

## **Research Activities at the Kalahari Research Centre**

### **DAMARALAND MOLE-RATS**

Damaraland mole-rats are social subterranean rodents that live in groups of up to 50 individuals in which reproduction is monopolized by a single female and is often shared between several males. In the wild, group-members maintain an extensive network of underground galleries that provide access to desert plants they feed on, communal nests and food stores. While these activities are costly to perform, they are beneficial to all other group members, including the breeding female who can produce more pups when being assisted by more non-breeding helpers. In contrast to other cooperative breeders like meerkats, Damaraland mole-rats do not directly provision pups or juveniles, though they groom and retrieve pups who wander from their birth chamber. Although cooperation is pronounced, individuals intensively fight to gain and maintain a breeding position

Since 2013, we have monitored around sixty captive groups of Damaraland mole-rats living in artificial tunnel systems that allow behavioural observations. Individuals are occasionally removed from their artificial habitat to be weighed or measured, and for the collection of urine and blood samples enabling the determination of their growth, behaviour and hormonal status across their lives. Using a combination of correlative and experimental approaches, we seek to understand what are the behavioural strategies employed by breeding females to monopolize reproduction within their social group. We also aim to elucidate the differences (gene expression, hormones, morphology, growth, immune functions, behaviours, ageing) between individuals that breed and the ones that do not breed and explain these differences from an evolutionary perspective.

#### **The work of a mole-rat volunteer**

The work of mole-rat volunteers is quite varied and changes from one day to the next. Volunteers will spend considerable time collecting behavioural data through the observation of entire groups (scan) or specific individuals (focal, standardized behavioural tests). They will also help to dye, weigh and measure individuals (including newly born pups), collect urine samples, and assess the pregnancy state of breeding females. Volunteers will also assist our on-site veterinarian to collect blood samples and take full body x-ray scans, a process that requires the animals to be anaesthetised. It is also expected that volunteers will contribute to animal husbandry duties, which include feeding animals, cleaning and fixing the artificial tunnel systems they live in and refilling them with sand to encourage natural digging activities.

Volunteers will also be trained to correct and edit all the collected data and to import into our database. Finally, they can expect to gain invaluable insights on researching animal behaviours and experimental design.



**Example references:**

Zöttl et al. 2016. Differences in cooperative behaviour among Damaraland mole-rats are consequences of an age-related polyethism. *PNAS*, 113, 10382-10387.

Thorley et al. 2018. Reproduction triggers adaptive increases in body size in female mole-rats. *Proc. R Soc. B.*, 285, 20180897.

Zöttl et al. Alloparental care in Damaraland mole-rats is female biased and age dependent, though independent of testosterone levels. *Physiology and Behaviour* 193, 149-153.