

## SHORT COMMUNICATIONS

### NOTES ON THE FEEDING HABITS OF THE YELLOW MONGOOSE *CYNICTIS PENICILLATA*

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#### INTRODUCTION

The monotypic genus *Cynictis* is endemic to southern Africa (Lundholm 1955). General remarks on its feeding habits are given by Sclater (1900) and Shortridge (1934). According to Snyman (1940) and Dücker (1965) it is mainly insectivorous but this does not entirely agree with the findings of Michaelis (1972). Hinton & Dunn (1967) following FitzSimons (1919) mention that *C. penicillata* (G. Cuvier) is inclined to attack vertebrates of medium size such as hares, bigger birds or even new-born lambs. These prey items, however, seem most unlikely, as other studies e.g. Smithers (1971), Viljoen & Davis (1973) and Zumpt (1968) show that invertebrates form a major part of the diet of this species, although a wide variety of small vertebrates and even carrion will be taken too. Ewer (1973) describes *Cynictis* as a mixed feeder.

In the western Transvaal, South Africa, *C. penicillata* has a high population density and specimens were collected regularly in 1973 and 1974. As the prevailing belief in this area was that

*Cynictis* fed mainly on ground-breeding birds and their eggs it seemed useful to analyse their stomach contents.

#### MATERIAL AND METHODS

Sixty-three *C. penicillata* were collected in the dry Cymbopogon-Themeda Veld (Acocks 1953; Van Zyl 1965) in the S.A. Lombard Nature Reserve (18 km west of Bloemhof, 25°35'E/27°25'S) between April 1973 and August 1974 (Table 1). Nineteen samples came from the area of the Vaal Dam, c. 150 km south of Pretoria, from August 1974.

TABLE 1

Monthly samples of 63 *Cynictis penicillata* collected from S.A. Lombard Nature Reserve near Bloemhof.

Sample size		Month
1973	1974	
0	7	March
1	0	April
0	5	May
12	0	June
5	0	July
5	6	August
6	0	September
11	0	October
3	0	November
2	0	December

Immediately after being shot the animals were measured and weighed and stomach samples were preserved in either 10 per cent formalin or 70 per cent alcohol; skulls were also kept for age determinations (Zumpt 1969). In the laboratory the volume of the entire contents of the stomach was measured and the contents then washed

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through a sieve. The amounts of the different food items present were estimated visually and split up into the following categories: exclusive, dominant, present. The vertebrate remains were kept for further identifications whereas the remaining residues are referred to as 'termites, locusts, other (or mixed) invertebrates, plants or seeds'.

### RESULTS

*C. penicillata* is generally diurnal but reports state that it is sometimes active at night. In the S.A. Lombard Nature Reserve animals were observed leaving their burrows well after sunrise: in summer between 08h00 and 09h00, and in winter around 10h00. They usually remained in the vicinity of the burrow entrance for some while and basked in the sun. Accordingly, some of the stomachs collected up to about 10h00 were empty. In the evening they were seen at the latest around 19h00 outside their burrows, but night activity data are not available.

The volumes of stomach contents give some idea of the amount of food consumed. The four biggest samples were 185; 118; 110 and 82 ml. Unfortunately it is not known at what time of day these particular animals were collected. Further data on the amount of stomach contents correlated with time of day are given in Figure 1.

Six of the 82 stomachs collected were empty. Most of the full stomachs contained mixed food items (Table 2). Invertebrates in general were found in 66 (86,8 per cent) cases and vertebrate residues in 21 (28,0 per cent).

Among the invertebrates, termites (*Hodotermes* sp.) were the most important: 21 (28,0 per cent) of the samples consisted of termites only and a further 30 (39,5 per cent) contained termites among other items. Other mixed invertebrates appeared in 26 (34,2 per cent) stomachs and locusts in 20 (26,3 per cent). The dominance of termites among the food items is also shown by the fact that the four largest samples consisted entirely of termites. In areas with high termite densities *C. penicillata* was observed to be

TABLE 2

Frequency of occurrence (FO) of food items in stomach contents of 76 *C. penicillata* from S.A. Lombard Nature Reserve and Vaal Dam District.

Food item	Total FO (%)	Exclusive FO (%)	Dominant FO (%)
Invertebrates, general	66 (86,8)		
Vertebrates	21 (28,0)		
Termites	51 (67,1)	21 (28,0)	8 (10,5)
Other invertebrates	26 (34,2)	—	—
Locusts	20 (26,3)	3 (4,0)	4 (5,3)
Mammalia	12 (15,8)	1 (1,3)	1 (1,3)
Aves*	7 (9,2)	2 (2,6)	2 (2,6)
Amphibia	6 (7,9)	—	—
Unidentified	4 (5,3)	4 (5,3)	—
Carrion	2 (2,6)	—	—
Sunflower seeds	1 (1,3)	—	1 (1,3)

\*in one case egg yolk only.

TABLE 3

Stomach samples of *Herpestes sanguineus* and *Suricata suricatta*

Species	Date collected	Food items
<i>H. sanguineus</i>	2.7.1973	Termites, locusts, piece of fur, 1 <i>Mabuya varia</i> (Family Scincidae), 12 <i>Lygodactylus capensis</i> (Family Gekkonidae). Note that the latter species is arboreal.
<i>H. sanguineus</i>	16.9.1973	Termites, locusts, other invertebrates
<i>H. sanguineus</i>	2.8.1974	Termites, locusts, other invertebrates
<i>S. suricatta</i>	18.10.1973	Termites, maggots (without vertebrate remains); pieces of plants

feeding exclusively on them without looking for other food.

Among the vertebrates, mammals (12: 15,8 per cent) were followed by birds (7: 9,2 per cent) and amphibians (6: 7,9 per cent). Two of the animals had fed on carrion (contents were

regarded as carrion when vertebrate remains plus maggots were found). In one case where fur of *C. penicillata* was present in the stomach, it originated from another individual that had been shot previously. Analysis of cuticular scale patterns of mammal hair indicated that the

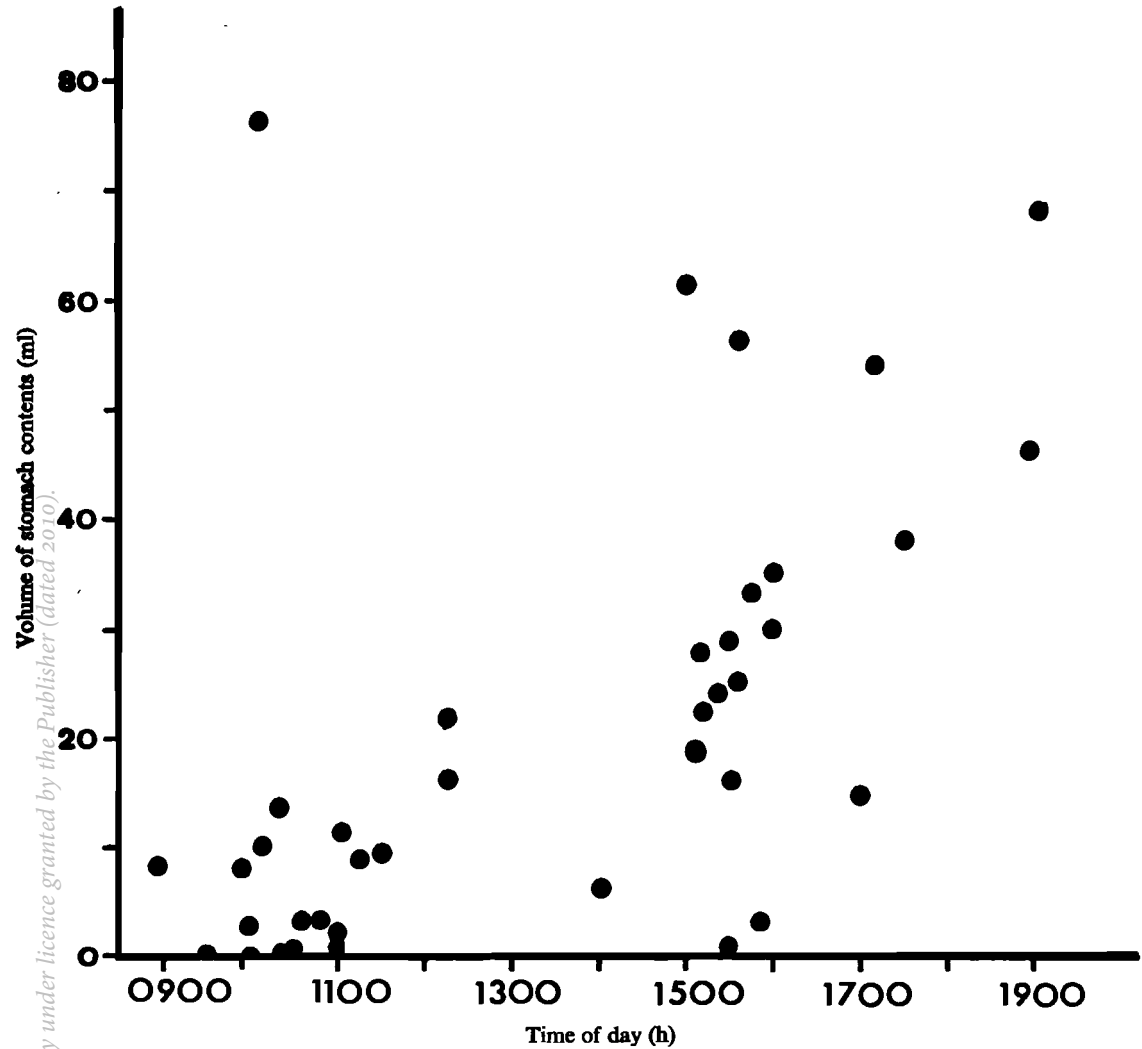


FIGURE 1

Volumes of stomach contents of *C. penicillata* at different times of day. Each dot represents one measurement.

yellow mongoose from the Vaal Dam area had been feeding on *Mystromys albicaudatus* (two stomachs), *Praomys (Mastomys) natalensis* (one stomach) and *Rhabdomys pumilio* (one stomach). Identifiable feathers of a juvenile moulting dove, probably the laughing dove, *Streptopelia senegalensis*, occurred in a stomach from Vaal Dam, and those of a mousebird, *Colius* sp., occurred in a stomach from the Bloemhof district. Amphibians from the Bloemhof stomachs were represented by *Tomopterna (Pyxicephalus) delalandi cryptotis* of the family Ranidae. Five Vaal Dam stomachs contained amphibians, three of them *Bufo* sp., of which two could be identified as *B. garmani*. The other amphibian was *Tomopterna delalandi*.

Occasionally *C. penicillata* also feeds on sunflower seeds (one stomach was more than half filled with them; see also Zumpt, 1968). Plants were represented in almost all samples and sand in some of them as a trace – probably coincidental contaminants when feeding on invertebrates; sometimes pieces of paper, mealie meal, etc. were found as well.

Limited data on stomach contents of two other Viverridae of the Bloemhof area are given in Table 3.

#### DISCUSSION

The evaluation of food consumption of wild animals in the field is generally difficult (Petrušewicz & MacFadyen 1970) and should be related to the size of the animal. The average mass of 33 adult male and female *C. penicillata* in the present study was 763 g; females are generally lighter ( $\bar{x}$  = 673 g; 610 g–825 g, n = 11; without embryos) than males ( $\bar{x}$  = 807 g; 663 g–980 g, n = 22).

The large numbers of termites (*Hodotermes* sp.) found in 51 (67,1 per cent) stomachs, and the presence of bird remains in only 7 (9,2 per cent) stomachs, does not support the hypothesis that *C. penicillata* preys heavily on ground-breeding birds (see also Zumpt 1968).

No seasonal pattern in the composition of

food items from the stomachs obtained from the S.A. Lombard Nature Reserve could be found and these results and those from the Vaal Dam area were therefore compared in Table 4. Invertebrates are the main food item in both cases but the difference in the percentage frequency of occurrence of vertebrate items suggests that *C. penicillata* is an opportunistic feeder. The data in Figure 1 indicate that *C. penicillata* feeds continually throughout its diurnal activity phase, but further data in this regard are necessary.

TABLE 4

Comparison of percentage frequency of occurrence of food items of *C. penicillata* from two collecting localities.

Food item	Percentage frequency of occurrence	
	Locality	
	Vaal Dam area	S.A. Lombard N.R.
Invertebrates, general	77,8	89,7
Vertebrates	44,4	22,4
Termites	77,8	63,8
Other invertebrates	11,1	41,4
Locusts	11,1	31,0
Mammalia	22,2	13,8
Aves	16,7	6,9
Amphibia	27,81	1,7

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## REFERENCES

- ACOCKS, J. P. H. 1953. Veldtypes of South Africa. *Mem. bot. Surv. S. Afr.* 28. Pretoria: Govt. Printer.
- DÜCKER, G. 1965. Das Verhalten der Viverriden. *Handb. Zool.* (8) 38: 1-48.
- EWER, R. F. 1973. *The Carnivores*. London: Weidenfeld & Nicolson.
- FITZSIMONS, F. W. 1919. *The natural history of South Africa*. London: Longmans & Green.
- HINTON, H. E. & DUNN, A. M. S. 1967. *Mongoose. Their natural history and behaviour*. Edinburgh & London: Oliver & Boyd.
- LUNDHOLM, B. G. 1955. A taxonomic study of *Cynictis penicillata* (Cuvier). *Ann. Transv. Mus.* 22: 305-319.
- MICHAELIS, B. 1972. Die Schleichkatzen Afrikas. *Säugetier. Mitt.* 20: 1-110.
- PETRUSEWICZ, K. & MACFADYEN, A. 1970. *Productivity of terrestrial animals. Principles and methods*. IBP Handbk 13. Oxford & Edinburgh: Blackwell.
- SCLATER, W. L. 1900. *The mammals of South Africa*, 2. London: Porter.
- SHORTTRIDGE, G. C. 1934. *The mammals of South West Africa*, 1. London: Heinemann.
- SMITHERS, R. 1971. *The mammals of Botswana. Mem. natn. Mus. Rhod.* 4: 1-230.
- SNYMAN, P. S. 1940. Study and control of the vectors of rabies. *Onderstepoort J. vet. Sci. Anim. Ind.* 15: 9-140.
- VAN ZYL, J. H. M. 1965. The vegetation of the S.A. Lombard Nature Reserve and its utilisation by certain antelope. *Zool. afr.* 1: 55-71.
- VILJOEN, S. & DAVIS, D. H. S. 1973. Notes on stomach contents analyses of various carnivores in southern Africa (Mammalia: Carnivora). *Ann. Transv. Mus.* 28: 353-363.
- ZUMPT, I. 1968. The feeding habits of the yellow mongoose, *Cynictis penicillata*, the suricate, *Suricata suricatta* and the Cape ground squirrel, *Xerus inauris*. *Jl S. Afr. vet. med. Ass.* 39: 89-91.
- ZUMPT, I. 1969. Factors influencing rabies outbreaks: the age and breeding cycle of the yellow mongoose, *Cynictis penicillata* (Cuvier). *Jl S. Afr. vet. med. Ass.* 40: 319-322.

ASPECTS OF PHALLIC  
MORPHOLOGY OF THE BUSH  
SQUIRREL, *PARAXERUS*  
*CEPAPI CEPAPI*

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During a two-year study of the bush squirrel, *Paraxerus cepapi cepapi*, 26 phalli were processed according to the method described by Lidicker

(1968) and sketches and measurements were made through a stereo microscope (Viljoen 1975). The bony elements of the penis are divided into three distinct parts (Figure 1):

*Crest*

A crest surrounds the greater part of the baculum. This crest is not continuous but consists of two halves, each half starting antero-ventrally of the anterior tip of the baculum, proceeding immediately to the dorsal surface, and then down three-quarters of the length of the everted part of the penis. Then it curves towards the dorsal mid-line to almost meet the other half. In the youngest animals (Class I of Viljoen 1976) the crest is without any bone