

EARTHWATCH INSTITUTE FIELD REPORT

Project Title: Meerkats of the Kalahari

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Research Site: Kuruman River Reserve, Northern Cape, South Africa (S26°57' E21°49')

Local Management Status of the Research Site: The site is privately owned and managed by the Kalahari Research Trust, a body comprising several scientists from the UK and South Africa

Scientific names of primary species being studied:

Suricata suricatta (Schreber 1776)

Key Research Objectives:

Meerkat Research

- Identify and quantify costs and benefits of cooperative behaviour
- Investigate different levels of investment amongst individuals
- Determine what constrains breeding by subordinates
- Explore physiological mechanisms regulating cooperative behaviour
- Investigate the population dynamic consequences of cooperative breeding

Biodiversity and Conservation Work

- Complete a thorough biodiversity survey of the Kuruman River Reserve
- Collect baseline vegetation data, and monitor these established vegetation plots annually to determine changes in vegetation dynamics in response to grazing.
- Identify threats to the local environment (such as alien vegetation), and take action where possible to combat these threats

Date this report was completed: November 2005

Data Collection and Results

- a) Give a concise account of the data you have collected during the past field season.**

Meerkat research

Earthwatch volunteers were directly involved in data collection for four different research protocols. The questions they were attempting to answer either contributed to current research being undertaken on the reserve, or provided the necessary information to justify further investigation into these issues.

Volunteers were required to take GPS points while out in the field with the meerkats, which were then plotted to produce tracks of group movements. This data helps to answer questions regarding territory use, foraging routes and spatial patterns of meerkats within their home ranges.

Foraging efficiency and its relation to energy intake was also investigated amongst different meerkats. With the basic aim being to establish who are the best foragers in the group, volunteers collected data for 20 minute focal periods, noting down the number of "short" versus "long" digs, size of the foraging hole, the amount of sand displaced, as well as the success rate of the individual meerkats.

Earthwatch volunteers also collected data to help answer the question as to whether begging pups follow particular helpers. They were trying to establish whether association patterns confirmed the prediction that female pups preferentially follow female helpers, or if pups follow the more successful foragers, regardless of sex. This data can only be collected during the breeding season, when there are sufficient foraging pups around to focal, so not all the Earthwatch groups were able to collect this particular data.

Fork-tailed drongos are adept opportunists that attempt to steal unearthed prey from unsuspecting meerkats. They will even employ false alarm calls to trick meerkats into abandoning their quarry. To answer the questions as to when and where meerkats are most likely to encounter drongos, and which meerkats are most susceptible to the drongos' wiles, Earthwatch volunteers collected data on the drongos that were present with the meerkat groups. During 10-minute scans and focals, they noted what prey items the drongos obtained and how they were acquired.

Biodiversity surveys

It was decided prior to the start of the Earthwatch season that a thorough survey of the KRR was necessary. The aim of the survey was to accurately record the position and characteristics of a number of organisms and features within the reserve, for the purposes of future studies. The volunteers individually walked transect lines of approximately 2 km in length. A GPS point was taken for every burrow, termite mound, sociable weaver nest and white-browed sparrow weaver nest encountered along the transects, with size, height, possible inhabitants, etc. being noted when necessary. Any ungulate species encountered while conducting the survey was also noted down (the ungulate information helps us to get an idea on the distribution of the different species within the reserve, as well as contributing to sex and age data). Collectively, the 2005 volunteers covered an area of 18 km².

In order to determine stocking rates of the ungulates on the reserve, it is necessary to know not only what plant species the area supports, but also the relative frequency of these species and the overall condition of the veld. Baseline vegetation surveys are therefore essential in providing this information to management. Monitoring of vegetation is also extremely important. It allows for the detection of changes in the state of vegetation in response to utilization by mammals. The Earthwatch volunteers assisted the management of the reserve by conducting reliable and repeatable baseline vegetation surveys, which will allow for the future monitoring of vegetation changes on the reserve. Since the KRR stocks a variety of ungulate species, these surveys are necessary for effective management.

a) What progress have you made towards achieving your original objectives?

Our research objectives generally take several seasons to accomplish so it is not always possible to disseminate results at the end of every EW field season.

However, the 2005 EW volunteers contributed towards:

- Identifying any kleptoparasitism patterns displayed by drongos towards meerkats
- Measuring the effort expended by individual meerkats during foraging
- Measuring the success rate of foraging meerkats
- Ascertaining whether meerkat pups preferentially follow certain helpers
- Determining range use and area covered by different meerkat groups

With regards to the ecological surveys, the 2005 teams covered a significant portion of the reserve. The Earthwatch teams in 2006 will complete this biodiversity survey.

10 vegetation plots were surveyed, which provided the reserve with valuable baseline data. These plots will be monitored on a yearly basis to determine vegetation change in response to utilisation.

Significance/Benefits of Research

a) What is/are the significance/benefits of your research at the following levels?

- Local (in the area of the research site)

At a local scale, the vegetation surveys are an invaluable tool in deciding on an appropriate stocking rate for game in the reserve. Unsustainable rates will cause a deterioration in the condition of the vegetation, something which can only be accurately noted through monitoring. Overstocking of game and the resulting overgrazing is a huge problem in the Kalahari, and something that the KRR hopes to avoid through ecologically sound management, serving as an example to neighbouring farmers.

- National

Our joint research with the Universities of Pretoria, Stellenbosch and Cape Town has provided opportunities for collaborative research at our study site, which have been welcomed by all three institutions. Our research also plays an important role in documenting ecological change in the Kalahari, where long-term biological studies are very scarce.

- International

Our work is helping to extend our understanding of the biology of cooperative breeders and the evolution of cooperation. On the one hand, this provides insight into the unusual problems faced by attempts to conserve cooperative breeders, who commonly show positive correlations between reproductive success and population density as opposed to negative ones like most animals. By providing an understanding of these processes, our work suggests how conservation policies should best be organised to deal with the problems of cooperative breeders.

On the other hand, our research provides close insight into the causal and evolutionary mechanisms that maintain animal cooperation. This is relevant to understanding the evolution of cooperation in early humans and may even shed some light on the factors affecting cooperative behaviour in human populations today.

b) How do your findings contribute to issues of sustainability?

The vegetation surveys conducted on the reserve are an invaluable tool in sustainable management of an area, preventing overutilisation of the vegetation and soil erosion. The biodiversity surveys conducted provide information on the associated fauna found in the reserve, and allow us to manage in such a way as to benefit these species.

Dissemination of Results

A list of publications from 2005 follows:

Sharpe, LL. Play does not enhance social cohesion in a cooperative mammal
Source: ANIMAL BEHAVIOUR, 70: 551-558 Part 3 SEP 2005

Sharpe, LL Frequency of social play does not affect dispersal partnerships
in wild meerkats ANIMAL BEHAVIOUR, 70: 559-569 Part 3 SEP 2005

Clutton-Brock, TH; Russell, AF; Sharpe, LL; Jordan, NR 'False feeding' and
aggression in meerkat societies ANIMAL BEHAVIOUR, 69: 1273-1284 Part 6 JUN
2005

Sharpe, LL Play fighting does not affect subsequent fighting success in
wild meerkats ANIMAL BEHAVIOUR, 69: 1023-1029 Part 5 MAY 2005

Stephens, PA; Russell, AF; Young, AJ; Sutherland, WJ; Clutton-Brock, TH
Dispersal, eviction, and conflict in meerkats (*Suricata suricatta*): An
evolutionarily stable strategy model AMERICAN NATURALIST, 165 (1): 120-135
JAN 2005

Young, AJ; Carlson, AA; Clutton-Brock, TH Trade-offs between
extraterritorial prospecting and helping in a cooperative mammal ANIMAL
BEHAVIOUR, 70: 829-837 OCT 2005

In addition, Oxford Scientific Films spent 6 months at the project, filming a 13-part series on the meerkats for Animal Planet. "Meerkat Manor" has screened in various countries, and they are currently filming a second series.