Table 2 Relative abundance (%) of most common arthropods in scats. Arthropods were recorded as either present (<30 fragments per sample) or numerous (≥30 fragments per sample), with the most abundant arthropod group in each sample being noted

	Most numerous	Numerous	Present
Isoptera	50	21	21
Coleoptera	21	42	37
Orthoptera	21	21	54
Dermaptera	4	17	37
Hymenoptera	4	0	41

12 (50%) scats while Coleoptera and Orthoptera were most abundant in five (21%) each (Table 2).

Identifiable hair, apart from that of *C. penicillata*, was present in 15 (63%) of the 24 presumed *C. penicillata* scats and 20 (54%) of the total sample of 37 scats. Three samples contained hair of more than one species. The small mammals identified, with number of occurrences in brackets, were *Mastomys* species (6), *Rhabdomys pumilio* (4), *Mus minutoides* (3), *Pedetes capensis* (3), *Tatera brantsii* (3), *Tatera* species (1), *Aethomys* species (1), *Desmodillus auricularis* (1) and *Lepus* species (1). Hair of *S. suricatta* was not identified from any scats examined.

Arthropods, principally Isoptera but also Coleoptera and Orthoptera, were found to be the most abundant food items of *C. penicillata* scats. This is consistent with results of stomach and colon analyses reported by other workers (Snyman 1940; Zumpt 1968; Smithers 1971; Herzig-Straschil 1977; Lynch 1980). Scat analysis recorded higher frequencies of most food items than in surveys based on stomach and colon analyses by Zumpt (1968), Smithers (1971) and Lynch (1980). Stomachs and colons were frequently found empty by these authors. However, scat analysis appears to be less efficient than stomach analysis for detection of food items which are completely degraded by digestion. The low incidence of Lepidoptera larvae (8%) and Coleoptera larvae (8%) and the absence of amphibia in the present study compared to others (Smithers 1971; Lynch 1980) may be due to this fact.

Other workers have reported the presence of one or other of the termite species *Hodotermes mossambicus* (Snyman 1940; Herzig-Straschil 1977) or *Trinervitermes trinervoides* (Lynch 1980) in the stomach or colon of *C. penicillata*. Both of these termite species were found in substantial numbers in this study, confirming the view of Lynch (1980) that an apparent preference for either termite species by *C. penicillata* merely reflects local abundance.

The small number of viverrid scat samples collected each month allow few conclusions to be made regarding rodent mortality in the study area. However, three of four occurrences of *Tatera* hair in scats were in March and all three occurrences of *Mus minutoides* hair were in June. It is unknown whether these occurrences in scats resulted from scavenging or active hunting and therefore the results obtained may reflect either abundance or mortality of a particular species. Either alternative is possible since high rodent populations often precede mortality caused by plague (Davis 1953), or other agents (Shepherd, Leman & Barnett, 1982).

Although plague has declined as a serious threat to health in recent years, the organism persists in South African rodents (Shepherd & Leman 1983). The results of the limited study presented here indicate that calculation of the percentage of viverrid scats containing identifiable hair may supplement serological surveys to detect plague epizootics in wild rodents.

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Food of the large grey mongoose *Herpestes ichneumon* in the south-west Cape Province

C.T. Stuart

Cape Department of Nature and Environmental Conservation
Present address: Albany Museum, Somerset Street, Grahamstown, 6140 Republic of South Africa

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The large grey mongoose has a wide distribution throughout Africa, the Middle East and westwards into Spain, but in the Cape Province was generally believed to only extend as far west as Knysna (Ellerman, Morrison-Scott & Hayman 1953;

Meester, Davis & Coetzee 1964). Sclater (1900) did, however, mention their occurrence in the Cape and Stellenbosch divisions of the south-west Cape Province. Stuart (1981) has documented its current distribution in the Cape Province. During the course of a study on the caracal, *Felis caracal*, in the Gansbaai/Quoin Point area, south-west Cape Province (3419 DA & DC Baardskeerdersbos), it was found that *Herpestes ichneumon* was one of the commonest small carnivores occurring in the area.

Literature records of diet have been summarized by Kingdon (1977) and they indicate that this mongoose feeds primarily on small vertebrates and invertebrates, but very little specific information has been published on this species for the African continent (Smithers & Wilson 1979; Stuart 1981).

The farm 'Groothagelkraal' is some 1 600 ha in extent, 25 km east of Gansbaai and consists of coastal sand dunes, low fynbos and cliffs with small pockets of indigenous forest. There are large stands of exotic *Acacia cyclops*. The annual rainfall averages 400 mm falling mainly in the winter months. One perennial stream (Haëlkraal River) flows through the property, and marshy ground is present. The area has a rich vertebrate fauna.

The majority of faecal samples (from small middens of known origin) were collected at the edge of the exotic infestations, and in close proximity to one of the forest pockets. Large grey mongooses are found in all areas of the farm, but the majority of sightings were made in the vicinity of dense vegetation, close to water.

A total of 105 scats were collected (23 in February and 82 in April) over a period of one year (1981/1982). Large grey mongoose were readily observed and only scats from confirmed midden sites were collected. Where any doubt existed as to scat origin they were discarded. The samples were macerated in water using a small mesh sieve and then stored separately in 5% formalin. Prey was then identified by macroanalysis of undigested fragments. Hair was compared with a reference collection and identified wherever possible, but in many cases hair could not be positively identified as to origin. In addition, one kill and two attempted kills were recorded.

Identified prey items yielded a total of 278 records as summarized in Table 1. These included at least ten species of mammals and an unknown number of birds, fish, reptiles and invertebrates. In addition there were 82 (72%) records of plant material, which consisted of green and dry grass and *A. cyclops* seeds.

Of all the prey groups the frequency of rodents, 115 (41,4%) occurrences, was the highest. Of the 22 snake occurrences only eight were positively identified as puffadder, *Bitis arietans*, although several of the remainder were also considered to be of this species. The puffadder is particularly abundant in the *A. cyclops* thickets, as is its principal prey, *R. pumilio*. Although no bird prey items were specifically identified it was determined, according to feather size, that they ranged from prinia to cormorant. The presence of egg-shell fragments was only recorded in the April sample. The Orthoptera taken included members of the Acridiidae and Gryllidae, with the former occurring most frequently. Terrestrial gasteropods were found in scats located in an area heavily populated by several species of snail. Feral cats and the African wild cat, *Felis libyca*, are fairly common in the area and the presence of small felid claws in two of the samples probably indicates that small kittens were removed from nests. The single rock hyrax, *Procavia capensis*, was a juvenile animal (foot present).

Two adult large grey mongooses were observed feeding on a freshly killed puffadder of some 50 cm in length, and they only ran off after the observer was within 20 m. A. Bell (pers. comm.) observed a large grey mongoose attacking a puffadder. The mongoose ran off on being approached and the snake was found to have serious wounds on the head. The injuries had affected the striking ability of the snake. An unsuccessful stalk involving a large grey mongoose was observed by the author, in which three Cape francolin, *Francolinus capensis*, feeding in a clearing, flew off before the predator could come within striking distance.

Table 1 Total occurrence and percentage occurrence of prey items in 105 large grey mongoose scats

Prey item	Total occurrence	Percentage occurrence
Mammal		
Rodent (unidentified)	65	17,0
Rhabdomys pumilio	21	5,5
Otomys irroratus	21	5,5
Bathyergus suillus	4	1,0
Praomys verreauxi	3	0,8
Cryptomys hottentotus (?)	1	0,3
Shrews (unidentified)	4	1,0
Myosorex varius	1	0,3
Chrysochloris asiatica	1	0,3
Felid (kitten)	2	0,5
Procavia capensis	1	0,3
Bird		
Unidentified	16	4,2
Egg	5	1,3
Reptile		
Serpentes (unidentified)	14	3,7
Bitis arietans	8	2,1
Sauria (unidentified)	2	0,5
Mabuya sp.	2	0,5
Fish		
Unidentified	4	1,0
Crustacean		
Unidentified crab	1	0,3
Arachnid		
Scorpion	2	0,5
Solifugid	2	0,5
Spider	1	0,3
Myriopod		
Millipede	1	0,3
Insect		
Coleoptera	46	12,0
Orthoptera	40	10,5
Mollusc		
Freshwater gasteropod	1	0,3
Terrestrial gasteropod	9	2,4
Total	278	
Plant material		
Green grass	46	12,0
Dry grass	17	4,5
Seed	17	4,5

Green grass was present in 46 scats, and dry grass in 19 scats. The high incidence of grass in the scats indicates that it is deliberately taken by this mongoose. The presence of *A. cyclops* seed in some scats (4,5%) is possibly incidental, but in view of the relatively high occurrence the deliberate taking of these seeds cannot be ruled out.

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Diet of *Gerres* fry in the Kosi system

D.P. Cyrus*

Department of Zoology, University of Natal, Pietermaritzburg, 3200 Republic of South Africa

S.J.M. Blaber

Present address: C.S.I.R.O., Division of Fisheries, P.O. Box 21, Cronulla, N.S.W. 2230, Australia

*To whom correspondence should be addressed

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The biology of juvenile and adult *Gerres* occurring in the estuaries of southern Africa has been studied in detail (Cyrus 1980; Cyrus & Blaber 1983 and in press). This short note gives details of the diet of *Gerres* fry (<40 mm S.L.) in the Kosi system (mouth at 26°54′S/32°53′E), Natal, South Africa.

Five sites in the system (Estuary, Water Level Recorder, Makhawulani, Mpungwini and Nhlange) were sampled quarterly from July 1978 to July 1980. For location of these sites in the system see Cyrus & Blaber 1983. The fry were collected using a 10 m × 1,5 m × 4 mm bar mesh seine-net. All specimens were preserved immediately in 10% formalin for analysis in the laboratory. Stomach contents of individual fish were analysed using the three methods given below.

(i) Numerical occurrence. The number of each food type in all stomachs was expressed as a percentage of the total number recorded.

(ii) The points method of Ricker (1968). The percentage fullness of a stomach was assessed, food items were sorted into species groups and points were then allocated to each group according to the proportion they represented in relation to the other groups present, and the fullness of the stomach. This method gives an approximate volumetric analysis of diet.

(iii) Percentage calorific contribution of each food item. Energy values of individual food items were used to establish the percentage energy contribution of each food type. The calorific values used for the different groups were obtained from a number of sources and are listed in Cyrus & Blaber (1983).

Diet of different species

During the study fry of four species were collected. Table 1 shows the percentage energy contribution of the most important food items to the diet of each species at each of the five seining sites.

(i) Gerres filamentosus

Fry of this species were collected only at the Estuary and, although polychaetes and marine calanoid copepods were important in terms of percentage 'points' and numerical analysis, polychaetes formed 86% of the energy value of the diet (Table 1).

(ii) Gerres acinaces

Polychaetes and terebellid tentacles were the dominant food items of *G. acinaces* at the Estuary, although an energy value was not available for the latter thus biasing the results shown in Table 1. At the W.L.R., 'points' and numerical analysis were dominated by polychaetes, copepods and chironomid larvae, but in terms of energy only chironomid larvae and polychaetes were important. In Makhawulani copepods and Cumacea were consumed in large numbers but energy analyses indicated the overwhelming importance of the siphon tips of *Hiatula lunulata* (Table 1).

(iii) Gerres rappi

Fry of *G. rappi* were collected from the W.L.R., Makhawulani, Mpungwini and Nhlange sites. At the first, polychaetes, amphipods and ostracods were important ('points'), but in terms of energy, polychaetes and the copepod, *Pseudodiaptomus stuhlmanni*, were the most valuable (Table 1). In Makhawulani, polychaetes and *P. stuhlmanni* were important ('points') but *H. lunulata* siphon tips made up 48% and polychaetes 36% of the total energy consumed. Large numbers of copepods, amphipods and *Hymenosoma orbiculare* were eaten in Mpungwini ('points'), but again the energy analysis showed that *Hiatula lunulata* siphon tips were more important (Table 1). In Nhlange *P. stuhlmanni* were the dominant food by all three methods of analysis.

(iv) Gerres oyena

Only four specimens were collected (two each from the W.L.R. and Makhawulani, in winter), energy analyses showed that *H. lunulata* siphon tips and polychaetes were the important prey while *P. stuhlmanni* and amphipods were also present.

Seasonal analysis

In the seasonal analysis of food taken by *Gerres* fry many items contributed similar percentages using 'points', numerical and energy analyses. Table 2 summarizes the dominant food items (in terms of energy) consumed by each species during the dif-