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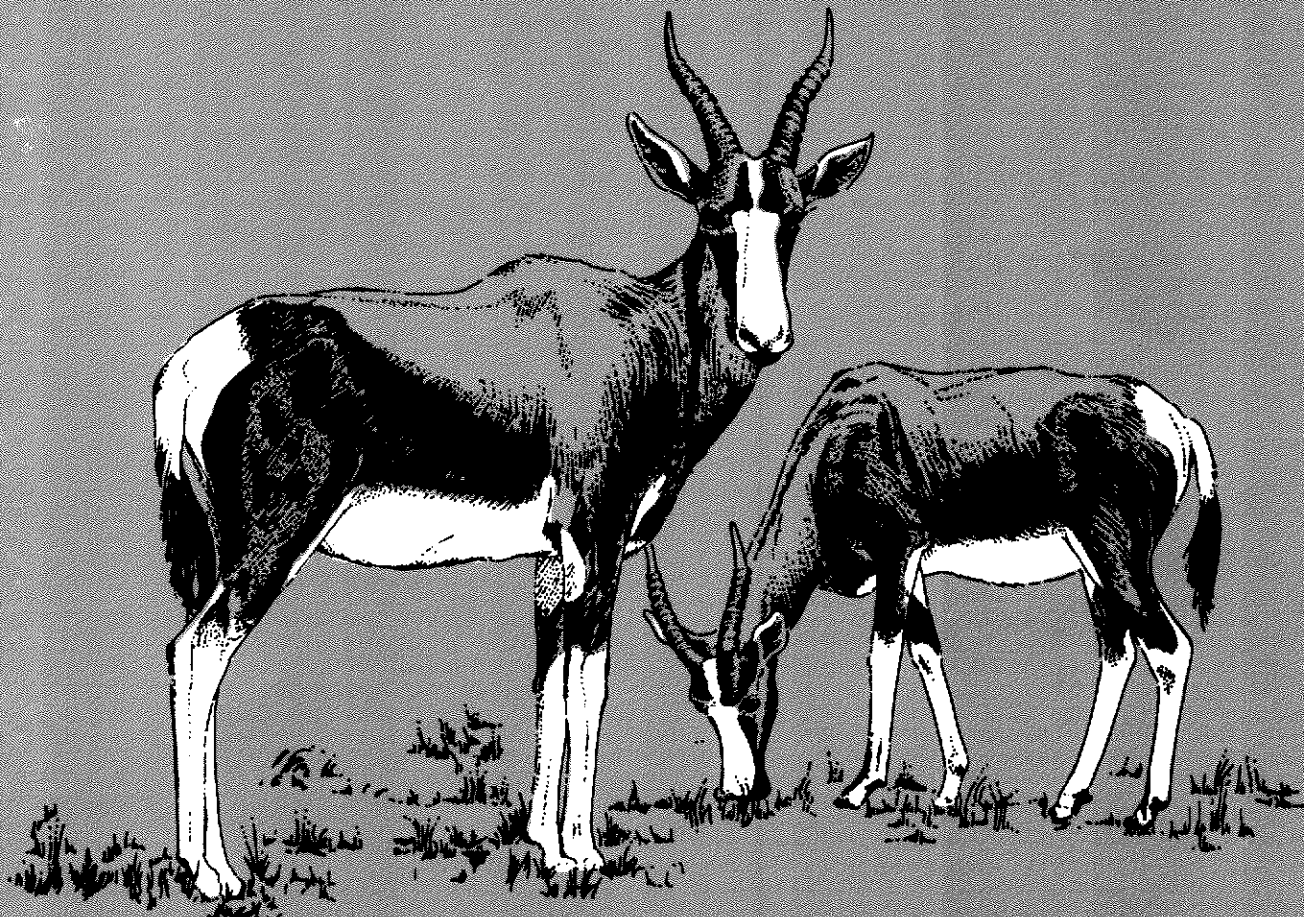
Abstract: This paper presents information gathered over a period of four years on the distribution, status, reproduction, feeding habits and body measurements of the 28 mammalian carnivores known to occur in the Cape Province. Of the 28 species investigated seven are considered to have no long-term future. The wild dog is extinct in the Cape, and the lion and cheetah are restricted to the Kalahari Gemsbok National Park. Both hyena species can be considered threatened, even inside the Kalahari Gemsbok National Park, which is their last Cape stronghold. The serval is close to extinction. The spotted-necked otter requires further investigation as there are no recent records of this species in the Cape Province. The remaining 21 species can be considered to be safe for the foreseeable future.

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Keywords: 1ZA/Acinonyx jubatus/Cape Province/cheetah/conservation/Crocuta crocuta/history/Hyaena brunnea/leopard/lion/Lycaon pictus/Panthera leo/Panthera pardus/predator/status/wild dog

Abstract: The status and distribution of the six large mammalian carnivore species known to occur in the Cape Province are presented. This is compared with their past distribution and status. Current threats to the various species are detailed. The wild dog *Lycaon pictus* is extinct as a breeding species and three species are only represented by small populations in the Kalahari Gemsbok National Park; lion *Panthera leo*, cheetah *Acinonyx jubatus* and the spotted hyena *Crocuta crocuta*. The leopard *Panthera pardus* is represented by small populations in the Kalahari Gemsbok National Park and Southern and Western Cape Province. The brown hyena *Hyaena brunnea* is represented by a population of some 170 individuals in the Kalahari Gemsbok National Park and smaller, scattered populations on privately owned land in two areas. The setting up of sanctuary areas for the leopard and the brown hyena in suitable areas is suggested.

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No 1

1981

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Notes on the mammalian carnivores of the Cape Province, South Africa

C. T. Stuart

This paper presents information gathered over a period of four years on the distribution, status, reproduction, feeding and body measurements of the 28 mammalian carnivores known to occur in the Cape Province. Of the 28 species investigated seven are considered to have no long-term future. The hunting dog is effectively extinct in the Cape, and the lion and cheetah are restricted to the Kalahari Gemsbok National Park. Both hyaena species can be considered threatened, even inside the Kalahari Gemsbok National Park, which is their last Cape stronghold. The serval is close to extinction. The spotted-necked otter requires further investigation as there are no recent records of this species in the Cape Province. The remaining 21 species can be considered to be safe for the foreseeable future.

Bontebok 1981, 1: 1–58

Inligting versamel oor 'n periode van vier jaar in verband met die verspreiding, status, voortplanting, voeding en liggaamsmates van die 28 soogdier-karnivore wat, sover bekend, in die Kaapprovinsie voorkom, word hier aangebied. Van die 28 spesies wat ondersoek is, kan sewe beskou word om geen toekoms op die lange duur te hê nie. Die wilde hond het prakties uitgesterf in die Kaapprovinsie, en die leeu en jagluiperd is beperk tot die Kalahari Gemsbok Nasionale Park. Beide hiëna-spesies kan as bedreig beskou word, selfs binne die Kalahari Gemsbok Nasionale Park wat hul laaste Kaapse vesting is. Die tierboskat is na aan uitsterwing. Die klein-otter vereis verdere ondersoek aangesien daar geen onlangse optekening van hierdie spesie se voorkoms in die Kaapprovinsie is nie. Die oorblywende 21 spesies kan as veilig binne die afsienbare toekoms beskou word.

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South Africa

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1. Gazetteer of localities mentioned.
2. A checklist of external and internal parasites collected from carnivores in the Cape Province.
3. The carnivores known to occur in the National Parks and the larger Provincial Nature Reserves of the Cape Province.

Introduction

Carnivorous mammals have always been persecuted by man. Many species are hunted because they are in direct or indirect competition with man's commercial interests; others are prized for their attractive pelts. In the early days of nature conservation (and even in the 1970s) larger carnivores were controlled within gazetted nature reserves in order to protect herbivorous big game.

In recent years, however, scientific opinion has turned full circle. Eisenberg (1980) argues that large carnivores are sensitive indicators of the health of an ecological community. The loss of any single carnivore species will certainly lead to the disruption of a suite of ecological interactions, and to the inevitable loss of one or more of the participating species (Soulé & Frankel 1980).

Recent research in population genetics suggests that a minimum population size of 500 is essential for any closed breeding group of mammals if long-term losses of genetic variation are to be avoided (Franklin 1980). It is clear that many established nature reserves cannot possibly support their key carnivore species in such numbers, especially where the large species are

concerned. It is essential therefore that conservationists should address themselves to the problems of carnivore conservation outside reserved areas, as well as within. The data provided in this paper serve to draw attention to the inadequate body of information available on the distribution and biology of the rich Cape carnivore fauna.

Past Research

The only detailed carnivore study that has been undertaken in the Cape Province is by Mills (1973, 1974, 1976, 1977, 1978) working on the brown hyaena in the Kalahari Gemsbok National Park. Other studies in this park include the work of Eloff (1964, 1973a, 1973b, 1973c) on the lion, and Nel (1978) who investigated the feeding behaviour of the bat-eared fox.

Pringle and Pringle (1979) recorded observations on the caracal (or lynx) in the Bedford district of the eastern Cape. Grafton (1965), Bothma (1966a, 1966b, 1971a, 1971b), and Viljoen and Davis (1973) examined small numbers of stomachs from seven carnivore species collected in the Cape Province. Rowe-Rowe (1972) has examined the distribution of the striped weasel throughout its range, which includes the Cape

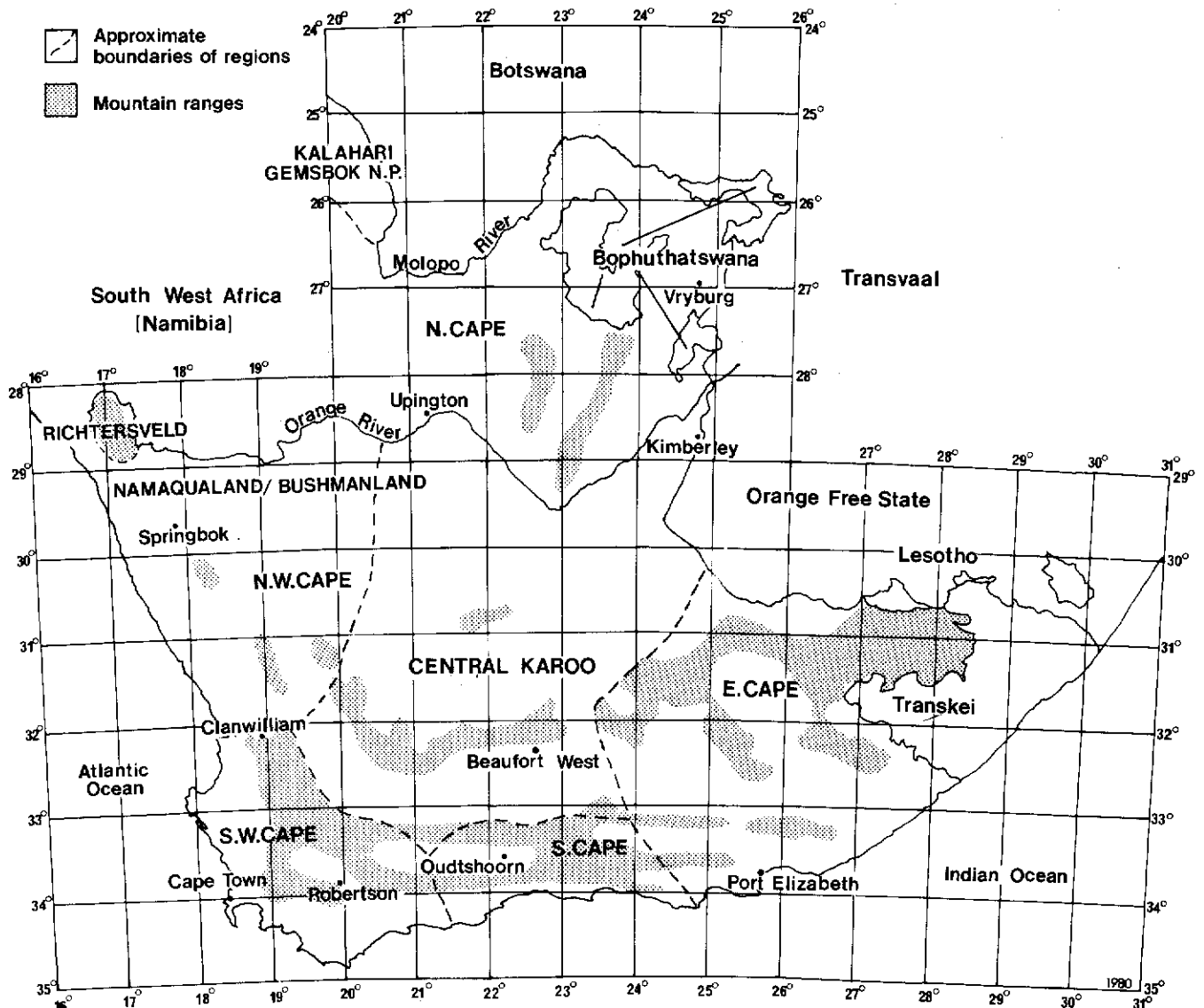


Fig.1 The principal regions of the Cape Province.

Province, and Skinner (1976) has reported on the distribution of the brown hyaena. Further published information may be found in Sclater (1900), Shortridge (1934, 1942), Roberts (1951), and in a number of mammal checklists for Cape Province reserves: Nel and Pretorius (1971), Rautenbach (1971), Rautenbach and Nel (1975), Swanepoel (1975), Robinson (1976), Stuart, Palmer and Munnik (1978) and Stuart and Braack (1978). Visser (1976) has briefly discussed the status of the smaller southern African cat species.

Study Area

The Cape Province is the largest of South Africa's four provinces, covering approximately 60% or 700 000 km² of the country's total surface area. The principal regions used in the study are shown in Fig. 1.

Most of the Cape Province is arid or semi-arid, with the exception of the narrow coastal strip in the south and the adjacent coastal mountain chain. Altitudes range from sea-level to over 3 000 m in the rugged mountains of the southern Drakensberg, but inland from the Cape Fold Belt the interior plateau consists of flat or undulating plains. The extreme north-western corner of Namaqualand forms the southern tip of the

Namib Desert and the Kalahari Desert extends into the northern Cape Province.

The major river system in the Cape Province is that of the Orange, which flows into the Atlantic, as do the Berg and Olifants Rivers in the south. All of the rivers which flow into the Indian Ocean are comparatively short.

Annual rainfall ranges from 1 500 mm or more in the Drakensberg of the E. Cape and the Jonkershoek Valley in the S.W. Cape, to less than 120 mm in the north-western part of Namaqualand. The major part of the Cape Province lies in a zone of summer rainfall, but the S.W. Cape receives most of its rain in the winter months; the forests of the S. Cape coastal strip lie in the transition zone between winter and summer rainfall regions, and receive year-round rain. Rainfall decreases in quantity and dependability from east to west (with the exception of the S.W. Cape), and droughts of varying severity occur at irregular intervals.

Although the vegetation of the Cape can be divided into many zones and sub-zones, Fig. 2 shows the classification of Stirton (1978), who divided it into eight major vegetation groups (upper case in the text).

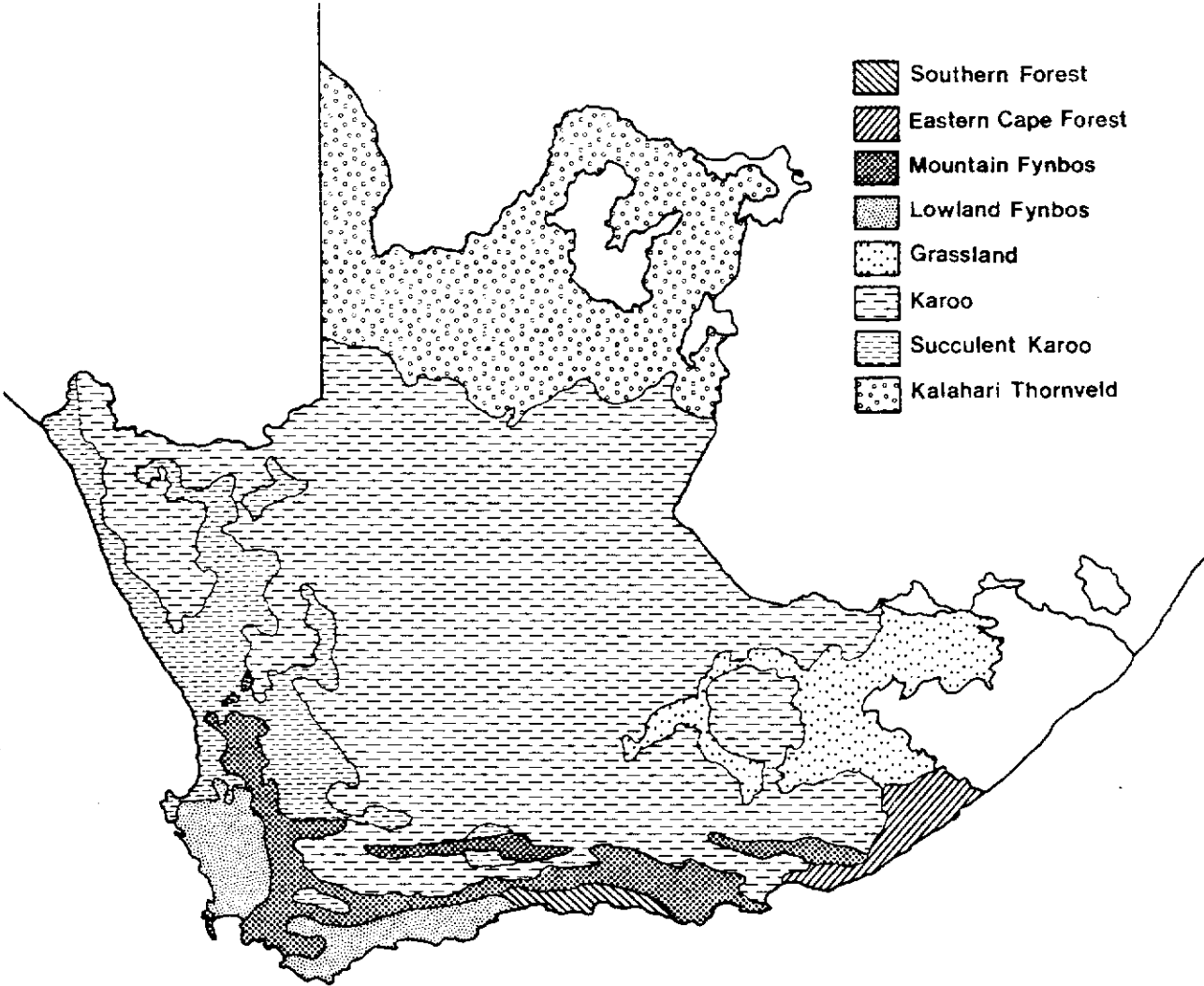


Fig. 2 The main vegetation groups of the Cape Province (after Stirton 1978).

Materials and Methods

Although most of the study material was collected during the project, museum holdings of Cape carnivores yielded important information. The collections of the Kaffrarian Museum, King William's Town (K.M.), the Albany Museum, Grahamstown (A.M.), and the South African Museum, Cape Town (S.A.M.), were all studied *in situ*. The Transvaal Museum, Pretoria (T.M.) provided information on their viverrid and mustelid holdings and loaned their Cape material of the Cape grey mongoose for examination.

Many specimens were trapped, shot, or collected as road casualties during numerous field expeditions. Major contributions were also made by divisional council hunters, farmers, private hunters and departmental staff.

Trapping

Three basic patterns of live-trap were used in the project:

- (i) double-door cage-trap (90 × 32 × 32 cm)
- (ii) single-door cage-trap, collapsible or rigid (75 × 36 × 36 cm)
- (iii) single-door cage-trap, rigid (135 × 60 × 60 cm).

Various baits were used, but standard hunt club attractants ("lynx" and "getter") were usually also included. Traps were camouflaged carefully with bushes and foliage, and the wire floors were sprinkled with earth or fine vegetation.

Shooting

Night shooting was used for collecting in some areas and daytime shooting was undertaken when possible. Weapons used were a .22 rifle with telescopic sights, 12-bore shotgun and a .410 shotgun. Night shooting usually took place from a vehicle with the aid of a spotlight.

Road casualties

Certain species, such as bat-eared fox and striped polecat, are frequently encountered as road-kills; many such animals were used in this project. Specimens which were in an advanced stage of decomposition were not collected, unless the skull could be salvaged, but in all cases locality and habitat were noted.

Material from other sources

In the Cape Province an extensive hunt club system is operated by the farming community for the sole purpose of destroying "problem" animals. The majority of the thousands of animals killed each year by these hunt clubs are carnivores. Although material was obtained from a large number of these clubs, only eight supplied material on a regular basis and with completely reliable information. The hunters employed by the clubs were supplied with 120 or 200 l drums containing 10% formalin, bottles of various sizes, and labels. They were asked to supply the following information: locality, date, circumstances and any other notes of interest. Full containers or bottles were returned to the Vrolijkheid Nature

Conservation Station, Robertson. Similar drums were dispatched to several staff members of the Cape Department of Nature and Environmental Conservation. At various times during the study those persons collecting material on a regular basis were visited and wherever possible accompanied on hunts and trap checks.

Processing of material

Field notebook and post-mortem sheets were filled in for each specimen processed, and the information recorded was as follows: the Cape Provincial Administration number (at present the same as the author's number), species, sex, collector, locus (quarter-degree square) and the co-ordinates (wherever possible), habitat and general notes. The standard measurements and mass were taken, and a record was kept of material that was retained.

Distribution was plotted on 1 : 50 000 Topo series maps. Where practicable the locality was noted to the nearest second, although in the case of hunter-collected specimens this was rarely possible. A gazetteer of localities is given in Appendix 1. On the maps in this paper solid squares indicate museum or present study material records and black triangles indicate sight, literature and in some instances hunter returns. Open symbols indicate very old records or areas where it is uncertain as to whether a species still occurs. Measurements were taken as described by Smithers (1971).

Reproductive material and information were collected, but only information on the presence or absence of foetuses, litter size and lactation are recorded in this paper. Position of foetuses was recorded as left uterine horn (L) and right uterine horn (R). All reproductive material has been retained. Stomach contents were preserved, and subsequently examined with the aid of a dissecting microscope. Scats were analysed as described by Stuart (1976b).

External and internal parasites were collected and sent to the Onderstepoort Veterinary Research Institute, Pretoria (Appendix 2).

Specimens from the size of the Cape fox upwards were prepared as flat skins while smaller animals were made up as round skins. Skulls were cleaned and labelled. Much of the material collected by hunters consists of the skull only, as the skins were spoiled by formaldehyde.

Most of the project material has been deposited with the South African Museum, Cape Town, the John R. Ellerman Museum, University of Stellenbosch, and the Kaffrarian Museum, King William's Town. Some of the northern Cape material will be donated to the McGregor Museum, Kimberley.

Nomenclature

The classification in this paper follows that of Meester and Setzer (1971). English, Afrikaans (A), Xhosa (X) and Tswana (T) names are given for each species where available or appropriate. For certain species, however, a wide variety of regional vernacular names exists, and it is difficult to select or recommend a name which will meet with general approval. For example, 25 different

Afrikaans and English names were collected for the black-backed jackal. Names subjectively considered to have the widest currency have been selected for use in this paper.

Xhosa names were obtained from C. J. Skead (*in litt.* 10/6/1971); the Tswana names are those given by Smithers (1971).

Species Account

Family CANIDAE
Otocyon megalotis Bat-eared fox
(A Bakoorkakkals T moThlose)

Distribution and status

The bat-eared fox occurs throughout the lower rainfall areas of the Cape Province and recent records suggest that it is expanding its range (Fig. 3). This expansion appears to be part of a general process in southern Africa, as it has been reported in Botswana and Zimbabwe (Rhodesia) by Smithers (1971), and in South

Africa by Pienaar (1970), Von Richter (1972) and Rautenbach (1978). In the Cape Province this expansion is taking place from the Karoo southwards to the coastal plain and eastwards to the high grassland regions of the E. Cape Midlands. Shortridge (1934) gave the distribution of the bat-eared fox as "as far south and east as Beaufort West, Graaff-Reinet and Uitenhage". Farmers in the Hofmeyr and Tarkastad districts maintain that it is a fairly recent addition to the local fauna, although it is already quite common. Von Richter (1972) considered records of this species in the Tarkastad district to be unreliable.

At present it is particularly abundant in Namaqualand, the central Karoo districts, Bushmanland and Gordonias. The species can be considered safe and abundant in the Cape Province, although intensification of unselective predator control measures could reduce populations in some localities. It makes up the largest proportion of non-target animals killed by the "coyote-getter" in several districts, particularly in the interior regions of the W. Cape (Departmental files, Vrolijkheid Nature Conservation Station, Robertson).

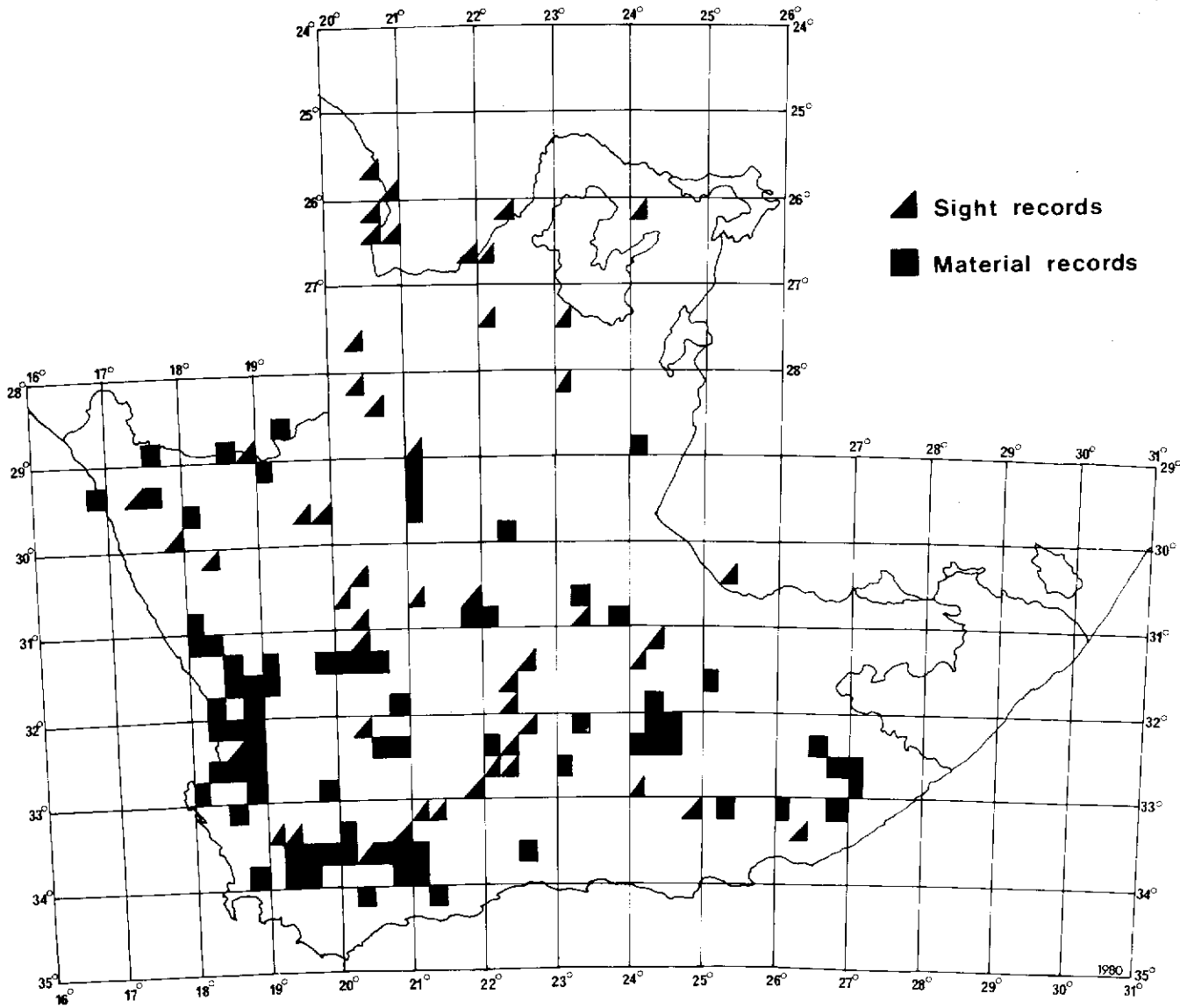


Fig. 3 Bat-eared fox: present distribution in the Cape Province.

Habitat

Found in all but forest and scrub forest habitats, the bat-eared fox is uncommon in the W. Cape fynbos and E. Cape bush- and grassveld, although, as stated above, it is apparently increasing in numbers in the E. Cape Midlands. It shows a marked preference for open karoo scrub, and the sandveld of Bushmanland and the western Kalahari. Animals recorded in the S.W. Cape fynbos were on flat or undulating ground. No specimens have been recorded from the high coastal mountains, although their altitudinal range is from just above sea-level on the west coast to over 1 500 m in the Sutherland district and near Graaff-Reinet. This species has not colonized the W. Cape wheatlands to the same extent as has the Cape fox.

Habits

Smithers (1971) and Nel (1978) have discussed the behaviour of the bat-eared fox in some detail, and only information on times of activity and group sizes is noted here.

In areas where it is relatively undisturbed it tends to be diurnal, but throughout much of its range it appears to be nocturnal or crepuscular. Most diurnal sightings have been made during the early morning and late afternoon, although on cool days individuals have been observed at midday.

Of 26 sightings the mean group size was three with a range from one to seven. Unconfirmed reports were received of a farmer counting 14 animals in one group on the farm "Goegap", Springbok, and a sighting of more than 80 animals feeding in a dry lucerne field on the farm "Jagersberg", Van Wyksvlei. The latter observation apparently coincided with a large-scale emergence of crickets (Orthoptera) during irrigation.

Food

Invertebrates formed 83% of the food item occurrences in 71 stomachs (Table 1). This compares with 68% in a sample of 50 stomachs collected in Botswana (Smithers 1971). Nel (1978) examined 380 scats from the Kalahari Gemsbok National Park and found that the bat-eared fox subsists almost exclusively on invertebrate prey in this area. Although domestic stock hair was found in two stomachs, this is probably a result of scavenging. A few reports have been received of this species taking lambs, but to date there have been no confirmed cases of stock-killing.

The feathers present in two stomachs were from lark-sized birds. Five stomachs contained grapes, these being from animals collected on the farm "Lemoenpoort", Worcester, in a major wine-growing area. Six animals had more than half of their stomach content consisting of wild fruits. The only wild fruits that have been identified are those of *Rhus glauca* and *Ehretia rigida*. Dry grass and pieces of plant stems were associated with the presence of termites (Isoptera), and it is likely that this material was accidentally ingested. The high incidence of Orthoptera (grasshoppers and crickets), Isoptera (termites) and Coleoptera (beetles) in the stomachs is in agreement with the findings of Smithers (1971) in Botswana, and Nel (1978) in the

Table 1 Bat-eared fox: contents of 71 stomachs from 33 localities in the Cape Province.

Food item	No. of stomachs
VERTEBRATES	
Mammalia	
Rodentia (Muridae)	5
Unidentified hair	3
Aves (small birds)	2
Reptilia (lizards)	2
INVERTEBRATES	
Insecta	
Orthoptera	41
Coleoptera (adults)	41
Coleoptera (larvae)	39
Isoptera	35
Hymenoptera (ants)	15
Diptera (1 larvae; 1 adult)	2
Lepidoptera (larvae)	2
Dictyoptera	1
Arachnida	
Scorpiones	5
Solifugae	1
Myriapoda	8
PLANT FOOD	
Seeds and fruit	19
Grass and stems	8

Kalahari Gemsbok National Park. Four stomachs contained termites only. Orthoptera were represented by members of the Acridiidae and Gryllidae. Coleoptera were most frequently represented by Carabidae and Tenebrionidae.

Reproduction

Pregnancy is clearly confined to the spring months of September and October, since none of the 14 females caught in July and August were pregnant (Table 2). Both pregnant females collected in September were carrying four very small fetuses (2L : 2R), and the female collected in October had three almost full-term fetuses.

Table 2 Bat-eared fox: monthly occurrence of pregnant and non-pregnant females in the Cape Province.

	J	F	M	A	M	J	J	A	S	O	N	D
Pregnant	—	—	—	—	—	—	—	—	2	1	—	—
Non-pregnant	2	1	4	3	1	1	8	6	1	1	1	—
Total	2	1	4	3	1	1	8	6	3	2	1	—

Smithers (1971) collected three pregnant females from Botswana, in October (2) and November, and recorded captive births in September, October and November. Shortridge (1934) mentions a litter of four pups from South West Africa (Namibia) in November. During the present study, pups were collected in December (weighing between 945 and 1 134 g),

Table 3 Bat-eared fox: mean monthly testes mass in the Cape Province.

	J	F	M	A	M	J	J	A	S	O	N	D
Number of males	—	3	2	2	1	3	4	13	3	8	—	—
Mean paired testes mass	—	0,74	0,66	1,18	0,9	3,12	2,9	3,08	2,26	1,26	—	—

Table 4 Bat-eared fox: measurements (mm, kg) of adult males and females in the Cape Province.

MALES	\bar{x}	n	Range
Head and body	552	39	470–670
Tail	251	42	230–335
Hind foot	124	44	110–145
Ear	128	34	110–140
Skull length	113	44	105–123
Body mass	3,25	20	3,0–4,5

FEMALES	\bar{x}	n	Range
Head and body	517	17	480–580
Tail	255	20	230–290
Hind foot	125	20	115–135
Ear	119	18	110–132
Skull length	112	23	108–115
Body mass	3,15	9	3,0–3,5

February (1 400 g), March (1 600 g) and April (1 802 g). Smithers (1971) recorded birth-weights of 99–142 g.

Whenever possible testes mass was recorded for adult males (Table 3) and, although the sample is small,

there seems to be an increase in testes mass during June, July and August. A mating season during this period fits in well with the pregnancies recorded above.

Measurements

Smithers (1971) found that females were slightly larger, on average, than the males. The material collected in this study does not support this finding (Table 4).

Lycaon pictus Hunting dog
(A Wildehond X iXhwili T leTlhalerwa or leTeane or leKanyane)

Distribution and status

During the course of this survey the hunting dog has become extinct as a breeding species in the Cape Province. The last resident group occurred in the Kalahari Gemsbok National Park, but this population is now extinct (M. G. L. Mills pers. comm.). Predator control measures adopted by stock-farmers to the south of the park are partly responsible. Vagrants occasionally cross the border into the N. Cape from

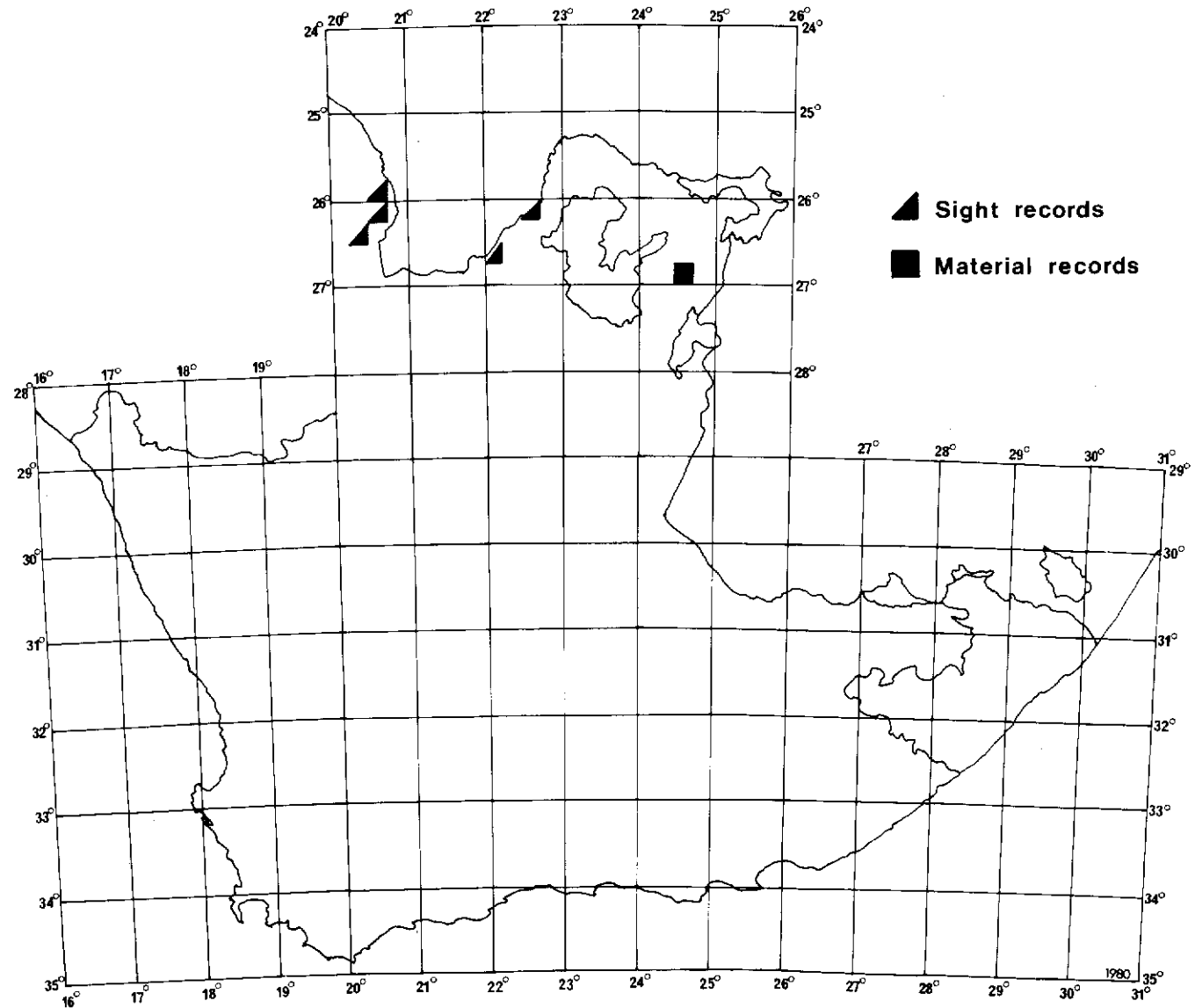


Fig. 4 Hunting dog: present distribution in the Cape Province.

Botswana. The most recent record is of a road casualty collected 12 km north-west of Vryburg during March 1979 (Fig. 4). The last animals known to have been killed south of the Orange River were shot on 16 July 1925 at Gray's Halt, Amabele (KM 13323, 13324).

There are numerous records of the hunting dog from the early years of European settlement in the Cape Province. Skead (1980) has documented the historical distribution in some detail. Today the lack of suitably large conservation areas and the incompatibility of this species with stock-farming make it unlikely that it will be re-established in the province.

Habitat

The past distribution of the hunting dog in the Cape Province, as recorded by Skead (1980) and others, indicates that the species had a wide habitat tolerance. It has been recorded from most major habitat types, excepting forest. Recent records have been restricted to the Kalahari Thornveld of the N. Cape.

Habits

The habits of this species have been adequately documented by Kruuk and Turner (1967), Van Lawick and Van Lawick-Goodall (1970), Smithers (1971) and others.

Food

Although the hunting dog will take a wide range of mammalian prey, it shows a preference for "medium-sized" animals (Shortridge 1934; Smithers 1971). Only one stomach was obtained, from a road casualty at Vryburg, and it contained a small quantity of unidentified hair.

Reproduction

No information was collected during the study.

Measurements

No information was collected during the study.

Vulpes chama Cape fox or silver jackal
(A Draaijakkals or silwerjakkals X uGqeleba T leSie)

Distribution and status

The Cape fox occurs throughout the Cape Province (Fig. 5) and has a similar distribution to the bat-eared fox, although the Cape fox is particularly abundant in the S.W. Cape wheatlands where the bat-eared fox is still rare. There appears to have been a range extension into parts of the E. Cape. Hewitt (1931) stated that it was found "in open country of the Eastern Karroo but comparatively rare. Henning Siding [Steensburg] seems to be the most eastern record." Coetzee (1979) has documented the eastward spread of the Cape fox in the Albany district.

This species is common throughout much of the Cape Province, particularly in the more arid regions and the

wheatlands of the S.W. Cape. Farmers consider it to be an important predator of newly-born lambs in some areas and it is actively hunted in control programmes. In 1966–1970 and 1974–1976 more than 6 000 Cape foxes were killed by registered hunters in districts south of the Orange River. Detailed figures available from six hunting districts in the E. Cape show that more than 20% of all animals killed in these areas were Cape foxes. However, despite this heavy hunting pressure the species is in no danger at present.

Habitat

The Cape fox is widespread throughout the Cape Province but appears to be absent from the forested areas of the south coast and the Cape Fold Belt. A marked preference is shown for open scrub country, particularly in the dry karoo regions and the Kalahari. However, individuals have been recorded in moderately dense stands of Lowland Fynbos in the W. Cape. They appear to have benefited from agricultural development in the S.W. Cape.

Habits

Cape foxes are nocturnal and normally solitary, although they occasionally gather in loose groups to feed. This has been recorded in the wheatlands of the Bredasdorp area where they were found to feed predominantly on Coleoptera (beetle) larvae.

Smithers (1971) has reported that they lie up under bushes during the day. This is supported by the present study, although they have also been found to utilize burrows and crevices amongst rock scree. One juvenile was extracted from a hole in a limestone bank on the

Table 5 Cape fox: contents of 57 stomachs from 22 localities in the Cape Province.

Food item	No. of stomachs
VERTEBRATES	
Mammalia	
Rodentia (<i>Cryptomys hottentotus</i> 2; <i>Mus</i> sp.1; <i>Otomys unisulcatus</i> 1; <i>Rhodomys pumilio</i> 1; unid. 8)	13
Domestic stock (lambs)	4
Carriion (remains of lambs 2)	4
Unidentified hair	2
Reptilia (<i>Mabuya</i> sp. 2; unid. lizard 1; unid. snake 1)	4
Aves	4
Unidentified flesh	3
INVERTEBRATES	
Insecta	
Coleoptera (larvae)	11
Orthoptera	10
Coleoptera (adults)	8
Isoptera	4
Lepidoptera (larvae)	1
Hymenoptera (ants)	1
Arachnida	
Solifugae	1
Myriapoda	1
PLANT FOOD	
Grass	5
Grapes	3
EMPTY STOMACHS	29

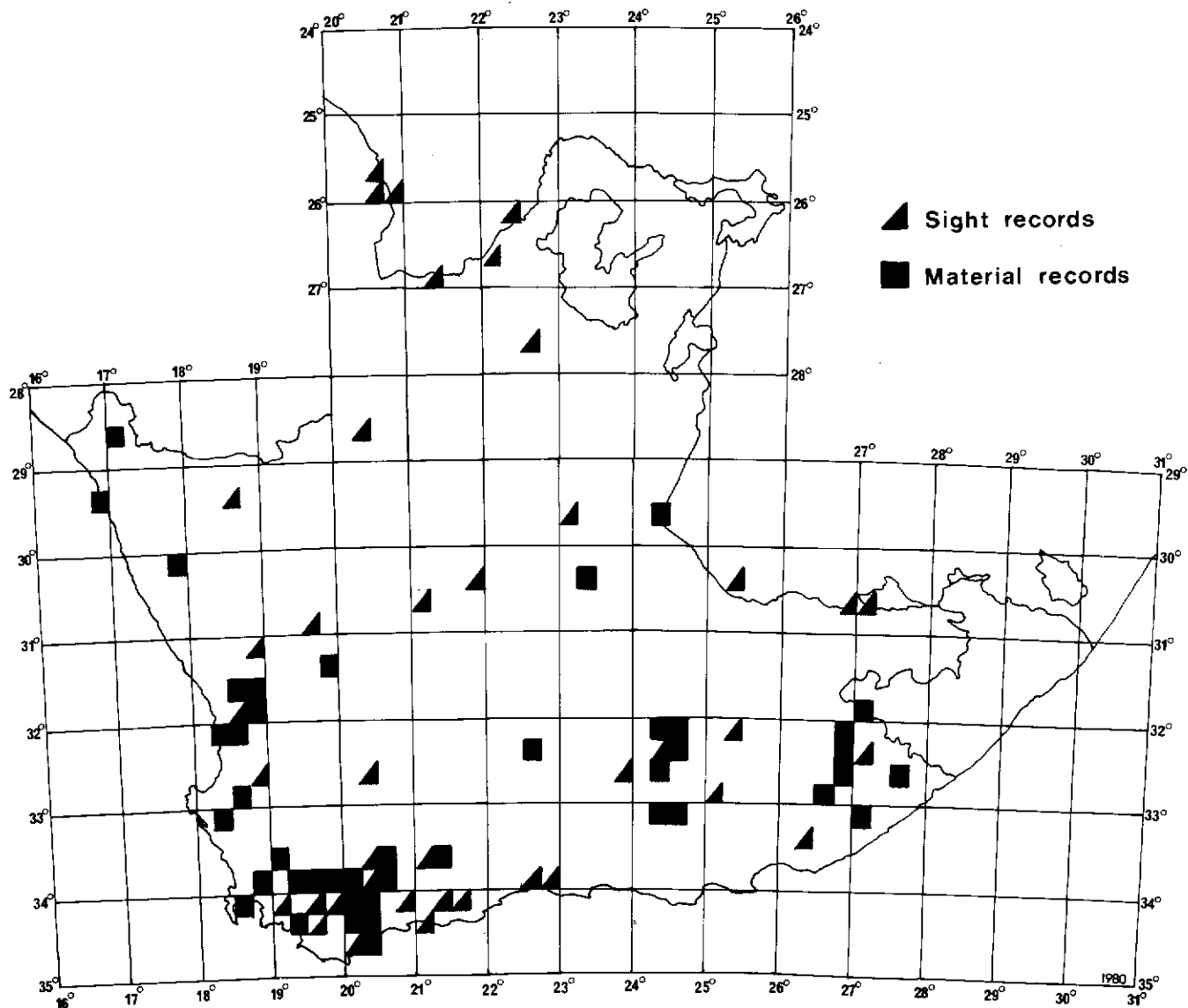


Fig. 5 Cape fox: present distribution in the Cape Province.

De Hoop Nature Reserve, Bredasdorp, and C. J. Skead (pers. comm.) noted four young taken from an antbear burrow at “Peninsula”, Lower Kubusie, 12 km west of Komga.

Food

The food of the Cape fox consists mostly of small animals such as rodents, birds, small reptiles and insects, although fruits are also occasionally eaten (Table 5). This is similar to the results of Bothma (1966a, 1971a), who examined 69 stomachs from throughout southern Africa, and Smithers (1971), who recorded the contents of 23 stomachs from Botswana.

Although there are confirmed cases of lambs up to the age of three weeks being taken, this predator is generally overrated as a killer of domestic stock. Of the six records during the study at least two were from scavenging on lambs that had died from other causes, since the meat was in an advanced stage of decomposition. A further source of confusion is incorrect identification of the predator. Although they do occasionally prey on healthy lambs, this loss could be reduced with improved management practices.

Reproduction

The small sample of two pregnant females (Table 6) suggests that pups are born in early summer. The female taken in August was carrying very small foetuses and the September female had three small foetuses (1L : 2R) ranging between 11,6 and 12,9 g.

Two pups found in November in the Ceres division weighed 730 g and 880 g, and a third animal collected in early December in the same division weighed 1 200 g. Three other juveniles taken during November/December had a mean body mass of 1 200 g. These data suggest that parturition takes place during early summer.

Table 6 Cape fox: monthly occurrence of pregnant and non-pregnant females in the Cape Province.

	J	F	M	A	M	J	J	A	S	O	N	D
Pregnant	-	-	-	-	-	-	-	1	1	-	-	-
Non-pregnant	1	-	3	2	3	4	1	1	3	2	1	3
Total	1	-	3	2	3	4	1	2	4	2	1	3

Smithers (1971) collected a pregnant female in October from Botswana, and Brand (1963) recorded captive births from mid-September to mid-October at the National Zoological Gardens, Pretoria.

Measurements

Table 7 Cape fox: measurements (mm, kg) of adult males and females in the Cape Province.

MALES	\bar{x}	n	Range
Head and body	554	21	450–610
Tail	348	25	300–406
Hind foot	131	20	123–140
Ear	98	22	90–110
Skull length	115	24	108–124
Body mass	2,8	17	2,0–4,2

FEMALES	\bar{x}	n	Range
Head and body	553	15	510–620
Tail	338	17	250–390
Hind foot	126	17	115–140
Ear	97	17	87–105
Skull length	113	26	109–119
Body mass	2,5	11	2,0–4,0

Canis mesomelas

Black-backed jackal

(A Rooijakkals XimPungutye or uDyakalashe
T Phokoje).

Distribution and status

The black-backed jackal occurs throughout the Cape Province, but it is uncommon along the southern coastal belt and appears to be largely absent from dense forest (Fig. 6), although animals have been heard calling from the Pirie Forest (King William's Town). It is one of the most common problem animals in the Cape Province. Despite extensive hunting and eradication programmes, the conservation status of the black-backed jackal appears to be secure.

Habitat

In the Cape Province this jackal has a wide habitat tolerance, as has been found by Shortridge (1934) in South West Africa (Namibia), Smithers (1971) in Botswana, and Rautenbach (1978) in the Transvaal. However, it is uncommon in the higher rainfall belt along the coast and there are no records for the forests of the southern Cape.

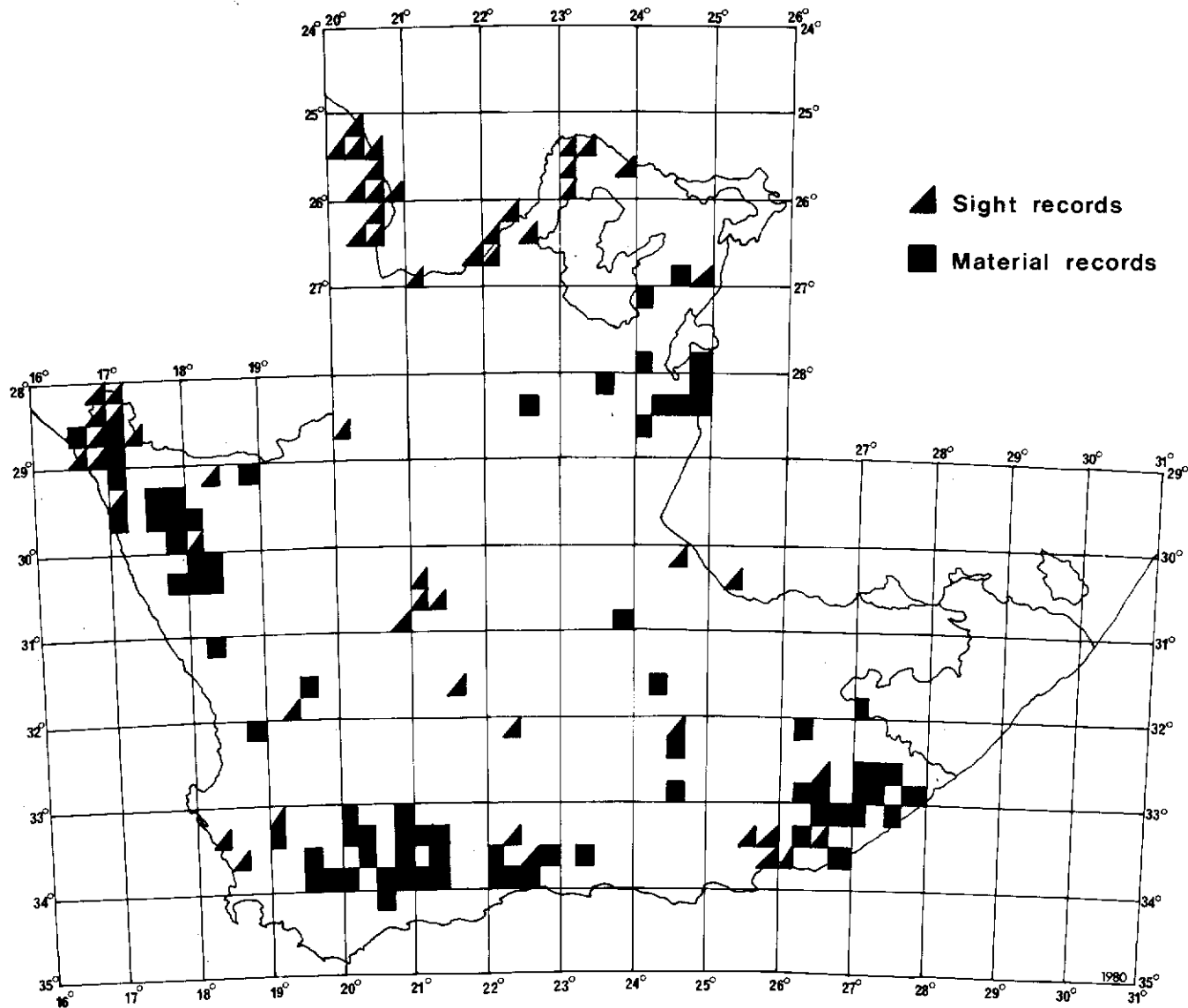


Fig. 6 Black-backed jackal: present distribution in the Cape Province.

Habits

Despite its widespread distribution and relative abundance, little has been recorded of this jackal's behaviour, and the only published work for the Cape Province is that of Ferguson (1978). This was a brief study of social interactions in the Kalahari Gemsbok National Park, which is one of the few areas in the province where black-backed jackals can be observed during the daylight hours. Throughout most of the Cape Province they are under constant hunting pressure, and as a result are nocturnal and extremely secretive. When they are protected they return to a semi-diurnal activity pattern, as has been observed in the Andries Vosloo Kudu Reserve near Grahamstown since its proclamation in 1973.

Food

Mammals constituted the most common food, of which rodents and domestic stock were the most important (Table 8). The material examined came from predator control programmes aimed at jackals in "problem" areas, and as such there is a bias towards those animals which had been preying on domestic stock. It was not possible to collect animals in reserves in the Cape Province. Of the 25 jackals that had been eating carrion, at least eight had been scavenging from sheep and goat carcasses.

Table 8 Black-backed jackal: contents of 143 stomachs from 65 localities in the Cape Province.

Food item	No. of stomachs
VERTEBRATES	
Mammalia	
Rodentia (<i>Cryptomys hottentotus</i> 4; <i>Hystrix africaeaustralis</i> 1; <i>Rhabdomys pumilio</i> 12; <i>Otomys unisulcatus</i> 1; <i>Pedetes capensis</i> 1; remainder unidentified)	31
Domestic stock	28
Carrion	25
Artiodactyla (wild) (<i>Sylvicapra grimmia</i> 2; <i>Raphicerus campestris</i> 3; <i>Antidorcas marsupialis</i> 1)	6
Unidentified hair	6
Lagomorpha (<i>Lepus</i> spp. 4; <i>Pronolagus</i> sp. 1)	5
Insectivora (Soricidae)	3
Carnivora (<i>Herpestes pulverulentus</i> 1; <i>Cynictis penicillata</i> 1)	2
Hyracoidea (<i>Procavia capensis</i>)	1
Aves	20
Reptilia (<i>Bitis arietans</i> 1; <i>Leptotyphlops</i> sp. 1; unid. snake 1; lizard 1)	5
Unidentified flesh	3
INVERTEBRATES	
Insecta	
Coleoptera	7
Orthoptera	5
PLANT FOOD	
Green grass	22
Wild fruits	11
Dry material	4
Grapes	2
Apricots	2
EMPTY STOMACHS	29

Only one bird was identified with any certainty, viz. crowned guinea-fowl (*Numida meleagris*), two were francolin-sized birds, and the remainder were small birds. One of the stomachs contained a fledgling.

Insects were relatively unimportant, occurring in only 12 stomachs. This contrasts with the finding of Smithers (1971) that insects occurred in 47 of the 59 stomachs he examined from Botswana. However, as has been pointed out by a number of authors (Grafton 1965; Bothma 1971b; Stuart 1976b), the black-backed jackal is an opportunistic feeder and adapts its diet to the area and conditions in which it lives.

Reproduction

In the Cape Province it appears that mating takes place from May to August, and parturition from July to October with a peak in August. This is deduced from the occurrence of pregnant and lactating females in these months, as well as from back-dated litter births (Table 9). The age of litters was estimated by comparing the masses of the individual pups with the graphs of Lombaard (1971) and Butynski (1975), and by comparisons with known-age animals housed at Vrolijkheid Nature Conservation Station.

Table 9 Black-backed jackal: monthly occurrence of pregnant, non-pregnant and lactating females, and back-dated litter births in the Cape Province.

	J	F	M	A	M	J	J	A	S	O	N	D
Pregnant	-	-	-	-	-	-	-	4	1	-	-	-
Non-pregnant	1	2	2	5	5	16	3	6	3	1	2	1
Lactating	-	-	-	-	-	-	-	2	1	1	-	-
Total	1	2	2	5	5	16	3	12	5	2	2	1
Back-dated litter births	-	-	-	-	-	-	3	7	3	1	-	-

Ante-natal litter sizes ranged from one to six (1R; 3L:2R ; 3L:2R ; 5 unrecorded; 3L:3R). The analysis of post-natal litters collected showed three as the most common class (Table 10). There were many more males than females in the litter sample, but the significance of this is not clear.

Table 10 Black-backed jackal: composition of 14 litters (post-natal) in the Cape Province.

Number in litter	Sex	
	♂	♀
2	2	-
2	2	-
2	1	1
2	1	1
3	2	1
3	3	-
3	3	-
3	2	1
3	3	-
4	2	2
4	1	3
5	3	2
5	2	3
6	4	2
Total	31	16

A late winter/early spring breeding season is supported by other workers in southern Africa. In Natal, Rowe-Rowe (1978) found that most births take place from July to September with a peak in July, and Brand (1963) recorded a well-defined breeding season from mid-August to mid-November in captive animals housed at the National Zoological Gardens in Pretoria. Fairall (1968) recorded births during August, September and October in the Kruger National Park, Transvaal.

Nine of the litters collected during the present study were removed from holes amongst rocks, one from a hole in an earth bank and one from dense vegetation; the origins of the remainder are not known.

Measurements

Taxonomic subdivision of this species according to body size has led to considerable confusion. However, Rautenbach (1978) suggests that a clinal increase in size throughout the range of this species, grading from north to south, offers a more acceptable alternative. During the present study three skull samples from the N.W. Cape, N. Cape and S. Cape were compared (Table 11) and, although the samples were small, the results tend to support Rautenbach's hypothesis.

Table 11 Black-backed jackal: a comparison of skull length (mm) from three regions of the Cape Province.

Area	Sex	\bar{x}	Range	n
N.W. Cape	♂	171	154–184	87
	♀	166	147–186	87
N. Cape	♂	175	168–185	20
	♀	166	152–185	30
S. Cape	♂	174	153–190	27
	♀	171	150–193	38

Females are on average smaller than males in all respects (Table 12); this has also been found by Smithers (1971) and Rautenbach (1978).

Table 12 Black-backed jackal: measurements (mm, kg) of adult males and females in the Cape Province.

MALES	\bar{x}	n	Range
Head and body	785	65	690–900
Tail	326	70	270–395
Hind foot	160	66	130–185
Ear	109	68	90–132
Body mass	8.15	59	5.89–12.0
FEMALES	\bar{x}	n	Range
Head and body	745	42	650–850
Tail	316	45	260–381
Hind foot	156	43	140–180
Ear	104	41	80–120
Body mass	7.44	42	6.2–9.9

Family MUSTELIDAE

Aonyx capensis Cape clawless otter
(A Groot-otter X inTini T leNyibi)

Distribution and status

The clawless otter is the most common otter in the Cape Province and occurs in all the major river systems as well as along many minor water courses (Fig. 7). It also visits many non-perennial streams and small dams and is resident on a number of larger dams. It is known to occur in several streams in the central Karoo, amongst others the Soutpoort, Slangfonteinspruit and Sak River (Carnarvon/Victoria West districts). Sightings were made as far west as "Beesbank" on the Orange River and there are unconfirmed reports from the Orange River estuary. Along the south coast, otters frequent the sea and intertidal zone, particularly at Tsitsikamma and in the vicinity of Port Elizabeth (Robinson 1976; pers. obs.).

Although it is hunted for killing poultry, this otter is still fairly common and its status appears secure for the foreseeable future.

Habitat

In the Cape Province clawless otters make extensive use of reed-beds (*Phragmites* and *Typha*) and show a marked preference for water bodies with this type of cover. Shallow water is apparently preferred to deeper waters, and they will move several kilometres from the "home" water body to feed in non-perennial streams and small isolated dams and vleis. As shown above the marine environment is utilized along the south coast, but no records exist for the west coast.

Habits

Rowe-Rowe (1975) has documented the habits of the clawless otter in some detail. Predominantly nocturnal in the Cape Province, they are nevertheless seen during daylight in several areas, notably the south coast and on quiet waters in the W. and E. Cape. Most sightings in the Cape Province involved pairs or small family groups. Shortridge (1934) and Rautenbach (1978) found clawless otters difficult to trap, but the present study has shown that careful camouflage and siting of the cage-trap usually results in the animal being caught. The use of live bait is preferable to dead bait.

Food

Seven stomachs were examined; one of these was empty. The contents of three stomachs were made up entirely of domestic ducks taken from farm dams in the Robertson and Worcester divisions (along the Breede River), and another stomach from Citrusdal (Olifants River) contained the remains of domestic ducks and a hen. This bias towards poultry-killing by otters is a result of control measures for "problem" animals, and should not be seen as the normal feeding pattern. The majority of poultry-killing incidents in the W. Cape occurred when the rivers were in flood.

Two stomachs contained the remains of wild waterfowl and the seventh stomach contained only

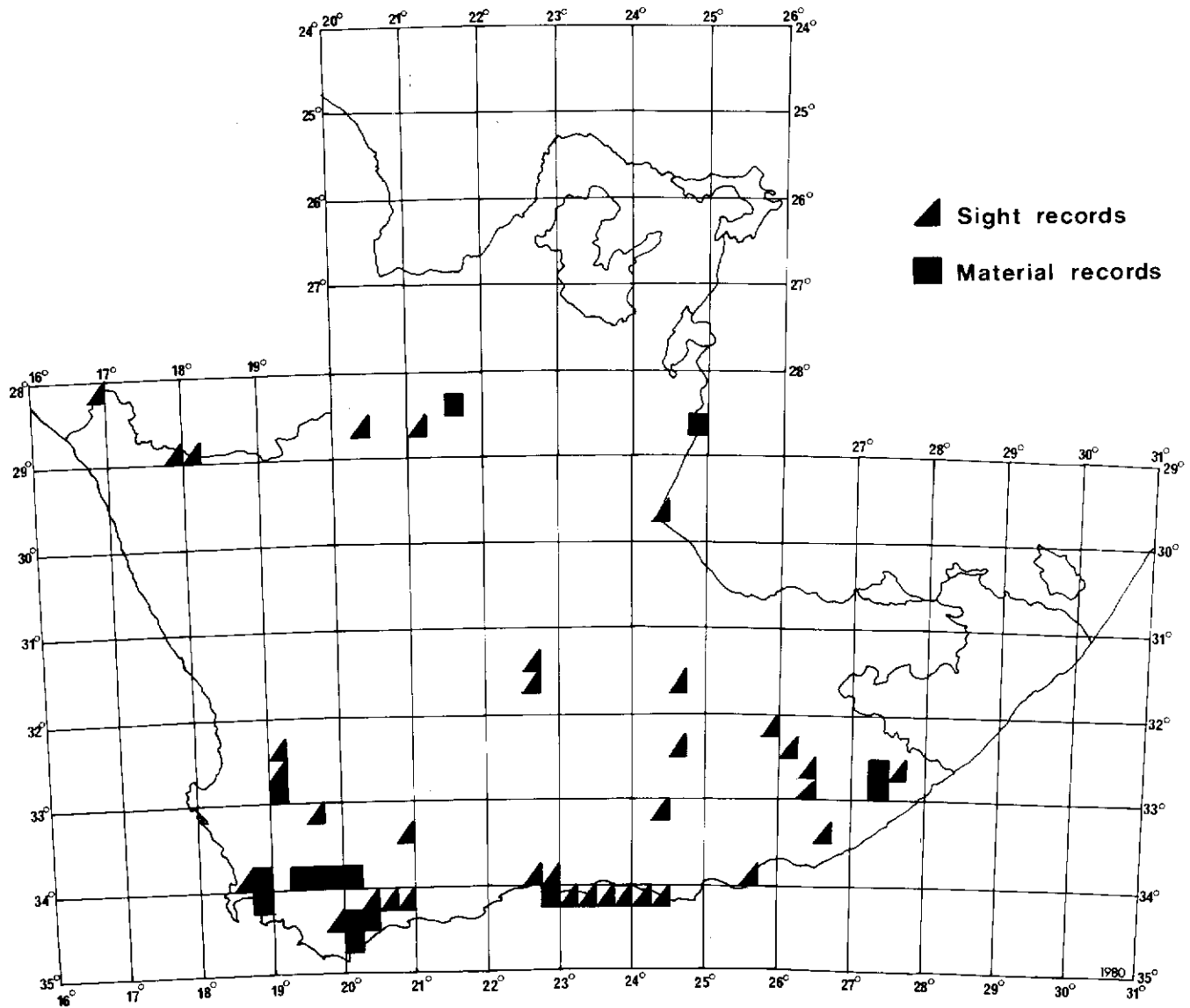


Fig. 7 Cape clawless otter: present distribution in the Cape Province.

crab remains. An otter stomach collected at the Pirie Trout Hatchery contained eight frogs (*Rana* sp.), a few crab fragments and a lepidopteran larva (Kaffrarian Museum records).

Scats were examined from the Maden and Rooikrantz Dams at Pirie, the Adelaide Municipal Dam, the Heuningklip River at Klipplaat and from several sites along the Breede River. Crab remains were by far the most frequent items at all sites and fish scales and bones were present in the scats from the Heuningklip River and four sites along the Breede River. Feathers and hair were found in the scats from the Adelaide Municipal Dam.

An otter was seen to capture a red-knobbed coot (*Fulica cristata*) on the Moordkuil Dam, Worcester (G. W. Dyer pers. comm.) and a sub-adult mute swan (*Cygnus olor*) was killed by otters at the Jonkershoek Nature Conservation Station, Stellenbosch. V. Pringle (pers. comm.) has observed that otters in the Bedford area of the E. Cape prey predominantly on crabs and common terrapins (*Pelomedusa subrufa*).

Rowe-Rowe (1977) found that the major food items of the clawless otter in Natal were crabs, frogs, fish, insects and birds, with crab remains present in 95% of all scats.

Reproduction

The reproductive tracts of four female otters caught in January, June and July (2) were examined, and none was pregnant. A very young animal weighing 780 g and with its eyes still closed was collected on a piece of driftwood in the Goukamma River estuary in April 1977 (N. G. Palmer pers. comm.). An embryo (KM 19060) housed in the Kaffrarian Museum was collected in July from a female killed at the Pirie Trout Hatchery. Smithers (1971) states that young are dropped during April in Rhodesia, and Ansell (1960) estimated births in about July or August in Zambia. Rowe-Rowe (1975) estimated births for August and November in Natal.

Measurements

The body mass of Cape clawless otters collected during the study (Table 13) was considerably less than a female specimen housed in the Kaffrarian Museum that weighed 28,4 kg (62,5 lbs).

Table 13 Cape clawless otter: measurements (mm, kg) of adult males and females in the Cape Province.

MALES	\bar{x}	n	Range
Head and body	829	7	762–880
Tail	487	7	465–515
Hind foot	152	7	130–170
Ear	31	7	23–35
Skull length	138	7	134–144
Body mass	15,1	7	11,5–21,0

FEMALES	\bar{x}	n	Range
Head and body	–	2	730; 736
Tail	–	2	495; 515
Hind foot	–	2	130; 139
Ear	–	2	28; 29
Skull length	–	2	128; 134
Body mass	12,9	3	10,6–14,2

Lutra maculicollis Spotted-necked otter
(A Klein-otter X inTini TleNyibi)

Distribution and status

No records of spotted-necked otters were collected during the study, but past records suggest that this otter occurs in the E. Cape, the Vaal River, and possibly the Orange River as far west as Upington (Fig. 8). Museum specimens have been collected from the Buffalo, Fish, Thorn and Keiskamma Rivers in the E. Cape, and the Vaal River at Warrenton. Twelve specimens housed in the Kaffrarian Museum were collected in the Pirie area, which includes the Rooikrantz and Maden Dams. Shortridge (1942) considered the spotted-necked otter to be more numerous than the clawless otter in the “North-Western” Cape (W. Cape), but it is unlikely that it has ever occurred in this area. Shortridge (1934) believed that the E. Cape population reached at least as far west as Knysna, but he presented no sound evidence to substantiate this.

The species’ secretive nature makes it difficult to observe, but its restricted distribution warrants a detailed survey.

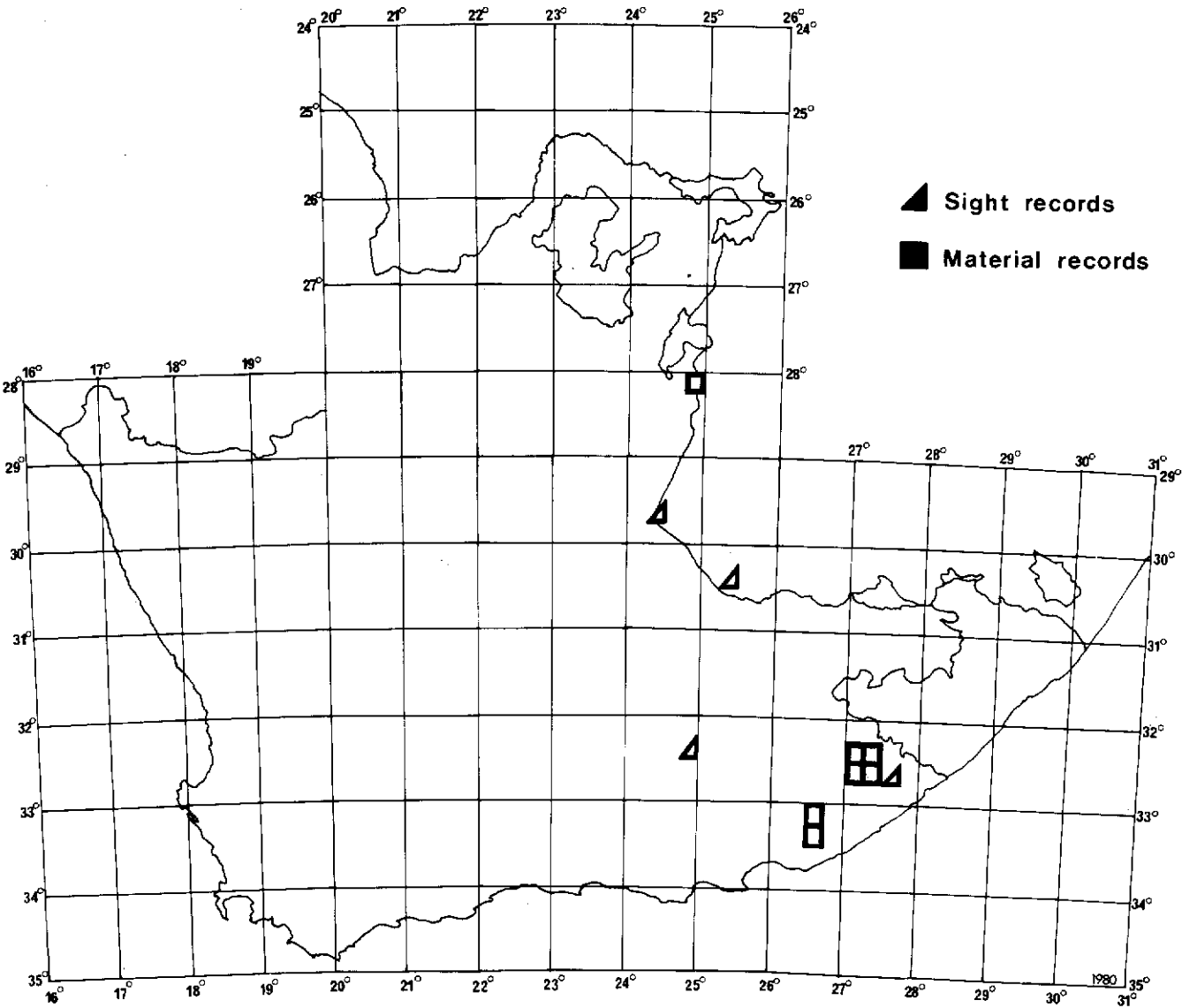


Fig. 8 Spotted-necked otter: distribution in the Cape Province. Hollow squares and triangles indicate historical records.

Habitat

This otter apparently prefers deeper water and is more aquatic than the clawless otter (Rowe-Rowe 1975).

Habits

Rowe-Rowe (1975) has documented the habits of this species in Natal. Rautenbach (1978) found it to be largely nocturnal, whereas Rowe-Rowe (1978b) considers it to be diurnal. Times of activity are probably affected by the level of disturbance.

Food

No stomach contents were examined during this study. Rowe-Rowe (1977) found from scat analysis that crabs and fish were the most important items in its diet.

On the files of the Kaffrarian Museum there is information on the gut contents of three spotted-necked otters from the Cape:

- (i) much frog material (*Rana* sp.), fish bones, one beetle, 1 "plant bug" and a caterpillar
- (ii) clawed frog (*Xenopus laevis*) and fish bones
- (iii) crab fragments.

Reproduction

There is no information for the Cape Province. Roberts (1951) and Procter (1963) recorded mating taking place during July and parturition during September.

Measurements

No information was collected during the study.

Mellivora capensis

Honey badger

(A Ratel X iChelesi T Matshwane).

Distribution and status

This is a widespread species in the Cape Province (Fig. 9) but it is nowhere common. The majority of animals killed during predator control programmes are taken in the southern coastal regions of Caledon, Bredasdorp, Riversdale and Mossel Bay, as well as the drier areas of Namaqualand, Calvinia, Beaufort West and Gordonia in the interior.

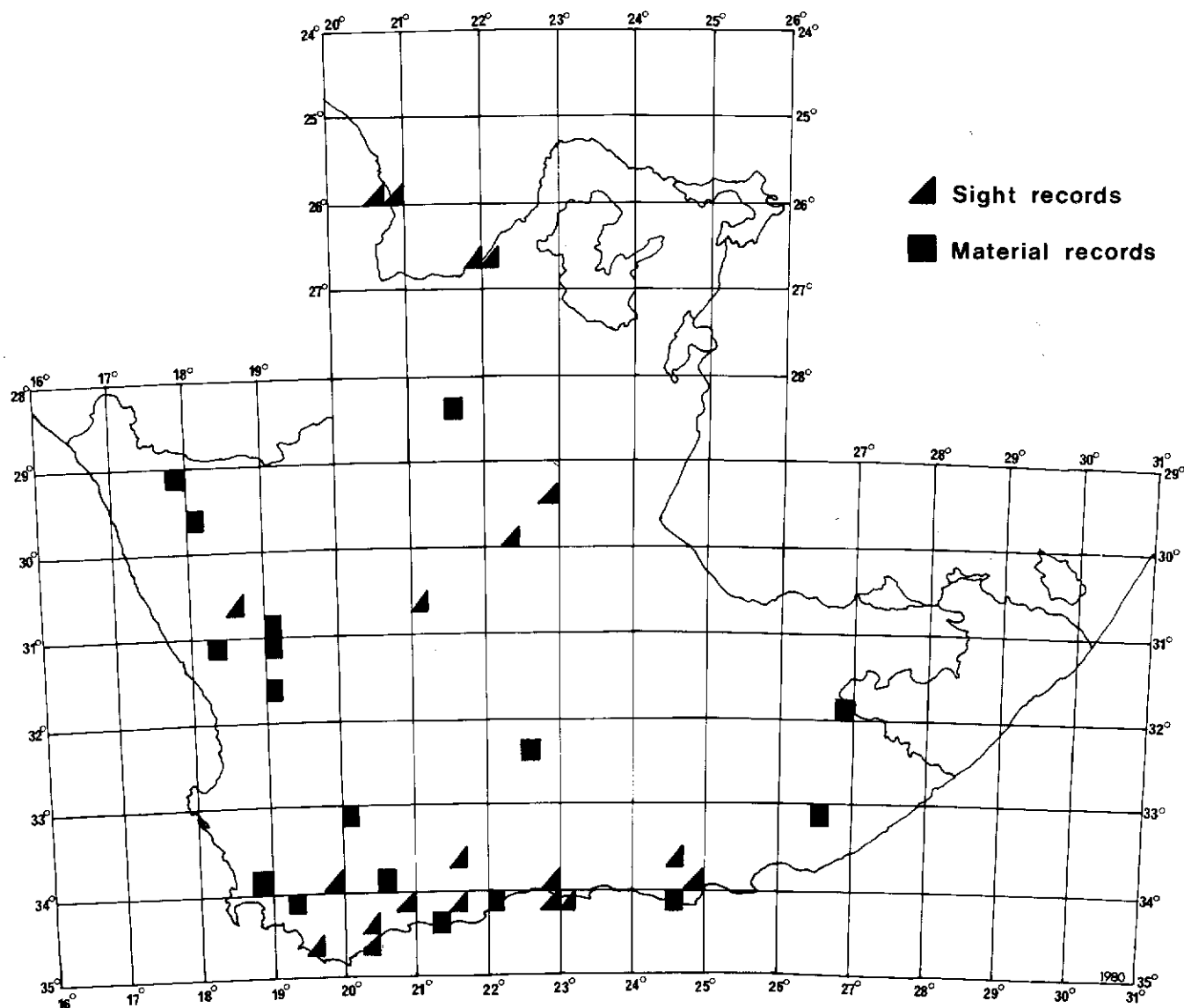


Fig. 9 Honey badger: present distribution in the Cape Province.

Habitat

Honey badgers show a wide habitat tolerance in the Cape Province, as they do throughout their range (Shortridge 1934; Novikov 1956; Smithers 1971; Rautenbach 1978). They are found in most of the major vegetation types including Mountain Fynbos, Lowland Fynbos, Grassveld, Kalahari Thornveld, open Karoo scrub (in association with rocky outcrops, gorges or vegetated river-beds) and coastal sandveld.

Habits

In the Cape Province honey badgers are predominantly nocturnal but have been seen during the day in protected areas such as the Kalahari Gemsbok National Park (M. G. L. Mills pers. comm.; pers. obs.) and the Hester Malan Nature Reserve near Springbok (P. M. Norton pers. comm.). Of the six recorded sightings during the present study, two were of pairs and the remainder of single animals.

The fact that the honey badger will break into beehives to get at the honey and larvae is well documented, but in the Cape Province only one incident was recorded during the project. This was on the farm "Sewefontein", Nieuwoudtville, where a honey badger had dug into a wild hive situated amongst rocks and earth close to a low ridge of rock. Commercial honey producers along the south coast, notably Riversdale, occasionally complain of damage to their hives. However, as noted by Kingdon (1977), this can be virtually eliminated by careful positioning of the hives.

Most honey badgers killed during problem animal control programmes are caught in gin-traps but on occasion they are killed by hounds. The latter method is usually avoided, however, because of the risk to the hounds. Unfortunately the unselective setting of the gin-trap for other predators makes it difficult to give this species greater protection.

Food

Of the ten stomachs examined in the study, seven were completely empty. One stomach contained the remains of a newly born antelope, provisionally identified as grey duiker (Riversdale). The other two stomachs came from animals killed in the Robertson district. One contained the remains of a water mongoose and the other Coleoptera larvae and a bee (Hymenoptera).

A farmer near Kliprand, J. A. Meyer (pers. comm.), saw a pair of honey badgers feeding on fresh carcasses of rock hyrax which had been shot as bait for a problem jackal. There are a few confirmed instances of killing small stock, although this is rare. When sheep are killed they are usually severely bitten on the head and only small quantities of flesh are actually eaten. The cheek muscles and tongue are often all that is taken.

Smithers (1971) identified four types of invertebrate and three of vertebrate food in six stomachs from Botswana.

Reproduction

During the study four females were taken in May, August (2) and September, but none was pregnant. In

the Kruger National Park mating has been recorded in February, June and December (Fairall 1968), and births have been recorded elsewhere in December (Ansell 1960) and February (Brand 1963).

Measurements

Table 14 Honey badger: measurements (mm, kg) of adult males and females in the Cape Province.

MALES	\bar{x}	n	Range
Head and body	832	4	760–900
Tail	165	4	160–180
Hind foot	116	4	105–120
Ear	–	2	20; 30
Skull length	139	3	132–144
Body mass	–	2	10.9; 12.0
FEMALES	\bar{x}	n	Range
Head and body	663	3	500–710
Tail	185	3	177–198
Hind foot	108	3	102–113
Ear	–	2	34; 40
Skull length	–	1	133
Body mass	–	1	8.0

Poecilogle albinucha

Striped weasel

(A Slangmuishond X iNyengelezi)

Distribution and status

The striped weasel is known only from as far west as Sedgefield in the south and the Nossob/Molopo junction in the north (Fig. 10). It may occur further to the west along the coast but is probably not found in the central Karoo.

Despite the small number of records it may be more abundant than is generally thought. It is easily overlooked because of its small size and secretive habits.

Habitat

The species has been recorded in the following vegetation types in the Cape Province: Kalahari Thornveld, Karoo, Grassveld, and Eastern Cape Forest (fringe), Fish River valley bushveld and fynbos. As has been shown by Rowe-Rowe (1972) the majority of distribution records fall in areas that receive at least 250 mm of rain.

Habits

Alexander and Ewer (1959) and Rowe-Rowe (1975) have discussed the habits of the striped weasel in some detail. It is considered to be predominantly nocturnal but can be diurnal on occasion. A captive animal held by the author occasionally moved around its enclosure during the day. This animal constructed shallow burrows in the soft sand of the enclosure, digging the sand with its forepaws and then moving it back in "caterpillar" fashion under the belly and out between the hind legs.

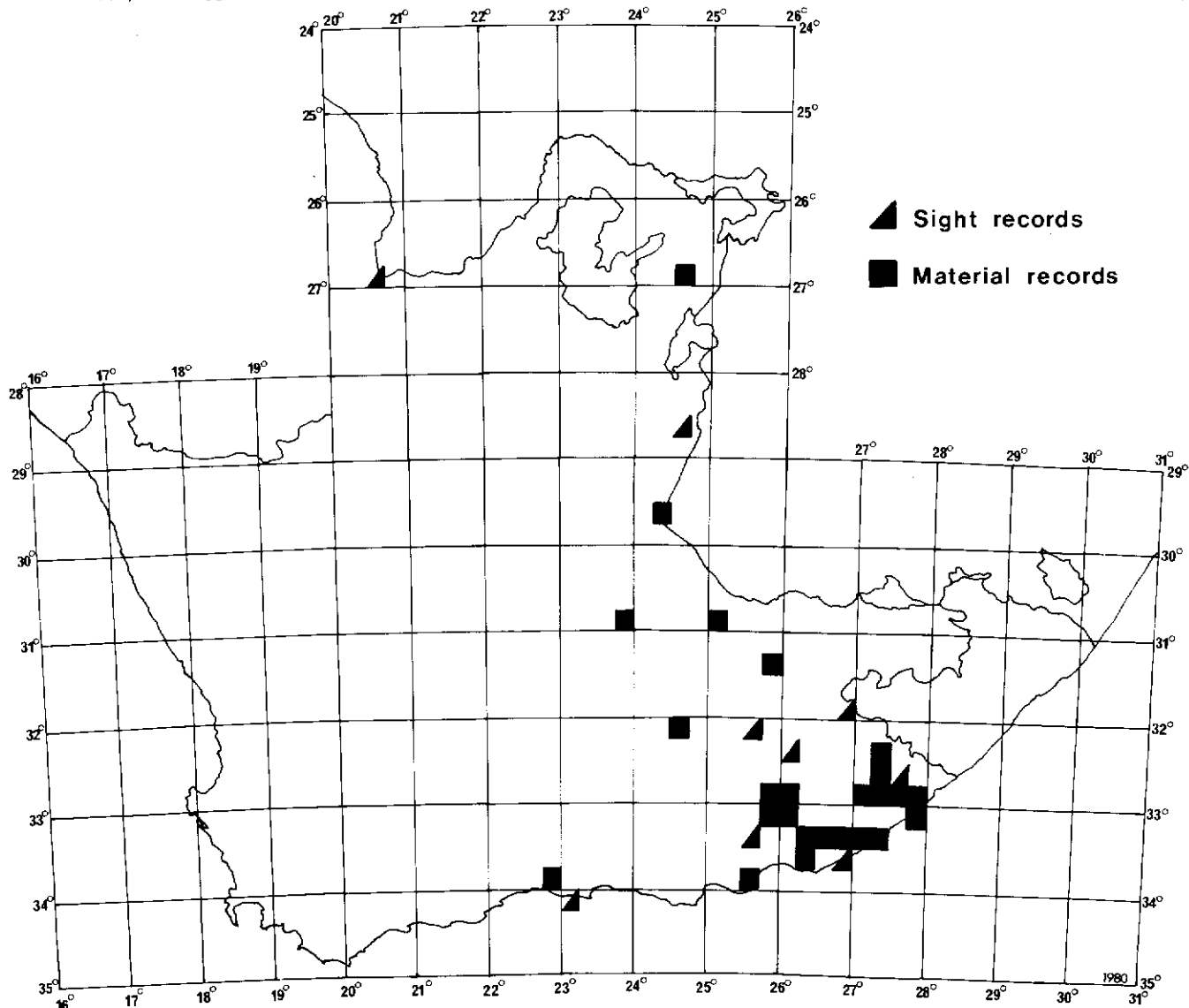


Fig. 10 Striped weasel: present distribution in the Cape Province.

Food

Only two stomachs were examined and both contained rodent remains, one unidentified and the second a vlei rat (*Otomys* sp.). Six stomachs were examined by Rowe-Rowe (1978b), and he found three species of rodent in four of the stomachs, as well as three unidentified small mammals. The striped weasel appears to be a specialised hunter, concentrating almost exclusively on rodents. Although usually recorded as taking small prey, Rowe-Rowe (1978b) found that captive individuals only accepted small mammals and birds, but rejected other food items offered. On three occasions the author's captive animal killed and partially consumed young rabbits with a mean mass of 500 g. It thrived in captivity on day-old chicks and Cape gerbils (*Tatera afra*).

V. Pringle (pers. comm.), of "Huntly Glen", Bedford, found a striped weasel that had stuck fast in meshed wire after it had apparently raided the nest of exotic pheasants and eaten several eggs. However, Rowe-Rowe (pers. comm.) doubts whether this carnivore eats eggs.

Reproduction

The two females collected were taken in August and

November, and neither was pregnant nor lactating. Rowe-Rowe (1978c) found that reproductive activity only took place in spring or summer, and that the maximum litter size was three.

Measurements

Table 15 Striped weasel: measurements (mm, g) of adult males and females in the Cape Province.

MALES	\bar{x}	n	Range
Head and body	314	3	306-327
Tail	—	2	171; 180
Hind foot	39	3	37-41
Ear	21	3	20-22
Body mass	357	3	327-379
FEMALES	\bar{x}	n	Range
Head and body	—	2	280; 350
Tail	—	2	145; 150
Hind foot	—	2	31; 36
Ear	—	2	18; 19
Body mass	—	2	210; 220

Ictonyx striatus

(A Stinkmuishond XiQaqa TNakedi)

Striped polecat

Habits

Distribution and status

This species is widespread and abundant throughout the province (Fig. 11).

Habitat

In the Cape Province the striped polecat has been recorded from all the major habitat types. Its wide habitat tolerance has also been noted by Smithers (1971) for Botswana and Zimbabwe, Rowe-Rowe (1978a) for Natal, and Rautenbach (1978) for the Transvaal. In the S.W. Cape wheatlands it is particularly abundant, and it is one of three carnivore species which appear to have benefited from agricultural activity in the region, the other two being the Cape fox and the yellow mongoose.

The striped polecat is a nocturnal, predominantly solitary animal. During the study an adult male was flushed from a hole in an active Cape gerbil colony during flood irrigation, another animal was taken under the floor of a beach house, and a third was removed from a derelict building containing dead vegetation and rubble. On three occasions during field collecting, animals escaped into burrows of, respectively, suricate, springhare and an unknown mammal. They will probably utilize any situation which offers adequate shelter.

Rowe-Rowe (1978b), who discusses the behaviour of the striped polecat in some detail, mentions that occasionally two animals are seen together, but there appears to be no mention in the literature of family parties. During the study an adult, presumably a female was seen moving along a road accompanied by

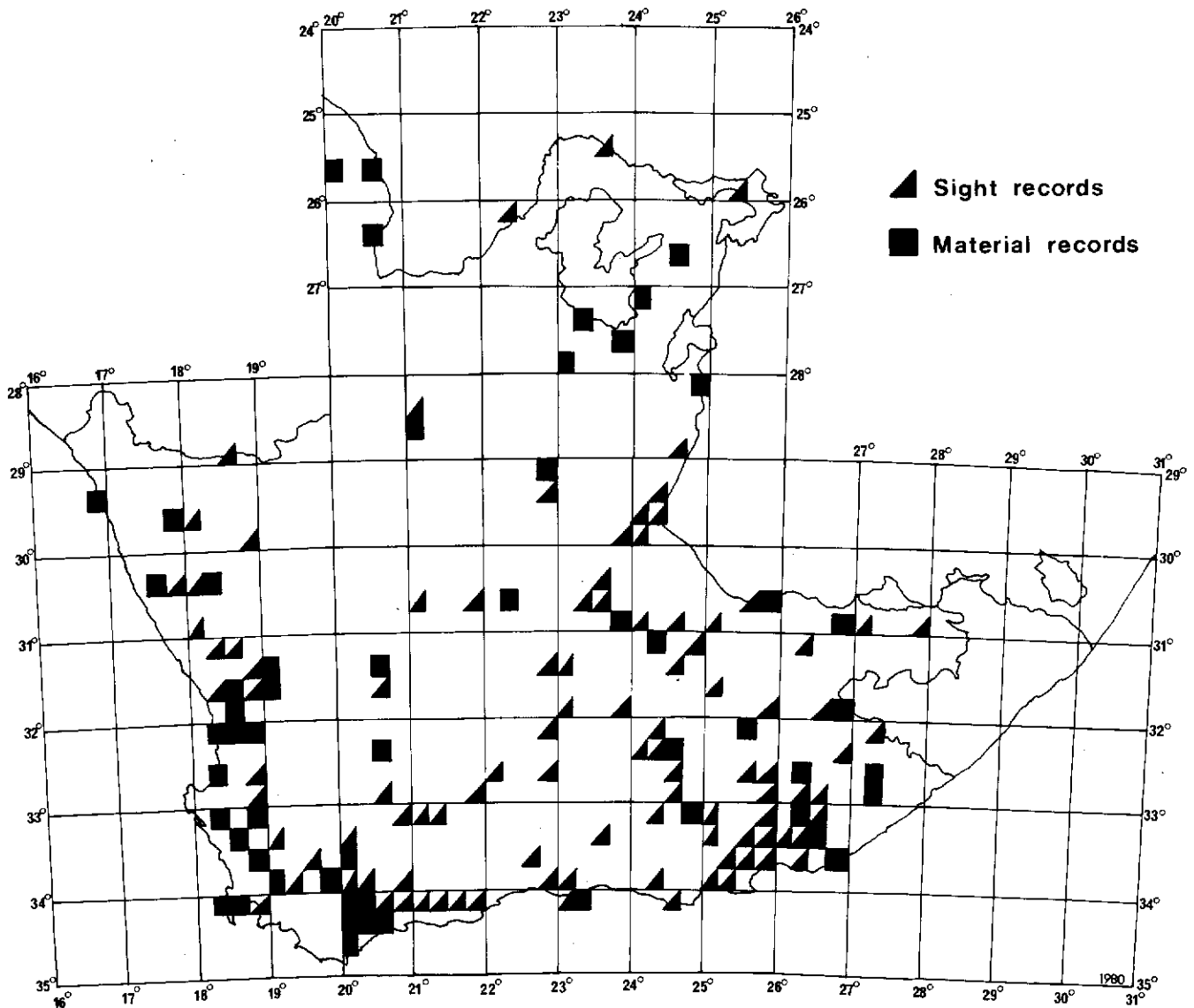


Fig. 11 Striped polecat: present distribution in the Cape Province.

two sub-adults. P. H. Lloyd (pers. comm.) has observed an adult and three juveniles walking together. All other sightings were of single animals.

Food

The analysis of 29 polecat stomachs is shown in Table 16. Of the five bird occurrences, two were fledglings and the remainder were small birds. It is possible that the Diptera larvae were taken as a result of scavenging. An additional four stomachs from the Robertson area were analysed before the present study was initiated, and the frequency of prey occurrence was as follows: insects (4), arachnids (2), reptiles (1) and myriapods (1). Stomach content analysis undertaken in other areas shows a preference for invertebrate prey.

Table 16 Striped polecat: contents of 29 stomachs from 23 localities in the Cape Province.

Food item	No. of stomachs
VERTEBRATES	
Aves	5
Mammalia (Muridae)	3
Reptilia (<i>Leptotyphlops</i> sp.)	1
Unidentified flesh	1
INVERTEBRATES	
Insecta	
Coleoptera (adults)	8
Coleoptera (larvae)	6
Orthoptera (Gryllidae 5; Acridiidae 1)	6
Lepidoptera (larvae)	1
Diptera (larvae)	1
Arachnida	
Solifugae	2
Scorpiones	1
Araneae (large spider)	1
EMPTY STOMACHS	7

Reproduction

No clear breeding season is apparent from the study (Table 17). The female caught in April had two small (0.9 g) foetuses (1L : 1R) and the animal taken in August was carrying one foetus (1R) weighing 9.4 g. The female collected in November had large extended nipples but was not lactating.

Rowe-Rowe (1978c) records the breeding season as being during spring and summer in Natal, with births in October and November, and Rautenbach (1978) recorded a lactating female in November in the Transvaal. A very small juvenile which was approximately 5½ weeks old (160 g) was retrieved in January after it had been found hanging on a fence, and a female weighing 200 g and approximately 6½ weeks old was collected in October. The ages of these two juveniles were calculated according to the method of Rowe-Rowe (1978c), who recorded birth weights of 10–15 g.

Table 17 Striped polecat: monthly occurrence of pregnant and non-pregnant females, and estimated birth dates of juveniles in the Cape Province.

	J	F	M	A	M	J	J	A	S	O	N	D
Pregnant	—	—	—	1	—	—	—	1	—	—	—	—
Non-pregnant	—	—	3	—	—	2	—	1	2	1	1	—
Total	—	—	3	1	—	2	—	2	2	1	1	—
Estimated birth dates	—	—	—	—	—	—	—	—	1	—	—	1

Rautenbach (1978) has commented on the disparity in sex ratios of animals collected in the Transvaal and Botswana, and this was also found in the present study (Table 18). Rowe-Rowe (1975) found that captive males were far more active than females and he believes this could explain why more males are taken in collection programmes than females.

Table 18 Striped polecat: a comparison of sex ratios from different studies in southern Africa.

Origin	Male	Female
Transvaal (Rautenbach 1978)	12	2
Botswana (Smithers 1971)	19	9
Natal (Rowe-Rowe 1975)	14	9
Cape (present study)	39	12
Cape (museum material)	40	27

Measurements

Table 19 Striped polecat: measurements (mm, g) of adult males and females in the Cape Province.

MALES	\bar{x}	n	Range
Head and body	340	30	280–380
Tail	207	32	165–255
Hind foot	54	28	47–66
Ear	28	32	22–34
Skull length	62	9	61–65
Body mass	793	21	486–1 200
FEMALES	\bar{x}	n	Range
Head and body	331	8	290–365
Tail	191	10	175–200
Hind foot	49	10	44–53
Ear	25	10	20–30
Skull length	60	3	59–61
Body mass	576	4	428–700

Family VIVERRIDAE

Genetta genetta Small-spotted genet
(A Kleinkolmuskejaatkat XiNyhwagi T Tshipa)

Habits

This genet is nocturnal and essentially solitary. During the study it was only encountered at night. The majority of animals were taken in live-traps set in river-beds, reed-beds, thorn scrub and in rocky hills.

Distribution and status

This is a widespread and common species in the Cape Province and has been recorded from all the major habitat types (Fig. 12). It is found in both high and low rainfall areas and from sea-level to high mountains.

Habitat

The small-spotted genet is found in many different habitats but appears to prefer scrub or bush cover, or rocky outcrops. Along the southern coastal belt it occurs in dense cover, often in association with the large-spotted genet. It is not found on the open Karoo plains, but usually occurs wherever well-vegetated river-beds are present.

Food

The stomachs of 25 small-spotted genets showed a wide range of vertebrate and invertebrate food (Table 20). A dove and a francolin were the only identifiable birds, the remainder being small sparrow-sized birds. Two of the occurrences under Aves were pieces of egg-shell. A batch of small-spotted genet scats collected at the De Hoop Nature Reserve, Bredasdorp, contained, amongst other items, the remains of crabs. A rock hyrax which had been shot and set aside for skinning was dragged 50 m to a rocky koppie by a small-spotted genet, and was then partially eaten.

N. G. Palmer (pers. comm.) has identified the forest shrew (*Myosorex varius*) from the stomach of a road casualty at Swartklip in the S.W. Cape.

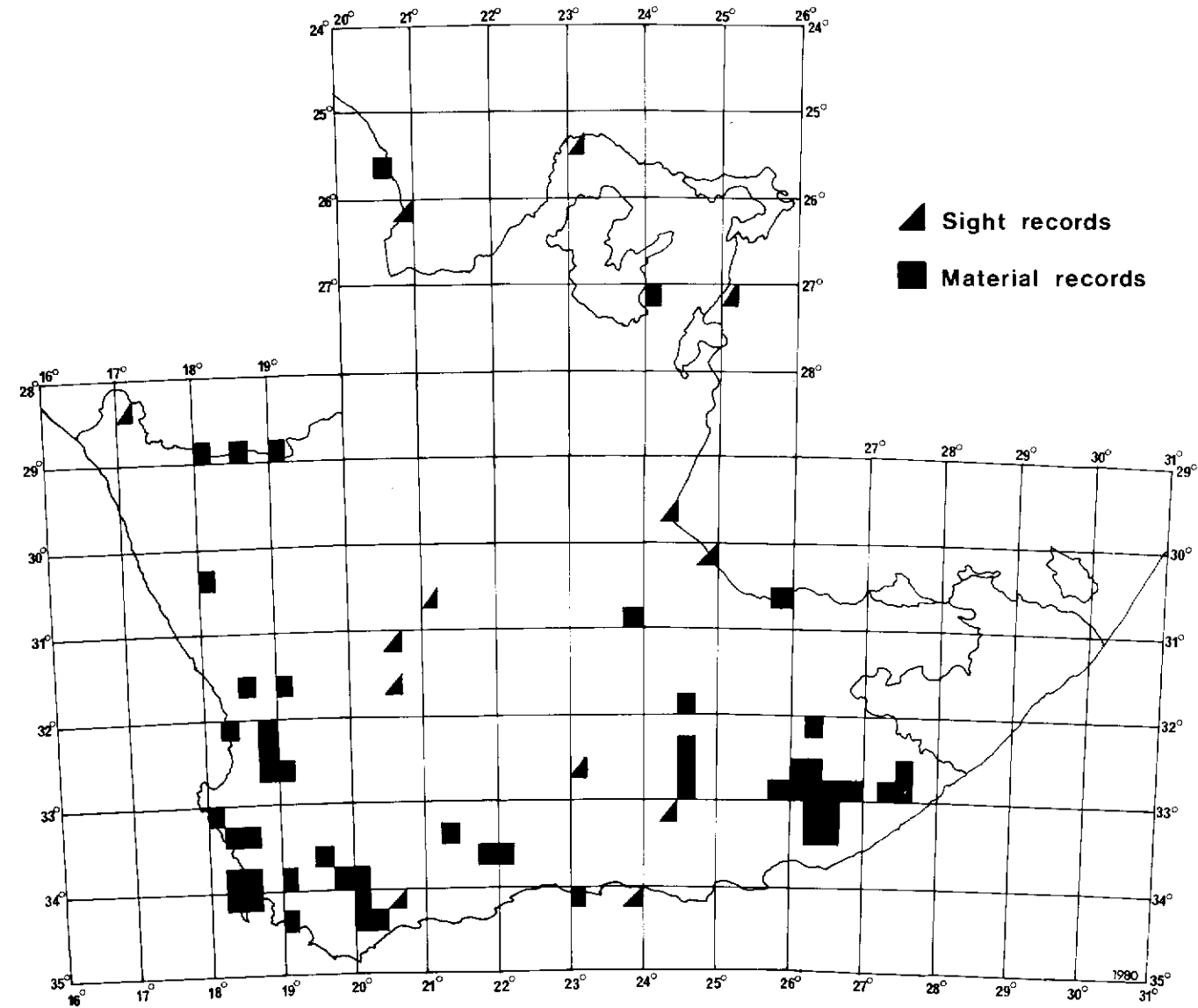


Fig. 12 Small-spotted genet: present distribution in the Cape Province.

Table 20 Small-spotted genet: contents of 25 stomachs from 22 localities in the Cape Province.

Food items	No. of stomachs
VERTEBRATES	
Mammalia	
Rodentia (<i>Rhabdomys pumilio</i> 4; <i>Otomys</i> sp. 2; <i>Desmodillus auricularis</i> 1; <i>Mus minutoides</i> 2; remainder unid.)	14
Insectivora (<i>Crocidura</i> sp.)	1
Carrion (domestic goat 1; rock hyrax 1)	2
Aves	8
Amphibia (<i>Rana</i> sp. 2)	2
Reptilia (unid. tortoise)	1
INVERTEBRATES	
Insecta	
Orthoptera (Acridiidae 7; Gryllidae 3)	10
Coleoptera	8
Isopoda	1
Arachnida	
Scorpiones	2
Solifugae	1
PLANT FOOD	
Green grass	3
Leaves	2
Grape skins	1

During the study several reports were received of genets (species not specified) killing pullets and adult hens, domestic pigeons and ducklings.

Smithers (1971) found the following in 78 stomachs (the percentages for the present study are given in parentheses): vertebrates 43% (50%), invertebrates 54% (39,3%) and plant food 3% (10,7%).

Reproduction

One of the females collected in October gave birth in captivity two days after capture. Two young were born alive and lived for three days. They both weighed 70 g at birth. The other pregnant female taken in October was carrying two fetuses (1L : 1R), which weighed 1,3 g and 1,5 g respectively. The female taken in September had two fetuses (1L : 1R) with weights of 5,7 g and 7,2 g. A juvenile female weighing 500 g was taken in mid-July and a 715 g animal was collected in June. Smithers (1971) recorded pregnancies from October through to February, and Rautenbach (1978) noted a pregnancy in January.

Table 21 Small-spotted genet: monthly occurrence of pregnant and non-pregnant females in the Cape Province.

	J	F	M	A	M	J	J	A	S	O	N	D
Pregnant	-	-	-	-	-	-	-	-	1	2	-	-
Non-pregnant	1	1	2	-	-	3	7	2	1	1	1	-
Total	1	1	2	-	-	3	7	2	2	3	1	-

Measurements

Table 22 Small-spotted genet: measurements (mm, g) of adult males and females in the Cape Province.

MALES	\bar{x}	n	Range
Head and body	514	24	475-565
Tail	454	25	410-494
Hind foot	85	25	73-95
Ear	51	23	40-56
Skull length	90	12	86-95
Body mass	1 908	19	1 500-2 455
FEMALES	\bar{x}	n	Range
Head and body	503	16	430-550
Tail	433	17	410-470
Hind foot	81	18	70-88
Ear	47	16	40-52
Skull length	89	6	86-92
Body mass	1 791	11	1 420-2 034

Genetta tigrina Large-spotted genet
(A Grootkolmuskejaatkat X iNyhagi T Tshipa or Thokolo)

Distribution and status

Specimens of the large-spotted genet have only been taken in the higher rainfall areas of the southern coastal belt in the Cape Province (Fig. 13), and to date not within the expected range of the northern subspecies *G. t. rubiginosa* (Ellerman *et al.* 1953). Both Smithers (1971) and Rautenbach (1978) have mentioned the apparent dependence of this species on standing water, and this was confirmed in the present study.

This genet has only been recorded south of 32°, primarily on the seaward side of the coastal mountains. It occurs from Cape Town eastwards to the Republic of Transkei. It is a fairly common species within its range and has been found in close association with the small-spotted genet in some areas.

Habitat

The large-spotted genet has been collected in both Lowland and Mountain Fynbos as well as Southern and Eastern Cape Forest. The majority of animals collected during the study were associated with fairly high vegetation cover and permanent water (usually streams or rivers). Both the small-spotted genet and large-spotted genet are found in moist environments, but only the former has been collected in the more arid Cape habitats. In parts of the S.W. Cape the large-spotted genet is notably abundant in extensive stands of exotic scrub.

Habits

During the study only solitary animals were encountered, and all were seen at night. One animal in the Jonkershoek Valley slept in a hollow oak tree, approximately three metres from the ground, where it

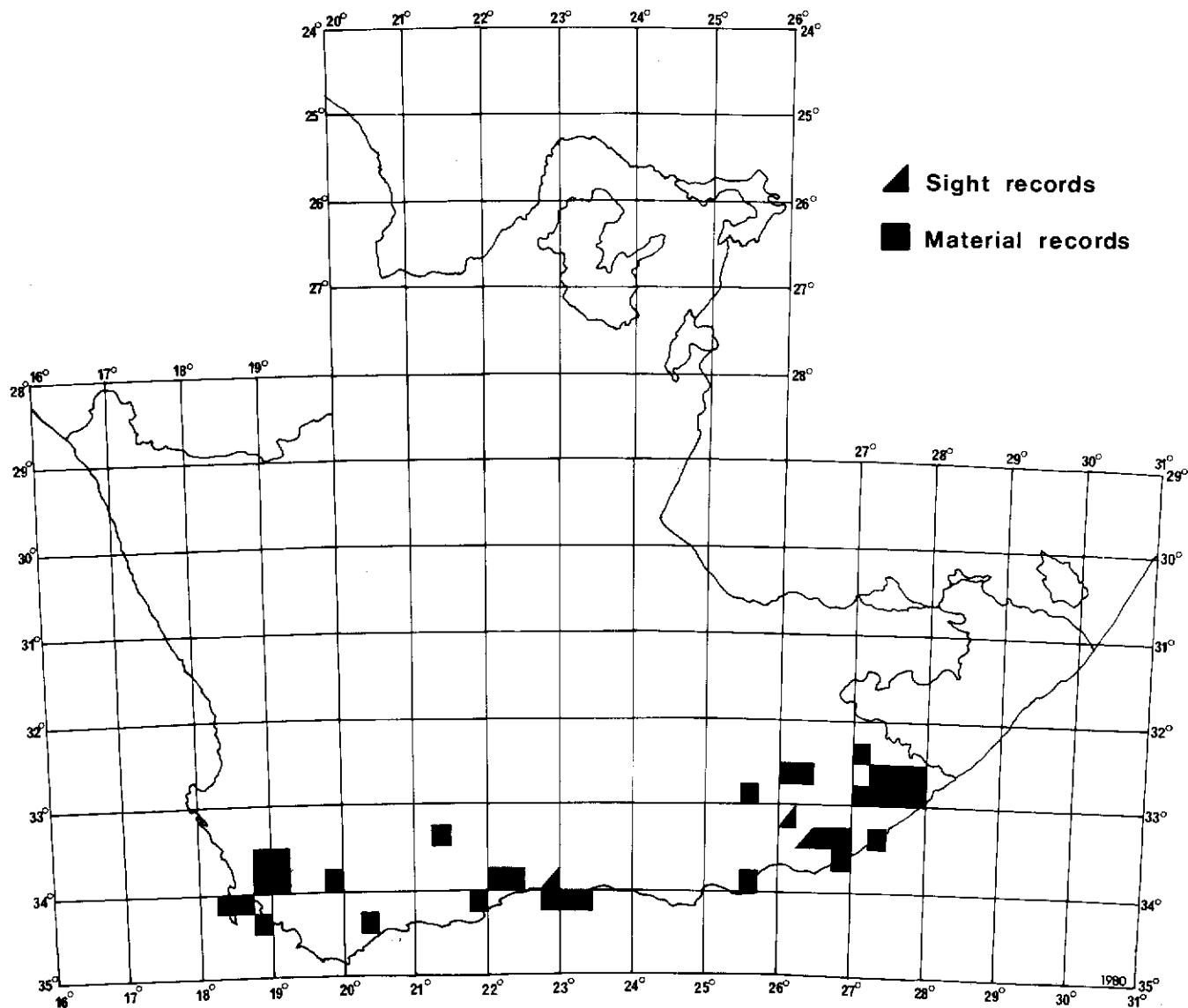


Fig. 13 Large-spotted genet: present distribution in the Cape Province.

was eventually trapped. These genets appear to frequent rubbish dumps and animals have been trapped at such sites in the Cape Point, Goukamma and De Hoop Nature Reserves. They are both terrestrial and arboreal, but most feeding seems to take place on the ground.

Food

Seventeen stomachs showed a mixture of vertebrate and invertebrate, as well as plant, food (Table 23). The two Egyptian geese recorded in this table were probably scavenged, although it is possible that they were killed by the genets.

The following stomach contents are recorded on the Kaffrarian Museum files: one male collected at the Pirie Trout Hatchery had an unidentified rodent, earthworms, spider fragments, freshwater crab remains and a blade of grass in its stomach, while another male collected at "Rangerton", Upper Gonubie, had chewed bark and wood, insects fragments and a pill millipede. Smithers (1971), Rowe-Rowe (1978a) and

Rautenbach (1978) found that rodents were by far the most important food items in the diet of the large-spotted genet.

Table 23 Large-spotted genet: contents of 17 stomachs from 12 localities in the Cape Province.

Food item	No. of stomachs
VERTEBRATES	
Mammalia	
Rodentia (<i>Aethomys namaquensis</i> 1;	
<i>Otomys irroratus</i> 1)	2
Unidentified mammal	2
Aves (<i>Alopochen aegyptiacus</i> 2; Columbidae 1)	3
Amphibia	1
Reptilia (Serpentes)	1
INVERTEBRATES	
Insecta	
Coleoptera (larvae)	2
Coleoptera (adults)	1
Orthoptera (Acridiidae)	1
PLANT FOOD	
Seeds and leaves	3
Green grass	2
EMPTY STOMACHS	5

Reproduction

Of the six female reproductive tracts examined in January (2), February, March, April and September, none contained foetuses. One animal taken in January had recently given birth and was lactating.

A juvenile male weighing 300 g was collected in March and, after comparing it with the growth curve given for a captive animal (Rowe-Rowe 1971) , the age was estimated at approximately six weeks. Rowe-Rowe (1971) estimated births in Natal for August, September, November and March. In Zimbabwe births have been recorded from August to February (Smithers 1971), while Rautenbach (1978) recorded two pregnant females in November.

Measurements

Table 24 Large-spotted genet: measurements (mm, g) of adult males and females in the Cape Province.

MALES	\bar{x}	n	Range
Head and body	507	11	460–580
Tail	431	10	390–459
Hind foot	85	11	80–90
Ear	43	10	36–55
Body mass	1 880	9	1 600–2 122
FEMALES	\bar{x}	n	Range
Head and body	495	5	427–560
Tail	403	5	385–432
Hind foot	82	5	77–85
Ear	42	5	39–43
Body mass	1 550	4	1 360–1 871

Suricata suricatta

(A Stokstertmeerkat)

Suricate

Distribution and status

The suricate is widely distributed in the Cape Province (Fig. 14), although it is apparently absent from the southern coastal belt to as far east as Colchester (near Port Elizabeth), and is infrequently encountered in the southern portion of the Little Karoo. As was found by Smithers (1971) for Botswana, it appears to be localized in suitable habitat and is subject to considerable local fluctuations in numbers.

Habitat

Suricates are largely restricted to the more arid areas of the Cape Province, and have not been recorded from Mountain Fynbos or forests. They are most frequently encountered in the Succulent Karoo and Kalahari Thornveld, but are known to occur in the Grassveld of the E. Cape. Although they seem to prefer fairly hard ground, the warren found at Colchester was in soft dune sand, and another near Springbok was also in soft sand. Suricates were seen on very rocky hillsides at the site of the Sutherland Observatory.

Habits

Suricates are diurnal and live in colonies, excavating their own underground warrens. Group sizes recorded in the Cape Province range from three to 22 as follows: 3 (three records), 5, 7, 8, 9 (two records), 12, 14, 15, 22. These figures can be considered as minima, since some individuals may have remained underground at the time of counting. Well-established warrens may have many holes, as shown by one warren near Springbok that had 18 entrances and had become raised above the surrounding ground level.

A number of authors (e.g. Smithers 1971; Stuart 1975) have mentioned the association of this species with ground squirrels (*Xerus inauris*) and yellow mongooses in the same burrow system. During the present study only the latter species was recorded with suricates.

Food

The most common food items were Coleoptera adults and larvae (Table 25), as was found by Smithers (1971) in Botswana.

Table 25 Suricate: contents of seven stomachs from six localities in the Cape Province.

Food item	No. of stomachs
VERTEBRATES	
Reptilia (<i>Nucras</i> sp. 1; Gekkonidae 1; unid. lizard)	3
Aves (small prinia-size)	1
INVERTEBRATES	
Insecta	
Coleoptera (adults)	4
Coleoptera (larvae)	3
Isoptera	2
Orthoptera	1
Hymenoptera (bee)	1
Dermoptera	1
Arachnida	
Solifugae	1
Araneae (spider)	1
Myriapoda	2
PLANT FOOD	
Seeds	2

Reproduction

Five females caught in June (2), July (2) and August were examined, and none was pregnant or lactating. Smithers (1971) noted a pregnant female in February, Shortridge (1934) collected a pregnant female in November, Brand (1963) recorded captive births from September through to January, and Ewer (1973) recorded births in November and December.

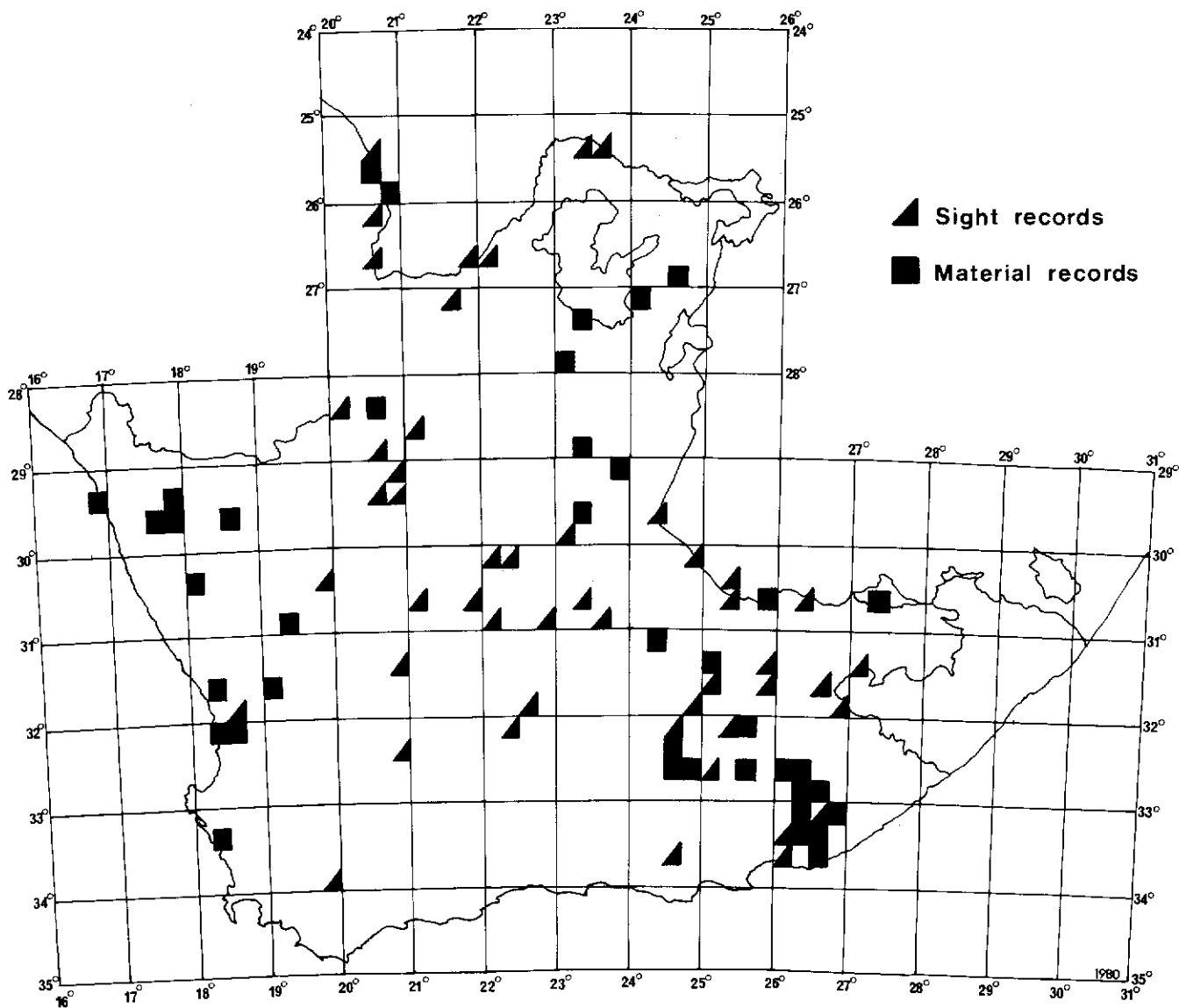


Fig. 14 Suricate: present distribution in the Cape Province.

Measurements

Table 26 Suricate: measurements (mm, g) of adult males and females in the Cape Province.

MALES	\bar{x}	n	Range
Head and body	295	5	258–330
Tail	188	5	167–200
Hind foot	66	5	56–71
Ear	18	5	16–19
Body mass	731	4	543–900
FEMALES	\bar{x}	n	Range
Head and body	292	6	255–310
Tail	181	6	160–202
Hind foot	66	6	60–72
Ear	19	6	15–20
Body mass	621	6	454–800

Cynictis penicillata Yellow mongoose
(A Rooimeerkat or Witkwasmuishond X iGala
T Moswe)

Distribution and status

Ellerman, Morrison-Scott and Hayman (1953) listed no fewer than six subspecies of the yellow mongoose in the Cape Province, whereas Lundholm (1955) did not subdivide the species at all, and showed that there is a colour cline from yellow in the Cape Province to grey in northern South West Africa.

The yellow mongoose is found throughout the Cape Province, being absent only from the forested areas of the S. and E. Cape (Fig 15). In the S.W. Cape it is apparently a fairly recent addition to the fauna, where it takes advantage of the open wheatlands. It is an abundant and widespread species.

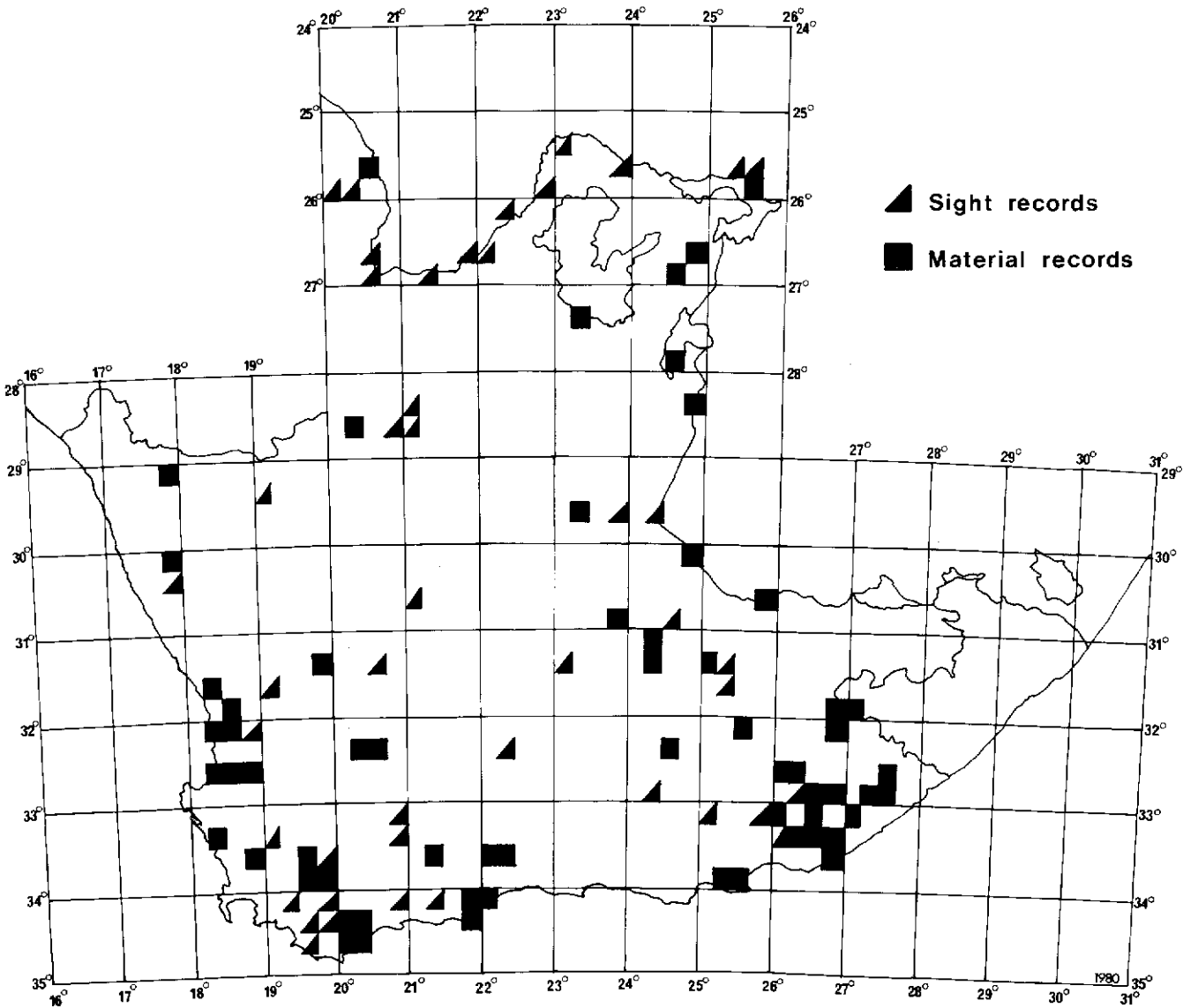


Fig. 15 Yellow mongoose: present distribution in the Cape Province.

Habitat

Yellow mongooses have been recorded in all the major habitat types other than the Southern and Eastern Cape Forest. They show a marked preference for open, lightly-vegetated terrain, although in the Robertson district they have been recorded from stands of the *Phragmites* reeds along the Keisers and Konings Rivers, and from the fairly dense Fish River valley bushveld. The other abundant diurnal carnivore in the S.W. Cape, the Cape grey mongoose, shows a preference for fairly dense vegetation, and thus competition with the yellow mongoose is reduced. In the S.W. Cape wheat-belt the latter construct their warrens on the edge of cultivated land in fairly soft soils.

Habits

Records in the Cape Province indicate diurnal activity. Yellow mongooses are fossorial and live in small colonies of two or more animals. The largest number recorded during the study was nine animals in an old

field near Stilbaai. The usual number appears to be four or five, although when foraging they are generally solitary or in pairs. They have been observed to share burrow systems with the suricate in parts of the Cape Province.

A well-established but small colony (3-5 animals) at Vrolijkheid has been in constant use for at least 10 years. Tagged animals from this colony were observed feeding up to 1,3 km from the burrows.

Food

Insects are by far the most common items found in yellow mongoose stomachs (Table 27). This is confirmed by Smithers (1971), Zumpt (1968), and Rautenbach (1978) in other areas of southern Africa.

The results of the stomach analyses are similar to the results of analyses of scat samples collected at different times of the year at Vrolijkheid. Table 28 shows that Coleoptera and Orthoptera were eaten throughout the year, while Myriapoda were only caught in winter (Table 28).

Table 27 Yellow mongoose: contents of 20 stomachs from 15 localities in the Cape Province.

Food item	No. of stomachs
VERTEBRATES	
Aves (<i>Numida meleagris</i> 1; sparrow-sized bird 1)	2
Mammalia (unid. murid)	1
Reptilia (<i>Acontias</i> sp.)	1
INVERTEBRATES	
Insecta	
Coleoptera (larvae)	12
Coleoptera (adults)	12
Orthoptera (<i>Acridiidae</i> 5; <i>Gryllidae</i> 8)	13
Isoptera	4
Lepidoptera (larva)	1
Hymenoptera (ant)	1
PLANT FOOD	
Grass	3
Seeds	1

Table 28 Yellow mongoose: scat contents from Vrolijkheid Nature Conservation Station, Cape Province. A=Abundant; P=Present

	Jan.	Feb.	Apr.	May	July	Sept.	Nov.
Coleoptera	A	P	A	A	A	A	A
Orthoptera	A	A	A	A	A	—	P
Isoptera	P	—	—	P	P	—	P
Myriapoda	—	—	A	A	P	P	—
Scorpiones	P	P	—	—	P	—	—
Aves	—	—	P	—	—	P	—
Rodentia	—	—	—	—	—	P	—
Grass	—	—	P	—	—	—	—

Smithers (1971) states that the taking of carrion by this species is unusual, but in the present study animals were recorded eating from offal fed to jackals in large enclosures at Vrolijkheid, and on another occasion from a decomposing grey duiker carcass. During a period when a number of blue cranes (*Anthropoides paradisea*) died of suspected poisoning in the Riversdale district two yellow mongooses were observed feeding on the carcass of one of these birds.

Observations on general feeding behaviour, especially the frequent habit of digging when searching for food, agree with the findings of Smithers (1971).

Reproduction

Although no pregnant females were found, a total of 19 non-pregnant individuals was examined (Table 29). A juvenile of 244 g was collected in December by N. G. Palmer (pers. comm.). Rautenbach (1978) collected pregnant females in November and December, and

Table 29 Yellow mongoose: monthly occurrence of non-pregnant and lactating females in the Cape Province.

	J	F	M	A	M	J	J	A	S	O	N	D
Non-pregnant	4	—	—	3	1	1	—	—	1	3	4	2
Lactating	1	—	—	—	—	—	—	—	—	—	—	—
Total	5	—	—	3	1	1	—	—	1	3	4	2

Smithers (1971) in February (2), March, July, October and November. Rowe-Rowe (1978a) collected three pregnant females in September.

The mean litter size for the 11 pregnancies recorded in the various studies was three, with a range of two to five.

Measurements

The measurements of seven of the males and four of the females (Table 30) were taken from live animals that were drugged, measured, marked and released.

Table 30 Yellow mongoose: measurements (mm, g) of adult males and females in the Cape Province.

MALES	\bar{x}	n	Range
Head and body	351	22	305–390
Tail	251	23	205–285
Hind foot	76	24	63–86
Ear	34	23	26–40
Skull length	71	10	67–74
Body mass	937	14	851–1 000
FEMALES	\bar{x}	n	Range
Head and body	363	13	315–395
Tail	263	15	227–297
Hind foot	77	14	69–83
Ear	32	12	21–37
Skull length	71	8	67–74
Body mass	931	9	750–1 073

Herpestes ichneumon Egyptian mongoose
(A Grootgrysmuishond XumHlangala)

Distribution and status

Ellerman *et al.* (1953) stated that this large mongoose occurs as far west as Knysna, and Meester, Davis and Coetzee (1964) give its distribution as the E. Cape. Apart from a specimen in the S.A.M. (ZM 36184) from Bot River (Caledon), and a mention of specimens in the same museum from the Cape and Stellenbosch divisions (Sclater 1900), there are no other records of its occurrence to the west of Knysna. However, during the present survey this species was found to be widespread in the S.W. Cape (Fig. 16). The most westerly record is of an animal taken at the Romansrivier, Wolseley, and from there they have been recorded to the south, and then eastwards to the Republic of Transkei. Although Rautenbach (1978) notes that it appears to occur in areas receiving more than 500 mm of rain annually, three specimens and two sightings from the S.W. Cape (Robertson, McGregor and Bonnievale) were in areas with an annual precipitation of less than 300 mm.

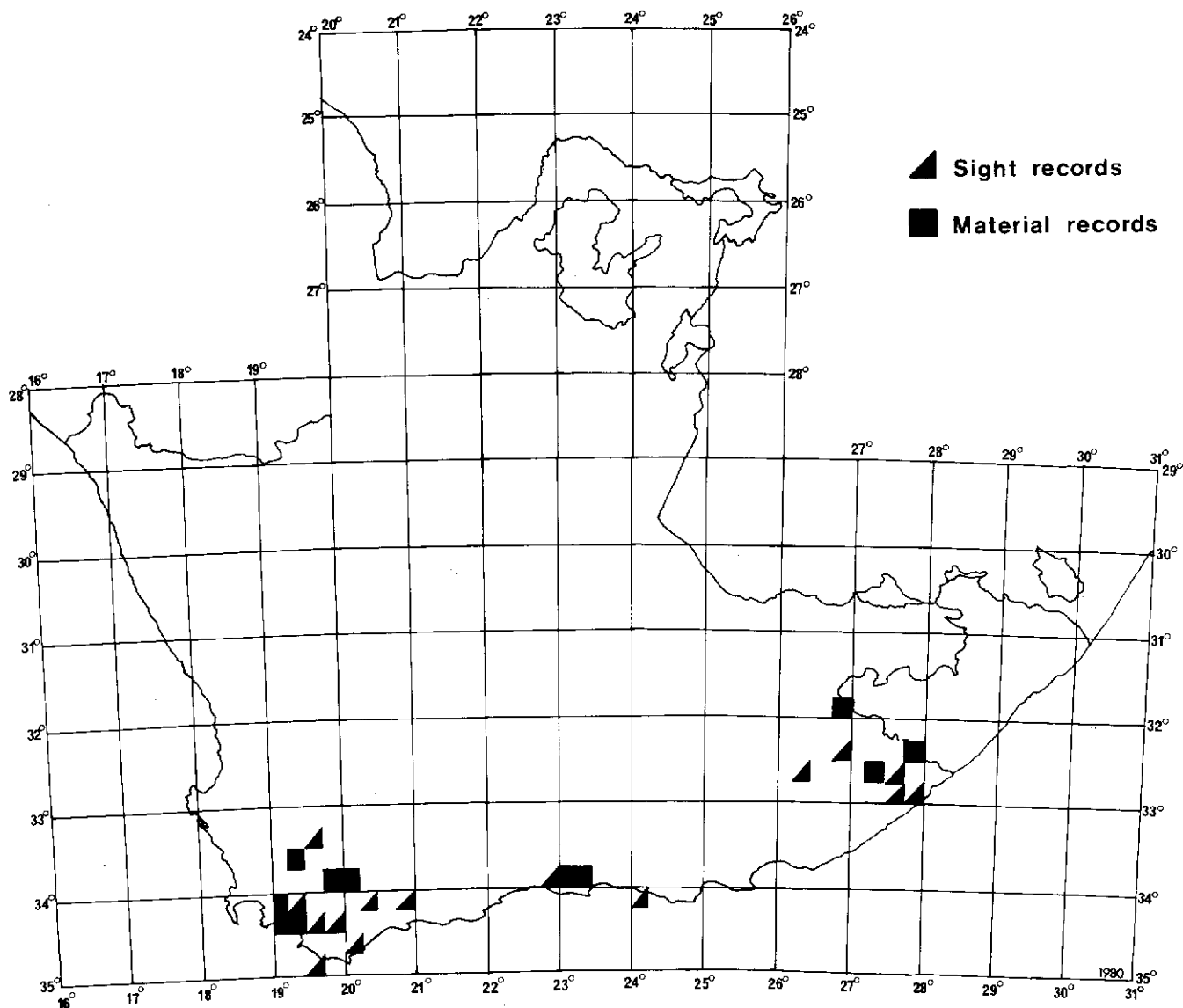


Fig. 16 Egyptian mongoose: present distribution in the Cape Province.

Habitat

This mongoose has been recorded from the fynbos and Succulent Karoo in the west, fynbos and forest in the south, and fynbos, forest and Karoo fringe in the east (Table 31). All the animals recorded during the study were within a short distance of permanent water.

Habits

Only diurnal sightings were made during the study. The maximum group size recorded was four, one group of three was observed and all remaining records were of solitary animals. Larger groupings in other parts of its range have been noted (Shortridge 1934; Roberts 1951; Booth 1960).

Food

The contents of six stomachs collected during the study are given in Table 32. The Kaffrarian Museum files give the stomach content of an animal collected between Macleantown and Berlin as a snake (approximately 2 ft in length), a small rodent and Coleoptera and Orthoptera fragments. Also on the files of this museum are notes of two claims that this species had killed and eaten small lambs ("Lowestoffe", Cathcart and Fort Wellington in the King William's Town area). Records from other parts of their range show them to have a very mixed diet.

Table 31 Egyptian mongoose: a break-down of specimens and sightings in relation to habitat types in the Cape Province.

Vegetation type	Number of records
Lowland Fynbos	6
Succulent Karoo (four in association with cultivation)	5
Forest/plantation fringe	4
Lowland/Mountain Fynbos (transition)	3
Riverine (1 reed-bed; 1 exotic growth)	2
Coastal sandveld	2

Table 32 Egyptian mongoose: contents of six stomachs from six localities in the Cape Province.

Food items	No. of stomachs
VERTEBRATES	
Mammalia	
Rodentia (<i>Otomys irroratus</i> 1; <i>Rhabdomys pumilio</i> 1; unid. 1)	3
Aves (1 fledgling)	1
Reptilia (<i>Mabuya</i> sp.)	2
Amphibia (<i>Rana</i> sp.)	1
INVERTEBRATES	
Insecta	
Orthoptera (Acridiidae)	2
Coleoptera (adults)	1
PLANTFOOD	
Grape skins	1
EMPTY STOMACHS	1

Reproduction

Female reproductive tracts were examined in March (2), April and September, and there was no sign of reproductive activity. No information on breeding has been recorded for southern Africa.

Measurements

Table 33 Egyptian mongoose: measurements (mm, g) of adult males and females in the Cape Province.

MALES	\bar{x}	n	Range
Head and body	583	4	557–610
Tail	513	4	447–610
Hind foot	99	4	95–102
Ear	32	4	25–37
Body mass	3 067	3	3 000–3 200
FEMALES	\bar{x}	n	Range
Head and body	549	4	500–580
Tail	484	4	435–528
Hind foot	96	4	89–100
Ear	36	4	34–38
Body mass	2 810	3	2 240–3 200

Herpestes sanguineus
(A Rooimuishond T Ngano)

Slender mongoose

Distribution and status

The slender mongoose is restricted to the northern and eastern parts of the Cape Province (Fig. 17), but is nowhere common. It is apparently rare in the E. Cape, there being only one specimen (TM 17604) from the Mountain Zebra National Park. In the Republic of Transkei there are specimens from Port St. Johns (AM 5130, 5004; SAM 5457, 6064) and Entafufu (SAM 1884). The majority of records are restricted to the area north of the Orange River.

Habitat

There are recent records from the Kalahari Thornveld and the transitional area to the west of the Augrabies Falls. Sightings have been made in short grassland, open thorn savanna and lightly-vegetated river-beds (I. A. W. MacDonald pers. comm.; pers. obs.). They also apparently occur in the irrigation belt at Hartswater (I. A. W. MacDonald pers. comm.). Both Smithers (1971) and Rautenbach (1978) point out that the slender mongoose is more abundant in well-watered areas.

Habits

This is a diurnal, terrestrial and usually solitary species. The nine recorded sightings during the study were all of single animals (I. A. W. MacDonald pers. comm.; pers. obs.).

Food

Two stomachs were obtained, but both were empty. Smithers (1971) states that the slender mongoose takes a wide variety of prey items, but vertebrates usually predominate. It appears to have a similar dietary pattern to that of the Cape grey mongoose. Both species are diurnal and their ranges do not appear to overlap in the Cape Province.

Reproduction

No records were collected during the present study. Smithers (1971) recorded a pregnant female in December (two fetuses) and two lactating animals in February. He further notes that pregnant animals have been taken in November in Zimbabwe (Rhodesia). In the Transvaal, Rautenbach (1978) collected a pregnant female in October (two fetuses,) and lactating animals in November (2), December and January.

Measurements

The measurements of one male were obtained during the study: head and body 330 mm, tail 255 mm, hind foot 56 mm, ear 22 mm.

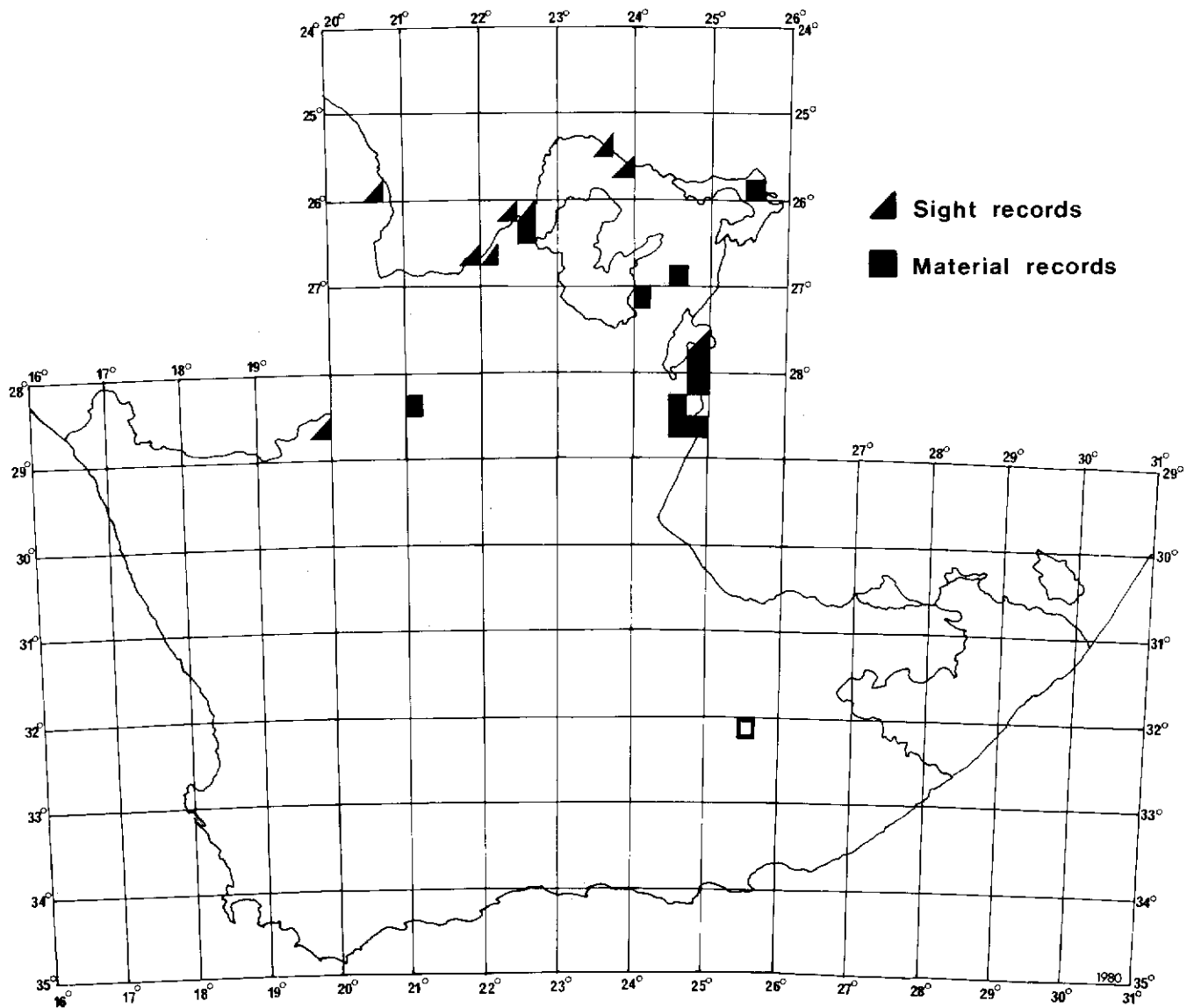


Fig. 17 Slender mongoose: distribution in the Cape Province. Hollow square indicates a museum specimen.

Herpestes pulverulentus Cape grey mongoose
(AKleingrysmuishond Xilitse or uNomatse)

Distribution and status

The Cape grey mongoose occurs widely in the Cape Province south of the Orange River (Fig. 18). It is particularly abundant along the coastal belt, in the Little Karoo and in most of the E. Cape with the exception of the open grassveld. In the central Karoo and Bushmanland it is largely restricted to riverine scrub and rocky areas. This mongoose is common over much of its range and is one of the most abundant small carnivores.

Habitat

Although there are records from all the major habitats and vegetation types south of the Orange River, it is apparently absent from the Kalahari Thornveld to the north of the river. It is uncommon in the Grassveld of the E. Cape, where it is largely restricted to scrub cover. It has a wide habitat tolerance, occurring from

areas with low rainfall (Namaqualand) to the Jonkershoek Valley near Stellenbosch, which has one of the highest recorded annual rainfalls in South Africa.

Habits

The Cape grey mongoose is a diurnal species which has been recorded at all times of the day, although in summer there are peaks of activity in the early morning and late afternoon. No animals have been encountered by the author after dusk.

It is predominantly solitary by nature. Of 178 individual recorded sightings only five were of more than one animal, namely two groups of three, one group of four and two groups of five. The group of four and the two groups of five were each made up of two adults with the remainder sub-adult or juvenile.

Although the Cape grey mongoose and the yellow mongoose frequently occur in the same areas, they appear to be largely separated by local habitat requirements, the former apparently requiring denser cover than the latter.

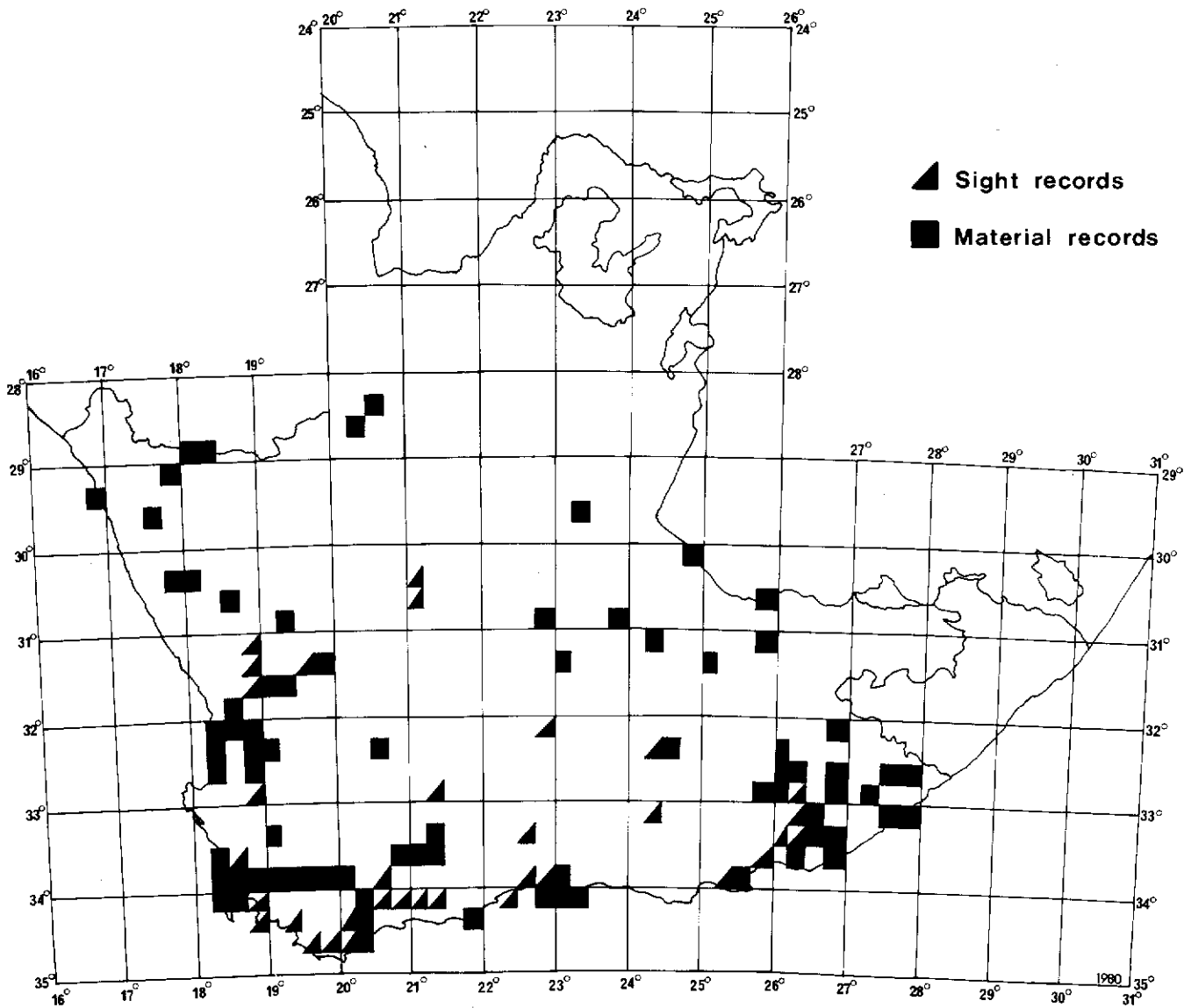


Fig. 18 Cape grey mongoose: present distribution in the Cape Province.

When feeding, Cape grey mongooses move from bush to bush or other potential feeding sites, and, although they do not dig as actively as yellow mongooses and suricates, they do scratch for subterranean prey items. They appear to rely on sight to a large extent when hunting; one animal was seen to move at least 20 m straight towards a basking rock agama (*Agama atra*), which it stalked from about three metres.

Cape grey mongooses have been recorded as using the following sites for shelter and rearing of young: rock crevices (17 records), eroded river and gully banks (8), dense scrub (6), a derelict building, and a hollow log. They apparently enjoy sunning themselves on boulders, dam walls and earth mounds, but always stay close to cover (see also Roberts 1951). They do not form large dung accumulations like several other small carnivores (e.g. the yellow-mongoose and genets), but small quantities are often deposited in open areas; this may possibly be for territorial or home range marking. Anal gland marking was noted in captive animals during the study.

Food

The contents of 44 stomachs (Table 34) show that this mongoose feeds on a wide variety of vertebrate and invertebrate prey. In stands of exotic scrub (*Acacia cyclops* and *A. saligna*) in the S.W. Cape, where striped mice (*Rhabdomys pumilio*) are particularly abundant, the scat content of Cape grey mongooses is made up primarily of the remains of this rodent species. A summary of the contents of a series of scats collected at Vrolijkheid Nature Conservation Station, Robertson, is given in Table 35.

Scats of this mongoose collected at the Keurbooms River Nature Reserve (Plettenberg Bay), were found to consist primarily of rodent remains, but fish bones and scorpion fragments were also present. The only rodent identified in this scat sample was an *Otomys* species. Between Robertson and Worcester a Cape grey mongoose was observed crossing the road with a small mammal in its mouth; at the approach of the author's vehicle it dropped the prey item, which was retrieved and identified as a vleis rat (*Otomys irroratus*). J. C. Greig (pers. comm.) observed a Cape grey mongoose

Table 34 Cape grey mongoose: contents of 59 stomachs from 40 localities in the Cape Province.

Food item	No. of stomachs
VERTEBRATES	
Mammalia	
Rodentia (<i>Otomys irroratus</i> 3; <i>Rhabdomys pumilio</i> 7)	23
Carrion	6
Aves	4
Reptilia (<i>Agama</i> sp. 2; <i>Mabuya</i> sp. 1)	4
Amphibia (<i>Tomopterna</i> sp.)	1
INVERTEBRATES	
Insecta	
Orthoptera (Acridiidae 8; Gryllidae 3)	11
Coleoptera (adults)	7
Isoptera	6
Coleoptera (larvae)	5
Arachnida	
Solifugae	4
Araneae	2
Myriapoda	1
PLANT FOOD	
Seed and grape skins	3
EMPTY STOMACHS	15

Table 35 Cape grey mongoose: scat contents from Vrolijkheid Nature Conservation Station, Cape Province. A = Abundant; P = Present

	Jan.	Feb.	Apr.	May	Sept.	Oct.	Nov.
Rodentia	A	P	A	A	A	A	A
Myriapoda	—	A	A	A	—	—	P
Solifugae	—	—	P	—	—	P	—
Orthoptera	—	P	—	—	—	—	—
Coleoptera	P	—	—	—	P	—	P
Hymenoptera	P	—	—	—	—	—	—
Seed	—	—	—	P	—	—	—

pulling a dead hare (*Lepus* sp.) from the road, and it is presumed that this was a road casualty. Captive animals were found to feed on a wide variety of food items, although they do not appear to take live toads, since a karoo toad (*Bufo garioensis*) and a raucous toad (*Bufo rangeri*) were rejected in a feeding experiment at Vrolijkheid Nature Conservation Station. Toads, however, produce toxins known as bufogenins, and it is likely that other amphibians, for example ranids, would be eaten; the one record in Table 34 was not of a bufonid.

Reproduction

The records of pregnant females seem to indicate that this mongoose mates in late winter, and the young are born in spring (Table 36). The number of foetuses present in the four pregnant females was as follows: 1R (2 records); 1L; 1L:2R. The foetuses were small in all cases, the two largest being from one of the animals collected in August (18,4 g and 20,2 g). An animal kept as part of a captive group gave birth to a single young in November. Two juveniles (a male of 140 g and a female of 112 g) were collected from a shallow crevice on the bank of the De Hoop Vlei (Bredasdorp) in December, after the lactating mother had been trapped earlier.

Table 36 Cape grey mongoose: monthly occurrence of pregnant, non-pregnant and lactating females in the Cape Province.

	J	F	M	A	M	J	J	A	S	O	N	D
Pregnant	—	—	—	—	—	—	—	2	2	—	—	—
Non-pregnant	4	1	5	2	1	5	1	8	2	1	1	6
Lactating	1	—	—	—	—	—	—	2	—	—	—	2
Total	5	1	5	2	1	5	1	12	4	1	1	8

A 230 g juvenile female was taken in the same trap as a lactating female in December on a bank of the Keisers River (near Robertson), and a 300 g female was collected in March at the Goukamma Nature Reserve (Knysna). A 385 g female caught in December still had the deciduous canines in place with the permanent teeth just beginning to emerge.

Measurements

Table 37 Cape grey mongoose: measurements (mm, g) of adult males and females in the Cape Province.

MALES	\bar{x}	n	Range
Head and body	364	59	330–425
Tail	292	62	240–337
Hind foot	65	60	49–72
Ear	28	56	22–35
Skull length	69	37	65–73
Body mass	825	45	550–1 100
FEMALES	\bar{x}	n	Range
Head and body	343	41	296–380
Tail	288	41	260–335
Hind foot	61	34	52–67
Ear	27	36	23–34
Skull length	67	24	64–70
Body mass	712	26	520–940

Ichneumia albicauda White-tailed mongoose
(A Witstertmuishond XiGqwalashu)

Distribution and status

The white-tailed mongoose has a restricted distribution in the E. Cape (Fig. 19), with nearly all records east of longitude 26° E, but it is fairly common within this range and is in no danger at present.

Habitat

The species is recorded from grass/thornveld and Karoo fringe, but seems to need a permanent water supply. The three specimens taken during the study were captured near permanent water. The largest collection of this species from the Cape Province is housed in the Kaffrarian Museum and, when the collection localities were compared with the presence of water on 1:50 000 Topo maps, the majority were found to be associated with rivers or streams.

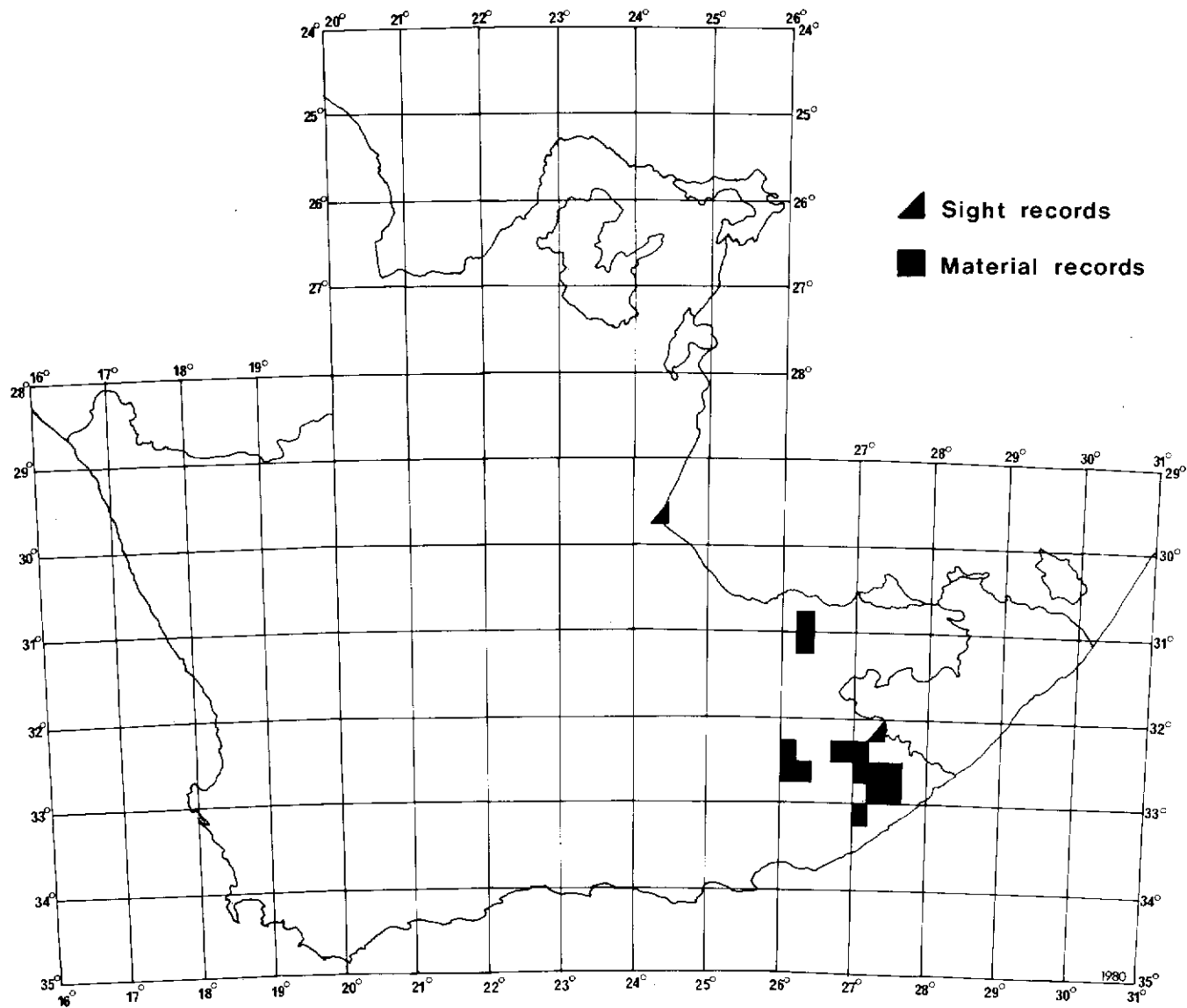


Fig. 19 White-tailed mongoose: present distribution in the Cape Province.

Habits

Although predominantly nocturnal there are a number of reported diurnal sightings from the Cape Province. Sightings are mostly of solitary animals, but they are occasionally seen in pairs (Smithers 1971; Kingdon 1977).

Food

The contents of two stomachs from the Adelaide district were examined. One from “Fontein” contained unidentified mammalian hair, and the other from “Kruizemantvlei” contained one small rodent, frog remains, feathers, Coleoptera adults, pieces of green grass and small herbivore dung pellets. Rowe-Rowe (1978a) also recorded antelope dung in one stomach; this could possibly be attributed to accidental ingestion while the animal was feeding on insects attracted to the dung. A specimen taken at “Doringkloof”, Burgersdorp, was killed while raiding a chicken run.

Reproduction

There are no records for the Cape Province. Rowe-Rowe (1978a) records a pregnant female in November, and a lactating animal from the same month. Smithers (1971) notes that pregnant or lactating females have been collected from October to February in Zimbabwe (Rhodesia). Shortridge (1934) records a pregnant animal in November and two juveniles apparently born in December.

Measurements

Only two of the specimens (both males) were measured during the study, but several specimens housed in the Kaffrarian Museum were collected in the Cape Province and have been included in Table 38.

Table 38 White-tailed mongoose: measurements (mm, g) of two males collected during the study, and of males and females from the Cape Province housed in the Kaffrarian Museum.

STUDY MALES	\bar{x}	n	Range
Head and body	—	2	580; 800
Tail	—	2	385; 410
Hind foot	—	2	125; 135
Ear	—	2	35; 38
Body mass	—	1	4 600
MUSEUM MALES	\bar{x}	n	Range
Head and body	564	9	510–630
Tail	420	9	340–493
Hind foot	128	8	120–135
Ear	40	8	30–45
Body mass	—	1	2 452
MUSEUM FEMALES	\bar{x}	n	Range
Head and body	563	8	500–610
Tail	417	10	370–450
Hind foot	127	10	120–140
Ear	40	9	30–46
Body mass	—	2	2 949; 3 500

Atilax paludinosus Water mongoose
(A Kommetjiegatmuishond XiVuzi T Tshagane)

Distribution and status

The water mongoose is widespread in the Cape Province (Fig. 20) and is found wherever there are streams or permanent water points, such as vleis and dams. It occurs throughout the coastal area and all along the Orange River. In the arid interior it is largely restricted to stream beds where there are permanent pools. It is apparently absent from most of the Kalahari Thornveld north of the Orange River, although it is reported to be common in the Vaalharts irrigation area in the east. During 1972 the author visited several points along the Molopo River on the Botswana border while the river was flowing, but no sign of this mongoose was found. There is no threat to this species at present.

Habitat

Being a semi-aquatic species, it requires permanent water and adequate vegetation cover. However, along some of the temporary streams in the Karoo it probably moves over fairly long distances between suitable habitats. The water mongoose is largely absent from the Kalahari Thornveld, the arid west coast and northern Namaqualand. Tracks have been observed along the high water mark along the S. Cape coast.

Habits

Although nocturnal and predominantly solitary, water mongooses do occasionally move in groups of two, and on one occasion an adult and two juveniles were sighted. Most of their feeding is done in the shallows but, judging by tracks and food remains, they also feed in reed-beds and vegetation surrounding watered areas.

Food

The food items recorded in 18 stomachs show that water mongooses feed mostly on aquatic amphibians and crustaceans (Table 39). A large batch of scats collected at the De Hoop Vlei (Bredasdorp) contained mainly crab exoskeleton fragments, but rodent hair (vlei rat and striped mouse) and Coleoptera remains were also present. Scats analysed from the Keisers River (Robertson) contained crab and insect remains as well as quantities of rodent hair and bones. Three reports of this mongoose killing domestic ducks in the Robertson district were confirmed.

Table 39 Water mongoose: contents of 18 stomachs from 16 localities in the Cape Province.

Food item	No. of stomachs
VERTEBRATES	
Amphibia (<i>Rana</i> sp. 2; <i>Bufo</i> sp. 1; <i>Tomopterna</i> sp. 1; <i>Cacosternum</i> sp. 1; <i>Xenopus laevis</i> 1)	7
Aves (egg-shell 1)	3
Mammalia (unid. rodent)	1
Unidentified flesh	2
INVERTEBRATES	
Crustacea (crab)	4
Insecta	
Coleoptera (adults)	2
Orthoptera	1
Lepidoptera (larvae)	1
Unidentified insect remains	1
PLANTFOOD	
Green grass	3
Leaves	1
Grape skins	1
EMPTY STOMACHS	3

Reproduction

Birth dates of young animals were estimated using growth curves of two known-age individuals born at Vrolijkheid Nature Conservation Station (Table 40).

Table 40 Water mongoose: monthly occurrence of pregnant, non-pregnant and lactating females, and approximate birth dates of juveniles in the Cape Province.

	J	F	M	A	M	J	J	A	S	O	N	D
Pregnant	—	—	—	—	—	—	—	—	2	—	—	—
Non-pregnant	—	—	—	1	—	—	1	1	3	2	—	—
Lactating	—	—	—	—	—	—	—	—	—	1	—	—
Total	—	—	—	1	—	—	1	1	5	3	—	—
Back-dated births	—	—	—	—	—	—	—	1	1	1	—	1

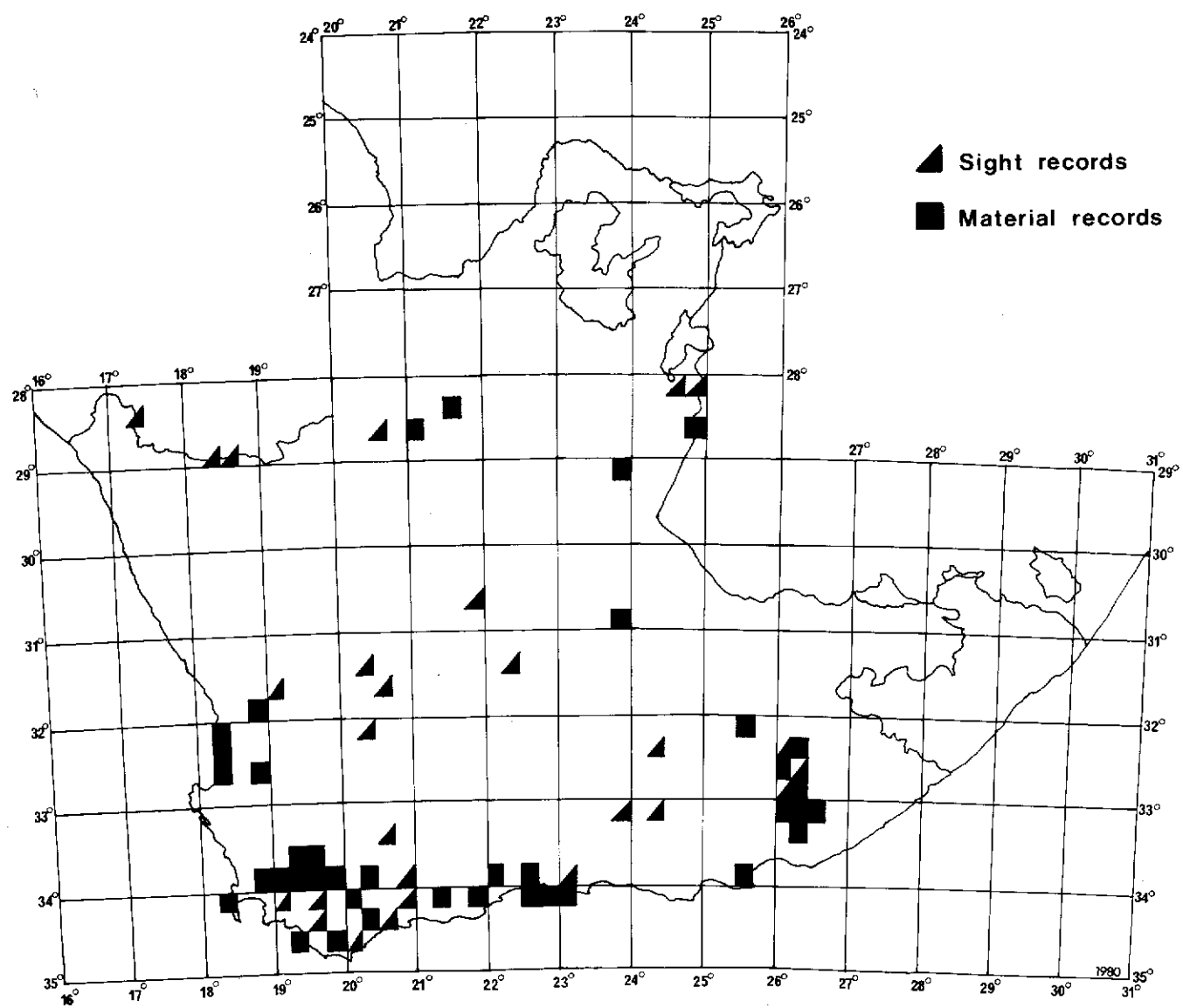


Fig. 20 Water mongoose: present distribution in the Cape Province.

Both pregnant females were carrying three foetuses. One of the females gave birth to two young (100 g; 120 g) shortly after capture. The permanent canines of both known-age animals were fully erupted at nine months. Smithers (1971) reports that pregnant and lactating females have been taken in November and December in Zimbabwe (Rhodesia). A pregnant female was collected in Zambia in October (Ansell 1960).

Measurements

Table 41 Water mongoose: measurements (mm, g) of adult males and females in the Cape Province.

MALES	\bar{x}	n	Range
Head and body	554	20	471–640
Tail	355	21	319–405
Hind foot	105	22	95–115
Ear	33	21	25–39
Skull length	109	18	103–117
Body mass	2 956	18	2 000–3 800
FEMALES	\bar{x}	n	Range
Head and body	515	10	465–570
Tail	338	10	310–385
Hind foot	102	10	95–107
Ear	30	10	25–37
Skull length	106	8	102–108
Body mass	2 562	9	2 000–3 200

Mungos mungo

Banded mongoose

Family PROTELIDAE

(A Gebande muishond T leTototo)

As far as is known, no specimens of the banded mongoose have been taken in the Cape Province, but, as Smithers (1971) and Rautenbach (1978) have recorded it close to the Cape border, in Botswana and the Transvaal respectively, it may occur in the extreme N.E. Cape. Shortridge (1934) stated that it occurs but is extremely rare in this area, but provided no material evidence.

Helogale parvula

Dwarf mongoose

(A Dwerghuiskind T leSwekete)

Although it is not recorded from the Cape Province, there are two registered specimens (ZM 5458 and 5459) in the S.A. Museum from Port St. John's in the Republic of Transkei. It has not been possible to trace this material, and, in view of their great distance from the nearest recorded occurrences (Tongaland) these records should be treated with caution. It is the author's opinion that this species probably never occurred in the Cape Province.

Proteles cristatus

Aardwolf

(A Aardwolf or maanhaarjakkals X iNgc (iNchi)

T Thukwe or mMabudu)

Distribution and status

Although widespread in the Cape Province (Fig. 21) it is nowhere common. It appears to be completely absent from the southern coastal area from Mossel Bay to Port Elizabeth, and is rare north of the Orange River and in the central Karoo.

Habitat

The aardwolf shows a marked preference for open country, but in the S.W. Cape it occurs in Lowland Fynbos and the Lowland/Mountain Fynbos ecotone. It is probably most abundant on the outer edges of the Karoo and the Succulent Karoo. In Namaqualand it is most frequently encountered in the broken veld consisting of granite koppies and valleys. During the study no records were obtained from Eastern Cape Forest or from dense bush such as the Fish River valley bushveld.

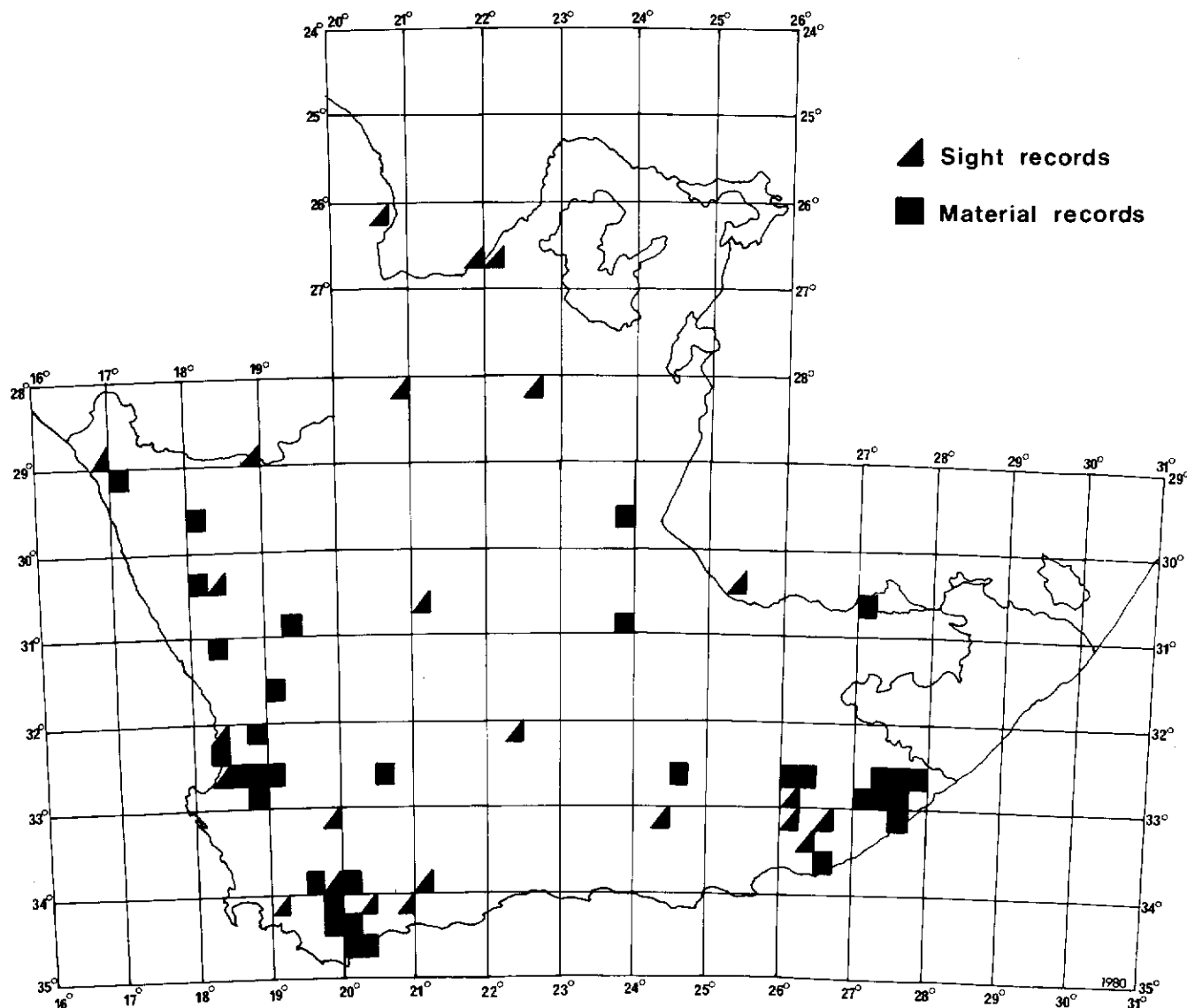


Fig. 21 Aardwolf: present distribution in the Cape Province.

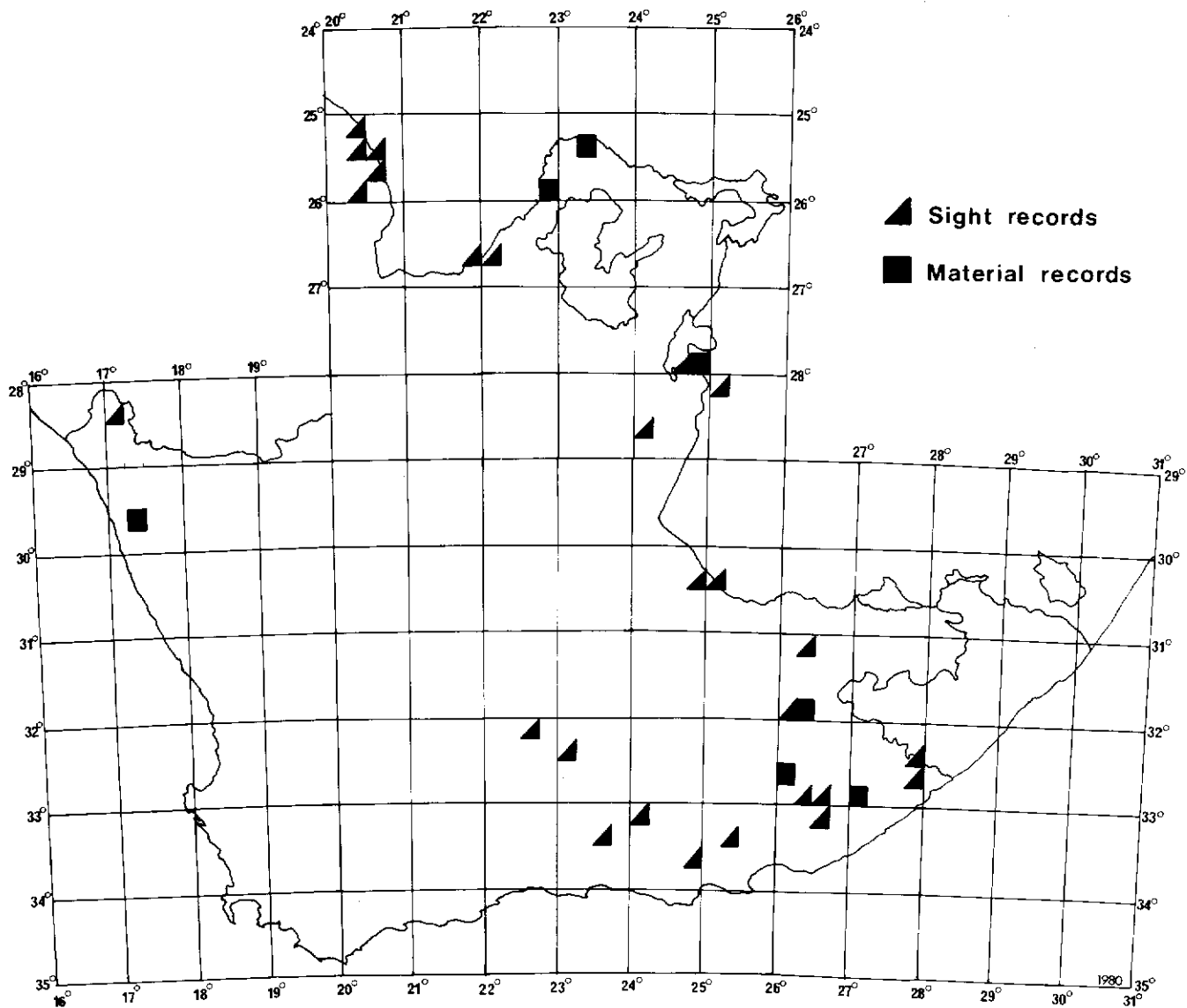


Fig. 22 Brown hyaena: present distribution in the Cape Province.

Table 43 Brown hyaena: newspaper reports of animals killed in the Cape Province since 1950.

Source	Locality given	General
Cape Argus 20/6/56	Nuwekloof (Baviaanskloof, Willowmore (3323 BC/DA)	Adult ♂, 130 lbs. Killed 5 sheep
Eastern Province Herald 30/4/55	"Matjiesfontein", Colesberg (3025AC)	Caught in trap; killed lambs and sheep.
Daily Dispatch 22/1/58	"Mooifontein", Komga (3227DB)	Killed by dogs. Had killed about 150 sheep.
Eastern Province Herald 15/10/62	"Glen Melville", Albany (3326BA)	Claimed to have killed about 500 sheep. On display in Albany Museum.
Daily Dispatch 7/7/70	"Prinsfontein", Tarkastad (3126CC)	♀, 104 lbs. Claimed to have killed 2 000 sheep in 3 years. Skin and skull in possession of C. Prins (Prince Alfred Hamlet, Ceres)
Daily Dispatch 26/6/65	"Waterfall", Bedford (3226CA)	142 lbs. Claimed to have killed approx. 150 sheep.
Cape Argus 9/9/52	"Nuweveld Mts." Beaufort West (3222AB/BA)	5 ft 3 in long.
Die Burger October 1954	Ceres	One "strandwolf" killed (identification not confirmed).

small stock. Unfortunately they tend to kill more than they can feed on, and there are unconfirmed reports of up to 15 sheep having been killed in one night. These vagrant animals frequently cover large areas and often prove difficult to hunt.

Food

The brown hyaena has been recorded as eating a wide variety of food items, including birds, eggs, reptiles, fish, insects, a wide range of mammals and wild fruits. Mills and Mills (1978) give a detailed description of the diet of the brown hyaena in the Kalahari Gemsbok National Park.

Only two stomachs were collected during the present study. Both contained antelope remains, one having been scavenged. Maggots and the remains of what has tentatively been identified as a steenbok were obtained from an animal taken at "Doornbult", Vaalharts. Further information comes from just north of the Orange River in South West Africa (Namibia), where conditions are similar to those found on the Namaqualand coast. The stomach of a road casualty killed to the east of Luderitz (specimen in the S.A.M.), contained scavenged bones, crab, fish and bird remains and a trace of plant material. P. Shaughnessy (pers. comm.) observed a brown hyaena attack and kill a black-backed jackal at Van Reenen Bay, to the south of Luderitz, but it apparently made no attempt to eat the jackal.

Reproduction

No reproductive information was obtained during the present study. Smithers (1971) records a pregnant female in October (three near-term fetuses), and Rautenbach (1978) obtained a lactating female during March. Skinner (1976) states that births occur from August through to November in the Transvaal, and births in the National Zoological Gardens in Pretoria were recorded in January and February (Brand 1963).

Measurements

The mass of one animal collected was 42,0 kg. The following masses were given in newspaper reports: 59 kg (male), 47 kg (female), 68 kg, 64 kg.

Crocota crocuta

Spotted hyaena

(A Gevlekte hiëna X is Andawane T Phiri or le Holo)

Distribution and status

Mills (1976) considers the spotted hyaena to be rare in the Kalahari Gemsbok National Park, which is the only conservation area in the Cape Province where it is found. It is a very rare species in the Cape Province as a whole. The only resident population appears to be in

Table 44 Spotted hyaena: newspaper and other reports of animals killed in the Cape Province since 1950.

Source	Locality	General
<i>Daily Dispatch</i> 21/5/68	"Killarney", Komga (3228CB?; 17 km W. Kei Mouth)	63,4 kg. Several stock losses in Wedmore area.
<i>Daily Dispatch</i> 9/4/65	Elliot (3127BD)	One killed.
Kaffrarian Mus. Files	Titus Pan, Prieska (3022BC)	Hyaena killed — described as "gevlekte"
<i>Daily Dispatch</i> 7/7/66	"Kei Farm", Komga (3228CA)	Adult male. Said to have killed 200 head of stock
<i>Eastern Province Herald</i> 29/8/66	"Paardekraal", Albany	One shot
<i>Farmers Weekly</i> 6/1/54	Gordonia district	Report stating that farmers wanted spotted hyaena declared as vermin
<i>Cape Times</i> 29/12/53	Gordonia district	Claimed that scores of hyaena are being poisoned
J. C. Greig (pers. comm.)	"Seven Fountains", 20 km S.W. Grahamstown (3326AD)	Weighed 64,4 kg. Claimed to have killed 500 head of stock in area. Unlabelled skull in A.M. Killed 30/10/63.
J. C. Greig (pers. comm.)	"Daleview", Komga (3227DB)	Male killed 1965(?)
J. C. Greig (pers. comm.)	"Charlgrove", Fort Beaufort (3226DC)	Killed in the latter half of 1960. Skull sent to A.M.
J. C. Greig (pers. comm.)	"Brakfontein", near Alice (3226DD)	Killed in May 1973 by "getter"; may have killed small-stock and kudu calves. Seen by J. C. Greig.
I. A. W. MacDonald (pers. comm.)	"Donkerbos", Tshabong (2622CA)	Shot c. 1974
I. A. W. MacDonald (pers. comm.)	"Lover's Leap", Tshabong (2622CA)	Shot January 1977
C. J. Skead (K.M. files)	"Thornkloof", Albany (3226CD)	Shot in November 1977(?)
Personal record	Gamka Mt., Calitzdorp (3321CB)	Mounted animal on display at Vrolijkheid, Killed 24/1/75
P. van der Westhuizen (pers. comm.)	"Wolwepoort", Namaqualand (3017BB)	Killed 8/4/78. Had killed stock in the area. Skeleton in Ellerman Museum, University of Stellenbosch.

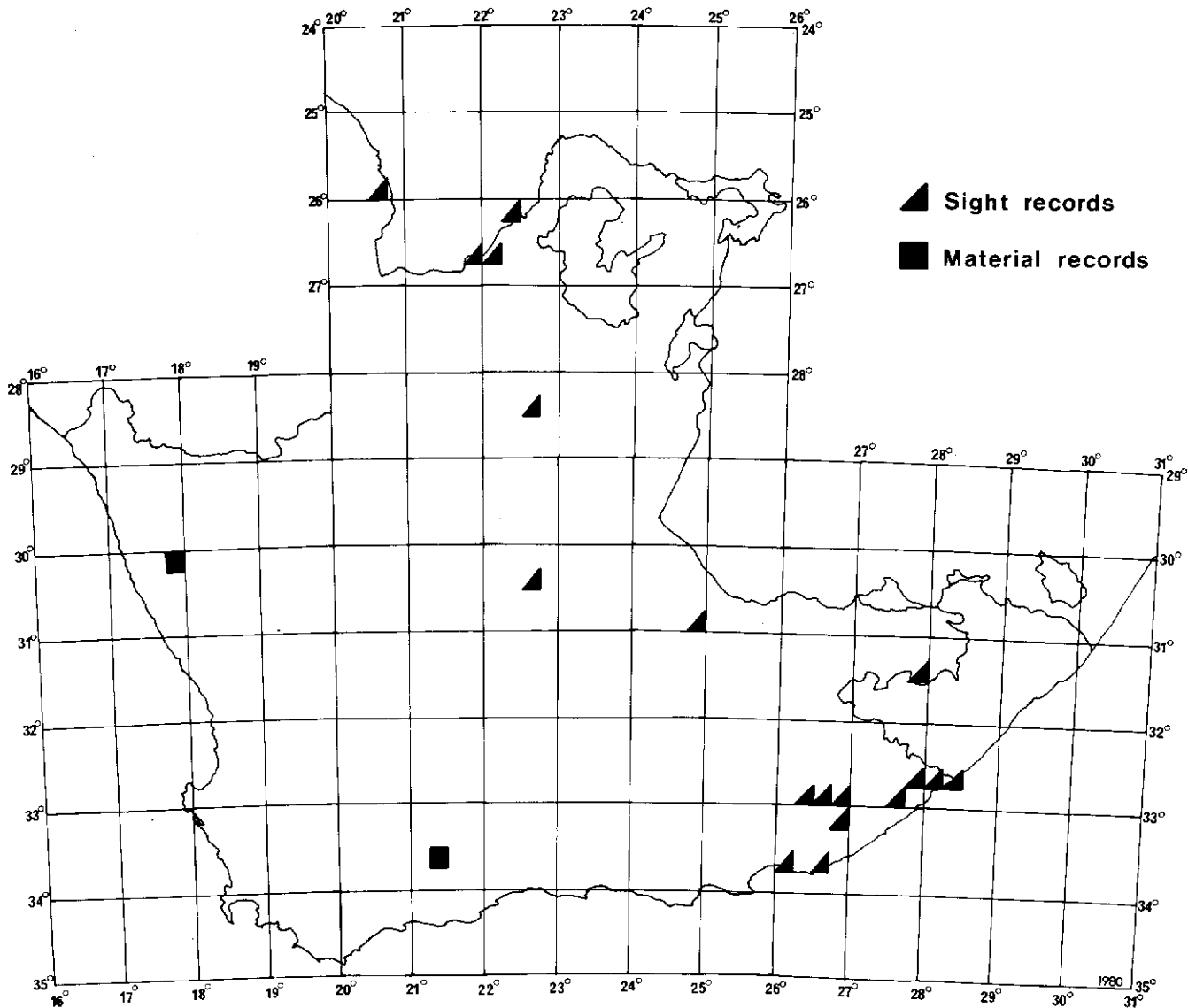


Fig. 23 Spotted hyaena: present distribution in the Cape Province.

the Kalahari Gemsbok National Park and animals outside this area can be considered transitory (Fig. 23). The possibility of isolated breeding animals in the E. Cape cannot be entirely ruled out, but to date no evidence of them has been found. Known occurrences of spotted hyaena in the Cape Province are recorded in Table 44.

Judging by historical records the species used to occur throughout the Cape Province (Skead 1980), but poisoning and hunting pressure have caused it to become even more endangered in the Cape Province than the brown hyaena.

Habitat

Throughout its range this species has a wide habitat tolerance, but in the Cape Province it is apparently now only resident in the Kalahari Thornveld. There are sporadic records from the Succulent Karoo and Karoo.

Habits

Kruuk (1972) has reported on the behaviour of the spotted hyaena in the Serengeti in some detail, and the

findings of workers such as Eloff (1964), Pienaar (1969) and Bearder (1977) in South Africa show that the habits are similar to those found in East Africa. They are predominantly nocturnal and occur singly, in pairs or small family clans. Animals outside the Kalahari Gemsbok National Park seem to be solitary individuals, since stock losses frequently cease when a single hyaena is killed in a particular area. As is the case with the brown hyaena, surplus-killing of small stock has been recorded, particularly in the E. Cape. In the Kalahari the spotted hyaena is essentially a predator, although it will scavenge when the opportunity presents itself (Eloff 1964).

Food

No stomachs were obtained during the study. The spotted hyaena is hunted ruthlessly outside the Kalahari Gemsbok National Park because of its depredations on domestic stock. One animal caught in the E. Cape was claimed to have killed a number of kudu (*Tragelaphus strepsiceros*) calves. In a sample of 10 stomachs from Botswana, Smithers (1971) recorded

the remains of six species of antelope and one springhare (*Pedetes capensis*). In two cases they took the baits set to attract them. They appear to be opportunistic in their feeding and have been recorded taking plant food (Dean 1962; Stuart 1976a), small, medium and large mammals, carrion and a wide variety of other food items (Kruuk 1972; Kingdon 1977).

Reproduction

There are no records for the Cape Province. Smithers (1971) noted lactating animals in February, June and July, and collected two young from an antbear (*Orycteropus afer*) burrow in May. Child (1968) recorded three small cubs in southern Botswana in June. Fairall (1968) found that these hyaenas were non-seasonal breeders in the Kruger National Park.

Measurements

No information was collected during the study.

Family FELIDAE

Acinonyx jubatus

Cheetah

(A Jagluiperd X iHlosi (?) T leNgau or leTlotse)

Distribution and status

The cheetah was once widespread in the Cape Province (Skead 1980), but now the only resident population in the Cape is in the Kalahari Gemsbok National Park (Fig. 24), and even there they occur in very low numbers. A few individuals have been introduced (1978) to the Rolfontein Nature Reserve, P. K. le Roux Dam, but two were shot after moving on to adjacent farm land. Animals crossing the Molopo River from Botswana are occasionally recorded, but they are usually hunted and killed by the farmers. One unconfirmed incident involved the shooting of six cheetah, and a confirmed incident in the Ulco region involved three, of which two were killed. At present there is little hope that the cheetah can survive outside extensive conservation areas.

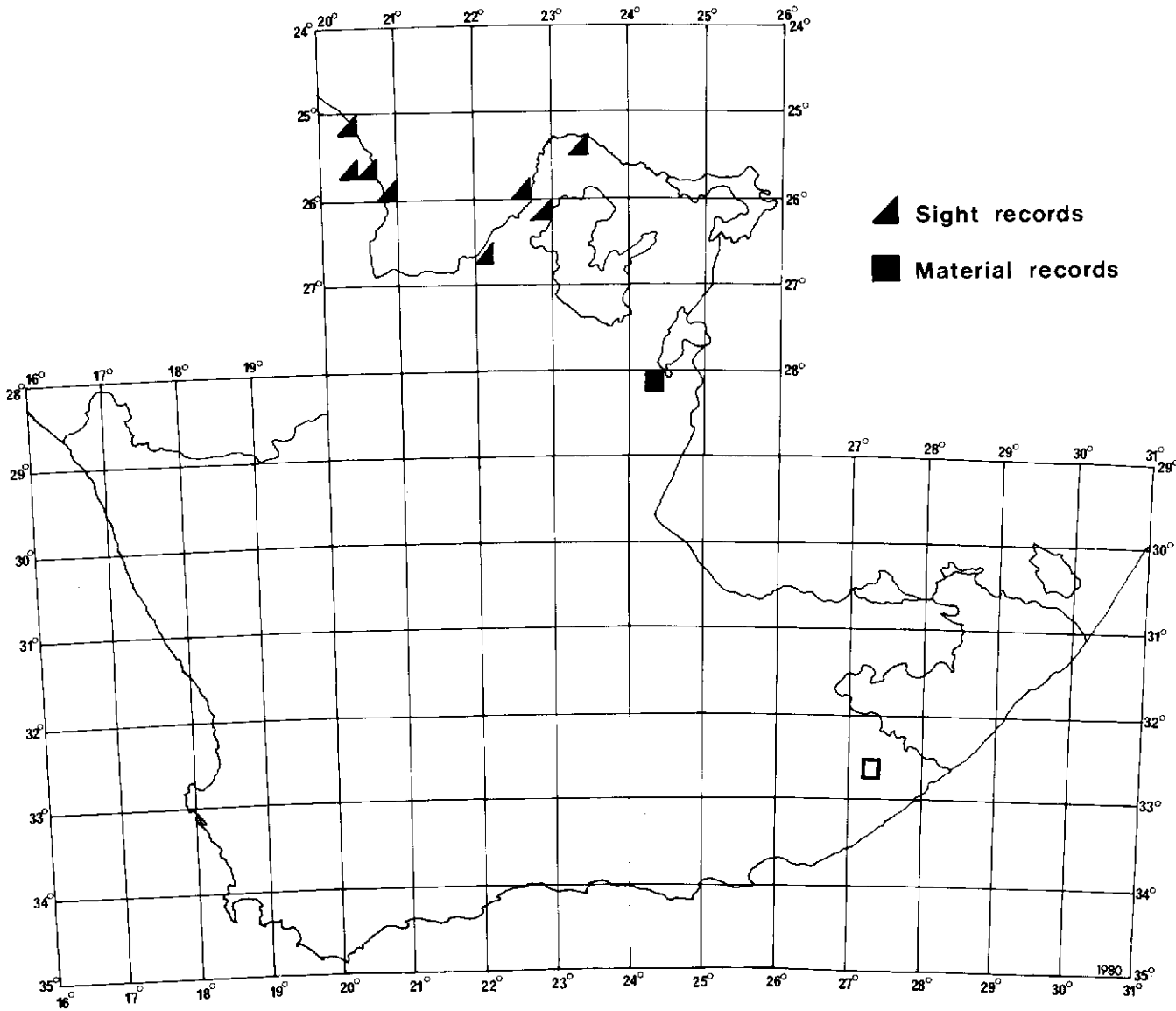


Fig. 24 Cheetah: present distribution in the Cape Province. The hollow square indicates the only museum specimen in the southern parts of the province (30°S).

Habitat

The cheetah is only found naturally in the Kalahari Thornveld, but has been re-introduced to False Upper Karoo (Acocks 1975) on the Rolfontein Nature Reserve.

Habits

Eaton (1974) and others have studied this cat in some detail in East Africa, both in the wild and in captivity. Although predominantly diurnal Smithers (1971) has recorded nocturnal hunting. Pairs or small family parties are usually encountered but solitary animals are not unusual. Although not threatened by the use of poisons because they rarely return to a kill or take carrion, they are easily trapped and most Cape records indicate that they have been shot illegally.

Food

Only one stomach from an animal killed at "Paaiskloof", near Ulco, was examined. The entire content was made up of fresh remains of a sheep.

Smithers (1971) records the remains of impala (*Aepyceros melampus*) and springbok in two stomachs, and that springhares are often preyed on in the Kalahari Gemsbok National Park. Child (1968) noted a domestic calf, female grey duiker and ostrich (*Struthio camelus*) from Botswana, while Pienaar (1969) recorded a wide range of prey items from the Kruger National Park. Schaller (1968) estimated that a healthy prey animal of about 26 kg is the maximum size that a solitary cheetah can bring down.

Reproduction

No information was collected during the study.

Measurements

No information was collected during the study.

Panthera pardus

Leopard

(A Luiperd X inGwe T Nkwe)

Distribution and status

The leopard is the most widespread of the large carnivores of the Cape Province (Fig. 25), mainly due to its ability to survive in rugged mountain terrain which is unsuitable for agricultural expansion. It has been eradicated in most of the interior, but substantial numbers appear to exist in the mountains and forests of the S. and S.W. Cape. However, it is possible that increased control and hunting pressures may reduce the populations to a level where they are no longer viable in the long term.

Habitat

The leopard reaches its highest population densities in the Mountain Fynbos of the S.W., S. and E. Cape, as well as the Southern Forest. There are a number of recent records from Namaqualand, particularly along the Orange River. Scattered records have been noted

for the Kalahari Thornveld, but the Kalahari Gemsbok National Park is the only place in this vegetation type where it is seen regularly.

Habits

Leopards are mostly nocturnal in the Cape, although in protected areas such as the Kalahari Gemsbok National Park and the Tsitsikamma National Park they have been observed during the day. Elsewhere daytime sightings are usually in cloudy or misty conditions. They are usually solitary, although tracks of what was assumed to be a female and up to three cubs were found on four different occasions. Adult males and females apparently come together only briefly for mating, and during this period evidence from tracks suggests that animals may hunt together. In the southern coastal mountains they seem to favour the deep, well-vegetated kloofs for shelter, but when hunting they often move down on to the Lowland/Mountain Fynbos fringe. Individuals on the south coast were found to utilize the deep seaward gorges and dense indigenous forest. Leopard tracks have also been found in the intertidal zone.

Leopards along the Orange River probably lie up in the hills and rocky outcrops bordering the river, but may also use the dense riverine vegetation as cover.

Smithers (1971) states that scarcity of prey is the cause of stock predation in Botswana. This may be true in some parts of the Cape Province, but, in areas where leopard take stock, wild prey such as small and medium-sized antelope, rock hyrax, bushpigs and baboons, are abundant. This stock predation may be due to competition for suitable and secure territories, which forces inexperienced animals to move to the fringe of these areas and on to grazing lands, where they take the easiest prey.

Surplus-killing of domestic stock by leopards in the Cape Province is a fairly frequent occurrence, and 28 such incidents were recorded during the present study. The number of stock killed during one night ranged from two to an exceptional 51 (on "Jonkershoek", Ceres), with a mean of 10 animals. Nearly all recorded leopard kills of domestic stock involved sheep and goats, but in eight separate incidents, in which a total of 13 animals was killed, calves ranging in age from a few weeks to just over a year were involved. In one incident the necks of two calves of about 130 kg had been broken. There are a number of other records of surplus-killing, but these have not been confirmed.

Accumulations of scats have been recorded on "Bokrivierplaas", Ceres, and "Jakkalsfontein", Worcester. It is possible that these are used for marking territories, since urine-spraying and tree-scratching are well-known means of communication in this species.

Food

Of the 36 stomachs examined, three were completely empty and four contained only fragments of sticks, sacking and newspaper, which are presumed to have been swallowed after capture (Table 45). The stomachs of seven leopards had portions of their own paws,

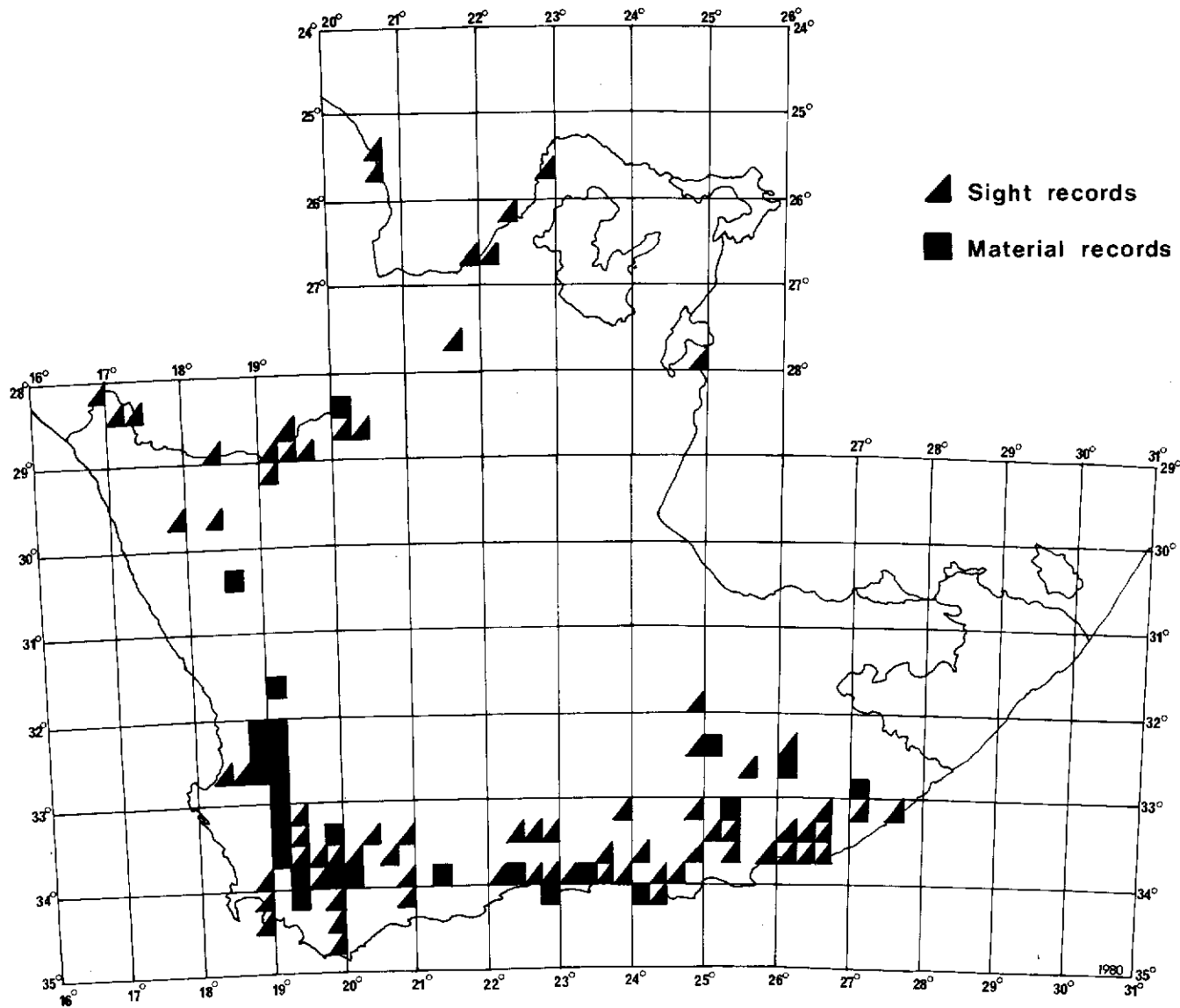


Fig. 25 Leopard: present distribution in the Cape Province.

which had been bitten off in their attempts to escape from gin traps.

The high occurrence of domestic stock is unrealistic because the stomachs examined were taken from leopards caught in farming areas during specific control operations after incidents of stock predation. No individuals were collected in protected areas, or in

areas where problems were not experienced. The majority of reported domestic stock kills take place during the wet winter months in the S.W. and S. Cape.

During the study there was a record of an adult donkey that was killed in the Wuppertal area (Clanwilliam), and two records of leopards taking chickens. On the "Wiesenhof" private game park, near Paarl, a leopard killed two ostriches and several springbok. The only confirmed case of a domestic dog having been taken was on the farm "Portland", Knysna (T. J. Heinecken pers. comm.).

Scats were examined from "Bokrivierplaas", Ceres, and were found to contain mostly hyrax remains, with some sheep wool, klipspringer (*Oreotragus oreotragus*) hair and a quantity of unidentified hair.

In addition to 16 species of antelope recorded as prey items in southern Africa, birds, crocodiles, cane-rats, porcupines, catfish, baboons, monkeys, and antbears have been noted as food by several authors (e.g. Smithers 1971). The leopard has the most varied diet of the large cats, and probably of any of the larger predators. This may be the reason why leopards are the only large cats that still occur in areas of relatively high human population density.

Table 45 Leopard: contents of 36 stomachs from 30 localities in the Cape Province.

Food item	No. of stomachs
VERTEBRATES	
Mammalia	
Domestic stock (sheep/lambs 17; cattle 1)	18
Hyracoidea (<i>Procavia capensis</i>)	8
Artiodactyla (wild) (unidentified 4; <i>Raphicerus melanotis</i> 1)	5
Aves	
Carriion (domestic hen-sized bird)	1
<i>Sruthio camelus</i> (chick)	1
EMPTY STOMACHS	7

Table 46 Leopard: details of sub-adult animals from the Cape Province.

Origin	Sex	Head and Body (mm)	Tail (mm)	Hind foot (mm)	Ear (mm)	Body mass (kg)	Date
"Meerlandsvlei" (3218DB)	♂	850	510	180	70	10,4	28/7/78
"Kliprivier" (Tsitsikamma)	?	—	—	—	—	—	20/6/79
"Rietfontein" (3219CC)	♂	950	630	210	75	14,5	1/7/78
"Sandfontein" (3319BD)	♀	(Total) 1 620	—	—	—	16,0	20/7/77
"Sandfontein" (3319BD)	♀	(Total) 1 800	—	—	—	16,5	26/5/77

Reproduction

Data on 56 leopards of known sex were recorded during the study, and of these 38 were male and 18 were female. Several other skulls were received without sex indicated. Five of the animals (three females and two males) could be classed as sub-adult because they were in the process of losing their deciduous canines. Measurements of these animals are given in Table 46.

Only one pregnant female was collected, on the farm "Noagshoogte", Uitenhage (Table 47), and she was carrying two very small foetuses. G. Robertson (pers. comm.) of "Fernbank", Knysna, reported that two juvenile leopards, the size of fox-terriers, were killed on his farm in April/May 1975.

Table 47 Leopard: monthly occurrence of pregnant and non-pregnant females in the Cape Province.

	J	F	M	A	M	J	J	A	S	O	N	D
Pregnant	—	—	—	—	—	—	—	—	1	—	—	—
Non-pregnant	—	1	1	—	1	2	1	—	1	2	1	1
Total	—	1	1	—	1	2	1	—	2	2	1	1

Measurements

Table 48 Leopard: measurements (mm, kg) of adult males and females in the Cape Province.

MALES	\bar{x}	n	Range
Head and body	1 107	21	920–1 250
Tail	678	20	510–800
Hind foot	219	20	190–252
Ear	73	20	65–100
Skull length	219	21	195–248
Body mass	30,9	27	20,0–45,0
FEMALES	\bar{x}	n	Range
Head and body	1 030	8	950–1 050
Tail	677	8	640–740
Hind foot	206	7	190–220
Ear	70	7	65–72
Skull length	200	9	190–210
Body mass	21,2	9	17,0–26,0

Panthera leo

Lion

(A Leeu X in Gonyama T Tau)

Distribution and status

The lion used to occur throughout the Cape Province, but is now only resident in the Kalahari Gemsbok National Park (Fig. 26), where the population numbers roughly 140 individuals (Mills *et al.* 1978). Occasional stragglers cross the Molopo River from Botswana, but these are either shot or return after a short while.

At this stage there is little hope of re-establishing this predator in its former range, due to the lack of suitable conservation areas.

Habitat

Throughout the Cape Province the lion showed a wide habitat tolerance, but is now restricted to the Kalahari Thornveld.

Habits

In other parts of its range the lion has received considerable attention (Guggisberg 1961; Pienaar 1969; Schaller 1972; Kingdon 1977). Smithers (1971) records that during a waterhole count on the Nossob River and near Union's End, Kalahari Gemsbok National Park and environs, single animals and pairs were most often seen, with the largest group consisting of a pride of seven. Although they survive without water in most of the Kalahari they will drink regularly when it is available (Smithers 1971).

No stomachs were available for analysis. Eloff (1964, 1973a, 1973b) has recorded a wide range of prey species from in and around the Kalahari Gemsbok National Park, including gemsbok (*Oryx gazella*), blue wildebeest (*Connochaetes taurinus*), eland (*Taurotragus oryx*), domestic horses, donkeys and cattle. Smithers (1971) has noted that lions will probably take any available warm-blooded prey, and Guggisberg (1961) has even recorded tortoises, fish, termites and wild fruits. Schaller (1972) has stated that scavenging is common in East Africa.

Reproduction

No reproductive information was collected in the Cape Province. Smithers (1971) recorded cubs in March and November, and also sightings of juveniles in all months except January, February and March. Shortridge (1934), Ansell (1960) and Smithers (1971) state that lions have no fixed breeding season.

Measurements

No information was collected during the study.

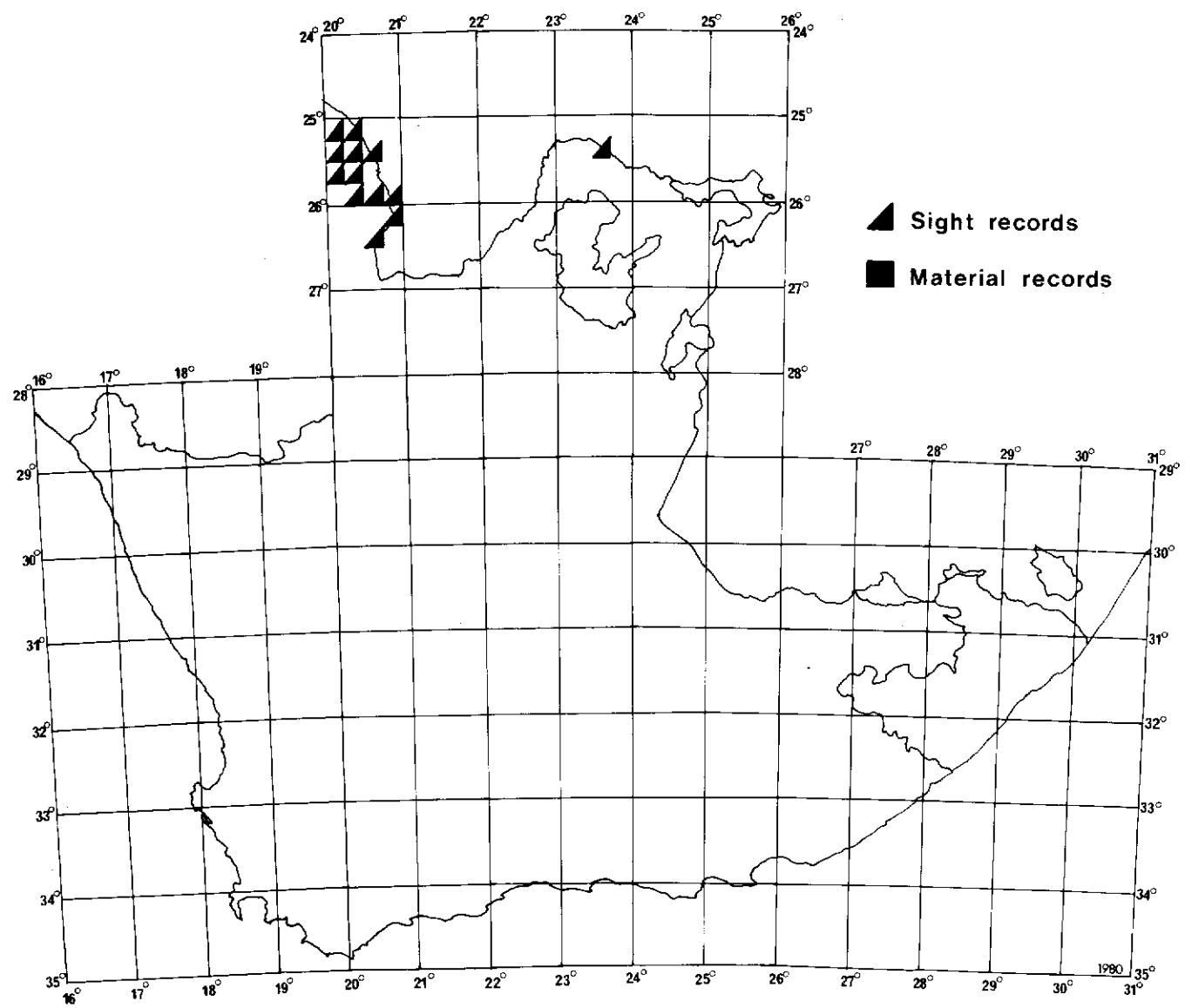


Fig. 26 Lion: present distribution in the Cape Province.

Felis libyca

Wild cat

(A Vaalboskat or groukat X inGada T Tibe or phage)

Distribution and status

This felid is widespread in the Cape Province (Fig. 27). Although there are few confirmed records for the southern coastal belt, it probably does occur in this region in low numbers. It is one of the most common small predators in the province, and in some parts of the W. and E. Cape it is considered by farmers to be an important predator of small lambs.

Although large numbers are killed during predator control programmes, possibly the greatest threat to the species is hybridization with the domestic cat (*Felis catus*), particularly in the southern parts of the Cape Province.

Habitat

The only habitat in which the wild cat has not been recorded is the Southern Forest, but it may have been overlooked there or confused with feral domestic cats. It shows a preference for areas with riverine scrub, thickets and thornveld, but in the Namaqualand broken veld and other rocky areas it shelters in crevices and holes in the rocks. Animals have, however, been recorded from the open plains of the Karoo and Bushmanland where there is little cover. It is a common species in the Kalahari Thornveld.

Smithers (1971) recorded this cat from ten major habitats in Botswana, and it is interesting to note that he found it to be more abundant in the moister northern areas than in the arid south. In the Cape Province it appears to be more abundant in the arid areas, but this may partly be a result of greater human population densities in the higher rainfall areas of the province.

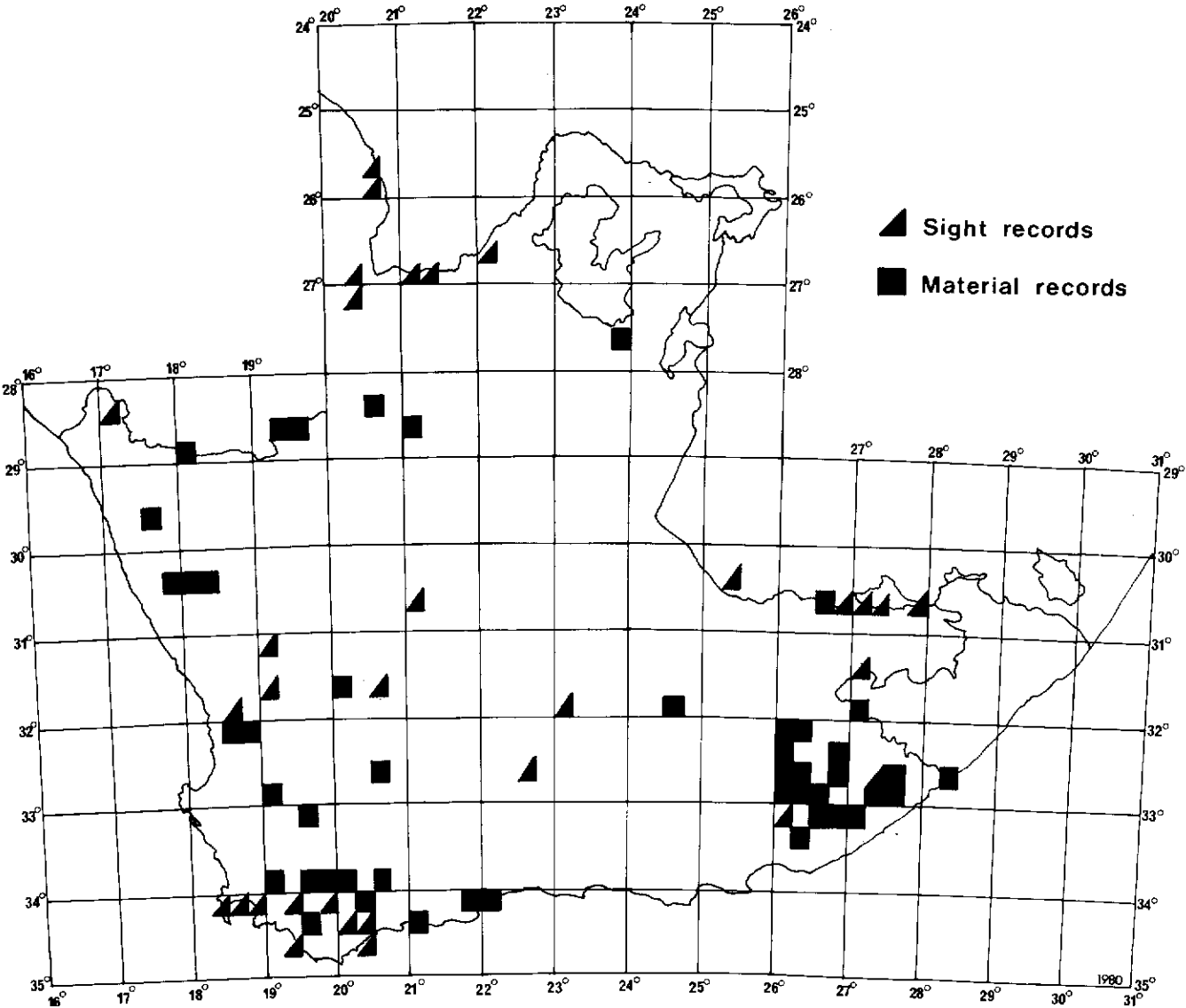


Fig. 27 Wild cat: present distribution in the Cape Province.

Habits

Wild cats are primarily nocturnal in the Cape Province, although in protected areas they have been observed during the early morning and late afternoon. All records during the present study were of solitary animals, but in the Namaqualand broken veld, where the species is quite common, animals were observed on different rocky outcrops within a few hundred metres of each other.

Rautenbach (1978) has mentioned tree-scratching in this species and its potential territorial marking value. During the present study it was found that the wild cat often makes use of midden-sites on which the scats are deposited. These sites are frequently relatively exposed, for example on the tops of large boulders and on patches of open ground, or near to the entrances of shelters. Smithers (1978) found that the wild cat carefully buries its scats, and this was noted on occasion in the present study. However, middens of uncovered scats were frequently seen, and this may indicate that they are used for marking boundaries or shelters.

Smithers (1971) questioned Shortridge's (1934) statement that wild cats prey on the young of sheep and

goats. During the present study, however, some evidence was collected to support this statement. Several confirmed instances of lamb predation were seen by the author and other members of the problem animal control section of the Cape Department of Nature and Environmental Conservation. The problem is mainly limited to the lambing season, and it is felt that improved farm management practices during this period could help to reduce losses. It would appear that many more wild cats are killed than can be justified on grounds of stock predation.

Food

The study showed that 82% of the food items recorded in 33 wild cat stomachs were small vertebrates, with the rest being invertebrates (Table 49). This agrees well with Smithers' (1971) figure of 72% for Botswana, from a sample of 80 stomachs. The largest items recorded by Smithers were hares (*Lepus* sp.) and springhares (*Pedetes capensis*), with the rest being largely rodents. The contents of wild cat stomachs recorded in the files of the Kaffrarian Museum showed a number of multimammate mice (*Praomys natalensis*).

Table 49 Wild cat: contents of 39 stomachs from 30 localities in the Cape Province.

Food item	No. of stomachs
VERTEBRATES	
Mammalia	
Rodentia (<i>Otomys irroratus</i> 1; <i>Otomys</i> sp. 3; <i>Rhabdomys pumilio</i> 2; <i>Aethomys namaquensis</i> 1; <i>Petromus typicus</i> 1; <i>Cryptomys hottentotus</i> 1; unid. 9)	18
Domestic stock (lambs)	2
Insectivora (<i>Elephantulus</i> sp. 1; Soricidae 1)	2
Hyracoidea (<i>Procavia capensis</i>)	1
Aves (Orange-throated longclaw <i>Macronyx capensis</i> 1; remainder unidentified)	6
Amphibia (<i>Kassina wealii</i>)	1
INVERTEBRATES	
Arachnida (spiders)	3
PLANTFOOD	
Grass	3
EMPTY STOMACHS	6

Reproduction

The only pregnant females were collected in August at “Kolka”, Montagu (Table 50), and a juvenile of 450 g was caught during the same month.

Smithers (1971) collected pregnant animals in September (2), November, January and February (2), and Ansell (1960) collected a pregnant female in March. Smithers (1971) caught a lactating female in February, and Rautenbach (1978) recorded lactating animals in March and May.

Table 50 Wild cat: monthly occurrence of pregnant and non-pregnant females in the Cape Province.

	J	F	M	A	M	J	J	A	S	O	N	D
Pregnant	—	—	—	—	—	—	—	2	—	—	—	—
Non-pregnant	1	—	1	—	3	2	5	1	1	—	1	—
Total	1	—	1	—	3	2	5	3	1	—	1	—

Measurements

Table 51 Wild cat: measurements (mm, kg) of adult males and females in the Cape Province.

MALES	\bar{x}	n	Range
Head and body	601	21	545–665
Tail	305	21	275–360
Hind foot	138	21	120–150
Ear	62	20	55–70
Skull length	102	18	95–116
Body mass	4,9	10	4,0–6,2
FEMALES	\bar{x}	n	Range
Head and body	550	15	460–620
Tail	295	16	250–355
Hind foot	133	14	120–150
Ear	64	15	55–72
Skull length	96	7	90–103
Body mass	3,7	10	2,4–5,0

Felis nigripes Black-footed cat
(A Swartpootkat, sandtier or miersshooptier
X inGwe yeziduli T seBalabolokwane)

Distribution and status

Although there are few records for the Cape Province, this small felid (also known as the anthill tiger) is widely distributed in the arid and semi-arid Cape interior (Fig. 28). The black-footed cat was previously only recorded from the E. and N. Cape but the present study revealed its presence on the west coast. A specimen was obtained on the farm “Peddieskop” near Bitterfontein. The author was shown a photograph of the skin of another specimen, one of two that had been caught on the farm “Leeuklip” in western Bushmanland.

At this stage it is not clear whether the E. and W. Cape records are from two discrete populations. It is possible that they link up in the Karoo, which has been inadequately surveyed. Unconfirmed reports of the black-footed cat have been received from several localities in the Calvinia and Ceres Divisions, where careful questioning of the observers suggests that this is the species involved. Records are, however, most frequently received from the E. Cape. Visser (1976) considers the black-footed cat to be fairly common in parts of the N. Cape, although this could not be confirmed in the study, probably because this species is caught or observed incidentally and seldom specifically hunted.

The black-footed cat can be regarded as an uncommon species which may not actually be as rare as is commonly believed. Its solitary nature may often cause it to be overlooked and, when encountered, it is frequently misidentified.

Habitat

This cat has so far been recorded from the Kalahari Thornveld, Karoo, Succulent Karoo, Grassveld and E. Cape thornveld. It is unlikely that it will be found in the higher rainfall areas south of the Cape Fold Belt mountains.

Habits

Little is known of the habits of this species. It seems to be nocturnal and predominantly solitary. Two animals have been taken together, at “Leeuklip” in Bushmanland and at “Blouboskuil” in the Klipplaat/Jansenville district (M. Krige pers. comm.). Rautenbach (1978) records some early morning and late afternoon activity in the Kalahari Gemsbok National Park.

Food

The only stomach examined came from the specimen collected at “Peddieskop”. The feathers of a small bird and unidentified hair were the only items present.

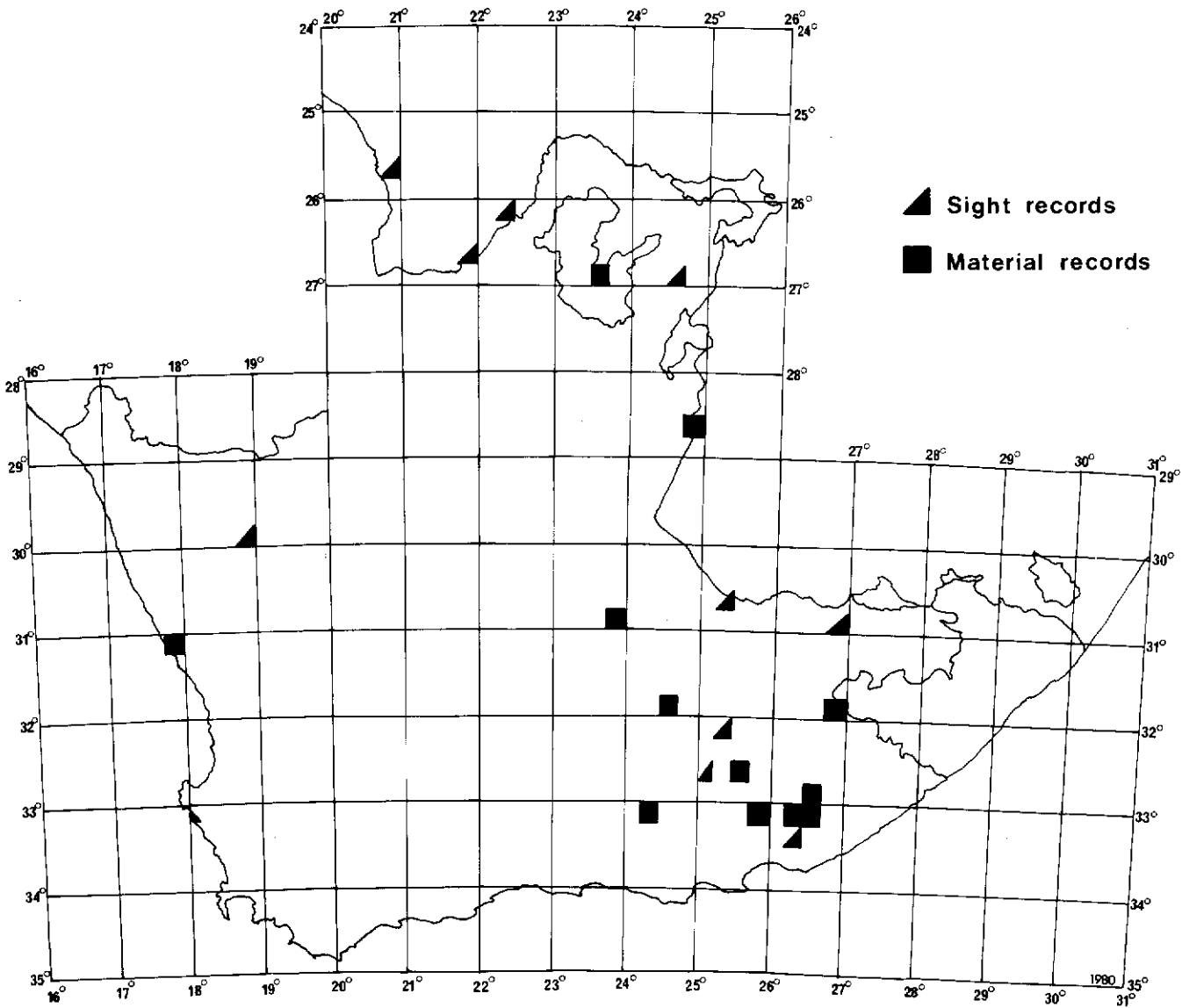


Fig. 28 Black-footed cat: present distribution in the Cape Province.

Smithers (1971) recorded four species of murid and insectivore, one bird, one lizard and four occurrences of invertebrate animals in a sample of six stomachs from Botswana. Rautenbach (1978) found bird remains and a solifugid together with a small quantity of grass and leaves in two stomachs from the Transvaal. J. C. Greig (pers. comm.) was informed of an incident in which a trapped black-footed cat had been feeding on a guinea-fowl on the farm "Glen Ovis", Carlisle Bridge. The largest prey item recorded in any stomach was a ground squirrel.

Reproduction

No information is recorded for the Cape Province. In the Transvaal Rautenbach (1978) collected a pregnant female carrying two foetuses in November.

Measurements

Table 52 Black-footed cat: measurements (mm, kg) of adult males in the Cape Province.

Sex	Locality	Head and Body	Tail	Hind foot	Ear	Body mass
♂	3117BB (present study)	437	150	95	45	2,4 (wet)
♂(?)	3225DA (J. C. Greig)	490	80	102	58	1,9
♂	3326AB (J. C. Greig)	414	200	109	57	1,7

Felis serval

(**A**Tierboskat **X**inGwenkala **T**Tadi)

Serval

Habitat

Previous records were from the Southern and Eastern Cape Forests, Lowland and possibly Mountain Fynbos. There is a possible but unconfirmed record from the bushveld of the Mafikeng/Vryburg area, and the only recent specimen was taken in the Succulent Karoo. It is generally considered to be a grassland/savanna species (Smithers 1978).

Habits

There is no information for the Cape Province. Smithers (1978) found them to be mainly nocturnal and he records that they occur singly or in pairs. Rowe-Rowe (1978a) stated that it is both diurnal and nocturnal, and predominantly solitary. Human pressure, and possibly competition with caracal could help explain the drastic decline of the species in this province.

Food

No information is available for the Cape Province. In a sample of 65 stomachs from the Salisbury district of Zimbabwe (Rhodesia), Smithers (1971) found that

Distribution and status

The serval probably occurred along the entire coastal belt from near Cape Town to Transkei, as well as close to the borders of the Transvaal and Botswana. However, a recent intensive survey undertaken by the author has shown that this species is on the verge of extinction in the Cape Province (Fig. 29). The most recent proven record was of a specimen collected on the farm "Klipdam" (Groenrivier, Namaqualand) in August 1975 (SAM 38724). Recent but unconfirmed records were obtained from Elliot, Plettenberg Bay, Klipplaat and Adelaide. Several other reports were found to be the result of confusion with the genet, wild cat, black-footed cat and even caracal. P. Visser (pers. comm.) reports that this species still occurs in the north-eastern corner of the N. Cape, but is very rare. No specimens or confirmed sightings were collected from this area during the study.

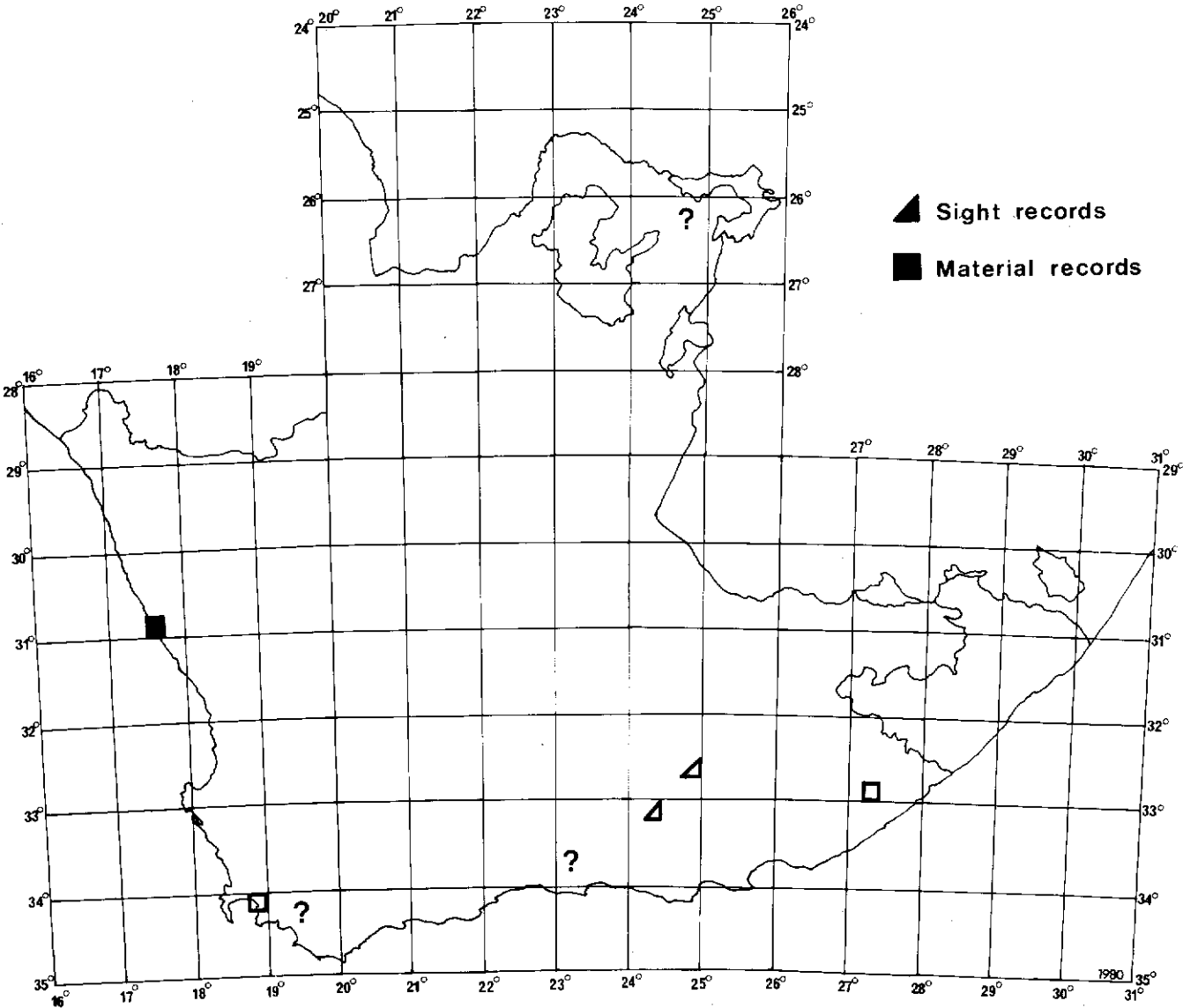


Fig. 29 Serval: distribution in the Cape Province. Hollow squares and triangles indicate historical records, and question marks recent possible sightings.

murids were by far the most important food items, followed by birds. Although Dorst and Dandelot (1970) gave oribi and duiker as prey items, Smithers (1978) considered it unlikely that such large prey would be taken.

Reproduction

Smithers (1978) recorded eight pregnant females in January (3), February (2), March, July and November, and two lactating females in November. He also saw small juveniles in May and June. Rowe-Rowe (1978a) recorded lactating females in April and December and sighted juveniles in December, April and May.

Measurements

No information was collected during the study.

Felis caracal

Caracal

(A Rooikat XiNgqawa T Thwane)

Distribution and status

The caracal (lynx) is widespread and common in the Cape Province (Fig. 30). Although records are sparse for the arid interior, it is known to occur throughout this area. The highest densities are reached in the southern and western Cape, particularly along the coastal belt, the coastal mountain chain and the adjacent interior. It has a wide distribution in Africa, the Middle East and as far east as India, but it is only in the Cape Province that it reaches such high population levels that it has become the primary predator of domestic small stock. Eighty-two per cent of the Cape Divisional Councils considered it to be the major problem animal (Unpubl. Departmental records, Vrolijkheid Nature Conservation Station).

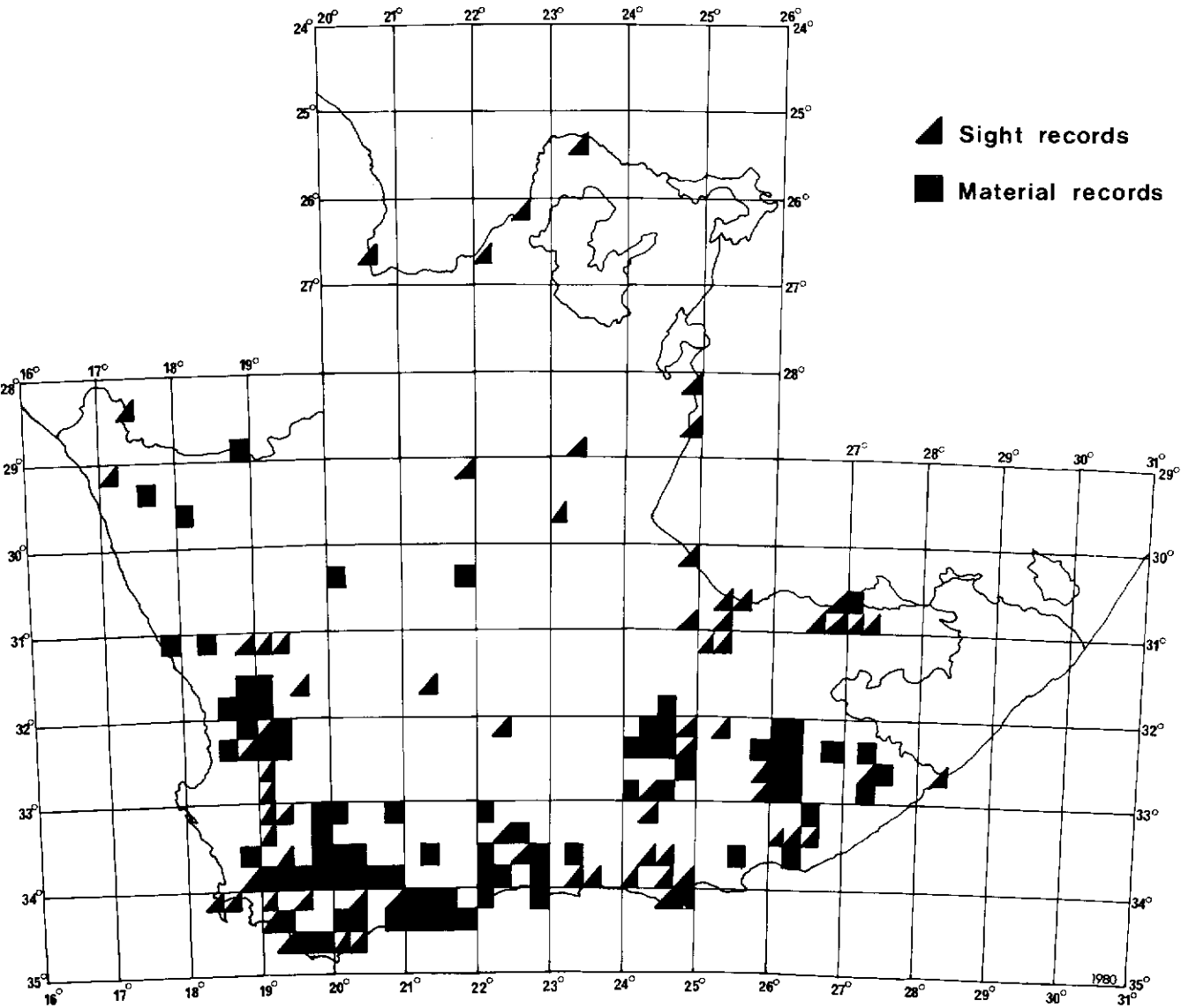


Fig. 30 Caracal: present distribution in the Cape Province.

It is without doubt the most abundant medium-sized predator in the southern areas of the Cape Province and, despite heavy predator-control programmes, there appears to be little reduction in population levels.

Habitat

This cat has a very wide habitat tolerance, and was recorded from all the principal habitat types in the Cape Province. It appears to be most abundant in the Lowland and Mountain Fynbos, Karoo and Succulent Karoo, as well as the mixed thornveld/grassland of the E. Cape.

Habits

Although the caracal is predominantly nocturnal in the Cape Province, several sightings have been made in the morning and late afternoon. Daylight activity is largely restricted to cool or overcast days, and they are very rarely diurnal in areas where they are heavily persecuted. Animals kept in captivity at Vrolijkheid are largely inactive during the day, particularly during the hot summer months, and usually emerge to feed and move around the enclosures from dusk onwards. However, they frequently bask in the sun just outside their dens, and kittens born in captivity play for short periods throughout the day and night, resting for long periods in between.

In the wild they are primarily solitary, but there are several records of two adults moving together, and females with cubs were recorded on 29 occasions. No evidence of co-operative hunting between adults was found, although in two cases females and large cubs were found at the same kill. There are no records of middens being used, but it is possible that the scats, which are not buried, are deposited around the boundaries of home-ranges. Tree-scratching may serve a territorial marking function.

A captive pair used urination sites within their enclosure. On three occasions the male was observed urinating on the ground and then moving the hind-feet through the urine-dampened sand several times, as was observed for a captive male leopard. The female has never been seen acting in this way, and moves on immediately after she has urinated. Spray marking by captive males was also observed. With the tail held vertically they sprayed small quantities of urine at regular intervals on certain bushes, rocks and logs within their enclosures.

Smithers (1971) stated that the caracal is not very vocal. Apart from different levels of "purring", hissing and low growls, the only call heard during the present study was a harsh hissing "bark". This was heard when strange animals were introduced into an enclosure with another animal, and on one occasion by an unreceptive female when a sub-adult male was trying to mount her.

Pringle and Pringle (1979) found that caracal kill large prey animals by biting the nape of the neck, but in the present study examination of carcasses and observation of captive animals showed that throat bites predominate. This may indicate regional differences in killing technique, as was found for the lion by Eloff (1964).

Food

As was the case with the leopard, the majority of caracal stomachs were obtained from animals killed during control operations, which explains the bias towards domestic stock remains in the stomachs (Table 53).

In cases where caracal preyed on larger antelope species, they took mostly females and lambs. The carcasses of bushbuck examined from the Riversdale/Albertinia area, and known to have been killed by caracal, were predominantly ewes and lambs, although one sub-adult ram was found. A sub-adult male vaalribbok (Vrolijkheid Nature Conservation Station) and a juvenile female mountain reedbuck (Bedford) were also killed. One of the six stomach content items listed for caracal on the Kaffrarian Museum files was bushbuck.

Carnivores are also occasionally fed on. H. A. Roussouw (pers. comm.) found a bat-eared fox that had been partially eaten by a caracal near Bitterfontein, and the tracks suggested that it had been killed by the caracal. On the files of the Kaffrarian Museum there is also a record of jackal pup remains in a caracal stomach. A wild cat was recorded as having been killed and eaten by a caracal in the Kruger National Park (Pienaar 1969).

Three cases of cannibalism were recorded during the study, and such behaviour is recorded twice on the Kaffrarian Museum files, with a further record from the Tarkastad district. All these records involved adult males that had eaten young kittens.

Most of the other records are of smaller prey. Scats examined from the Bedford district (E. Cape), Gamka Mountain (S. Cape), McGregor area (W. Cape) and

Table 53 Caracal: contents of 194 stomachs from 135 localities in the Cape Province.

Food item	No. of stomachs
VERTEBRATES	
Mammalia	
Domestic stock (goats, sheep)	51
Artiodactyla (wild) (<i>Raphicerus campestris</i> 2; <i>Raphicerus melanotis</i> 3; <i>Tragelaphus scriptus</i> 6; <i>Oreotragus oreotragus</i> 1; <i>Sylvicapra grimmia</i> 10; unid. 8)	30
Rodentia (<i>Pedetes capensis</i> 2; Bathyergidae 3; <i>Rhabdomys pumilio</i> 4; <i>Aethomys namaquensis</i> (?) 1; unid. 5)	15
Hyracoidea (<i>Procavia capensis</i>)	13
Carnivora (canid juv. 1; <i>Felis caracal</i> kittens 3; <i>Cynictis penicillata</i> 1; <i>Herpestes pulverulentus</i> 2; <i>Ictonyx striatus</i> 2; <i>Genetta</i> sp. 1).	10
Lagomorpha (<i>Lepus</i> spp. 6)	6
Insectivora (Soricidae)	1
Unidentified mammal material	21
Aves (<i>Numida meleagris</i> 2; Anatidae 1; <i>Zosterops pallidus</i> 1; remainder unidentified)	13
Carrion (presence of maggots)	1
PLANT FOOD	
Green grass	17
EMPTY STOMACHS	46

"Sewefontein" (W. Cape) were found to contain rock hyrax remains, and one of the stomachs at the Kaffrarian Museum contained cane-rat (*Thryonomys swinderianus*) remains. Caracal kept in captivity at Vrolijkheid Nature Conservation Station have been observed catching weavers and sparrows which entered their cages. Bothma (1965) recorded grapes in the stomach of a caracal collected in the Robertson district (W. Cape).

Pringle and Pringle (1979) examined 103 stomachs from the Bedford district, of which 25% were empty, and of the remainder 55% contained sheep or goat remains, and 14% had the remains of rock hyrax. They recorded most of the same prey as in the present study, as well as the red rock hare (*Pronolagus* sp.). Pienaar (1969) recorded impala (lambs), grey duiker, steenbok, Sharpe's grysbok (*Raphicercus sharpei*), rock hyrax and wild cat.

Reproduction

During the study pregnant females were recorded from March to September, but, when combined with the results of Pringle and Pringle (1979), the only months when pregnant animals have not been collected were the summer months from December to February. Births in captivity were recorded during these months in the present study. (Table 54)

Back-dated births were established by comparing the sizes of wild-caught juveniles and sub-adults with data from known-age animals, and then calculating the approximate date of birth. The National Zoological Gardens, Pretoria, have recorded births in January, February, April, May and November. Of the fourteen pregnant females recorded during the study, three were carrying one foetus, seven had two foetuses and four had three foetuses. Captive births involved four groups of two kittens and seven groups of three.

Table 54 Caracal: monthly occurrence of pregnant, non-pregnant and lactating females, and back-dated and known-age births in the Cape Province. Pregnant animals caught by Pringle and Pringle (1979) are given separately.

	J	F	M	A	M	J	J	A	S	O	N	D
Pregnant	-	-	2	1	1	1	2	5	2	-	-	-
Non-pregnant	2	2	10	4	10	10	4	11	6	3	2	1
Lactating	-	-	2	-	-	-	-	1	-	-	-	-
Total	2	2	14	5	11	11	6	17	8	3	2	1
Pregnant (Pringle & Pringle 1979)	-	-	-	1	-	-	-	-	1	3	3	-
Captive births (Vrolijkheid)	2	1	1	-	-	-	2	1	1	-	2	1
Back-dated births	2	-	2	1	-	-	-	1	1	2	1	1

Measurements

Table 55 Caracal: measurements (mm, kg) of adult males and females in the Cape Province.

MALES	\bar{x}	n	Range
Head and body	881	65	750-1 057
Tail	272	70	210-340
Hind foot	196	61	172-215
Ear	82	61	70-90
Skull length	137	100	120-149
Body mass	12,7	61	8,0-18,1
FEMALES	\bar{x}	n	Range
Head and body	834	40	710-1 029
Tail	248	47	198-305
Hind foot	182	47	165-205
Ear	79	43	70-94
Skull length	124	100	118-139
Body mass	10,1	40	7,0-15,9

Conclusion

Few of the carnivores of the Cape Province are adequately conserved in nature reserves. Even though a number of reserves afford protection to a spectrum of carnivorous species (Appendix 3), they are seldom extensive enough to contain viable populations of the larger forms. The conservation status of large carnivores therefore depends almost entirely on whether they can co-exist with man in partially developed areas outside nature reserves. The hunting dog is now extinct as a breeding species in the Cape Province, and the lion, cheetah, spotted hyaena and brown hyaena are only conserved in the Kalahari Gemsbok National Park. Two smaller species, the serval and spotted-necked otter, may also be close to extinction in the Cape Province.

All the remaining 21 mammalian carnivores can be considered as safe for the foreseeable future, although several have a restricted range. A few species have adapted so well to human development that they survive in sufficient numbers to cause extensive losses to farmers, in spite of sustained attempts at eradication. The two most widespread problem animals are the caracal and black-backed jackal, and these are responsible for most stock predation. The Cape fox, wild cat, honey badger, Cape clawless otter and leopard are the cause of localized or seasonal problems, but of these only the leopard is of real economic significance. This species presents an unusual conservation problem in that it is regarded as a problem animal in this province, but is also considered as rare and endangered on a world-wide basis.

The promotion of active conservation of large and economically harmful carnivores is a relatively new concept in this country, but careful extension work could lead to an improvement in status of some

species. Only two of the larger carnivores occurring in the Cape Province, the leopard and brown hyaena, may be able to survive in adequate numbers outside nature reserves, but this would need careful organization of a sanctuary system, as outlined in Stuart and Heineken (1977).

The most effective way to conserve many of the smaller species is to increase the selectivity of the control methods used for the caracal and black-backed jackal. At present several non-target animals are killed for every problem animal caught, and the elimination or refinement of non-selective methods is an important priority for research and extension work.

Further research on the biology of both problem and endangered carnivores should be carried out as soon as possible. An understanding of the habits and population structure of problem animals helps to identify which segment of the population is causing the problem, and how such individuals can be selectively controlled. Research on threatened species, such as the serval and spotted-necked otter, would show whether it is possible to apply active management to conserve them in the Cape Province. At this stage it is not clear to what extent these marginal species are declining due to agricultural development, or whether the declines are due to natural fluctuations at the extremity of their range. Thus future initiatives in conservation management, or the development of more selective control methods, should be based on a considerably more detailed knowledge of their basic ecology than has at present been achieved for any species in the Cape Province.

The answer to the problem of carnivore conservation revolves around the acceptance of the role of carnivores as key members of the biotic community. Blanket condemnation of all larger carnivores because of the depredations of a few problem animals is ecologically indefensible. The priority, therefore, is a greater educational or extension effort to convince the farming community that carnivores play a fundamental role in the ecosystem, and that control methods should be refined in order to select only those individuals responsible for damage.

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Appendix 1 Gazetteer of localities mentioned in the text

Place name	Locus and name	Co-ordinates
Adelaide Municipal Dam	3226CB Adelaide	32°40'S/26°25'E
Albertinia	3421BA Albertinia	34°12'S/21°35'E
Amabele	3227DA Kei Road	32°39'S/27°31'E
Andries Vosloo Kudu Reserve	3326BA Fort Brown	33°07'S/26°41'E
Assegaaibosch	3318DD Stellenbosch	33°58'S/18°56'E
Augrabies Falls	2820CB Augrabies	28°35'S/20°20'E
Beaufort West	3222BC Beaufort West	32°22'S/22°35'E
Bedford	3226CA Bedford	32°41'S/26°05'E
"Beesbank", Orange River	2816DA Grootderm	28°30'S/16°43'E
"Blouboskuil", Klipplaat	3324AB Klipplaat	33°04'S/24°21'E
"Bokrivierplaas", Ceres	3319BD Matroosberg	33°20'S/19°46'E
Bonnivale	3320CC Montagu	33°56'S/20°06'E
Bot River	3419AC Hermanus	
"Brakfontein", Alice	3226DD Alice	32°57'S/26°53'E
Bredasdorp	3420CA Bredasdorp	34°32'S/20°02'E
Caledon	3419AB Caledon	34°14'S/19°25'E
Calvinia	3119BD Calvinia	31°28'S/19°47'E
Cape Point Nature Reserve	3418AD Simonstad/Simonstown	34°17'S/18°26'E
Cape Town	3318CD Cape Town	33°57'S/18°28'E
Ceres	3319AD Ceres	33°22'S/19°18'E
"Charlgrave", Ft Beaufort	3226DC Fort Beaufort	32°53'S/26°42'E
Colchester	3324DA Cambria	33°37'S/24°42'E
"Daleview", Komga	3227DB Komga	32°41'S/27°51'E
De Hoop Nature Reserve	3420AD Wydgeleë	34°27'S/20°25'E
"Donkerbos", Tshabong	2622CA Grootdors	26°35'S/22°09'E
"Doornbult", Vaalharts	2724DD Jan Kempdorp	27°45'S/24°59'E
"Doringkloof", Burgersdorp	3126AB Lower Adamson	31°02'S/26°28'E
Elliot	3127BD Elliot	31°20'S/27°50'E
Entafufu	3129BC Lusikisiki	31°29'S/29°31'E
"Fernbank", Knysna	3322DD Karatara	33°57'S/22°50'E
"Fontein", Adelaide	3226CA Bedford	32°33'S/26°08'E
Gamka Mountain Reserve	3321CB Van Wyksdorp	
"Glen Melville", Albany	3326BA Fort Brown	33°11'S/26°37'E
"Glen Ovis", Carlisle Bridge	3326AA Riebeeck-Oos	33°02'S/26°08'E
"Goegap", Springbok	2918CA Kaip	29°40'S/18°05'E
Goukamma River Estuary	3422BB Sedgefield	34°04'S/22°56'E
Goukamma Nature Reserve	3422BB Sedgefield	34°03'S/22°56'E
Graaff-Reinet	3224BC Graaff-Reinet (Suid)	32°15'S/24°32'E
Hartswater	2724DD Jan Kempdorp	27°45'S/24°49'E
Henning Siding	3126AC Henning	31°16'S/26°07'E
Heuningklip River	3324AB Klipplaat	
"Huntly Glen", Bedford	3226AC Baviaansrivier	32°24'S/26°06'E
"Jagersberg", Van Wyksvlei	3021DB Jagersberg	30°21'S/21°47'E
"Jakkalsfontein", Worcester	3320BA Matjiesfontein	33°06'S/20°39'E
"Jonkershoek", Ceres	3219CD De Meul	32°45'S/19°26'E
Jonkershoek Valley	3318DD Stellenbosch	33°57'S/18°55'E
Kalahari Gemsbok National Park	2520	
"Kei Farm", Komga	3228CA Mpetu	32°32'S/28°03'E
Keisers River	3319DD Robertson	
Keurbooms River Nature Reserve	3423AB Plettenbergbaai	34°02'S/23°24'E
"Killarney", Komga	3227DB Komga	32°43'S/27°52'E
"Klipdam", Groenrivier	3017DC Nariep	30°46'S/17°40'E
Klipriver, Tsitsikamma	3323DC Nature's Valley	33°58'S/23°37'E
Knysna	3423AA Knysna	34°02'S/23°03'E
"Kolka", Montagu	3320CB Allemorgens	33°37'S/20°21'E
Konings River	3319DD Robertson	
"Kruizemantvlei", Adelaide	3226CB Adelaide	32°32'S/26°28'E
"Leeuklip"	2918DD Kalkstasie	29°46'S/18°51'E
"Lemoenpoort", Worcester	3319CD Villiersdorp	33°46'S/19°17'E
Louisvale	2821CA Kanoneiland	28°34'S/21°12'E
"Lovers Leap", Tshabong	2622CA Grootdors	26°40'S/22°01'E
"Lowestoffe", Cathcart	3226BD Fairford	32°26'S/26°54'E
Maden Dam	3227CB Stutterheim	32°44'S/27°17'E
Mafikeng	2525DC Mafeking	25°51'S/25°38'E
"Matjiesfontein", Colesburg	3025AC Kookfontein	30°28'S/25°07'E

"Meerlandsvlei"	3218DB Eendekuil	32°34'S/18°53'E
"Misgund", Citrusdal	3219CC Keerom	32°46'S/19°04'E
"Mooifontein", Komga	3227BD Toleni	32°29'S/27°53'E
Moordkuil Dam	3319CD Villiersdorp	33°47'S/19°28'E
Mossel Bay	3422AA Mosselbaai	34°11'S/22°09'E
"Noagshoogte", Uitenhage	3324BD Wolwefontein	33°29'S/24°52'E
Nossob/Molopo River Junction	2620DC Witdraai	26°54'S/20°41'E
Nuwekloof, Willowmore	3323BC Willowmore (East)	
Nuweveld Mountains	3222AB/BA Rosedene/Kuilspoort	
"Paaiskloof", Ulco	2824AB Bellsbank	28°11'S/24°17'E
"Paardekraal", Albany	3326BC Grahamstown	33°22'S/26°35'E
"Peddieskop", Bitterfontein	3117BB Ruitersvlei	31°12'S/17°53'E
"Peninsula", Lower Kubusie	3227DA Kei Road	32°33'S/27°42'E
Pirie Forest	3227CB Stutterheim	32°44'S/27°16'E
Pirie Trout Hatchery	3227CD King William's Town	32°45'S/27°18'E
P. K. le Roux Dam	3024BB Joubertsgat	
Plettenberg Bay	3423AB Plettenbergbaai	34°03'S/23°22'E
Port Elizabeth	3325DC Port Elizabeth	33°56'S/25°37'E
"Portland", Knysna	3322DD Karatara	33°57'S/22°59'E
"Prinsfontein", Tarkastad	3126CC Eland's River	31°55'S/26°08'E
"Rangerton", Upper Gonubie	3227DA Kei Road	32°36'S/27°39'E
Richtersveld	2817	
"Rietfontein", Ceres	3219CD De Meul	32°54'S/19°15'E
Riversdale	3421AB Riversdale	34°05'S/21°15'E
Robertson	3319DD Robertson	33°39'S/19°53'E
Rolfontein Nature Reserve	3024BA/BB Petrusville/Joubertsgat	
Romansrivier	3319AC Tulbagh	33°28'S/19°13'E
Rooikrantz Dam	3227CB Stutterheim	32°45'S/27°19'E
Sak River	3122CC Vonkfontein	
"Sandfontein"	3319BD Matroosberg	33°22'S/19°51'E
Sedgefield	3422BB Sedgefield	34°10'S/22°48'E
"Seven Fountains"	3326AD Salem	33°26'S/26°19'E
"Sewefontein"	3119CA Lokenburg	31°35'S/19°07'E
Slangfontein spruit	3122AD Loxton	
"Sout", Kliprand	3018DA Kliprand	30°37'S/18°32'E
Soutpoort	3122AC Gansvlei	
Springbok	2917DB Springbok	29°40'S/17°53'E
Stilbaai	3421AD Stilbaai	34°22'S/21°25'E
Sutherland Observatory	3220BD Kuilenburg	32°23'S/20°49'E
"Thornkloof", Albany	3226CD Kroomie	32°58'S/26°18'E
Titus Pan, Prieska	3022BC Titus Pan	30°28'S/22°43'E
Tsitsikamma coast	3424AA Oubosrand	34°03'S/24°11'E
Uitenhage	3325CD Uitenhage	33°45'S/25°24'E
Ulco area	2824AD Delpoortshoop	
Union's End	2420CC Union's End	24°48'S/20°01'E
Upington	2821AC Upington	28°27'S/21°14'E
Vaalharts	2724DD Jan Kempdorp	
Vrolijkheid Nature Conservation Station	3319DD Robertson	33°56'S/19°56'E
Vryburg	2624DC Vryburg	26°57'S/24°44'E
Warrenton	2824BB Warrenton	28°07'S/24°51'E
"Waterfall", Bedford	3226CA Bedford	32°35'S/26°05'E
"Wolwepoort", Kamieskroon	3017BB Kamieskroon	30°37'S/17°50'E
Worcester	3319CB Worcester	33°39'S/19°27'E

Appendix 2 A checklist of external and internal parasites collected from carnivores in the Cape Province (Identified by J. B. Walker, E. M. Nevill and A. Verster of the Veterinary Research Institute, Onderstepoort)

HOST SPECIES	EXTERNAL		INTERNAL		
	INSECTA		ARACHNIDA	CESTODA	NEMATODA
	Order SIPHONAPTERA	Order PHTHIRAPTERA	Order ACARINA	Order EUCESTODA	Order ASCARIDATA Order STRONGYLATA Order SPIRURORIDA
CANIDAE					
<i>Otocyon megalotis</i>	<i>Ctenocephalides felis</i> <i>Echidnophaga gallinacea</i>		<i>Haemaphysalis zumpti</i> <i>Rhipicephalus capensis</i> (group)	<i>Tetrathyridia</i> sp. (<i>Mesocestoides</i> ?)	
<i>Vulpes chama</i>	<i>Ctenocephalides connatus</i> <i>Echidnophaga gallinacea</i>		<i>Haemaphysalis leachi</i> <i>Rhipicephalus capensis</i> (group)	<i>Joyeuxiella</i> sp. <i>Mesocestoides</i> sp. <i>Taenia endothoracicus</i>	
<i>Canis mesomelas</i>	<i>Echidnophaga gallinacea</i>		<i>Ixodes rubicundus</i> <i>Rhipicephalus capensis</i>	<i>Joyeuxiella</i> sp. <i>Mesocestoides lineatus</i> <i>Taenia multiceps</i> <i>Taenia serialis</i>	<i>Ancylostoma caninum</i> <i>Toxocara canis</i> <i>Toxascaris leonina</i>
VIVERRIDAE					
<i>Genetta genetta</i>	<i>Echidnophaga gallinacea</i>	<i>Felicola</i> (<i>Parafelicola</i>) <i>africanus</i>	<i>Haemaphysalis leachi</i> (group) <i>Ixodes rubicundus</i>	<i>Taenia parva</i>	
<i>Genetta tigrina</i>			<i>Haemaphysalis zumpti</i> <i>Ixodes</i> n.sp. near <i>oldi</i>		
<i>Atilax paludinosus</i>					<i>Oxynema</i> sp.
<i>Herpestes pulverulentus</i>	<i>Ctenocephalides felis</i>	<i>Felicola</i> (F.) <i>calogaleus</i>	<i>Haemaphysalis leachi</i> <i>H. zumpti</i> <i>Ixodes</i> n.sp. near <i>oldi</i>		
<i>Cynictis penicillata</i>	<i>Ctenocephalides felis</i>				
<i>Suricata suricatta</i>					<i>Toxocara suricattae</i>
FELIDAE					
<i>Felis libyca</i>	<i>Ctenocephalides connatus</i> <i>Ctenocephalides felis</i>		<i>Haemaphysalis leachi</i> <i>Ixodes rubicundus</i>	<i>Diplopylidium acanthotetra</i> <i>Joyeuxiella fuhrmanni</i> <i>Mesocestoides lineatus</i> <i>Taenia pisiformis</i> <i>T. taeniaeformis</i>	<i>Toxascaris leonina</i> <i>Physaloptera</i> sp.
<i>Felis caracal</i>	<i>Ctenocephalides felis</i> <i>Echidnophaga gallinacea</i>		<i>Haemaphysalis leachi</i> <i>H. muhsamae</i> <i>H. zumpti</i> <i>Ixodes pilosus</i> <i>I. rubicundus</i> <i>Rhipicentor bicornis</i> <i>Rhipicephalus evertsi</i> <i>R. gertrudae</i>	<i>Taenia hydatigena</i> <i>Joyeuxiella</i> sp. <i>Mesocestoides</i> sp. <i>Taenia</i> (<i>hydatigena</i> ?)	
<i>Panthera pardus</i>			<i>Haemaphysalis leuchi</i> <i>Rhipicephalus capensis</i>	<i>Taenia</i> (<i>ingwei</i> ?)	<i>Toxocara cati</i> <i>Toxocara canis</i>

Appendix 3 The carnivores known to occur in the National Parks (N.P.) and the larger Provincial Nature Reserves (N.R.) of the Cape Province. Crosses indicate presence.

	Tsitsikamma N.P.	Kalahari Gembok N.P.	Bontebok N.P.	Augrabies N.P.	Mountain Zebra N.P.	Addo Elephant N.P.	Andries Vosloo Kudu Reserve	De Hoop N.R.	Goukamma N.R.	Hester Malan N.R.	Karoo N.R.	Keurbooms River N.R.	Gamka Mountain Reserve	Oviston N.R.	Rolfontein N.R.	Vrolijkheid N.R.
<i>Otocyon megalotis</i>		X		X	X					X	X			X	X	X
<i>Lycaon pictus</i>		?														
<i>Vulpes chama</i>		X	X		X			X		X			X	X	X	X
<i>Canis mesomelas</i>		X		X		X	X			?			X	?	X	
<i>Aonyx capensis</i>	X		X				X	X	X			X		X	X	
<i>Lutra maculicollis</i>																
<i>Mellivora capensis</i>	X	X						X	X	X						X
<i>Poecilogale albinucha</i>	X					X									X	
<i>Ictonyx striatus</i>	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X
<i>Genetta genetta</i>	X	X	X					X			?		X	X	X	X
<i>Genetta tigrina</i>							X	X	X			X				
<i>Suricata suricatta</i>		X		X	X	X	X			X	?			X	X	
<i>Cynictis penicillata</i>		X	X		X			X		X	?		X	X	X	X
<i>Herpestes ichneumon</i>			X													X
<i>Herpestes sanguineus</i>		X		X	?											
<i>Herpestes pulverulentus</i>	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
<i>Ichneumia albicauda</i>																
<i>Atilax paludinosus</i>	X		X					X	X			X		X	X	X
<i>Mungos mungo</i>																
<i>Helogale parvula</i>																
<i>Proteles cristatus</i>		X	X		X	X	X			X				X	X	
<i>Hyaena brunnea</i>		X													X	
<i>Crocuta crocuta</i>		X														
<i>Acinonyx jubatus</i>		X													X	
<i>Panthera pardus</i>	X	X		X								X	X			
<i>Panthera leo</i>		X														
<i>Felis libyca</i>		X	X		X			X		X			X		X	X
<i>Felis nigripes</i>					X		X									
<i>Felis serval</i>																
<i>Felis caracal</i>	X	X	X	X	X		X	X	X	X	X		X		X	X

INVESTIGATIONAL REPORTS OF THE CAPE DEPARTMENT OF NATURE CONSERVATION / ONDERSOEKVERSLAE VAN DIE KAAPSE DEPARTEMENT VAN NATUURBEWARING

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