# NOTES ON SOME SMALL MAMMALS IN THE KALAHARI GEMSBOK NATIONAL PARK, WITH SPECIAL REFERENCE TO THOSE PREYED UPON BY BARN OWLS

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## INTRODUCTION

The small mammals of the Kalahari Gemsbok National Park were virtually unknown until May 1956 when a rapid reconnaissance was made up those portions of the Nossob and Auob river beds within the confines of the Park. The Nossob was traversed from its confluence with the Auob at Twee Rivieren to Union's End and the Auob from the same point to Mata-Mata. The Bechuanaland Protectorate lies immediately to the east of the Nossob and Mata-Mata is the point of entry into South West Africa on the west. The small mammal fauna of South West Africa and of Bechuanaland is fairly well known and much of our present knowledge is available in the works by Shortridge (1934) and Roberts (1951). In addition the results of plague surveys conducted by the Union Health Department in both these territories and in adjoining parts of the Kalahari within the Union's borders provide additional data on the small mammal fauna.

It is proposed to study the Park fauna intensively and these preliminary notes, based principally upon an analysis of the contents of owl pellets, are introductory to more thorough future taxonomic and ecological studies.

In this instance, the species being preyed upon by the owls were the same as those recorded during trapping and field observations. In fact, there was one species, a tree-rat, which did not appear in these particular owl pellet collections. As a rule, it is usual to find more species in barn owl pellets than in rapid surveys in the surrounding area. This contribution by owls to the field work of the mammal ecologist in this and other respects is discussed in a general introductory paper (Davis, *in press*). It is proposed to make full use of the owls in future work in the Park, to help unravel small mammal population problems.

According to the observations of the Warden, rodents in general were much more abundant during 1954-5 than in 1956 and this was borne out by the observations made during this reconnaissance. It is more than likely that plague was responsible for the sharp reduction in numbers, as the Park lies in the heart of the plague-enzootic area.

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## MATERIAL

Sixteen skins, comprising 7 of the 10 odd species observed, were collected but these cannot be used for taxonomic analysis until adequate series of each have been collected. No attempt will therefore be made here to designate the subspecies. The owl pellet material, consisting of whole skulls or portions thereof, cannot be identified — as a rule — beyond the species, as subspecific cranial characters are rarely distinct enough for diagnosis without correlation with body measurements and colour.

Owl pellet collections were made at five points, two in the Nossob and three in the Auob, the larger collection coming from below an occupied nest (with 4 eggs) in the Nossob at Ky Ky, 30 miles north of Twee Rivieren. A further collection from Ky Ky, made by J. Meester of the Transvaal Museum, in February, 1957, is included in the analysis for comparison.

## NOTE ON METHODS

In preserving the skulls and skull fragments for study, it has been found best to coat them with dilute Glyptal according to the method developed for delicate palaeontological specimens (Brink, 1957) and then to mount them on strips of paper and store them in specimen tubes. This treatment holds the skull bones together and the teeth in place and makes the handling of specimens much easier.

The number of individuals of each species from each locality are set out in Table 1. In the last column but two, the approximate weight of young adults is given so that an idea can be gained of the weight of food provided by each species.

In the last two columns of the table the composition of the prey according to number of individuals and weight is given. It will be seen at once that the three kinds of gerbils (possibly four, if two *Tatera* spp. are present, see below) make up well over 80% of the owl's diet, whether considered in terms of numbers of individuals or of their weight.

Now the gerbils are particularly important as plague reservoirs, and as has been noted in the Introduction, their numbers were far below normal as a result of the suspected plague epizootic in 1954-5. Whereas *Tatera* and *Gerbillus* are highly susceptible to plague, *Desmodillus*, although susceptible, has a natural resistance sufficiently high to retard the spread of plague, though in the long run it dies out as surely as the other species. In May, 1956, *Desmodillus* colonies, normally active, could be found; signs of *Gerbillus* were also in evidence, but the *Tatera* were hardly encountered. Yet the owls diet consisted mostly of *Tatera* and *Gerbillus* with rather few *Desmodillus*. It is possible that the surviving *Tatera* were enough for the owls to

Results:

TABLE 1.

SMALL MAMMAL PREY OF BARN OWLS IN THE KALAHARI GEMSBOK NATIONAL PARK.

| | Twee-rivieren, Nossob | Ky Ky Nossob | Monro, Auob | Auchter-lonie, Auob | Kamfers-boom, Auob | Total | 1957 Ky Ky Nossob | Grand Total | Approx. body weight (g) | Composition | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | By Species (%) | By Weight (%) |
| Shrew (*Crocidura deserti*) ... ... ... ... ... ... ... | 1 | 15 | 1 | 1 | 5 | 23 | 29 | 52 | 20 | 11.4 | 5.4 |
| Mole-rat (*Cryptomys lugardi*) ... | — | — | — | — | — | — | 1 | 1 | 60 | 0.2 | 0.3 |
| Striped mouse (*Rhabdomys pumilio*) | 1 | 6 | 1 | — | — | 8 | 2 | 10 | 45 | 2.2 | 2.3 |
| Dwarf Mouse (*Mus minutoides*) ... ... | 1 | 5 | 1 | — | 4 | 11 | 2 | 13 | 8 | 2.8 | 0.5 |
| Large ear mouse *Malacothrix typica*) | — | 2 | — | — | — | 2 | — | 2 | 20 | 0.4 | 0.2 |
| Karoo rat (*Parotomys brantsi*) ... | 1 | — | — | — | — | 1 | 3 | 4 | 80 | 0.9 | 1.6 |
| Namaqua gerbil (*Desmodillus auricularis*) ... ... ... ... ... | — | 3 | 1 | — | 1 | 5 | 6 | 11 | 50 | 2.4 | 2.8 |
| Pigmy gerbil (*Gerbillus paeba*) ... ... | 3 | 83 | 9 | 11 | 22 | 128 | 122 | 250 | 30 | 54.0 | 38.3 |
| Common gerbil (*Tatera schinzi & brantsi*) ... ... | 2 | 45 | — | 6 | 6 | 59 | 60 | 119 | 80 | 25.7 | 48.6 |
| Total ... ... ... ... ... ... ... ... | 9 | 159 | 13 | 18 | 38 | 237 | 225 | 462 | — | 100.0 | 100.0 |

catch, but not enough to leave many clear signs of their presence—a situation somewhat similar to the "ghost-occupation" observed in Ngamiland in 1944 in the aftermath of a widespread plague epizootic when *Tatera* signs were few, but some could still be trapped (Davis, 1946).

The diurnal species — striped mice *(Rhabdomys)* and the karoo-rats *Parotomys)* — were fairly abundant, but barn owls catch them very rarely. Barn owls are known to hunt on dull days, but dull days are rare in the Kalahari, and it was not in the least surprising to find that these species formed such a small proportion of the owl's prey.

Since the two collections consisted of about the same number of pellets, they are directly comparable and it will be noted that the actual number of each species of gerbil was almost the same in each collection.

Distribution of *Thallomys paedulcus* (tree-rat).

It has been noted above that tree-rats were not among the prey-items of the barn owl. This does not mean that they are not caught, because fair numbers have been found in owl pellets in other parts of the Kalahari (Molopo River near Bray). *Thallomys* is strictly dependent upon the camelthorn and then probably only to the larger specimens growing in the river beds. Camelthorn groves are discontinuously distributed and there may be gaps of many miles between them. In May, 1956, tree rats appeared to be more abundant up the Auob towards Mata-Mata, while fewer occupied nests were observed up the Nossob. This race of the species not only lives on camelthorn leaves, gum and seeds but constructs large protective shelters in the forks of trees, usually hollow ones. It retreats during the day to its twig shelter or inside the tree.

Distribution of the karoo-rat *(Parotomys brantsi).*

*Parotomys* is colonial and diurnal. It has a high-pitched whistle, which it emits as it leaves its burrows or sits near its entrance. It was not seen to leave its burrow until an hour after sunrise nor to emerge after sunset. It is probably as strictly diurnal as the gerbils are nocturnal. An observation of some interest made towards the upper reaches of the Nossob towards Union's End was that in those parts it was found only around camelthorn trees, upon the seeds of which it appeared to depend entirely for food. In the Karoo proper it lives on succulents (soutslaai) to a large extent and it was remarkable to find it dependent upon such a dry food, and so far north of its known range.

Allied species of *Tatera.*

There are two closely allied species of *Tatera* which occur together in parts of the Kalahari, *T. schinzi* and *T. brantsi* (Davis, 1949). They can

normally be separated with certainty on external characters, but it is extremely difficult to find diagnostic cranial characters. They differ in their choice of habitat and mode of burrowing but sometimes occupy each other's burrows.

The Barn Owl is a valuable ally in studying the ecology of nocturnal small mammals. It will be of material assistance in unravelling the population dynamics and interrelations of the different species of gerbils. This may well contribute to a deeper understanding of the plague cycle, since two of the reservoir species are highly susceptible to plague while the third, *Desmodillus,* is much less so. The environmental limitations imposed on the distribution of the tree-rat *(Thallomys)* and the karoo-rat *(Parotomys)* offer a rewarding field of study and being at the same time conspicuous animals, in spite of their small size, have an attraction for the biologist as well as the visitor.

In conclusion, I should like to thank Mr. J. Meester, Transvaal Museum, for making the second collection of owl pellets and for the identification of the shrews and Mr. le Riche, the Warden, for taking me to the owl roosts known to him.

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