1268

Inside this issue:

Above: A male Cape Serotine bat (*Neoromicia capensis*) caught at Makalali Game Reserve, Limpopo province, South Africa on 13th April 2007 [ECJS-06/13/04/2007 - deposited in the Transvaal Museum].

Notes from the Editor:

During September this year I was fortunate to visit Poland and Germany. In Poland Teresa Kearney and I worked on collaborative projects with Wieslaw Bogdanowicz and his team at the Polish Academy of Science in Warsaw, on *Laephotis* (see ABCN 11: 2) and *Sauromys*. We were also taken to a Nature2000 bat reserve called Nietoperek (meaning "not at bird") in the west of Poland, which has been recognised to protect a relatively recent hibernaculum of 17 bat species in 32 km of German built military bunkers. Tomasz Kokurewicz, who has been active in the recognition of this bat reserve and has also been coordinating the annual winter bat census in the bunkers (a single day, dawn to dusk survey with 50-60 volunteers from all over Europe), showed us a small section of the bunkers where we were able to see a few of the early arrivals, and we had some interesting discussions about the conflicting interests of bat conservation and military history tourism at Nietoperek.

Hendrik Turni had informed me of his, as yet unpublished, work identifying the chiroptera type specimens in the Humbolt Museum of Natural History in Berlin. With the knowledge that this collection housed specimens collected by Karl Hendrick Peters from Mozambique in the early 1830's, as well as collections from former German colonies in Africa a stop in Germany to examine part of the collection was added to my overseas visit. The African chiroptera collection in the Humbolt Museum of Natural History is large and I am certain it is going to reveal some interesting treasures as the collections are worked through.

I have been requested to change the section title of "Debates and Updates" to "Discussion and Updates". The purpose of this section is to allow a forum for discussion and updates of African bat related topics / information from anyone who wishes to make submissions to the editor. Discussion is not limited to a single issue at a time, and may revisit past topics. The January issue of this publication may include a number of bat banding related contributions, including to the "Discussion and Updates" section, the email correspondence (where permission has been given by the authors) that circulated largely within South Africa earlier this year with regards bat banding as a marking technique. You are welcome to share your experience or add your opinion to this discussion, some questions that you may wish to respond to are - Do we need to band bats? What other, alternative marking techniques are available? Another suggestion for contributions to the "Discussion and Updates" section is for contributions in relation to good and best practices in bat conservation (see the survey publication on page 7).

This will be my last regular "Notes from the editor" I have been finding this piece more difficult to write, and it does not contribute as much as the other sections to this publication.

Ernest C.J. Seamark

PS: Does anyone have bat images to use in future issues, as I seem to be running out.

Download site for ABCN:

www.Africanbats.org

All Out · Transvaal Museum · Durban Natural Science Museum

ISSN 1812-1268

RECENT LITERATURE

21st Annual Conference of the Society for Conservation Biology

Nelson Mandela Metropolitan University, Port Elizabeth

1 - 5 July 2007

Paper Presentations

Julie Razafimanahaka

CONSERVING MADAGASCAR'S FRUIT BATS: A CHALLENGE FOR BIOLOGISTS, GOVERNMENT AND COMMUNITIES

RAZAFIMANAHAKA, J., Andriafidison, D., Andrianavoarivelo, R., Racey, P., and Jenkins, R.

Maintenance of wild populations of Madagascar's three endemic species of fruit bats is a major challenge to conservation biologists. Although these bats are threatened species they are classed as game and can be legally hunted for sport, subsistence and commerce, with certain restrictions. In reality, the law is widely ignored and hunting occurs throughout the year and there is growing evidence of population declines and roost desertion because of over-exploitation and forest clearance for agriculture. The important ecological services, such as seed dispersal and pollination, provided by these bats are also in jeopardy. We advocate a 5-point conservation plan for Malagasy fruit bats that includes (i) implementing and augmenting wildlife legislation (ii) the inclusion of bats roosts in new protected areas (iii) defining their landscape requirements (iv) education and training for local communities and professionals and (v) quantifying their ecological role. After years of neglect in Madagascar, fruit bats are beginning to receive attention from conservation biologists, due mainly to a capacity building programme for Malagasy students established in 1999. With the ongoing project to expand the protected area system in Madagascar, there has never been a better time to improve establish a conservation plan for the fruit bats.

Richard Jenkins

FRUIT BAT POLLINATORS LINK TERRESTRIAL AND MARINE CONSERVATION IN MADAGASCAR

Andriafidison, D., Andrianavoarivelo, R., Racey, P., **JENKINS, R.**, and Ramilijaona, O.

Madagascar's three endemic and threatened fruit bat species of fruit bat play a potentially vital role as seed dispersers and pollinators. In Kirindy-Mitea National Park in western Madagascar, we studied the visits of mammal pollinators to endangered baobab trees *Adansonia grandidieri*. Nocturnal observations of fruit bats and lemurs were made at 35 flowering trees in intact forest (13), degraded forest (13) and agricultural land (9). The large fruit bat *Pteropus rufus* was the most common mammal visitor and highest visitation rates were recorded on baobabs in agricultural land. Small lemurs were not recorded from this habitat, and visited baobabs in degraded forest more often than in intact forest. We located two *P. rufus* roosts in mangrove forest 8-10 km from the baobab forest. Lemur pollination appeared to be far less important than *P. rufus* and for the fruit bats to be conserved the mangrove roost sites need to be incorporated into conservation plans. At other sites in Madagascar *P. rufus* roosts in small offshore islands. Fruit bat roost sites need to be conserved to maintain the ecological services provided by these bats even when feeding areas and roosting sites are physically separated.

Francois Durand

THE CONSERVATION OF KARST ECOLOGY IN SOUTH AFRICA

DURAND, F.

Gauteng is the smallest province with the largest and fastest growing population in South Africa. Fast-growing urbanisation is accompanied with growing pressure on the existing water supply, sanitation and waste management infrastructure. Research done shows that the abstraction of groundwater poses a serious threat to the structure of karst and karst ecology in the dolomitic regions of South Africa. In addition, several anthropogenic factors such as mining activities, poor waste management principles, certain farming practices, urbanisation and pollution threaten not only karst ecology but also the potability of surface and groundwater in Gauteng. These anthropogenic disturbances pose a serious threat to aquatic ecosystems in this region. The development of the Cradle of Humankind World Heritage Site as a major tourism attraction puts additional pressure on this fragile ecosystem. Most of the caves and associated groundwater in the dolomitic regions of South Africa are occupied by organisms, including numerous indigenous bat species and endemic invertebrate species, which form an intricate food web. The proposed management plan for karst ecosystems in Gauteng is the first step towards the conservation of this sensitive and unique part of the biodiversity and natural heritage of South Africa.

ISSN 1812-1268

Poster Presentations

DOES THE INCREASED ELEPHANT POPULATION HAVE AN ADVERSE AFFECT ON BIODIVERSITY IN THE KRUGER NATIONAL PARK?

GRANT, R., Kruger, L., Kruger, J., and Biggs, H.

The mission of the South African National Parks is to maintain biodiversity in all its natural facets and fluxes. Significant value changes involving animal rights and the value of ecosystem services led to a moratorium on elephant culling in areas where they have been successfully protected. Since this happened the elephant density has increased from an average density of 0.41 elephant /km2 in 1994 to 0.66 elephant /km2 in 2006. This increase in elephant density has led to concern that biodiversity may be affected as previous studies elsewhere have shown that a conversion of woodland to shrubland took place at elephant density above 0.5 elephant /km2. To be able to fulfill SANParks's mission, the effect of elephant on biodiversity in its full complexity of process, function and structure, needs to be understood. A framework to evaluate these aspects traces the effects on vegetation structure and composition as a function of plant traits and elephant preferences, and the resultant knock-on affects on other species. Preliminary monitoring and research results are used to examine these hypotheses. Large trees have decreased over time, although it is difficult to relate this to elephant impacts alone. Changes in tree structure effect bird and bat diversity especially if this is associated with a loss of layers at different heights. Very little effect on rodents, amphibians and reptiles can be shown at this early stage.

Simone van Tonder

THE ECOLOGICAL ROLE OF CAVE-DWELLING AMPHIPODS IN THE DOLOMITIC REGION OF SOUTH AFRICA

VAN TONDER, S., and Durand, F.

Specialized stygobitic amphipods are found in ground water in dolomitic caves and aquifers in South Africa. Stygobitic amphipods form part of the food web within groundwater. Amphipods, water and soil samples were collected from water bodies within dolomitic caves in Gauteng and the Limpopo Province. General ecological observations were conducted at each of these sites. Bacteriological analyses were done on the gut contents of the amphipods and the silt and water at each collection site. Various microbiological tests were undertaken to establish the gut contents. Feeding experiments conducted on the amphipods in an environmental room show that amphipods are omnivorous, scavengers and predators. They feed on bacteria, fungi, plant and animal debris, bat faeces and prey upon one another. The conclusion is that amphipods feed on any organic material present within caves, including one another. Amphipods are the end consumers of an intricate food web situated both outside and inside the cave environment and above and below the water table. This study fills an important gap in our knowledge of stygobitic amphipod behaviour and the amphipod's relationship to the rest of the food web that is essential for the conservation of this vulnerable ecosystem.

the Zoological Society of Southern Africa

33rd Bi-annual Conference of the Zoological Society of Southern Africa

North-West University, Potchefstroom, South Africa

8 - 11 July 2007

CRYPTIC GENETIC LINEAGES OF THE COMMON LITTLE FREE-TAILED BAT *(CHAEREPHON PUMILA)* IN SOUTHERN AFRICA

Peter Taylor

TAYLOR, P.[1], Lamb, J.[2] and Reddy D.[2]
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The little free-tailed bat *(Chaerephon pumila)* is widespread in Africa and frequently inhabits human habitations where it is often regarded to be a pest. Across its wide range in Africa the species shows considerable morphological variability yet recent analyses of partial and complete cytochrome b sequences failed to reveal any evidence of speciation or phylogeographic differentiation in southern Africa. Here we present data from the mitochondrial D-loop of 34 individuals from throughout the KwaZulu Natal Province of South Africa and Swaziland that reveal the presence of three discrete lineages, based on "bar-codes" from nucleotide substitutions at 42 positions. Haplotype analysis distinguished 16 haplotypes which grouped into three lineages (clades) separated by between 15 and 23 mutational steps. The first clade (A) comprised a star-like configuration of seven haplotypes from the "hinterland" of South Africa (western Swaziland and the Kruger National Park) as well as from Durban, where the coastal plain is very narrow. The Durban and "hinterland" haplotypes were separated by eight mutational steps. A second lineage (Clade B) comprised a star-like configuration of eight haplotypes separated by 1-2 steps, representing populations from the Indian Ocean coastal plain of southeastern Africa (Zululand and the lowveld of Swaziland). Five Clade A individuals occured sympatrically with Clade Bin Zululand but no Clade B individuals occurred in the Durban area or South African hinterland. Sympatry could be evidence of reproductive isolation between species (with incomplete lineage sorting), or it could be due to introgression of maternal haplotypes. The third clade (q comprised just one distinct haplotype comprising two individuals from the Durban area. Given the intermediate position of Clade C between Clades A and Bit is this Oade may indicate hybridization. The origin and distribution of the described lineages is best explained by historical events relating to the Last Glacial Maximum at 18,000 years, which could explain the recent origin of Indian Ocean coastal plain populations. Genetic data from the D-loop are analysed by population genetic methods to explore possible demographic parameters which may support or refute this hypothesis. We also examine morphological variables of voucher specimens used in the molecular analysis to search for morphological correlates of the two recognized lineages.

10th International African Small Mammal Symposium

International Institute of Tropical Agriculture, Abomey-Calavi, Benin (West Africa)

20 - 25 August 2007

NOTES ON SYSTEMATICS OF THE *RHINOLOPHUS FERRUMEQUINUM* GROUP (CHIROPTERA) IN AFRICA

Pter Benda

Benda P.[1,2], Vallo P.[3,4] and Reiter A.[5]
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In Africa, the *R. ferrumequinum* group consists of five species, from which two occur also in the Palaearctic, *R. ferrumequinum* and *R. clivosus*. We analysed an extensive material of these two species originating from South, East, and North Africa as well as from Europe and Southwest Asia, using morphologic and molecular genetic approaches. Morphometric analysis divided the examined specimens of various geographic origin into groups basically responding to two known species, although large individuals of *R. clivosus* conformed in size to smaller ones of *R. ferrumequinum*. In both species, cline shifts in metric characters were present and the largest representatives of *R. ferrumequinum* meet the smallest bats of the *R. clivosus* rank in the Levant. Genetic analysis (cytochrome *b*) of the complex showed five main lineages. Most distinct was the Libyan form of *R. clivosus* from Cyrenaica, which constitutes a new species within the complex. Remaing lineages represent (1) Asian *R. ferrumequinum* (*nippon*), (2) and (3) Afro-Arabian forms of *R. clivosus* (South African *augur* and Yemeni *acrotis*), and (4) little divergent haplotypes of both species from western Palaearctic. Size-distinct Egyptian forms of *R. clivosus* (*clivosus* and *brachygnathus*) showed close genetic affinity. The Middle Eastern haplotypes of *R. ferrumequinum* slightly diverged from the compact European sublineage. Low divergence was shown between the Maghebian *R. ferrumequinum* and Libyan *R. clivosus* from Tripolitania. On the DNA level we proved that the high phenotype variation in the *R. ferrumequinum/clivosus* complex does not respond to the genetic variation. This suggests a relatively quick and recent spreading throughout the Afrotropics and Palaearctic. Our view on the *R. ferrumequinum/clivosus* complex represents a challenge for taxonomic revision of the *ferrumequinum* group. We acknowledge grant supports of the work (GACR 206/05/2334, GAAS CR IAA6093404).

NOTEWORTHY RECORDS OF BATS (CHIROPTERA) FROM SENEGAL

Cervený J.[1,2], Koubek P.[1], Bryja J.[1], Konecný A.[1,3,4] and **Benda P.**[5,6]
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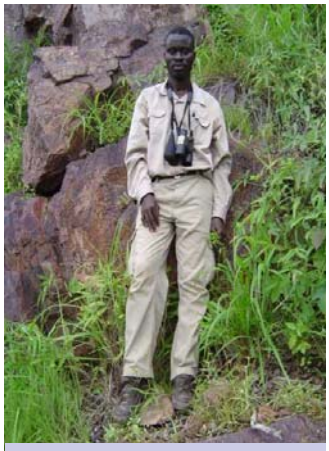
The knowledge of bat fauna of Senegal is relatively poor. Our bat investigations in this country were focused mainly to the area of the National Park Niokolo Koba (SE Senegal), which represents a mosaic of different habitats. We present results conducted during eight field trips made in the from 2002 to 2007, when bats were captured to mistnets or harptraps above the water or in the savannah/forest, occasionally were recorded directly in their shelters (underground spaces, tree hollows, buildings). We found at least 33 chiropteran taxa, however, several species identifications is better to consider preliminary because of unclear situation in several genera (*Rhinolophus*, *Hipposideros*, *Scotophilus*, etc.) and successive detailed morphologic, cytogenetic and molecular studies are necessarry. The records of *Nanonycteris veldkampii* (for the first time recorded in Senegal, from three sites), *Rhinolophus* cf. *fumigatus* and *Hipposideros jonesi* (first records), *Rhinophoma hardwickii*, *Rhinolophus alcyone, Hipposideros cyclops*, *H.* cf. *gigas*, *Lavia frons,* and *Myotis bocagei* (second records), and *Lissonycteris angolensis* (fourth record in Senegal), seem to be the most important faunal results of our project. We acknowledge grant support of the work (GAAS CR IAA6093404).

IMPORTANCE OF PROTECTED AREA IN BIODIVERSITY CONSERVATION IN BENIN: CASE STUDY OF BAT



Bruno A. Djossa

Djossa B.A.[1], Fahr J.[2],. E.V Kalko[2], Sinsin B.[1]
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Bat survey in Benin started in 1968 with naturalists of Smithsonian Institution. Only few and sporadic investigations occurred with foreign naturalists since this time and from 2003 Benin native naturalists started prospecting bat. But few ecosystems have been surveyed up to now. 50 bat species are recorded for Benin at this stage of knowledge on this small mammal group. Bat captured in Pendjari region (within and around Biosphere Reserve of Pendjari) between 2004 and 2006 contributed to reach 32 bat species (64 % of known bat species) for this region, showing the highest diversity at the country level. Of the 11 known fruit bat species for the whole country, 8 (73 %) are recorded in Pendjari region. Rare and less common fruit bats occurred mainly or exclusively within the Biosphere Reserve of Pendjari. This result demonstrated the importance of protected area in bat conservation in Benin.

ZOONOTIC DISEASES: A NEW BOOST FOR AFRICAN SMALL MAMMAL BIOLOGY

Herwig Leirs

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The last decade has seen a strongly increased interest in infectious diseases and new and (re-)emerging pathogens, often of zoonotic origin with reservoirs in wildlife. Consequently, there is also a renewed attention for the role that small mammals play in the ecology and epidemiology of such infections. Those animals are indeed a potential reservoir for numerous pathogens and they have been involved (or suspected to be involved) in several important outbreaks of diseases. The growing interest for wildlife-borne diseases can be seen on all continents, but Africa attracts some special attention. This is linked to the high biodiversity there, the fact that small mammals have been largely unexplored with regard to infectious diseases, growing contact between humans and wildlife in previously untouched areas and the increased ease of transport. Outbreaks of hemorrhagic fevers for which the reservoir is not even known, the existence of very active plague foci or instances where exported small mammals initiated an epidemic of a tropical disease at northern latitudes, further contributed to this impression. In recent years, a number of studies have been undertaken to investigate the role that small mammals play in the ecology and epidemiology of different zoonotic infections in Africa and it is expected that this trend will continue for some time. I will indicate a number of fields where more knowledge is urgently needed, related to several disciplines of African small mammal biology. A fundamental question remains to identify the reservoir of several infections. For some diseases (e.g. Ebola and Marbug fever, caused by filoviruses) the reservoir is still unknown although evidence points towards bats. Other diseases have since long been recognised as "rodent-borne", like Lassa fever or plague. Yet for plague, we do not even know which species are active reservoirs outside epidemic or epizootic periods. For Lassa fever in Western Africa, the reservoir was only recently confirmed to be specifically *Mastomys natalensis* and not the other species of the genus in the region, which explains also the regional distribution of the disease. This kind of questions require proper taxonomic knowledge of the small mammals and their arthropod ectoparasites and there is still a lot of work to do. Related to this there will be a growing need for fast and reliable identification of small mammal species. Information about the phylogenetics, geographical and ecological distribution of small mammals will be indispensable for predicting where particular diseases can be expected. Temporal patterns in the population dynamics of small mammals will be important for understanding e.g. seasonality in disease patterns. Modelling will be a big help here. I will present a number of examples and discuss how African small mammal biologists can make important contributions here.

ROOSTING ECOLOGY OF THE BANANA BAT, *NEOROMICIA NANUS,* IN MPUMALANGA, SOUTH AFRICA.

Mac Van der Merwe

Van der Merwe, M.
University of Pretoria, Pretoria, South Africa.

The social structure of banana bats, *Neoromicia nanus,* was studied in relation to reproductive events over an annual cycle in banana plantations in Mpumalanga, South Africa. This insectivorous bat is one of the smallest bat species in South Africa. They typically roost in furled banana or Strelitzia leaves, preferring medium-sized furled leaves. Group composition of banana bats was found to vary considerably over the annual cycle. Changes in group composition were linked to reproductive events. Mixed sex groups began to form during February and lasted until October. Despite frequent copulations in this population during the period late March to July, fertilization did not occur until ovulation in late July/ early August. Numbers of mixed sex groups were highest immediately prior to ovulation. During the lactation period, females formed maternity colonies composed of lactating females and juveniles.

AN OVERVIEW OF CHIROPTERAN FAUNA IN LAMA FOREST RESERVE, SOUTHERN BENIN

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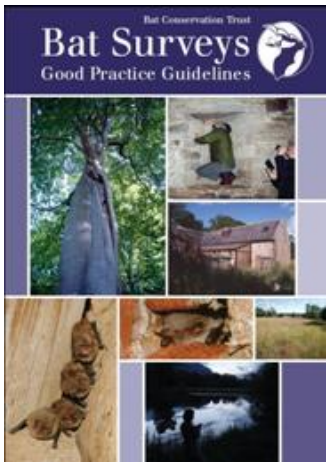
We present the results of the first comprehensive survey of the chiropteran fauna of a forest-savannah mosaic in Benin, West Africa. Chiroptera have been chosen in an attempt to an understanding of the spatial, structural and functional relationships among the different elements of the forest landscape which consists of natural forest, degraded forest and surrounding plantations. Sampling sites were chosen and bats surveys were made. Bats were captured with standard mist nets. We herein make an inventory of 17 species: *Eidolon helvum, Epomophorus gambianus, Epomophorus cf. labiatus, Epomops franqueti, Megaloglossus woermanni, Micropteropus pusillus, Nanonycteris veldkampii, Hypsignatus monstrosus, Hipposideros beatus, Hipposideros cyclops, Hipposideros commersoni, Nycteris hispida, Pipistrellus nanus, Pipistrellus nanulus, Scotophilus dinganii, Chaerephon pumila, Mops condylurus.* The 2 new species of Chiroptera caught the first time in Benin in 2003 are *Epomorphorus labiatus* Temminck (1837) and *Megaloglossus woermanni* Pagenstecker (1885). *Nanonycteris veldkampii, Hypsignatus monstrosus* and *Hipposideros beatus* are new record for Lama Forest Reserve.

PUBLISHED BOOKS / REPORTS

BAT CONSERVATION TRUST., 2007. *Bat Surveys—Good Practice Guidelines.* Bat Conservation Trust, London. 82pp.



ISBN 978-1-872745-99-2

Bat Surveys– Good Practice Guidelines provides a guide to the type and level of survey required for different habitats, in order to adequately ascertain their use by bats. These guidelines were developed with input from experts in the field and they provide the best current thinking on bat surveys.

CONTENTS

Bat Surveys– Good Practice Guidelines is written with a Northern Hemisphere audience in mind, mainly Britain. But the general principles for good practice can and should be adopted around the world with little or no modification..

The electronic version of the publication is available to download free of charge. Go to http://www.bats.org.uk/downloads/survey.asp [1Mb], and follow the instructions on the screen.

ISSN 1812-1268

AFRICAN CHIROPTERA REPORT. 2007. African Chiroptera Project, Pretoria. i+xiii + 1562 pp.

ISSN 1990-6471

African Chiroptera Report 2007 is currently most comprehensive in the presentation of information on all known synonyms, for presently accepted taxa of African bat species. Unlike the 2006 release, the taxonomy of the higher orders in this report is not conservative. The 2007 report also incorporates more information on the whereabouts of type specimens, name combinations, and spelling variations and errors/*lapsus calami* in names.

The report can be downloaded free of charge from http://www.Africanbats.org/ACR.html [17Mb].

Any mistakes, misrepresentation of data, or omitted publications can be reported to the managing editors of the database (AfricanChiropteraReport@Africanbats.org). This will allow corrections and updates to be made in the next report (July 2008).

PUBLISHED PAPERS

AMREIN, I., DECHMANN, D. K. N., WINTER, Y., and LIPP, H.-P., 2007. Absent or low rate of adult neurogenesis in the hippocampus of bats (Chiroptera). *PLos ONE* 2(5): e455.

Abstract: Bats are the only flying mammals and have well developed navigation abilities for 3D-space. Even bats with comparatively small home ranges cover much larger territories than rodents, and long-distance migration by some species is unique among small mammals. Adult proliferation of neurons, i.e., adult neurogenesis, in the dentate gyrus of rodents is thought to play an important role in spatial memory and learning, as indicated by lesion studies and recordings of neurons active during spatial behavior. Assuming a role of adult neurogenesis in hippocampal function, one might expect high levels of adult neurogenesis in bats, particularly among fruit- and nectar-eating bats in need of excellent spatial working memory. The dentate gyrus of 12 tropical bat species was examined immunohistochemically, using multiple antibodies against proteins specific for proliferating cells (Ki-67, MCM2), and migrating and differentiating neurons (Doublecortin, NeuroD). Our data show a complete lack of hippocampal neurogenesis in nine of the species (*Glossophaga soricina*, *Carollia perspicillata*, *Phyllostomus discolor*, *Nycteris macrotis*, *Nycteris thebaica*, *Hipposideros cyclops*, *Neoromicia rendalli*, *Pipistrellus guineensis*, and *Scotophilus leucogaster*), while it was present at low levels in three species (*Chaerephon pumila* , *Mops condylurus* and *Hipposideros caffer*). Although not all antigens were recognized in all species, proliferation activity in the subventricular zone and rostral migratory stream was found in all species, confirming the appropriateness of our methods for detecting neurogenesis. The small variation of adult hippocampal neurogenesis within our sample of bats showed no indication of a correlation with phylogenetic relationship, foraging strategy, type of hunting habitat or diet. Our data indicate that the widely accepted notion of adult neurogenesis supporting spatial abilities needs to be considered carefully. Given their astonishing longevity, certain bat species may be useful subjects to compare adult neurogenesis with other long-living species, such as monkeys and humans, showing low rates of adult hippocampal neurogenesis.

DECHER, J., and FAHR, J., 2007. A conservation assessment of bats (Chiroptera) of Draw River, Boi-Tano, and Krokosua Hills Forest Reserves in the Western Region of Ghana. *Myotis* 43: 5-30.

Abstract: As part of a Rapid Assessment Program (RAP) survey organized by Conservation International in southwestern Ghana, bats were surveyed in three forest reserves recently designated as Globally Significant Biodiversity Areas. We present a list of species obtained during this survey and include some previous records. The survey yielded 82 bat captures composed of 15 species. At Krokosua Hills Forest Reserve we documented the rarely recorded vespertilionid *Scotophilus nucella* (IUCN Red List: Vulnerable), which was described in 1984 and hitherto known from only ten specimens from Ghana, Côte d'Ivoire and Uganda. Specimens from Ghana, Liberia, Sierra Leone and Cameroon assigned to *Hipposideros lamotte*i by Koopman et al. (1995) and Grubb et al. (1999) are here re-identified as *H. caffer*. The known distribution of *H. lamotte*i is restricted to the Guinean side of Mt. Nimba. Overall the bat species composition of the surveyed reserves clearly reflects a forest fauna. Not a single savanna species was present despite partially degraded forest conditions.

JACOBS, D. S., BARCLAY, R. M. R., and WALKER, M. H., 2007. The allometery of echolocation call frequencies of insectivorous bats: Why do some species deviate from the pattern? *Oecologia* 152(3): 583-594.

Abstract: The peak echolocation frequency of insectivorous bats generally declines as body size increases. However, there are notable exceptions to this rule, with some species, such as *Rhinolophus clivosus*, having a higher than expected peak frequency for their body size. Such deviations from allometry may be associated with partitioning of foraging habitat (the foraging habitat hypothesis) or insect prey (the prey detection hypothesis). Alternatively, the deviations may be associated with the partitioning of sonar frequency bands to allow effective communication in a social context (the acoustic communication hypothesis). We tested the predictions of these hypotheses through comparisons at the family, clade and species level, using species of rhinolophids in general and *R. clivosus*, a species with a wide distribution, as a specific test case. We compared the wing parameters, echolocation frequency and ecology of *R. clivosus* to those of the sympatric *R. capensis*. *Rhinolophus clivosus* has a much higher echolocation frequency than predicted from its wing loading or body mass. Furthermore, contrary to the predictions of the foraging habitat hypothesis, we found no difference in foraging habitat between *R. clivosus* and *R. capensis*. The size range of insect prey taken by the two species also overlapped almost completely, contrary to the prey detection hypothesis. On the other hand, the variation of echolocation frequencies around the allometric relationship for rhinolophids was smaller than that for *Myotis* spp., supporting the prediction of the acoustic communication hypothesis. We thus propose that the relatively high peak frequency of *R. clivosus* is the result of partitioning of sonar frequency bands to minimize the ambiguity of echolocation calls during social interactions.

JUSTE, B. J., FERRÁNDEZ, A., FA, J. E., MASAFIELD, W., and IBÁÑEZ, C., 2007. Taxonomy of little bent-winged bats (*Miniopterus*, Miniopteridae) from the African islands of São Tomé, Grand Comoro and Madagascar, based on mtDNA. *Acta Chiropterologica* 9(1): 27-37.

Abstract: Due to a morphological uniformity typically shown by bent-winged bats, the taxonomic recognition of species and subspecies within the sole genus *Miniopterus* has been much questioned and revised. The situation and definition of the African species *M. minor* is particularly confused. This species is known from scattered and discontinuous records on both mainland coasts, Madagascar, São Tomé and Grand Comoro islands. The island forms have been included either within *M. minor* or considered as endemic species. To clarify their taxonomy, we compare mitochondrial DNA sequences of all the island forms with other related African *Miniopterus*. The genetic distances found in this study support a taxonomic recognition of the island forms at species level and the phylogenetic reconstructions based on these data suggest that the *M. minor*, as considered traditionally, is not a monophyletic group. The morphological similarities between the *Miniopterus* from São Tomé (West Africa) and Grand Comoro (East Africa) may reflect convergent evolution rather than a common ancestry.

LONG, E., and RACEY, P. A., 2007. An exotic plantation crop as a keystone resource for an endemic megachiropteran, *Pteropus rufus*, in Madagascar. *Journal of Tropical Ecology* 23(4): 397-407.

Abstract: The single most important food source for *Pteropus rufus* at Berenty, in south-east Madagascar, is the pollen of *Agave sisalana*, a commercial species introduced to the area 60 y ago, which was widely available and constantly eaten by the bats during this 28-mo study. The diet of the bats at this site is unique in this respect when compared with *P. rufus* elsewhere in Madagascar and with other *Pteropus* species. The dietary breadth of *P. rufus* at Berenty is narrow, consisting of only 14 plant species, identified through microsopic faecal analysis and direct field observations, and three unidentified ones. The bats also eat locally cultivated and introduced fruits (*Mangifera indica*, *Psidium* cf. *cattleianum*, *Sclerocarya caffra*, *Cordia sinensis* and *Hylocereus* species) and native and endemic forest species (*Tamarindus indica*, *Celtis philippensis*, *Ficus megapoda*, *F. grevei*, *F. pachyclada* and *Grewia* species). The majority of the plant species used by *P. rufus* for food are located within the gallery forests of the Mandrare valley. No evidence of adjacent endemic spiny forest species was identified in their diet. Thus, conservation of the remaining gallery forest as well as retention of the sisal plantations is important to maintain the food sources of *P. rufus* at this site.

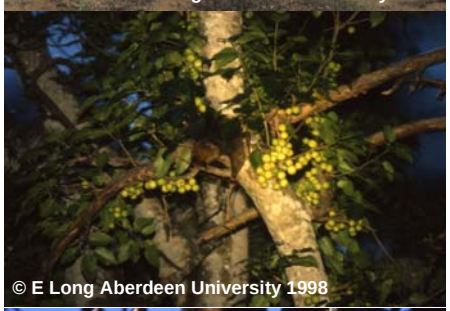
Left-top: Setting nets in the sisal plantations to catch *Pteropus rufus* as part of a short radio-tracking study - **E. Long**.

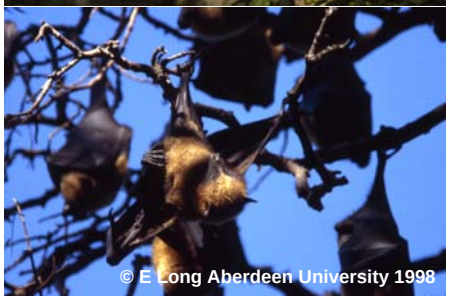
Left-middle: *Pteropus rufus* feeding in a fig tree (*Ficus grevei*) - E Long.

Left-bottom: *Pteropus rufus* (juvenile) basking in the sun - **E. Long**.

Below: A new flush of leaves on a tamarind tree (*Tamarindus indica*) which is one of the main food sources of *P. rufus* - **E. Long**.

Above: Berenty reserve, on the banks of the Mandrare River, surrounded by sisal plantations - **E. Long.**





Above: Bat feeding remains (ejecta pellets) and fruit below a fig tree (*Ficus grevei*). - **E. Long**.

Above: A flowering sisal (*Agave sisalana*) - **E. Long**.

MILLER-BUTTERWORTH, C. M., MURPHY, W. J., O'BRIEN, S. J., JACOBS, D. S., SPRINGER, D. S., and TEELING, E. C., 2007. A family matter: Conclusive resolution of the taxonomic position of the long-fingered bats, *Miniopterus*. *Molecular Biology and Evolution* 24(7): 1553-1561.

Abstract: The long-fingered bats (*Miniopterus* sp.) are among the most widely distributed mammals in the world. However, despite recent focus on the systematics of these bats, their taxonomic position has not been resolved. Traditionally, they are considered to be sole members of Miniopterinae, 1 of 5 subfamilies within the largest family of bats, the Vespertilionidae. However, this classification has increasingly been called into question. Miniopterines differ extensively from other vespertilionids in numerous aspects of morphology, embryology, immunology, and, most recently, genetics. Recent molecular studies have proposed that the miniopterines are sufficiently distinct from vespertilionids that Miniopterinae should be elevated to full familial status. However, controversy remains regarding the relationship of the putative family, Miniopteridae to existing Vespertilionidae and to the closely related free-tailed bats, the Molossidae. We report here the first conclusive analysis of the taxonomic position of *Miniopterus* relative to all other bat families. We generated one of the largest chiropteran data sets to date, incorporating ~11 kb of sequence data from 16 nuclear genes, from representatives of all bat families and 2 *Miniopterus* species. Our data confirm the distinctiveness of *Miniopterus*, and we support previous recommendations to elevate these bats to full familial status. We estimate that they diverged from all other bat species approximately 49-38 MYA, which is comparable to most other bat families. Furthermore, we find very strong support from all phylogenetic methods for a sister group relationship between Miniopteridae and Vespertilionidae. The Molossidae diverged from these lineages approximately 54-43 MYA and form a sister group to the Miniopteridae-Vespertilionidae clade.

RAKOTOARIVELO, A. A., RANAIVOSON, N., RAMILIJAONA, O. R., KOFOKY, A. F., RACEY, P. A., and JENKINS, R. K. B., 2007. Seasonal food habits of five sympatric forest microchiropterans in western Madagascar. *Journal of Mammalogy* 88(4): 959-966.

Abstract: We determined the foods habits of 5 species of microchiropteran bats (*Hipposideros commersoni*, *Triaenops rufus*, *Triaenops furculus*, *Myotis goudoti*, and *Miniopterus manavi*) in the austral winter and summer in a dry deciduous forest in western Madagascar using fecal analysis. We also assessed food availability and bat activity in 4 forest microhabitats. Despite overlap in dietary composition, *H. commersoni* consumed mainly Coleoptera; *M. goudoti* consumed mainly Hymenoptera, Neuroptera, and Araneae; *M. manavi* consumed mainly Hemiptera; and *T. rufus* and *T. furculus* consumed mainly Lepidoptera. Diptera were the most abundant insects in traps but were rarely encountered in feces. *H. commersoni* was not netted during the austral winter, but the other 4 species changed their diet according to seasonal availability, with lepidopterans the most important diet items in winter and coleopterans in summer. We consistently trapped a higher abundance of potential bat prey at the forest edge, whereas the forest interior was low in both food availability and bat activity. The 5 microchiropterans studied partitioned the available food mainly through dietary specialization, although spatial and temporal partitioning also may play a role. More research is needed to assess levels of dependency on forest by these bats, and to investigate the seasonal ecology of *H. commersoni* and interspecific competition between *T. rufus* and *T. furculus*.

SALGUEIRO, P., RUEDI, M., COELHO, M. M., and PALMEIRIM, J. M., 2007. Genetic divergence and phylogeography in the genus *Nyctalus* (Mammalia, Chiroptera): Implications for population history of the insular bat *Nyctalus azoreum*. *Genetica* 130(2): 169-181.

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Above: Azorean bat (*Nyctalus azoreum*).

Abstract: We used three mitochondrial DNA fragments with different substitution rates (ND1, Cyt b and the CR) to infer phylogenetic relationships among six species of the genus *Nyctalus*, and compare levels of genetic divergence between the insular, vulnerable *Nyctalus azoreum* and its continental counterpart to assess the origins of the Azorean bat. The larger species found throughout the Palaearctic region (*N. lasiopterus*, *N. aviator* and *N. noctula*) share a unique chromosome formula (2n = 42) and form a monophyletic clade in our reconstructions. *Nyctalus plancyi* (= *velutinus*), a Chinese taxon with 2n = 36 chromosomes, is sometimes included in *N. noctula*, but is genetically very divergent from the latter and deserves full species status. All Cyt b and CR haplotypes of *N. azoreum* are closely related and only found in the Azores archipelago, but when compared to continental sequences of *N. leisleri*, levels of mtDNA divergence are unusually low for mammalian species. This contrasts with the high level of differentiation that *N. azoreum* has attained in its morphology, ecology, and echolocation calls, suggesting a recent split followed by fast evolutionary change. The molecular data suggest that *N. azoreum* originated from a European population of *N. leisleri*, and that the colonisation of the Azores occurred at the end of the Pleistocene. The Madeiran populations of *N. leisleri* also appear to have a European origin, whereas those of the Canary Islands probably came from North Africa. In spite of its recent origin and low genetic divergence, the Azorean bat is well differentiated and consequently represents a unique evolutionary unit with great conservation value.

© H.R.da Silva Fraga, 2001

Above: Azorean bat (*Nyctalus azoreum*).

REBELO, H., and BRITO, J. C., 2007. Bat guild structure and habitat use in the Sahara desert. *African Journal of Ecology* 45(2): 228-230.

Above: Lesser mouse-tailed bat (*Rhinopoma hardwickii*) captured in the Air mountains, Niger. Echolocation was recorded from bats after released in order to build an acoustic library for different bat species.— **Hugo V. Rebelo**.

Above: Lake Gabrum in Libya. The highest abundance and diversity of bats was observed in water spots.— **Hugo V. Rebelo**.

Above: Air mountains near Timia, Niger. This type of habitat constitutes a good foraging area and also provides potential roosts for bats.— **Hugo V. Rebelo**.

Above: Oasis of Bilma, Niger. In the study area, the highest abundance and diversity of bats was observed in water spots and oases. — **Hugo V. Rebelo**.

SAMONDS, K. E., 2007. Late Pleistocene bat fossils from Anjjohibe Cave, northwestern Madagascar. *Acta Chiropterologica* 9(1): 39-65.

Abstract: In spite of decades of research on Madagascar's unique and endemic modern fauna, the evolutionary history of the island's bat fauna remains largely unknown. Their origin and evolution is largely unknown because of the nature of the fossil record; the deepest well-dated glimpse of Madagascar's mammal groups comes from only 26,000 years ago. Bat remains have frequently been recovered from paleontological sites, but have been rarely identified or described. It therefore remains unknown whether bats underwent a reduction in species diversity similar to that seen in many of Madagascar's vertebrate clades. Herein I describe a collection of newly discovered subfossil bats from Anjohibe Cave, northwestern Madagascar, some estimated to have been deposited about 80,000 years ago. Five bat genera are represented as subfossil (*Rousettus*, *Eidolon*, *Hipposideros*, *Triaenops*, and *Myotis*) with four of these genera present in Anjohibe Cave today. The subfossil material has yielded two new species, indicating that Malagasy bats experienced recent species turnover, paralleling what is seen in much of the island's terrestrial vertebrate fauna.

TOWNER, J. S., POURRUT, X., ALBARINO, C. G., NKOGUE, C. N., BIRD, B. H., GRARD, G., KSIAZEK, T. G., GONZALEZ, J.-P., NICHOL, S. T., and LEROY, E. M., 2007. Marburg virus infection detected in a common African bat. *PLos ONE* 2(8): e764.

Abstract: Marburg and Ebola viruses can cause large hemorrhagic fever (HF) outbreaks with high case fatality (80-90%) in human and great apes. Identification of the natural reservoir of these viruses is one of the most important topics in this field and a fundamental key to understanding their natural history. Despite the discovery of this virus family almost 40 years ago, the search for the natural reservoir of these lethal pathogens remains an enigma despite numerous ecological studies. Here, we report the discovery of Marburg virus in a common species of fruit bat (*Rousettus aegyptiacus*) in Gabon as shown by finding virus-specific RNA and IgG antibody in individual bats. These Marburg virus positive bats represent the first naturally infected non-primate animals identified. Furthermore, this is the first report of Marburg virus being present in this area of Africa, thus extending the known range of the virus. These data imply that more areas are at risk for MHF outbreaks than previously realized and correspond well with a recently published report in which three species of fruit bats were demonstrated to be likely reservoirs for Ebola virus.

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- 12th European Bat Research Symposium, Lithuania, August 2011.

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