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The following is the established format for referencing this article:

Stuart, C.T., Stuart, T. and Pereboom, V. 2003. Diet of the bat-eared fox (*Otocyon megalotis*), based on scat analysis, on the Western Escarpment, South Africa. *Canid News* 6:2 [online]

URL: http://www.canids.org/canidnews/6/Diet_of_the_bat-eared_fox.pdf

Field Report

Diet of the bat-eared fox (*Otocyon megalotis*), based on scat analysis, on the Western Escarpment, South Africa

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Keywords: diet; insectivorous; *Otocyon megalotis*; scat analysis; Western Escarpment

Abstract

Scats of the bat-eared fox *Otocyon megalotis* were collected on the farm 'Sewefontein', Western Cape Province, South Africa between May 1994 and January 1995, in order to study its diet in this area. The only other study covering the diet of this species within the Western Cape Province (MacDonald and Nel 1986) was undertaken more than 200km to the west of this study area in the West Coast National Park. Other studies have been undertaken in the Kalahari Gemsbok National Park - now Kgaligadi Transfrontier Park- (Bothma 1966; Nel 1978), from central and northern South Africa (Berry 1981; Nel and Mackie 1990; Kuntzsch and Nel 1992; Kok 1996), elsewhere (Smithers 1971; Lamprecht 1979; Waser 1980; Koop and Valimirov 1982; Bothma, Nel and Macdonald 1984; Malcom 1986).

Studies of stomach contents and scats show that these small canids are mainly insectivorous, eating principally termites (mostly *Hodotermes mossambicus*) but also other insects. Other invertebrates (scorpions, solifugids and

myriapods) and wild fruits are also included in the diet.

Study area

Sewefontein (3119 CA Lokenburg, 31° 35' 45" S; 19° 07' 48" E) is situated to the south of the village of Nieuwoudtville on the Bokkeveld escarpment. The area comprises undulating hill country with steep rock ridges separating a scattering of agricultural lands (mainly rooibos tea and lupins). Livestock (sheep and cattle) run freely over most of the area. Sandy soil dominates the valley bottoms. The farm lies 720m above sea level. The annual rainfall measured over a period of six years ranged between 200 and 500mm, of which most falls during the winter months (June to September).

The area is situated at a meeting place of three principal vegetation types with a great diversity of plant species. These are:

1. Sparse vegetation made up of shrubs, grass, succulents and geophytes (Karoo scrub). In

most places it is overgrazed or put over to dry-land cultivation.

2. Succulent Karoo dominated by dwarf shrubs and numerous species of *Mesembryanthemaceae*.

3. The greater part of the study area is dominated by fynbos (Cape Heathland), with various *Protea*, *Rhus* and *Restio* species being abundant.

Methods

Bat-eared fox scats were collected from May 1994 to January 1995. Bat-eared foxes do not use latrines but defecate when coming out of their resting place which in time often leads to concentrations of faeces in a small area (Skinner and Smithers 1990). Most scats were collected at such sites but also along paths and roads. Results are shown as percentage occurrence of each item or group. The results from May (end of autumn), July (cold wet winter), October (spring) and December (hot dry summer) were used to determine seasonality in food consumption of the bat-eared fox.

Results

A total of 450 droppings were collected. Table 1 shows the detailed occurrence of the most frequently identified food items.

Insects occurred in all 450 droppings, Isoptera (termites) had the highest occurrence, followed by Coleoptera (beetles), both adults and larvae. Other insects identified included cockroaches (Blattodea), Lepidopteran larvae and praying mantises (Mantodea). Isoptera were represented almost exclusively by the common harvester termite *Hodotermes mossambicus*. Snouted termites (probably *Trinervitermes trinervoides*) were present in only three scats. Of the Coleoptera, those identified were dor beetles (Geotrupidae), weevils (Curculionidae), longicorn beetle (Cerambycidae, present in one scat), also members of the Scarabaeidae and Tenebrionidae. The Hymenoptera were represented by members of the Formicidae, but only *Camponotus* ants could be identified. Within the Orthoptera, mole crickets (Gryllotalpidae) were identified. Arachnida were represented

by scorpions (Scorpiones) and solifugids (Solifugae).

Table 1. Percentage occurrence of items found in 450 scats of bat-eared foxes at "Sewefontein", Western Escarpment

	Percentage occurrence (%)
Invertebrates	
Insecta	100
Isoptera	93
Hodotermes	93
Trinervitermes	1
Coleoptera	92
Dor beetles	22
Weevils	22
Scarabaeidae	4
Hymenoptera	45
Orthoptera	3
Arachnida	17
Scorpiones	16
Solifugae	3
Chilopoda	1
Vertebrates	
Mammals	12
Sheep	6
Rodents	50
Lagomorphs	1
Reptiles	3
Birds	2
Plant parts	25
Wild olives	14
Oat seeds	4

Plant material comprised seeds, deliberately consumed grass (as opposed to dry cut stems ingested while feeding on *Hodotermes* (Skinner and Smithers 1990)) and *Oxalis* sp. bulbs. Most of the seeds were from the wild olive (*Olea europaea*). Other identified seeds were from the *skilpadbessie* (*Nylandtia spinosa*), oats and in a single scat the seed from a *Grewia* sp.

The occurrence of domestic stock hair in stomach contents is probably a result of feeding on maggots in decomposing carcasses.

Discussion

Otocyon megalotis may be considered insectivorous with a marked preference for harvester termites (*Hodotermes* sp.). When harvester termites are less active, its opportunistic diet allows it to take a wide range of other food items.

This study clearly shows that *Otocyon megalotis* feeds mainly on termites, especially *Hodotermes*. In support of this, the distribution of harvester termites (Coaton and Sheasby 1975, quoted by Mackie and Nel 1989) and bat-eared Fox (Smithers, 1983) in southern Africa when superimposed on a map show a 95% overlap (Mackie and Nel 1989). The snouted harvester termites *Trinervitermes* sp. are always in very low numbers in stomach contents and scats (Kok 1996; Nel and Mackie 1990). Low occurrence of snouted harvester termites is not surprising as ,

although often foraging in dense concentrations on the soil surface, this species can squirt threads of a sticky and noxious substance (Braekman et.al. 1984). In an experiment by Richardson and Levitan (1994), *Otocyon megalotis* refused any food containing as little as 0.5% of liquidized soldiers of *Trinervitermes trinervoides*.

Seasonality in food consumption has been demonstrated by Smithers (1971; 1983), Nel (1978) and Mackie (1988) and reflects the opportunistic feeding behaviour of *Otocyon megalotis*. Figure 1 shows the food items with statistically significant degree of consumption between seasons. In this study insects were present throughout the year, at 100% occurrence. Smithers (1971; 1990) found a marked decline in insect consumption in May.

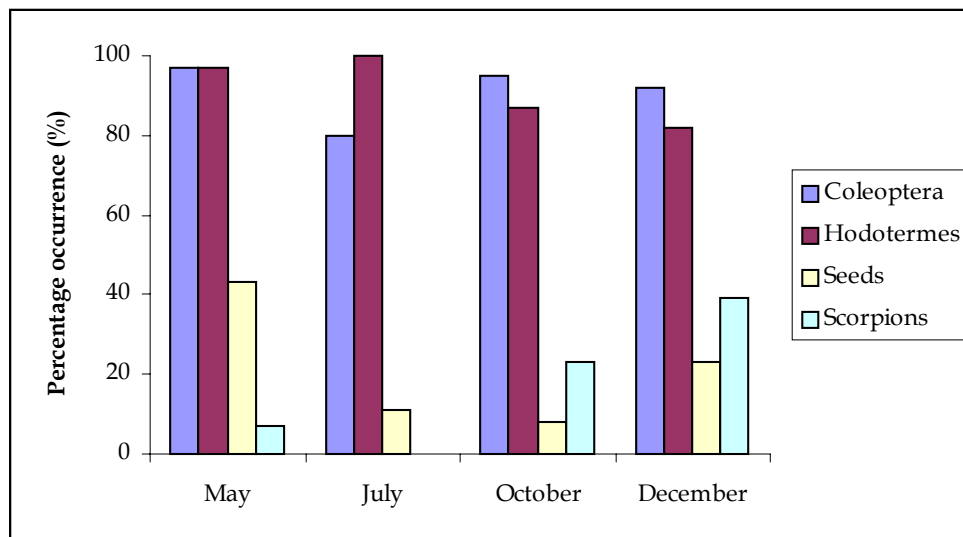


Figure 1. Seasonality of food consumption of the bat-eared fox on the Western Escarpment

Within the Insecta, this study shows a difference in the consumption of Coleopterans between July (cold, wet winter) and the other seasons. A difference was also found in the consumption of *Hodotermes*: they were preferred in May and July and eaten less in October and December. Nel (1978) found ants to be more common in winter. This study does not show any significant variation in consumption of Hymenoptera between seasons. But a variation in the consumption of scorpions was found. Scorpions occurred more often in the scats in

October, with the return of the warmer months and the percentage occurrence was even higher in December.

The occurrence of wild fruits, berries and seeds in the diet of *Otocyon megalotis* also shows seasonal variation (Smithers 1971; Skinner and Smithers 1990; Nel 1978; Nel and Mackie 1990; Kok 1996).

The bat-eared fox is not the only South African carnivore relying on insects for the greater part

of its diet (Skinner and Smithers 1990). Termites are the principal food of two others (Stuart 1981; Skinner and Smithers 1990). The aardwolf (*Proteles cristatus*) feeds almost exclusively on *Trinervitermes* spp., a group of termites distasteful to most mammals, including the bat-eared fox (Richardson and Levitan 1994). More than 90% of the diet of Meller's mongoose (*Rhynchogale melleri*) consists of the harvester termites *Hodotermes* and *Macrotermes* (Smithers 1990).

The harvester termite *Hodotermes mossambicus* has the potential to noticeably denude vegetation and may therefore be an important competitor of domestic grazing stock, especially in years of drought in semi-arid to arid regions (Nel and Mackie 1990). It has been estimated that 1.15 million termites can be eaten each year by a single Bat-eared Fox (Nel and Mackie 1990). Therefore *Otocyon megalotis* should be regarded as important in termite control.

Acknowledgement

Jan A.J. Nel is thanked for reviewing this short note.

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