

2010 International Year of Biodiversity report of the work of BRinK: Biological Research in Kuzikus Wildlife Reserve, Namibia

The International Year of Biodiversity was celebrated throughout 2010 in Kuzikus Wildlife Reserve, Namibia. Small research initiative, Biological Research in Kuzikus (BRinK) was founded in 2008 to assess biodiversity in Kuzikus and flourished in 2010 with the IYB celebrations. BRinK's vision is to study and document biodiversity in an area that holds an intact ecosystem: the Kalahari Desert. We aim to locally guarantee conservation of the area and to globally encourage protection of biodiversity. To celebrate the International Year of Biodiversity, BRinK investigated all animal taxa on the reserve, which had never been done before. Previously research concerning large mammals and birds had been conducted but in response to the IYB BRinK undertook to include small mammals, insects and reptiles in research programs too. The complete biodiversity data collected is important for Kuzikus conservation and useful in management decisions.

With the help of 22 international volunteer researchers BRinK's research resulted in a full assessment of animals in the reserve and implications for biodiversity and management of Kuzikus. As part of BRinK's public awareness campaign, we introduced guests staying at the lodge to our research, enhancing their holiday and showing them the importance of ecological monitoring. With the children of today holding the future of biodiversity in their hands, we made a concerted effort to include them in our research and introduce them to their environment.

The aims of each research project were to assess the number of species present in the reserve and focus on their distribution. This included extensive vegetation surveying of the reserve hence important management implications for preserving Kuzikus' wilderness. Each research project undertaken was written into a full report available by request online at www.brink-namibia.com which will be held as part of ongoing monitoring and used in management strategies. The abstracts of each are outlined below.

Bird abundance and distribution on Kuzikus Wildlife Reserve

SKEATS, A.M. *ET AL.*, 2010

Birds can be used as important indicators of environment health. Being used in this way, the study of the birds in Kuzikus can indicate the health of various parts of the reserve. Being home to several endangered species, long term monitoring of the birds in Kuzikus gives clues into population fluctuations and the plausible future for threatened and endangered species. The aim of the study was to accurately assess population size of birds and investigate differences in diversity of birds with vegetation. Line transects were used to document the species present in Kuzikus in the winter season and to investigate habitat preferences of birds. Distance sampling was used to estimate the population numbers of some bird species, finding the most common bird in Kuzikus to be the White-browed Sparrow-Weaver, *Plocepasser mahali*, a sociable year-long breeder. The diversity and abundance of birds is dependent on the vegetation of the region they are in, providing shelter and provisions. This study found a correlation between the number of birds and vegetation types in areas of Kuzikus. Bird diversity increased with certain combinations of shrub and grass species, but no correlations were found between bird diversity and single species of vegetation. This highlights the need for mixed vegetation structure to support a diversity of birds. The results of this study have therefore important implications for the management of the reserve to ensure a diverse range of vegetation is preserved for birds.

The importance of simple methods in biodiversity monitoring in Kuzikus

SKEATS, A.M. & COTON, C., 2010

Accurate assessment of animal populations is crucial for management and conservation of wildlife reserves such as Kuzikus Wildlife reserve in Namibia. Simple index methods can be useful in providing data about animal presence or absence and methods can include recording spoor and sightings on the reserve. These methods are often overlooked by more statistically analysable data collection, but in fact provide information about shy species or those seen too infrequently to be reliably included in numerical data. This study undertook to record every animal seen in Kuzikus over a four week collection period in an attempt to monitor full biodiversity of the area. Results showed that many animals undetected in transect monitoring programmes in Kuzikus were detected by these simple spotting methods, allowing development of a species list. Frequently seen in this study were the Carnivora group, which, being medium sized, have previously gone unrecorded as they are too small for transect distance sampling analysis and too large for rodent trapping. Included in this group are the Kaokoveld Slender Mongoose and Yellow Mongoose, and Aardwolf. Medium sized Lagomorphs and Spring Hares were also seen. Bats were recorded on eight occasions (species undefined) so provide scope for further research and the use of bat detectors to identify species. Limitations are discussed regarding reliability and population sizes, and comparisons made to transect data collected in other studies of Kuzikus. This study highlights the importance of simple visual recording, affordable worldwide, for ongoing monitoring of full species diversity of an area.

Small mammal species on Kuzikus

REINHARD, J.E. *ET AL.*, 2010

Small mammals were sampled in five different microhabitats in Kuzikus Wildlife Reserve, a remote area in the Namibian Kalahari Desert. This was the first small mammal survey ever done in the area. Trap success was high (9.4%) and eight species of rodent were captured and identified over 954 trap nights. One species remained unidentified. One trapping session of three consecutive trap nights was sufficient to capture local rodent species in all sites but the salt-pan environment. Sherman traps proved to be the most successful trap type in capturing individuals between 10.5 and 67.0 grams. Trip traps were restricted to species weighing less than 33.0 grams, although they did capture one individual weighing 46.0 grams. The grass mouse *Rhabdomys pumilio* shows a clear preference for nesting near *Acacia hebeclada*, a result concurrent with previous studies on the species elsewhere in Africa. Overall rodent species richness and diversity differed in all five microhabitats. Even the least species rich, the savanna habitat, had the highest abundance of rodents, which was dominated by the Hairy-footed Gerbil *Gerbillurus paeba*. The salt-pan microhabitat had the highest diversity of small mammals and a high diversity of plants. The most plant species rich and abundant area was the herbivore exclusion near human settlement. No rodents, however, were captured in this area. The hump-shaped relationship between small mammal species and plant species are discussed and conclusions are treated with care. The current study explored biodiversity trends in small mammal occurrence, abundance and diversity in the Kuzikus ecosystem with results worth further investigation.

Simple, terrestrial count methods for long-term monitoring of herbivores in Kuzikus

REINHARD, J.E. *ET AL.*, 2010

Knowing the number of animals on natural reserves is important for sound management and conservation. On large areas with many species and large populations, it is still very challenging to obtain accurate abundance estimates using straightforward and inexpensive methods. The present study used simple, terrestrial census methods for different species of large herbivores in a fenced wildlife reserve and compared them to numbers obtained from aerial counts from a helicopter of the same reserve. Terrestrial methods included road detections for animals less often seen. Hereby,

animals were counted when driving to transects used for distance sampling. A Distance analysis was employed for species with sufficient detections on transects. The abundance estimate for different species of herbivore did not significantly differ from the count obtained from helicopter counting. This implies that simple terrestrial methods employed in this study can serve as potential inexpensive and efficient methods to obtain reliable estimates of animal populations on wildlife reserves similar to Kuzikus.

Tracks and signs of the bush: skills useful for conservation

NUNES, J. *ET AL.*, 2010

Studying animal pellets and tracks is a common non-invasive survey technique. This method represents minimum disturbance to the study organism and allows for elusive species to be identified and monitored. The current study consisted of a diversity survey in Kuzikus Wildlife Reserve, Namibia, using quadrat clearance and identifying species based on their pellets and tracks. Five different sites were compared and differences in species diversity and relative abundance due to vegetation and waterbody characteristics were assessed. Over twenty species were identified during this study and the most frequent was the Black Wildebeest, *Connochaetes gnou*, followed by the Gemsbok, *Oryx gazella*. The water hole "Fohlen Posten I" was the site that registered the highest Shannon Index of Diversity, however, this value was not significantly different to that of other sites. There were no significant differences in species diversity and relative abundance due to vegetation or waterbody characteristics. This study confirmed the existence of some secretive species and emphasised potential future study subjects, for which accurate density estimates can be obtained by surveying their pellets and tracks combined with other monitoring methods.

Insect diversity in Kuzikus

REINHARD, J.E. *ET AL.*, 2010

Insects comprise over half of all described species on Earth and therefore are of great economic and ecological importance. Still, many species of insect remain to be described to add to our understanding of their biodiversity. The current expedition involved the collection and preparation of insect specimen (excluding Lepidoptera) in Kuzikus during the month of October, 2010. The wildlife reserve is situated on the edge of the arid Kalahari, which is characterised by variable rain seasons. The aim of the study was to gain an insight into the diversity of insects in the area and to collect data for comparisons for future studies in different seasons. Furthermore, seven different collection methods were employed to capture a wide range of insects. Each of these methods was compared for which insect orders are best caught by which method. A small study was designed to reveal differences in microhabitats in insect biodiversity and the effect of small scale changes on the local fauna. Results showed that light-trapping captures by far most insect orders, however, did not capture some orders that were caught with other methods. Ants were predominant in all areas under study and it was shown that microhabitats can differ substantially even when not far apart. It was also shown that grasslands with the same grass species composition and density can differ in Hymenoptera abundance. The present study serves as a reference for future studies that want to collect specific insect orders, as well as a starting point for insect biodiversity comparison across areas and seasons.

Reptile diversity on Kuzikus

NUNES, J. & SEPPEY, C. 2010

Reptile community composition and abundance are frequently correlated with specific habitats and microhabitats. Reptile abundance and diversity has been shown to be positively correlated with vegetative structural complexity, as this often represents variation in prey abundance and predation

risk. This was a pilot-study with three main aims: 1) determine preliminary reptile diversity in Kuzikus Wildlife Reserve, Namibia, 2) compare survey techniques to assess which methods are more suitable for studying specific questions and specific reptile groups and 3) find out if variables such as vegetation structure, temperature and time of day were correlated with variations in reptile abundance and diversity. Techniques used included pit-fall, tube and trip traps, reptile tiles, behavioural observations of arboreal activity and night surveys. Ten species (six families) of reptiles were captured and/or observed during this study, four of which had not been previously identified in Kuzikus. Pit-fall traps captured individuals of three species that, otherwise, would not be known to be present in Kuzikus; behavioural observations focused mainly on arboreal skinks; and during night surveys the species seen was the Turner's thick-toed gecko, *Pachydactylus turneri*. During this study there was not a significant difference in reptile diversity due to vegetation characteristics or abiotic variables. The study highlights the need for an earlier set up of pit-fall traps and increased trapping effort and the need for different techniques in order to study different reptile families and accurately infer on reptile species diversity.

Part of BRinK's vision is to bring conservation and research to the minds of the public. In order to raise public awareness and affinity for biodiversity we share our findings with locals and tourists on the reserve. In 2010 we engaged many non-biologists with our environmental field sessions and presentations. In order to bring our results to a wider domain we collaborate with Universities and offer a study facility for on-going novel research. 2010 was the second year that Kuzikus was visited by researchers from the University of Reading, UK, who are investigating the relationships between ants and acacia trees. BRinK is a facility for long term ecological studies, ideal for long term ecological studies concerning natural resource management and conservation. BRinK is committed to ongoing monitoring of biodiversity in Kuzikus Wildlife Reserve. The bird diversity research has now been conducted twice, in summer and winter for seasonal comparison and will be repeated again in August 2011. Monitoring of herbivore populations has been done seasonally for three years already and will continue into 2011. The second entomology study will begin in April 2011. Inspired by the International Year of Biodiversity, BRinK now endeavours to carry on monitoring the new taxa investigated this year, the insects, reptiles and small mammals. By continuing this research BRinK aims to be able to see changes in biodiversity and the health of the wildlife reserve. It is only through this commitment that we are able to preserve this area in a natural state and discover the depth of potential species richness that lies in Namibia.