

4. RESULTS

4.1 INTRODUCTION

In all, 2700 micromammal specimens have been recovered from Sibudu Cave to date. Of this total, 905 were postcranial, 259 were cranial and the remaining 1536 were undiagnostic. Twenty-nine separate layers were identified amongst the 18m² excavated. The layer containing the most specimens was Buff (Bu), consisting of 68.4% of the total assemblage. Red Speckled contained 6.1% of the specimens and Light Brown Mottled contained 3.7% of the specimens. The remaining 25.8% of the assemblage is spread amongst the remaining 28 layers (Table 4.1), representing a range from 0.0%-3.7%. Thus the majority of samples in this Sibudu collection are very small in comparison to those from Bu. As a result of these findings, the layer Bu micromammals are studied intensively. Species diversity from the remaining layers is then compared to that from Bu to provide an idea of variation between layers and through time.

Table 4.1. Assemblage Frequencies and Percentages per Layer.

North Stratigraphy			North Stratigraphy (cont.)			East Stratigraphy		
Layer	f	%	Layer	f	%	Layer	f	%
MOD	42	1.6	MY	49	1.8	Co	69	2.6
OMOD	49	1.8	Y1	1	0.0	Bu	1844	68.4
GMOD	3	0.1	B/Gmix	1	0.0	LB MOD	99	3.7
BMOD	9	0.3	YA1	14	0.5	Ore	7	0.3
RSp ±	164	6.1	YA2	5	0.2	Es	14	0.5
YSp ±	15	0.6	B/YA2	6	0.2	Cad	10	0.4
BSp ±	42	1.6	GR	32	1.2	Pu	7	0.3
BSp2 ±	81	3.0	GRII	67	2.5	BR/Y	16	0.6
SPCA ±	23	0.9	GS	3	0.1			
Or	2	0.0	Fla	1	0.0			
MC	18	0.7						

± = Found in both north and east stratigraphy

B/Gmix= Brown Grey mix; BMOD= Brown Mottled; BR/Y= Brown Yellow; BSp= Brown Speckled; BSp2= Brown Speckled II; B/YA2= Brown Yellow Ash II; Bu= Buff; Cad= Cadbury; Co= Coffee; Es= Espresso; Fla= Flame; GMOD= Grey Mottled; GR= Grey Rocky; GRII= Grey Rocky II; GS= Grey Sandy; LB MOD= Light Brown Mottled; Lmou= Light Mousse; MC= Milk Chocolate; MOD= Mottled; MY= Mexican Yellow; OMOD= Orange Mottled; Or= Orange; Ore = Oreo; Pu= Pumpkin; RSp= Red Speckled; SPCA= Spotted Camel; Y1= Yellow 1; YA1 = Yellow Ash 1; YA2= Yellow Ash II; YSp= Yellow Speckled.

4.2 POSTCRANIAL

A total of 905 postcranial elements was recovered from the entire assemblage (Table 4.2). These specimens consist mostly of vertebrae (505: 55.8%) and long bones (310: 34.3%). A number of unfused epiphyses (63: 7.0%) were also recovered, indicating the presence of juvenile individuals in the assemblage. The low representation of various smaller skeletal elements (astragali, atlases, phalanges etc.), could be ascribed to the large mesh size used during screening, resulting in these smaller skeletal elements slipping through the screen.

The layer Bu contained the most elements (68.4%) of the total collection. This was followed by the layer RSp which contained 6.1% and LB MOD containing 3.7%.

Table 4.2. Percentages of the total postcranial assemblage represented by various elements.

<u>Skeleton</u>	<u>Body Part</u>	<u>Percentage</u>
<u>Axial</u>	Atlas	0.1
	Sacrum	0.2
	Vertebra	55.8
	Sternum	0.2
	Scapula	0.1
	Innominate	3.5
	Rib	0.7
<u>Appendicular</u>	Humerus	8.6
	Radius	1.9
	Ulna	2.5
	Femur	7.6
	Tibia	4.3
	Fibula	0.3
	Shaft indet.	2.0
	Epiphysis, unfused	7.0
	Metapodial	1.2
	Astragalus	0.4
	Calcaneum	0.6
	Phalanges	2.9
<u>TOTAL</u>		<u>905</u>

Table 4.3 Percentages of the total postcranial assemblage represented in each layer.

North Stratigraphy		North Stratigraphy (cont.)		East Stratigraphy	
Level	%	Level	%	Level	%
MOD	2.1	MY	3.1	Co	3.3
OMOD	1.5	Y1	0.0	Bu	64.4
GMOD	0.2	B/Gmix	0.0	LB MOD	4.6
BMOD	0.6	YA1	0.6	Ore	0.6
RSp ±	5.1	YA2	0.2	Es	0.1
YSp ±	0.5	B/YA2	0.0	Cad	0.6
BSp ±	1.8	GR	0.6	Pu	0.0
BSp2 ±	3.3	GRII	2.9	BR/Y	0.5
SPCA ±	0.9	GS	0.0		
Or	0.0	Fla	0.1		
MC	1.4				

± = Found in both north and east stratigraphy

B/Gmix= Brown Grey mix; BMOD= Brown Mottled; BR/Y= Brown Yellow; BSp= Brown Speckled; BSp2= Brown Speckled II; B/YA2= Brown Yellow Ash II; Bu= Buff; Cad= Cadbury; Co= Coffee; Es= Espresso; Fla= Flame; GMOD= Grey Mottled; GR= Grey Rocky; GRII= Grey Rocky II; GS= Grey Sandy; LB MOD= Light Brown Mottled; Lmou= Light Mousse; MC= Milk Chocolate; MOD= Mottled; MY= Mexican Yellow; OMOD= Orange Mottled; Or= Orange; Ore = Oreo; Pu= Pumpkin; RSp= Red Speckled; SPCA= Spotted Camel; Y1= Yellow 1; YA1 = Yellow Ash 1; YA2= Yellow Ash II; YSp= Yellow Speckled.

4.3 CRANIAL

A total of 259 cranial specimens was identified in the assemblage. Of this total, 76 (29.3%) were incisors, 74 (28.6%) were mandibles, 6 (2.3%) were maxilla and the remaining 103 (39.8%) were isolated teeth. Of the total cranial assemblage, only 115 (44.4%) were diagnostic, of which, only 72 (62.7%) were identifiable to species level and used in this analysis. The layer Bu contained 59.5% of the cranial collection, layer RSp contained 8.4% and LB MOD 6.6%. The remainder of the cranial assemblage was scattered throughout the remaining levels. Late additions to the cranial assemblage include six specimens from the levels Grey Sand II (GS II), Light Brown Grey (LBG) and Light Brown Grey II (LBG II). Figure 4.1 illustrates the species variety found within the assemblage.

Table 4.4 Percentages of the total cranial assemblage represented in each layer.

North Stratigraphy		North Stratigraphy (cont.)		East Stratigraphy	
Level	%	Level	%	Level	%
MOD	3.0	MY	2.4	Co	4.6
OMOD	1.5	Y1	0.0	Bu	59.5
GMOD	0.0	B/Gmix	0.0	LB MOD	6.6
BMOD	0.3	YA1	0.0	Ore	0.3
RSp ±	8.4	YA2	0.8	Es	0.3
YSp ±	1.5	B/YA2	0.0	Cad	0.3
BSp ±	1.2	GR	1.5	Pu	0.0
BSp2 ±	2.3	GRII	2.3	BR/Y	0.0
SPCA ±	1.2	GS	1.2		
Or	0.8	Fla	0.0		
MC	0.0				

± = Found in both north and east stratigraphy

B/Gmix= Brown Grey mix; BMOD= Brown Mottled; BR/Y= Brown Yellow; BSp= Brown Speckled; BSp2= Brown Speckled II; B/YA2= Brown Yellow Ash II; Bu= Buff; Cad= Cadbury; Co= Coffee; Es= Espresso; Fla= Flame; GMOD= Grey Mottled; GR= Grey Rocky; GRII= Grey Rocky II; GS= Grey Sandy; LB MOD= Light Brown Mottled; Lmou= Light Mousse; MC= Milk Chocolate; MOD= Mottled; MY= Mexican Yellow; OMOD= Orange Mottled; Or= Orange; Ore = Oreo; Pu= Pumpkin; RSp= Red Speckled; SPCA= Spotted Camel; Y1= Yellow 1; YA1 = Yellow Ash I; YA2= Yellow Ash II; YSp= Yellow Speckled.

4.4 SPECIES IDENTIFIED

The cranial collection of the micromammal assemblage was used in this analysis and 72 (62.7% of the total collection) specimens were identified to species level. These identifications were based on cheek tooth patterns. Incisors are not considered diagnostic for species identification and as such were not used. The majority of identified specimens were from the layer Bu (31.9%), as this layer contained the most cranial specimens. The next largest collections were from RSp (18%) and LB MOD (9.7%), followed by MOD (5.6%), MY (4.2%), GS (4.2%), GSII (4.2%), OMOD (2.7%), YSp (2.7%), Or (2.7%), Co (2.7%), GR (2.7%), BSp (1.4%), SPCA (1.4%), LMou (1.4%), LBG (1.4%), LBGII (1.4%) (Table 4.5). Eleven different micromammal species were identified in the assemblage.

The collection was predominately made up of *Otomys irroratus* (vlei Rat), *Otomys laminatus* (laminar vlei rat) and *Mastomys natalensis* (Natal multimammate mouse) (Table 4.5). Other species identified included, *Otomys angoniensis* (angoni vlei rat), *Rhabdomys pumilio* (striped mouse), *Cryptomys hottentotus* (common mole rat),

Georhynchus capensis (cape molerat), *Myosorex varius* (forest shrew), *Elephantulus myurus* (elephant shrew) and *Rhinolophus clivosus* (Geoffrey's horseshoe bat). The specimen examined from the modern owl pellet found at Sibudu Cave was identified as *O. irroratus*. Table 4.5 provides a list of the number of specimens and the type of species identified within each stratigraphic layer.



Figure 4.1 SMF: 1054. Lingual view of a mandible of *Otomys irroratus* from layer YSp.



Figure 4.2 SMF: 1772. Occlusal view of a maxilla of *Otomys irroratus* from layer Co.



Figure 4.3 SMF: 1135. Lingual view of a mandible of *Mastomys natalensis* from layer RSp.



Figure 4.4 SMF: 1830. Occlusal view of a maxilla of *Mastomys natalensis* from layer RSp.



Figure 4.5 SMF: 1861. Basal view of a partial cranium and buccal view of a mandible of *Myosorex varius* from layer RSp.



Figure 4.6 SMF: 1855. Lingual view of a partial mandible of *O. irroratus* from layer RSp, showing the degree of breakage and etching modifications on the incisors.

Cricetomys gambianus (giant rat) has been identified within the assemblage. Although this species does not fall within the micromammal criteria (< 300g) described for this project, this specimen has been included in the environmental analysis.

4.5 MINIMUM NUMBER OF INDIVIDUALS

The postcranial MNI was 35, based on the humerus, with 78 specimens: 35 right, 27 left and 16 undiagnostic. The cranial MNI was 13, based on the left M³. The postcranial and cranial MNI differed significantly from each other, with the postcranial numbering 35 individuals and the cranial numbering 13. It should, however, be noted that the calculations to determine relative abundances of species (MNI), can be biased (Plug & Plug 1990). Plug and Plug (1990) revealed that the methodological problems often found to be associated with MNI abundances are logical consequences of the manner in which an MNI count is defined.

4.6 TAPHONOMY

The taphonomic analysis was based on the incisors and postcranial elements. The level of bone preservation throughout the assemblage is good although there is evidence for soil staining on a large number of the bone remains. The incisors were examined for etching modifications. There was evidence for pre-depositional breakage and damage associated with trampling, but very little evidence for digestion modification on any of the incisors. Some etching on the incisors can be categorised within category 1 and category 2 (Andrews 1990) (see Chapter 1). The pattern that emerged from these results showed similarities with the trampling patterns proposed by Andrews (1990), evident throughout the assemblage (see Chapter 1). There was a complete absence of skulls, under-representation of maxilla, a considerable loss of teeth leading to the large numbers of isolated teeth and considerable breakage of postcranial elements (Andrews 1990).

4.7 SPATIAL ANALYSIS

The spatial analysis was based on the spatial distribution of micromammal bone throughout the site (Table 4.5). Ninety-eight percent of the assemblage was mapped according to their unit distribution within the site. The spatial distribution of the remaining two percent of the bone had not been recorded. The results show that the majority of the microfaunal assemblage was recovered from squares situated along the eastern wall (back wall of cave), E2, E3, D2 and D3.

Table 4.6 Percentage representation of total bone in each square.

Square	Frequency	%
B4	19	0.7
B5	91	3.4
B6	25	0.9
C2	92	3.4
C3	28	0.8
C4	34	1.3
C5	7	0.2
C6	3	0.1
D2	761	28.1
D3	174	6.4
D4	81	3.0
D5	31	1.1
E2	655	24.3
E3	559	21.0
E4	74	2.1
E5	23	0.8
E6	10	0.4
Total	2667	98

· Highest percentages in bold.

4.8 SPECIES PROFILE

Order MACROSCELIDEA

Family: MACROSCILIDIDAE

Elephantulus myurus (Rock elephant shrew)

Modern distribution

The geographic range of this species in southern Africa includes much of the central south-eastern part of this region (Mills & Hes 1997). In South Africa it occurs widely in the North-West and the Northern Province, Mpumalanga and the Free State, in the north of the Eastern Cape, and in the mountainous regions of western KwaZulu-Natal and Lesotho (Skinner & Smithers 1990; Mills & Hes 1997). The adult has a total length of about 260 millimetres and weighs about 60 grams (Mills & Hes 1997).

Habitat

This species is completely rupicolous. It prefers large rock debris which offers abundant crevices and cranies for refuge (Rautenbach 1982; Mills & Hes 1997). The species can also be found in lower densities on unbroken hill slopes, isolated rock outcrops, on valley floors and on plains (Rautenbach 1982; Mills & Hes 1997).

Diet

Elephantulus myurus eats small insects, especially ants and termites (Rautenbach 1982; Mills & Hes 1997).

Habits

This species is most diurnal with occasional nocturnal activity (Rautenbach 1982). Records show that, to a much lesser extent, this species displays some activity after sunset and before sunrise. They are, however, more active during the warmer hours of the day (Skinner & Smithers 1990) and are extremely agile, often leaping in rocky terrain (Mills & Hes 1997).

Order RODENTIA

Family: BATHERYGIDAE

***Cryptomys hottentotus* (Common Molerat)**

Modern Distribution

This species exhibits one of the most extensive distribution patterns in southern Africa. It ranges from the western Cape through the Free State up into the former Transvaal (Limpopo, Gauteng, Mpumalanga, North West) and into KwaZulu Natal (Meester *et al.*1986). This species taxonomy is currently under revision as this wide distribution represents subspecies, which are probably true species (Mills & Hes 1997). This species size and weight is variable (60-140 grams) both within and between colonies (Mills & Hes 1997). This varying size in both body and weight depend on social status, with the reproductives in the colonies being the largest (Mills & Hes 1997).

Habitat

The distribution of this species seems only to be limited by the existence of loose sandy soil, and some subspecies have even been recorded in swampy areas (Rautenbach 1982; Skinner & Smithers 1990). This species, however, cannot tolerate heavy red clay soils or the hard soils associated with mopane woodland (Skinner & Smithers 1990). This species is more common in granite sand and other types of sandy soil including sandy alluvium along river systems (Skinner & Smithers 1990).

Diet

This species is vegetarian eating bulbs, corms and tubers (Mills & Hes 1997).

Habits

This species is highly social and lives in colonies (Skinner & Smithers 1990). This is a fossorial species that rarely ventures above ground.

***Georychus capensis* (Cape Molerat)**

Modern Distribution

The Cape Molerat is confined to South Africa, from the Cape Peninsula to the mountains around Worcester, eastwards along the coast to Port Elizabeth. There is a relict population found inland in Nottingham Road (De Graaff 1981) in KwaZulu Natal and near the Lesotho border (Skinner & Smithers 1990; Mills & Hes 1997). This species is common but its distribution is patchy (Mills & Hes 1997). Its average body weight is 180g (maximum 350g) and there is no sexual dimorphism (Mills & Hes 1997).

Habitat

Cape Molerats occur in sandy coastal dunes as well as in unconsolidated soils along rivers (Skinner & Smithers 1990). This species occurs in the sandveld, various types of fynbos and in deeper pockets of soil in some mountain regions (Mills & Hes 1997).

Diet

This species readily eats bulbs and a diversity of other roots and tubers with some green vegetation (Mills & Hes 1997).

Habits

This is an extremely aggressive solitary species which, meet only briefly to mate (Mills & Hes 1997).

Family MURIDAE

Subfamily MURINAE

Mastomys natalensis (Natal multimammate mouse)

Modern Distribution

The Natal multimammate mouse is a very widely distributed species, tolerant of a number of varying environments. This species is found throughout southern Africa and frequents southern Savannah Woodlands and Grasslands as well as the moisture parts of the South West Arid (Davis 1974; Skinner & Smithers 1990; Mills & Hes 1997). Multimammate mice have a total length of 24 cm and a body mass of about 65g (Skinner & Smithers 1990).

Habitat

This species has a wide habitat tolerance with generalized ecological requirements. The Multimammate mouse occurs in various habitats from sea level to high lying ground, but is absent from very dry and arid regions (De Graaff 1981; Mills & Hes 1997).

Diet

The Natal Multimammate mouse is known to eat a variety of grasses and seeds including *Acacia* seeds. They also take dry pods and the pulpy exterior of wild fruits (De Graaff 1981; Skinner & Smithers 1990; Mills & Hes 1997).

Habits

Multimammate mice are communal, terrestrial and nocturnal and will shelter in any hole in the ground (De Graff 1981; Skinner & Smithers 1990; Mills & Hes 1997). This species has been known to enter huts and other human abodes, where it breeds under floors (Mills & Hes 1997).

Predators

Predators include various species of owls, including the Giant Eagle Owl (*Bubo lacteus*), the Barn Owl (*Tyto alba*), the Marsh Owl (*Asio capensis*), the Spotted Eagle Owl (*Bubo africanus*) and the Grass Owl (*Tyto capensis*) (Davis 1974). They are also taken by various canids and felids (De Graaff 1981).

Rhabdomys pumilio (Striped mouse)

Modern Distribution

The Striped mouse occurs throughout South Africa and Namibia except the northeast and southwest. It also occurs in Lesotho, southern Botswana and eastern Zimbabwe (Mills & Hes 1997). A large male may weigh as much as 55g. Head and body length is about 105mm with a tail of 106mm (Mills & Hes 1997).

Habitat

Although this species is essentially a grassland species, it has been found in diverse habitats with good grass cover (Mills & Hes 1997). Davis (1974) describes this species as primarily savannah form. Brooks (1974) also states that the Striped mouse is absent from the montane and subtropical evergreen forests which are distributed in the Savannah and South West Cape zones. Brooks (1974) suggests that this species occupies a wide variety of habitat types, and may thus be considered a broad-niche species.

Diet

Rhabdomys pumillio is predominantly granivorous, but will supplement its diet with green plants, berries and even small invertebrates (Mills & Hes 1997). Their diet varies throughout the year (Brooks 1974).

Habits

The Striped mouse is predominantly diurnal (Skinner & Smithers 1990).

Predators

These rodents are often taken by owls such as the Marsh Owl (*Asio capensis*), and the Spotted Eagle Owl (*Bubo africanus*) (Kemp & Calburn 1987). Other avian predators include, the Black-shouldered Kite (*Elanus caeruleus*). This mouse also forms part of the diet of various felids and canids.

Subfamily: **OTOMYINAE**

Otomys irroratus (Vlei Rat)

Modern Distribution

This species occurs throughout South Africa, and is only absent from the more arid western and north-western regions (Mills & Hes 1997). There is an additional isolated population in eastern Zimbabwe (Mills & Hes 1997). This species was found in a modern owl pellet found near Sibudu Cave. *Otomys irroratus* is a relatively large species with a body length of about 150mm (Mills & Hes 1997). Males tend to be heavier (122g) than females (114g) (Mills & Hes 1997).

Habitat

Otomys irroratus prefers grass-covered ground in proximity to streams and marshes (Skinner & Smithers 1990). Davis (1973) was able to show a highly significant positive association of *O. irroratus* with the following plant species on an experimental grid in the Van Riebeeck Nature Reserve near Pretoria: *Mariscus congestus*, *Eleocharis dregeana*, *Berula erecta*, *Agrostis lachnantha*, *Juncus punctorius*, *Pennisetum thunbergii* and *Cirsium vulgare*. Although this study was conducted in the Pretoria region, the associated plant species may provide future reference for studies in the KwaZulu-Natal region for similar associations.

Diet

This species is primarily vegetarian and eats everything within its habitat from grass stems, grass leaves and herbs to seeds, reeds and thistle (Davis 1973).

Habits

Otomys irroratus is terrestrial but is an able swimmer and may become partly amphibious, depending on surroundings. It is semi-gregarious and diurnal, although some nocturnal activity has been observed (De Graaff 1981; Mills & Hes 1997), as it is caught in large numbers by Barn Owls in some areas (Avery pers. comm.)

Otomys angoniensis (Angoni Vlei Rat)

Modern Distribution

This species is widely distributed through Central and southern Africa (Mills & Hes 1997). In southern Africa, it is found in savannah woodland and grasslands in South Africa's Northern Province, Mpumalanga, the North-West, Gauteng, central and northern KwaZulu-Natal as well as Swaziland and Lesotho (Mills & Hes 1997). This is a small and slender species with a body length of 220mm and a body weight of 100g (Mills & Hes 1997).

Habitat

Otomys angoniensis is generally associated with drier areas with wet vleis, swamps and swampy areas along rivers (Smithers & Wilson 1979 cited in Skinner & Smithers 1990). De Graaff (1981) included savannah woodland and grasslands.

Diet

They subsist on an array of grass species, grains, seeds and fine reeds (Skinner & Smithers 1990).

Habits

This species is predominantly diurnal although nocturnal activities have been recorded (Skinner & Smithers 1990; Mills & Hes 1997).

Otomys laminatus (Laminate Vlei Rat)

Modern Distribution

This species has a discontinuous distribution on the lowveld side of the eastern escarpment of the Drakensberg range, as well as central Kwa-Zulu Natal and

Pondoland and in the former Transkei (Coetzee 1972; Skinner & Smithers 1990), with a separate population in the Western Cape (Mills & Hes 1997). Adult males have a mean total length of 300mm with tails just over 100mm and a mass of about 190g (Skinner & Smithers 1990).

Habitat

Otomys laminatus is a poorly known species but seems to prefer grassland, submontane and coastal zones in South Africa (De Graaff 1981; Skinner & Smithers 1990; Mills & Hes 1997).

Diet

As far as is known this species is entirely vegetarian, taking roots and stems of small grasses and small shrubs (De Graaff 1981; Skinner & Smithers 1990; Mills & Hes 1997).

Habits

Very little is known about this species habits, reproduction and predators (Mills & Hes 1997).

Subfamily: **Cricetomyinae**

Cricetomys gambianus (Giant rat)

Modern Distribution

The Giant Rat is considered rare in South Africa because of restricted distribution (Mills & Hes 1997). It occurs in south-western Mozambique (Skinner & Smithers 1990), ranging southwards into the Soutpansberg mountains, the Northern Province and northern KwaZulu Natal (De Graaff 1981; Mills & Hes 1997). Adults measure about 0,75m from nose to tail tip and males can weigh an average of 1,3kg, females 1,2kg (Mills & Hes 1997).

Habitat

This species prefers forests and forest scrub in areas that receive more than 800mm of rainfall per annum (Skinner & Smithers 1990; Mills & Hes 1997).

Diet

Giant Rats are omnivorous and feed on seeds, fruits, groundnuts, maize, insects and termites (Mills & Hes 1997).

Habits

The Giant Rat is terrestrial and predominantly nocturnal, but may be seen to move in the late afternoon (Skinner & Smithers 1990). They are terrestrial species but have been known to climb trees in search of food when none is available on the ground (Skinner & Smithers 1990).

Predators

Reports on Giant Rat predation are rare, but there have been cases where this species has been preyed on by the Giant Eagle Owl (*Bubo lacteus*) (De Graaff 1981).

Order EULIPOTYPHLA

Family: SORICIDAE

Myosorex varius (Forest shrew)

Modern distribution

This species is the most widely distributed species of forest shrew (Mills & Hes 1997), ranging from the Northern province along the western Cape coast to the eastern coastal areas of KwaZulu Natal, inland to Lesotho into the former Transvaal (Limpopo, Mpumalanga, Gauteng, North West) (Meester *et al.* 1986; Skinner & Smithers 1990). It is about 83mm in length and weighs on average 12g (Mills & Hes 1997).

Habitat

This species prefers moist conditions with dense grass cover (Rautenbach 1982) and vegetation (Skinner & Smithers 1990). *Myosorex varius* is highly dependant on permanent water on the highveld (Rautenbach 1982; Mills & Hes 1997) and moist misty conditions with low succulent bushes in drier areas (Skinner & Smithers 1990).

Diet

Myosorex varius is an opportunistic feeder and eats insects and other small invertebrates (Skinner & Smithers 1990; Mills & Hes 1997).

Habits

This species is active for short time periods both during the day and night (Rautenbach 1982).

Predators

Remains of this species are often found in barn owl pellets. Other known predators include the water mongoose, the African weasel and the striped polecat (Mills & Hes 1997).

Order CHIROPTERA

Family: RHINOLOPHIDAE

Rhinolophus clivosus (Geoffrey's horseshoe bat)

Modern distribution

This species ranges from the Western Cape province northwards into Namibia, KwaZulu-Natal, the Free State and the Limpopo, North West, Mpumalanga and Gauteng (Meester *et al.* 1986; Mills & Hes 1997). Adults range between 80mm-90mm in length and weigh between 8-10g (Skinner & Smithers 1990).

Habitat

This is predominantly a woodland species (Skinner & Smithers 1990) with a wide habitat tolerance (Mills & Hes 1997). Its absence from desert areas is probably related the lack of suitable roosting sites such as caves and hollow trees (Skinner & Smithers 1990; Mills & Hes 1997).

Diet

Rhinolophus clivosus is entirely insectivorous (Mills & Hes 1997).

Habits

This species is gregarious and nocturnal (Skinner & Smithers 1990) and torpid in winter months with occasional activity. It roosts individually or in colonies from the cave roof or small hollows in trees (Rautenbach 1982; Mills & Hes 1997).