TITLE: THE BUSH KAROO RAT

By Julian Brenner

There are a lot of bush Karoo-rats at our field-site, and even one in our “garden” at the research station. We tagged them too, for studies which might be done by diploma-students in the future. Tagging them is a bit more difficult than tagging striped mice as they are bigger and also stronger. This also explains why striped mice are often chased away from bush karoo rats’ nests. Striped mice and bush Karoo rats often compete for nesting sites and both appear to prefer the shrubs of the genus *Lycium*. Previously, striped mice only occasionally used bush Karoo rat nests but were often chased away from them by the rats. However, when the rats became locally extinct in 2003 after a severe drought, the mice took over the nests of the rats. This indicates that normally the larger rats monopolize the best nesting sites. In 2004, when we had more rain, the rats came back, emigrating from a neighboring farm. They did not build new nests but took their nests back from the mice, forcing the mice to nest elsewhere.

Systematics

There are 10 species of *Otomys*, all confined to Africa. Six of them occur in southern Africa. It has been discussed before whether the bush Karoo rats belongs to the genus *Otomys* at all, because its dental characteristics and bull inflation are actually more similar to the whistling rats of the genus *Parotomys*. In any case, bush Karoo rats have nothing to do with the Norwegian rat, but belong to their own sub-family Otomyinae (to whom the whistling rats belong also).

A bush Karoo rat in front of its nest

Description
Although they look like a small teddy with black eyes and hairy round ears there is also an academic description:
O. unisulcatus is a medium-sized rodent. The pelage is long, dense and shaggy. Dorsal it is brown to dark chocolate-brown whereas the hairs are grey at their base and light yellow at their tip. Long pure black hairs interspersed throughout the pelage, especially on the head and back, but not on the flanks. The Peritoneum is white and the hairs are grey at the base and with a buff yellow tip. The head is blunt and has the same color as the back. The eyes do not have an eye-ring. The ears are darkly pigmented, large and rounded, well covered with hair and partly obscured by hair on cheeks. The fore- and hind feet are white. The tail is moderately long (60% of body size), covered with short bristles and is colored black above and dull white or black below.
The upper incisors have each a single shallow grove towards outer edge; the lower incisors are not grooved. The upper M3 have four laminae and a small circular posterior section; the lower M1 comes with two laminae with a kidney-shaped anterior section.
Bush karoo rats are sexual dimorphic. The males (158mm, 105g) are large than females (147mm, 87g). The females have four nipples.

Scrubland: the preferred habitat of bush Karoo rats

Habitat & Nesting sites
The bush Karoo rat is found in the bushier regions of the Karoo and Succulent Karoo, particularly along dry watercourses, but excluded from dense riverine thicket. It is particularly associated with thorny shrubs up to about 1.5m in height.

The presence of bush Karoo rats cannot be overlooked because of the extensive, sometimes up to 1.5m high stick lodges, they build inside shrubs. The rats spend a good time of their day carrying little sticks and branches to their nests, making them bigger and bigger. The nests offer protection against harsh climatic conditions and

predators. Apart from one main sleeping nest, each group also has several smaller nests inside their territory to offer protection against predators. When foraging, the way to the next shelter is never far in case the rat has to seek refuge.
High densities of the bush Karoo rat have been recorded, with up to 155 lodges per hectare in suitable habitat. However, each family group may occupy a number of lodges, temporarily abandoning one when the food in the vicinity is exhausted. Lodges are used by successive generations. The bush karoo-rat prefers *Lycium* shrubs as nesting sites, and they feed on the leaves of these shrubs, too.

A dense stick lodge is the nest of a bush Karoo rat

A bush Karoo rat nest in an euphorbia. In the middle a rat runway leads away from the nest to the feeding grounds.

Foraging behavior

The bush Karoo rat is strictly herbivorous, feeding on the leaves and fruits of a wide range of plant species. Over 60 plant species have been recorded in its diet. Succulent plants comprise more than 30% of the diet and provide sufficient water. *Lycium* bushes are heavily utilized due to their leaves and highly hydrated fruits. Few grasses are eaten. The nature of the herbivorous diet is of key importance to survival within semi-arid areas and to the diversity of plants. They may feed more on dominant plant species and so make place for rare plants.

Between lodges and food plants are foraging pathways. On average they do not travel more than 5m from the lodges. Individuals forage alone but sometimes they are foraging in a group of up to eight individuals. They carry back cropped material to a shrub or lodge, which gives them cover while eating.

Social and Reproductive behavior

A lodge may be home for up to eight rats. The exact nature of the relationship between the individuals is not understood. However, inhabitants of one single lodge probably represent a family group comprising of one adult pair with their offspring. The interactions between the individuals of one group appear to be amicable. Males show ritualized aggression. However, direct aggression, often resulting in fatal wounds is only recorded between individuals of different lodges.

The breeding season in Namaqualand occurs in the spring, following the winter rainfalls. In other regions it is also correlated with rainfall, though in the Karoo this occurs in summer and so does the breeding season.

Litters normally comprise of 1-3 pups. The juveniles become reproductively active at an age of 5-6 weeks.

When in distress (e.g., when tagging them) they squeak in a high pitch that is more uncomfortable for human ears than the squeaks of the striped mice. Probably they have ultrasonic vocalization.

A female bush Karoo rat with her offspring.

Adaptations

The bush Karoo rats are diurnal and crepuscular. At our field-site they normally become active earlier than the striped mice. Perhaps they are not that dependent on the sun and high temperatures. In summer they show activity during the colder times of the day, so in the morning and late afternoon, whereas in winter they are more active during midday when it is warmer.
Although the bush Karoo rat lives in a semi-arid to arid region, it is poorly adapted physiologically to these harsh conditions. Protection by their stick lodges and feeding on highly hydrated plant material is clearly critical for its survival.

Threats

Bush Karoo rats are preyed upon by small carnivores, snakes and raptors. At our field-site those are the African wild cat (*Felis lybica*), mongooses, cape fox (*Vulpes chama*), bat-eared fox (*Otocyon megalotis*) black-backed jackals (*Canis mesomelas*), jackal buzzard (*Buteo rufofuscus*), puff adder (*Bitins arietans arietans*), black-spitting cobra (*Naja nigricollis woodi*), cape cobra (*Naja nivea*), and mole snake (*Pseudaspis cana*).

The bush Karoo rat is host to a lot of parasites. They could host 26 species of fleas, 8 species of ticks, as well as sucking lice and tape worms. The bush Karoo rat is an important vector for the veterinary significant tick-plague. The ticks may carry babesiases, rickettsiases and theileriosis.

Another important threat to bush Karoo rats is man. But because of man's suppression of fire, eradication of predators and the provision of additional habitat through overgrazing the bush Karoo rat has even benefited from their presence

References

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