Notes and records

The diet of the aardwolf, *Proteles cristatus* at Malolotja Nature Reserve, western Swaziland

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Introduction

Diet is a key determinant of activity patterns and social organization of carnivores (Henschel & Skinner, 1990). In addition, understanding the diet of the aardwolf, (*Proteles cristatus* Sparman), a highly specialized carnivore (Richardson, 1987a), may be important to its conservation. Substantial information has been collected on its diet in various parts of its sub-Saharan range (Kruuk & Sands, 1972; Bothma & Nel, 1980 and Richardson, 1983), where it shows high selectivity for certain species of termites, *Trinervitermes* and *Hodotermes* (Anderson, Richardson & Woodal, 1992). In general, its diet fluctuates seasonally from a predominance of *Trinervitermes* during summer (October–March) to increased contribution of *Hodotermes* during winter (Kruuk & Sands, 1972; Richardson, 1987b; Taylor & Skinner, 2000). This pattern is attributed to the underground disappearance of *Trinervitermes* during winter (June–August), whereas *Hodotermes* remains active. In contrast, Dean (1978) reported termites of the genera *Fulleritemes, Pseudacanthotermes* and *Odontotermes* in the diet, suggesting that dietary variation exists, possibly linked to different habitats. Most studies have been conducted in dry arid regions (<500 mm rainfall per annum), while information from moist regions is lacking. In this study, we investigate the diet of aardwolf in a high rainfall region in southern Africa.

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Study area and methods

This study was conducted at Malolotja Nature Reserve (26°08′S; 31°05′E), western Swaziland, which covers 18,000 hectares of montane grasslands, protea savannah, forested ravines and upland marshes. The elevation ranges from 450 to 1837 m above sea level. Malolotja receives high rainfall, with annual rainfall ranging between 850 and 1400 mm, mostly from October to March with dry and cool winters. The reserve provides sanctuary for the largest population of aardwolf in Swaziland (Monadjem, 1998).

The diet of aardwolves was studied for 11 months beginning in November 2001, by examining faeces which were collected at least once per week. Aardwolves used latrines, which greatly facilitated the collection of faeces. These were collected from latrines within the home ranges of six different individuals (as determined by radio-telemetry and observations of individuals during night drives). The faeces were collected early in the morning when they were still moist and fresh. A portion of the set of droppings was collected and placed in plastic bags. A total of 89 faecal samples were collected and then oven dried for about 24 h at 80–90°C to arrest microbial and insect degradation. The samples were then stored in plastic bags with a fumigant (naphthalene) to prevent insect infestation (Bookhout, 1996). Later three to five subsamples were taken from the samples for analysis using Cooper & Skinner's (1979) methods. Each sample was dissolved in water and then crushed to allow organic material to float. It was then drained through a filter to separate the liquid from the organic material. A Computer Aided Biological Identification key (Sands, 1997) combined with a guide on termites (Uys, 2002) were used for identifying the termites.

Prey items present in the faeces were expressed in two ways. First, frequency of occurrence was defined as the percent of the total faecal samples in which a particular prey item was found (Monadjem, 1997). Second, proportional contribution was defined as the relative abundance of prey in the faeces. This was estimated by averaging the percent cover of each prey item in five randomly placed microscope fields. Importance values (IV)

Table 1 The frequency of occurrence of different food items in faecal samples by month, indicating limited seasonal variation in the aardwolf's diet at Malolotja Nature Reserve

	Month (November 2001–September 2002)											
	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
No. samples (n)	4	6	11	8	12	8	10	13	10	4	3	89
Termites												
Trinervitermes	4	6	11	8	12	7	10	13	10	4	3	88
Hodotermes	–	–	1	–	4	6	–	–	–	–	–	11
Beetles	1	2	–	–	–	–	–	–	–	–	–	3
Ants	1	–	2	1	–	–	–	–	–	–	–	4
Grass, fragments and sand	4	6	11	8	12	8	10	13	10	4	3	89

of the different food categories were also calculated by the formula:

IV = proportional contribution × frequency of occurrence.

Results

Unidentified prey items, along with grass fragments and sand, accounted for 74.4% of the total dry mass of the faeces. The remainder was separated into four categories: *Trinervitermes* termites, *Hodotermes* termites, ants and beetles. *Trinervitermes* were recorded in all but one sample (Table 1 and Fig. 1) and in 87% of samples it was the only termite genus present. *Trinervitermes* was also the most abundant prey item in the faeces as shown by its high proportional contribution (Fig. 1). *Trinervitermes* maintain a high importance value during both the dry and wet seasons (Fig. 2).

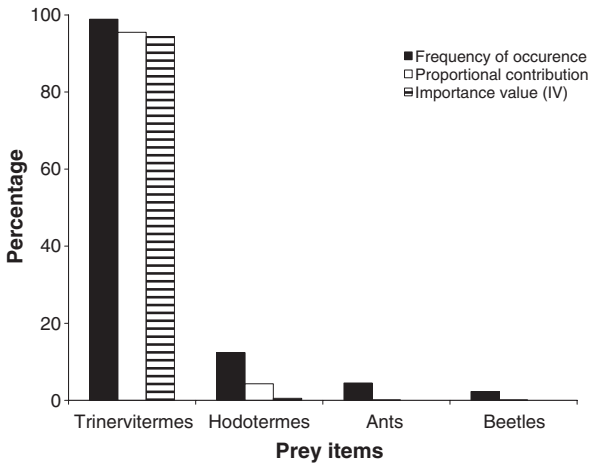

Fig 1 Frequency of occurrence, proportional contribution and importance value of items in faeces (n = 89) collected from aardwolf latrines throughout the year, at Malolotja Nature Reserve

A second genus of termite, *Hodotermes* occurred in 12% of samples (Fig. 1), and was the sole food item in one sample from April. However, on average *Hodotermes* was far less abundant than *Trinervitermes*, as shown by its low proportional contribution (Fig. 1). *Hodotermes* was recorded in faeces only during the wet season (Table 1 and Fig. 2). Traces of ants and beetles were found in 8% of samples but they had low importance values (Figs 1 and 2).

Discussion

This study corroborates the general findings of other investigations, which indicate that aardwolves feed almost exclusively on termites. The dominance of *Trinervitermes* in the diet of aardwolves is most likely because of their wide distribution in southern Africa, the high density of mounds and their emergence behaviour (Kruuk & Sands, 1972; Cooper & Skinner, 1979).

Other studies have recorded significant fluctuations in the diet of aardwolves with season (Kruuk & Sands, 1972; Richardson, 1987b; Taylor & Skinner, 2000). However, in this study, the dominance of *Trinervitermes* does not fluctuate significantly on a seasonal basis. Cooper & Skinner (1979) recorded a similar lack of seasonal fluctuation from the former Transvaal and Orange Free State provinces of South Africa, which they attributed to the environmental differences of their study area in comparison with other studies. *Hodotermes* contributed very little to the diet of aardwolves in the study area and were only recorded in samples collected in the wet season. This is in contrast to the findings of Richardson (1987b) who found them in higher overall proportions and only during the dry season. This is most likely a result of the low proportions of *Hodotermes* in the study area as evidenced by few *Hodotermes* mounds.

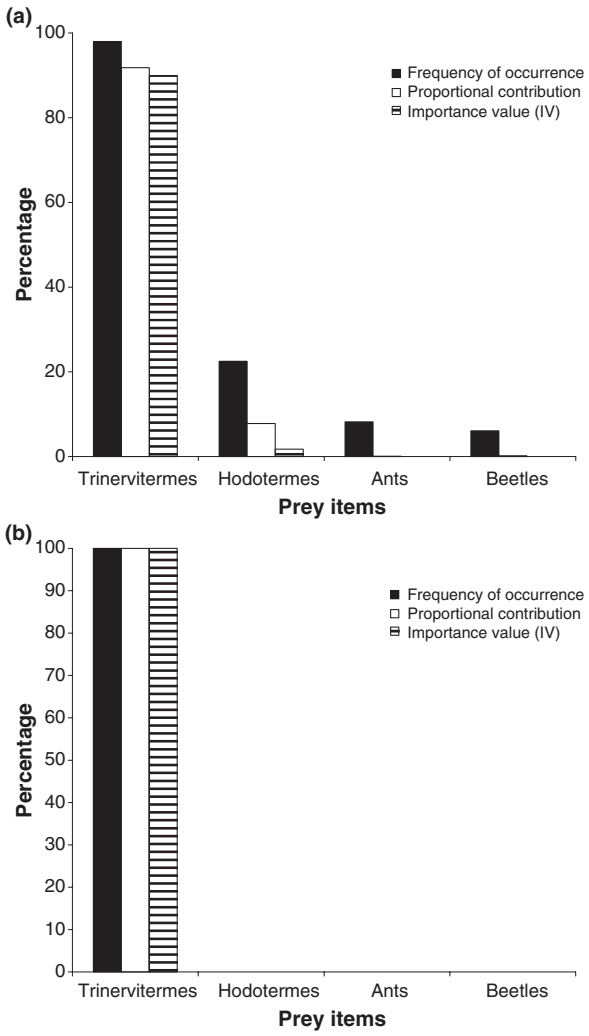

Fig 2 (a) Frequency of occurrence, proportional contribution and importance value of items in faeces (n = 49) collected from aardwolf latrines during the wet season (November 2001–April 2002), at Malolotja Nature Reserve. (b) Frequency of occurrence, proportional contribution and importance value of items in faeces (n = 40) collected from aardwolf latrines during the dry season (May 2002–September 2002), at Malolotja Nature Reserve

The presence of ants and beetles in the faeces probably results from accidental ingestion by aardwolves whilst feeding on the termites, as observed by Cooper & Skinner (1979). The grass fragments, plant matter and sand present in the faeces may have been taken whilst the animal was licking up the termites from the soil as observed by Kruuk & Sands (1972).

The numbers and distribution of aardwolves are believed to be dependent on the distribution of *Trinervitermes* (Kruuk & Sands, 1972). The results of this study at Malolotja support this hypothesis. First, *Trinervitermes* were by far the most abundant component of the diet and second, aardwolves were recorded only in open grassland areas supporting numerous *Trinervitermes* mounds.

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