

A
HERPETOFAUNAL SURVEY
OF SWAZILAND

by
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ABSTRACT

The present report, based on a survey conducted over four years and on the accumulation of museum records, provides the most detailed documentation yet of the herpetofauna of Swaziland. One hundred and two new forms are recorded from the country bringing the total number of forms to 154, consisting of 44 amphibians and 110 reptiles. Up-to-date checklists of the amphibians and reptiles are presented and effectively indicate a rich and diverse herpetofauna.

The biogeography of the Swaziland herpetofauna is discussed based on distribution records derived from collected specimens as well as reliable sight and audio records. Swaziland does not constitute a distinctive biogeographical unit. The present study indicates that the herpetofauna shows affinities with both the Afrotropical and Afrotropical biomes. The traditional biogeographical classification in southern Africa, of the presence of a Cape temperate fauna and a tropical East African lowland fauna, is tested by means of a transect and is reinforced. It is also shown that Swaziland, together with Natal and southern Mozambique, forms an integral part of the tropical subtraction zone of south-east Africa. Amphibian diversity and species turnover in southern Africa are investigated by means of a transect from the east coast, through Swaziland, to the interior plateau, and a north to south transect down the eastern lowveld. The Dice-Sorenson Similarity index gives a value of 41% for the entire east-west transect and 89% for the north-south transect.

The conservation status of the amphibians and reptiles of Swaziland is discussed. Conservation measures are proposed.

PREFACE

The present writer undertook this study while employed by the Swaziland National Trust Commission. The research was carried out while registered as a part time student in the Department of Biology, University of Natal, Durban between January 1991 and December 1992 under the supervision of Professor John C. Poynton of the University of Natal, Durban. The study represents original work by the writer and has not been submitted to any other University.

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DEDICATION

To Judy,
Simon and Timothy

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CHAPTER ONE

DESCRIPTION OF STUDY AREA

1.1. Location, extent and herpetofaunal composition

Swaziland is located in the subtropics of south-eastern Africa between the latitudes $25^{\circ}40'S$ and $27^{\circ}20'S$, and the longitudes, $30^{\circ}45'E$ and $32^{\circ}10'E$. The geographical regions in Swaziland provide living space for a great diversity of forms of amphibians and reptiles in a relatively small area. Small as the country might be (17 366sq.km) it boasts a herpetofaunal composition of more than 150 forms, 44 amphibians and 110 reptiles (1 crocodile, 5 chelonians, 44 lizards, 60 snakes). This fauna is one of the most diverse and interesting vertebrate communities in southern Africa. Great variation in topography, geology and climate over a relatively short distance makes Swaziland an ideal region in which to study the herpetofaunal communities of southern Africa. In this study it is shown that Swaziland possesses a southern African microcosm of herpetofaunal diversity.

1.2. Geology, topography, vegetation and climate

The geology of the highveld and middleveld consists mostly of granites and gneisses including some of the oldest sedimentary rocks in the world (Goudie and Price Williams 1983). In the highveld the granites, quartzites and banded ironstone are very resistant to erosion and have given rise to the rugged relief found in this part of the country. Most of the middleveld is underlain by granites and gneisses, producing an undulating landscape of open plains and small hills. In the lowveld and Lubombo regions, shales, sandstones, basalts and rhyolites predominate (Goudie and Price Williams 1983). In the lowveld the softer basalts have eroded into a level, almost featureless plain, overlaid by granitic sands. Outcrops of the harder, erosion, resistant sandstones and dolerites occur sporadically throughout the region. The Lubombo region consists of basalts and rhyolites comprising a plateau rather than a mountain range, that extends in a north-south direction over the length of the country. The western edge is higher than the eastern edge and the plateau tilts to the east.

Topographically, vegetationally and climatically Swaziland can be divided into four major regions (after Compton 1966, I'ons 1967 and Goudie and Price Williams 1983). From west to east these are the Highveld region (1000m to 1860m altitude a.s.l.), the Middleveld region (300m to 1000m), the Lowveld region (150m to 300m) and the Lubombo region (150m to 780m)(Figure 1). Altitude ranges from 30m (100ft) at Abercorn Hoek in the Usutu Gorge, in the south-east of the country, to 1863m (6100ft) on top of Emlembe Mountain, in the north-west of the country.

The great South African escarpment extends from the north-eastern Transvaal to south-western Natal (and beyond) through the highveld region of western Swaziland. In Swaziland this region is characterised by several mountain ranges, such as, from the north, the Sondeza Range (1205m to 1455m altitude), Makonjwa Range (915m to 1420m), Kobolondo Heights (915m to 1280m), Mgwayiza Range (965m to 1863m), Silotwane Range (1525m to 1677m) and Ngwenya Range (1525m to 1838m) that extend along the Swaziland/South African border. To the east of this chain of mountain ranges the highveld plateau extends into Swaziland for 40km to 50km in a series of highveld promontories between the major rivers. South of the Ngwenya Range there are no typical mountain ranges as such, but rather, many single peaks, domes and plateaux that characterise the highveld region in the central and southern parts. These include the Motshane Hills (1370m to 1645m), Mdzimba Hills (1000m to 1400m), Makwana (1665m), Bellskop (1578m), Etshaneni Dome (1623m), Dwalile (1455m), Ntongozi (1370m), Ntungulu (1448m), Mahlangatsha Hills (915m to 1260m) and Hlatikulu (1258m). Consequently the highveld/middleveld ecotone in Swaziland is far more pronounced in the northern part of the country than in the south, where the topography is broken by numerous river systems and is more gentle. The northern highveld is penetrated by the Nkomati River, and, to a lesser extent, the Mlumati River, while in the central and southern highveld many more rivers are to be found. These are the Lusushwana (Little Usutu), Mpuluzi, Lusutfu (Great Usutu), Ngwempisi, Mkondo and Ngwavuma (Figure 1). All the preceding rivers rise in South Africa and have carved deep valleys in the highveld of western Swaziland. The Umbuluzi River which rises in the western highveld of Swaziland has cut a substantial gorge in the eastern highveld.

The natural vegetation of the highveld is typically Afromontane, consisting of extensive short grassland, interspersed with rock-outcrops covered in bushes and small trees, vleis systems, small pockets of temperate forest on steeper slopes and in deeper valleys, thick temperate forest. The vegetation of the highveld is strongly associated with the Cape temperate flora, with species of *Protea*, *Leucospermum*, *Erica*, *Cliffortia* and others being well represented but there are also northern elements in the tree flora such as *Ocotea kenyensis*, *Aphloia theiformis*, *Vaccinium exul* and *Anthocleista grandiflora*. The vegetation of the middleveld is a mixture of temperate and tropical elements consisting of woodland and broad-leaved savanna in hilly and mountainous terrain, and, in the larger valleys, forest. The vegetation of the lowveld is typically Afrotropical, consisting of mixed acacia and broad-leaved savanna and woodland, dominated by large trees. The vegetation of the Lubombo region is similar to that of the middleveld, consisting of acacia savanna, broad-leaved savanna, patches of open grassland and thick tropical forest in the river valleys.

The highveld is essentially part of the Drakensberg escarpment and is the coolest and wettest part of the country, mainly as a result of altitude. The summers are warm and humid, the winters cool and dry, with light to moderate frosts. Snow does occur but very rarely (last recorded in 1987). The climate of the middleveld is generally warmer and drier than that of the highveld. The summers are warm to hot, the winters mild with occasional light frosts in the higher regions. The climate of the lowveld is hotter and drier than that of the middleveld. The summers are hot and very humid after rains, the winters mild with occasional light frosts along drainage lines. The climate of the Lubombo region is similar to that of the middleveld.

1.3. Hydrology

Several large rivers flow through Swaziland in a west-east direction. In the highveld these rivers have carved deep valleys while in the east they meander through the lowveld before flowing through steep-sided gorges in the Lubombo Mountains. Highveld rivers and streams are perennial and the region's drainage network is dense. Similar conditions are found in the middleveld above 750m altitude. Floods can occur at any time during the summer and the rivers and streams are at their lowest in September or October. After this period, rainfall is certain and the catchments of these rivers are soon replenished. In normal years stream flow

is intermittent below 750m altitude except for the major rivers and their largest tributaries, such as, from the north, the Mlumati, Nkomati, Black Umbuluzi, Little Usutu, Great Usutu, Ngwempisi, Mkondo and Ngwavuma. The White Umbuluzi, a major tributary of the Black Umbuluzi, and the Ngwavuma may be reduced to dry sand rivers along some of their lowveld tracts in late winter, particularly in years of below-average rainfall. The discharge from catchments in the highveld is more than ten times as great as that from lowveld catchments (Murdoch 1970). Water analysis indicates that Swaziland rivers are among the purest in Africa, as most streams flow through collecting grounds floored by acid igneous rock, or deep, highly leached soils. The regional watertable is usually deep-seated in Swaziland because of the present phase of vigorous downcutting by rivers, coupled with aridity in the east and the amplitude of relative relief in the west (Murdoch 1970). Dams have been constructed on some of the main rivers and these include, Sand River Dam on the Sand River, Mnjoli Dam on the Black Umbuluzi, Hawane Dam on the upper reaches of the Black Umbuluzi and Lupholo Dam on the Little Usutu. Consideration is being given at present to the construction of a dam on the Nkomati River.

1.4. History of collecting in Swaziland

The earliest Swaziland herpetological collections appear to have been made by Austin Roberts under the auspices of the Transvaal Museum. Roberts collected amphibians and reptiles in Swaziland in 1915 at Forbes Reef. In 1937, Vivian FitzSimons, also under the auspices of the Transvaal Museum, collected reptiles in the south of Swaziland and apparently returned the following year to Mbabane. These collections were added to through further collecting by R.F.Lawrence of the Natal Museum in 1939, and V.FitzSimons, G.van Son and R.Martin of the Transvaal Museum in 1956. In January-February 1959, Natal University embarked on a Nyasaland/Mozambique expedition that traversed part of Swaziland. The expedition collected some amphibians in Swaziland. In 1962, Donald Broadley, then of the Umtali Museum, collected a number of reptiles in Swaziland and in 1963, W.J.Lawson collected amphibians and reptiles for the Durban Museum. These expeditions appear to have been the last attempts by recognised natural history institutions to collect in the region, except for infrequent trips by individual biologists attached to them, since then. Apart from these latter collectors, of which there have been only a few, all subsequent collecting has been undertaken by students,

private collectors and interested individuals. A few Swaziland residents with a keen interest in the herpetofauna have made significant collections of the region's amphibians and reptiles and much of this material is housed in some of southern Africa's foremost museums.

V. FitzSimons' book "The Lizards of South Africa", published in 1943, was the first publication to document voucher specimens from Swaziland and later, his book on southern African snakes published in 1962, documented the first voucher snake specimens from the region. In the former, 13 lizard species from six localities were recorded, and in the latter, 25 species of snake were listed from seventeen localities. The first voucher amphibian specimens from Swaziland were documented in Poynton's (1964) monograph on southern African frogs. In this publication 13 species from four localities were recorded. Since then odd specimens have featured in a few taxonomic publications and short notes on distribution and biology (Schaefer 1970, Broadley 1977a, 1977b, 1978, 1984, Onderstall 1984, Pickersgill 1984, Haagner and Hurter 1988, Boycott 1990a, 1990b, 1990c, Boycott and la Croix 1991). Broadley's (1983) revision of FitzSimons' snake book is the only publication that has included fairly recent snake collections from the region, and Boycott (1992b) lists recently collected amphibian specimens from Swaziland. It is quite remarkable that in this modest list of herpetological publications three new taxa have been described from Swaziland, a snake (Schaefer 1970), a lizard (Onderstall 1984) and a frog (Pickersgill 1984).

1.5. Erroneous distributional data

Attention is drawn to a number of distributional errors that were encountered during the course of the study. In 1959 Natal University embarked on a Nyasaland/Mozambique expedition which traversed part of Swaziland. According to the Natal Museum catalogue, several amphibian specimens were collected from "Motshane River, between Mbabane and the Transvaal border". Poynton (1964) documented this material and listed it from Mbabane (2631AC), and plotted the localities as such on the distribution maps. However, this represents an erroneous plot as the Motshane River on the Mbabane/Transvaal route is located 12km south of Forbes Reef in the Forbes Reef quarter degree grid square (2631AA). The corrected records have been incorporated into the present study. Poynton (*op. cit.*) also listed a Durban Museum specimen of *Chiromantis xerampelina* from "near Mananga" (2531DD). The entry

in the Durban Museum catalogue is given as "near Mananga, Swaziland" and Poynton's gazetteer lists the locality as "Mananga, Transvaal". Although Mananga is situated right on the border between Swaziland and the Transvaal, it appears as if this material was in fact collected within Swaziland. The quarter degree grid square plot on Poynton's map for this species is correct but the locality needs to be ammended.

Many of Broadley's (1983) "Tshaneni" records were misplotted as 2631BB instead of 2531DD, not surprisingly as Tshaneni straddles both grid squares. Clearer detail was supplied to the writer by the collector of most of this material, Mr B.L.Washington, who is based in Swaziland, and the corrections have been incorporated into the present account. The above, as well as other erroneous distribution records (*viz* FitzSimons 1962, Broadley 1981a) are dealt with in the individual species accounts under the heading "Remarks". The Durban Museum locality of "Mcandatshe Farm" was placed in the grid square 2631BB by Poynton (1964). The writer, despite attempts made through the Government Archives in Swaziland, has failed to locate or confirm this locality, and for want of no alternative, has adhered to Poynton's gazetteer in respect of this locality. Onderstall (1984) refers to two localities for the endemic gecko, *Afroedura pondolia major*, namely, "Matenga Falls" (*sic.*) and "Mdimba Plateau" (*sic.*). These should be corrected to Mantenga Falls and Mdzimba Plateau respectively. Furthermore, he gives the co-ordinates for "E slope of Mdimba Plateau" as 26°23'S; 31°12'E when these clearly refer to the western slopes. If the locality was indeed on the eastern slopes of the Mdzimba Plateau it would fall into the Manzini grid square (2631AD) which would warrant an additional plot on the distribution map. Boycott (1992b) lists the locality "Motshane River" for some amphibians and cites Poynton (1964) as the source when in fact the source should have been the Natal Museum (NM).

CHAPTER TWO

METHODS AND MATERIALS

2.1. Collecting methods

The present study is based mainly on a collection of some 1000 amphibians and reptiles collected by the writer in Swaziland between 1988 and 1992. Much of this material has been lodged in the Transvaal Museum collection. Additional to this was the incorporation of material from Swaziland lodged in the collections of museums and institutions in southern Africa and overseas. The study therefore is not based solely on the writer's own collected material but also comprises a synthesis of additional material from other sources. Just over 1000 specimens have been collected by the writer while a further 1100 specimens from other sources are also included. All the material collected by the writer has been examined, while only the distributional data of the additional material has been incorporated into the study. The following abbreviations have been used in the text in respect of material held by museums and institutions, and in respect of literature records cited.

BMNH	British Museum of Natural History, London, England
Brdly	D.G.Broadley
CAS	California Academy of Sciences, San Francisco, California, United States
DM	The Natural Science Museum, Durban, Natal, South Africa
Fitz	V.F.M.FitzSimons
JV	J.D.Visser Collection, Cape Town, Cape Province, South Africa
LR	L.R.G.Raw Collection, Merrivale, Natal, South Africa
NM	Natal Museum, Pietermaritzburg, Natal, South Africa
NMZB	National Museums of Zimbabwe, Bulawayo, Zimbabwe
Poytn	J.C.Poynton
RCBS	R.C.Boycott Swaziland Collection, Mbabane, Swaziland
SAM	South African Museum, Cape Town, Cape Province, South Africa
TM	Transvaal Museum, Pretoria, Transvaal, South Africa
UM	Umtali Museum, Bulawayo, Zimbabwe

Amphibians were collected mostly at night, although some day collections were also made. In most cases amphibians were tracked down by ear or collected while crossing roads and tracks during wet weather; road kills were also collected if the specimen was not too badly damaged. Usually two specimens, preferably a male and a female, of each species were collected from each locality, although, at times, as many as seven specimens were collected from a single locality. Specimens were retrieved from swimming pools and holes in the ground. A fine net was used to collect specimens in fast flowing streams (e.g. *Heleophryne*).

Reptiles were searched for under rocks, logs and other debris which, once turned, would be replaced as before. Rock crevices were searched using welding rods and a light crowbar, soil pits up to three metres in depth were inspected. A small garden hand-rake was used when searching through loose soil and debris in the bottom of soil pits. Exfoliating rock pieces were examined and replaced where possible, decaying aloe stems, logs and branches were partially opened. Night driving was also embarked upon and road kills as well as live specimens on roads were collected. Pilstrom tongs were used to capture venomous species.

In many parts of Swaziland, including Malolotja Nature Reserve, signs of previous searching by collectors were evident, the most obvious sign being chock-stones in rock cracks that had previously been widened or opened. Additional to this was the blatant removal and destruction of exfoliating rock slabs, particularly near the main roads in the middleveld and lowveld. In many rock cracks, twigs and other tools of extrication had been left. Other people including colleagues, friends, farmers and nature enthusiasts collected material for the writer. This comprised some potentially dangerous species destroyed near houses and homesteads, and others found "dead on road" or found dead in cane rat traps. In addition, active collecting was undertaken by a few individuals.

2.2. Preservation of material

Amphibians were killed in a solution of 70% alcohol. When dead and still in a limp condition they were rinsed in water and positioned, with limbs and digits splayed, in shallow plastic containers on white paper towelling soaked in 10% formalin. The forefeet and hindfeet of each specimen were held in position by small square pieces of paper towelling and each

specimen was covered in more paper towelling soaked in 10% formalin. A small ball of cottonwool was placed inside the mouth of frogs and the mouth was closed to ensure the bulging position of the eyes. The plastic container was then sealed and the specimens were left to set over a period of time ranging from two hours to twenty-four hours. Measurements were then taken. Road kills were set immediately in the field or within a few hours of collection.

Reptiles were killed through placement in a deep freeze for a minimum period of twenty-four hours, after which they were allowed to thaw. A solution of 10% formalin was injected into each specimen. With snakes this was done at intervals of 2cm along the whole length of the body. The tail was also injected firstly in the direction of the head about three or four centimetres below the vent, in order that, in males, the hemipenes might be everted, and then at small intervals towards the tail tip. In lizards a smaller gauge needle was used to inject formalin into the forelimbs, in the direction of the digits, from the armpit, and into the hindlimbs, in the direction of the digits, from the groin. In larger lizards a further injection was administered from just below the "knee-joint" to help splay the digits of the hindfeet. Formalin was also injected into the base of the tail again lower down in suspect males. A final injection of formalin was made into the abdomen. The specimen was then placed full length in a shallow plastic container on white paper towelling soaked in 10% formalin. Thereafter the same procedure as described above for the amphibians was applied. In the case of large reptiles such as monitor lizards (*Varanus* sp.), and large snakes such as the python (*Python sebae natalensis*), puff adder (*Bitis arietans*), cobras (*Naja* sp.), black mamba (*Dendroaspis polylepis*), and boomslang (*Dispholidus typus*), a portion, consisting of the head and part of the neck, was cut off and retained as a voucher specimen. This was due to restricted storage facilities and preservative. After six months or a year the material was rinsed in water and then placed, for final preservation, in a solution of 70% alcohol.

2.3. Data processing, labelling, storage and identification

Collection of material was planned with the help of the Swaziland 1:50 000 topographical map series and was based on the quarter degree grid (Figure 1). The territory of Swaziland extends over a total of 35 grid squares. Attempts were made to collect material from each

square, and at least two or more specimens have been collected from all but two of the southernmost squares in the country. Some areas have undoubtedly been better collected than others. The greatest coverage has been achieved in the north of the country where the writer has been based. Other enthusiastic collectors have also been based in, or passed through, this part of the country. Both Swaziland National Trust Commission nature reserves, Malolotja in the north west and Mlawula in the north east, have been well surveyed by the reserve managers past and present. The distributions of all species are presented in the form of quarter degree grid maps.

All specimens collected by the writer and those donated by other people have a collector's number RCBS (R.C.Boycott Swaziland). Most of this material has been sent to the Transvaal Museum and all designated TM numbers are listed in the text where necessary. If not, the number is given as follows: (RCBS1050). All material is entered into an accession register as follows:

RCBS494 *Tomopterna natalensis* Adult male Coll. 10/i/1991

TM70727 Natal sand frog

2631DC SITOBELA 26°48'15"S; 31°35'46"E. Alt.260m

Collected in amplexus with RCBS495 from the sandy riverbed of the Tofu River, approximately 20km south west of Siphofaneni, Swaziland. Collected between 10-15p.m. and 10-30p.m. by R.C.B. Many males were calling here. SVL 32,5mm

An index card filing system is employed. This consists of three different cards, a Collector's Number Card, a Species Card and a Grid Square Card. On the Collector's Number Card brief details in eight or nine lines are entered as follows:

RCBS834

Ptychadena oxyrhynchus

Adult male

Collected by R.C.B.

7/xii/1991

Collected at edge of borrow-pit next to road, 3,5km N of Mambane, Lubombo Mountains, Swaziland.

2632CA TIKHUBA 26°44'30"S; 32°01'28"E. Alt.580m

On the Species Card all the localities where that particular species has been collected are listed. Each card can have eight entries whereupon a second card is added. The grid square is given in parenthesis after the locality and the specimen numbers are listed at the end of each line as follows:

Tomopterna cryptotis (Card 1)

Air-strip pan, Mlawula Nat.Res.(2632AA)	RCBS258,259
15km W of Nhlangano (2731AA)	RCBS353,354
Btwn. Piggs Peak and Matsamo (2531CD)	RCBS442,443
15km NW of Mafutseni (2631BC)	RCBS452,458
3km E of Maloma on Nsoko road (2631DC)	RCBS529,530
10km S of Nsoko on Lavumisa road (2731BB)	RCBS535
8km S of Nsoko on Lavumisa road (2731BB)	RCBS539
6km N of Lavumisa (2731BD)	RCBS552

The Grid Square Card lists all the species recorded from that particular grid square. Literature records are included. A species is only listed once on this card and that entry reflects the first time the species was recorded. The author or, in the case of unpublished data, the collector and date of recording are entered after the species name. Each card can have eight entries whereafter a second, third and fourth card are added. The species recorded are listed as follows:

2631AA FORBES REEF (Card 1) R

Lygodactylus ocellatus: Fitz.(1943)

Chamaeleo dilepis: Fitz.(1943)

Scelotes mira: Fitz.(1943)

Pseudocordylus melanotus transvaalensis: Fitz.(1943) - as *P. subviridis transvaalensis*

Lamprophis swazicus: Schaefer (1970)

Psammophylax rhombeatus: Brdly.(1983)

Afroedura pondolia major: Onderstall (1984)

Aparallactus capensis: Boycott (8/vi/1988)

In the case of reptiles each card is marked with a "R" in the top righthand corner. Several advantages are realised with this system. The Collector's Number Card includes the species name and grid square which allows for rapid cross-reference to the other cards. The Species Card was of great value when preparing the distribution maps, as each locality is listed with the relevant grid square. These cards can be used to quickly determine whether a species occurs in any particular region, for example, protected areas, areas about to be developed etc. It allows for rapid cross-reference to the other cards. Each Grid Square Card serves as a checklist for any given area. It has historical value, as the discovery of each species is chronologically listed. This may allow for crude evaluation of population trends over extended periods. These cards serve also to reveal gaps, and regional "hit-lists" can be prepared. Once armed with such a list, duplication in the collection of material can be avoided and distribution survey work is greatly enhanced. All the Collector's Number Cards are filed in order, irrespective of whether they are amphibian or reptile cards. However, the Species Cards and Grid Square Cards are filed separately, the amphibians in one filing box, the reptiles in another.

This system was developed before the writer had access to a computer. Ideally the system should be incorporated into a computer programme. A start has been made and at this stage, the word processing facility offered by WordPerfect is being used. The data is being captured in the form of an annotated checklist with different files for amphibians and reptiles and for a gazetteer of localities. More details specific to each specimen will be incorporated later.

Most of the Swaziland material collected by the writer has been examined and identified by him. Identifications have been confirmed, corrected or supplied by herpetologists based at various institutions. However, the identifications of all other Swaziland material held by local and overseas institutions, not seen by the writer, are based on those supplied (in institutional printouts) by resident or consulting herpetologists attached to those institutions. Obvious

erroneous and dubious identifications have been followed up, if these have remained unresolved they have been excluded from the present account.

Unfortunately, some of the earlier records of material from the study area are as vague as "Swaziland" or as obscure as "Eranchi". One species of snake, *Elapsoidea sundevallii* *sundevallii*, has been included in the present account as the only locality details available are "Swaziland" and because of the proximity to Swaziland, of some South African records. The occurrence of this species in Swaziland has yet to be confirmed; however, there is little doubt that the record is authentic. Nevertheless, in most cases vague and obscure records have been omitted. During the course of the current survey, efforts have been made to avoid vague or ambiguous locality details. Descriptions of physical features and obvious landmarks such as beacons, mountains, valleys, rivers, waterfalls, dams, ranches, farms, towns and villages have been employed to assist with the recording of accurate localities. Mileage or kilometreage readings are regularly recorded along roads and tracks (e.g. 14km NW of Big Bend) and these are written down in the field notebook. Later such measurements are used to plot accurate localities on the 1:50 000 topographical maps, enabling the calculation of co-ordinates or spot localities of each locality (refer to Mapping Methods).

As most of the material collected is not kept by the writer for long before being sent to a museum, storage facilities are basic. Amphibians are bottled in genus or species bottles into which all the specimens of that particular genus or species are placed, and each bottle is numbered. Examples: AMPH.1.(*Chiromantis/Pyxicephalus*); AMPH.2.(*Bufo*); etc. The material is then sent off and is accompanied by complete lists, in numerical order, of specimens in each bottle. Each list has the number, tentative identification, brief locality and grid square of each specimen. Copies of the original list are returned with the museum accession numbers added. Reptiles are bottled according to size, and snakes and lizards are bottled separately. Each specimen has a tie-on label, normally attached to the left hindlimb. On one side the tentative identification and the collector's number are written, and on the reverse, a brief locality description, the co-ordinates, the grid square, the date of collection and the collector's name appear. The label is made of syntosil and is tied on with a nylon-based string, the tips of which are melted together to prevent splaying.

Identification of material collected by the writer in Swaziland has been done by him. The following definitive publications have been consulted in this regard: amphibians (Poynton 1964; Passmore and Carruthers 1979; Parry 1982; Pickersgill 1984), chelonians (Boycott and Bourquin 1988), lizards (FitzSimons 1943; Broadley 1977a, 1977b, 1978; Pienaar, Haacke and Jacobsen 1978; Onderstall 1984), snakes (FitzSimons 1962; Broadley 1983). In many cases identifications have been made or confirmed by Dr. D.G.Broadley, Dr. R.Drewes, Mr. W.D.Haacke, Dr. N.H.G.Jacobsen, Dr. A.J.L.Lambiris and Prof J.C.Poynton.

2.4. Mapping and plotting of localities

Two popular distribution mapping systems are recognised and used worldwide, the Universal Transverse Mercator (UTM) grid and the Latitude/Longitude grid (Greig 1978). The latter is more familiar as a result of its wide usage within southern Africa and indeed in other parts of Africa as well, and the former less familiar or unknown to local workers as it is used mostly in Europe and America. The UTM grid's major characteristic is the use of grids of varying size that are unrelated to latitude and longitude. The 10km grid in Britain and the 50km grid in Europe are in popular usage. Smaller grids can also be applied such as the 2km or 1km grids but such use is determined by the area of coverage desired. Some of the advantages of using the UTM grid are that it is accepted internationally (although mostly in the northern hemisphere), it is adaptable to mapping at different scales and its units are of equal area at different latitudes. The southern African system using the latitude/longitude grid has a long history. It was upon this system that the South African Trigonometrical Survey map series (i.e. the 1:50 000 Topographical maps) was based. Individual maps of this scale covering 1/4 degree "grid squares" or an area bounded by 15' of latitude and 15' of longitude (roughly an area 25km by 25km), were produced and published by the Government Printer. The regions covered were the territories of South Africa and South West Africa (Namibia). In Swaziland a similar series was published by the Government of the United Kingdom (specifically the Directorate of Overseas Surveys) for the Government of Swaziland.

The latitude/longitude grid has been applied in differing ways using different sized "grid squares", from 1 degree squares down to 1/8 degree squares, not only in southern Africa but also in other parts of Africa. By far the most popular unit has been the 1/4 degree grid unit.

The grid size selected is invariably linked to the regional coverage embarked upon by the individual author. If the author is, for example, covering the whole of Africa, as did Davis (1962), the grid that is likely to be selected is the whole degree unit or alternatively the half degree unit, as was the case with Sayer (1977). FitzSimons (1962) and Poynton (1964) in their monographic works on the reptile and amphibian faunas of southern Africa respectively, selected the 1/4 degree unit. Despite the obvious accuracy factor some authors with a huge deficit of detailed data choose to use the degree unit for southern Africa (Crowe 1990). de Waal (1978) in his herpetological survey of the Orange Free State selected the 1/8 degree unit as did Parker (in prep) for the Swaziland bird atlas project. For the southern African bird atlas the 1/4 degree unit was used. Greater resolution and greater accuracy of distribution patterns will be achieved using the 1/8 degree unit, especially when smaller regions are more intensively surveyed. Another major advantage of using the 1/8 degree unit is that it can be very easily incorporated into the other larger units. This means that the smallest most insignificant looking distributional survey can be more widely used. The term "grid square" should not be taken literally as these units are not square, as they become more elongated latitudinally as one moves further away from the equator. de Waal (1978), because of this, preferred to call them "degree-units". However, this suggestion has not gained general acceptance. Greig (1978) suggested the term "locus" but this too has yet to gain popularity. The variation in the size of the "grid squares" as one moves to higher latitudes (north and south) is one of the major differences between the two mapping systems. Greig (1978) did, however, point out that the Latitude/Longitude grid system can be converted to the UTM grid system by computer programme. Nonetheless, the Latitude/Longitude grid system is firmly entrenched in southern African usage and is likely to remain the dominant mapping system for the region.

Ideally the 1/8 degree grid unit should have been used in the present study but due to time constraints this was impractical. Nonetheless, the 1/4 degree grid was found to be adequate in the present study which basically represents a primary survey of the herpetofauna of Swaziland. It is indeed hoped that the present study will encourage other researchers to embark on a more detailed survey of the Swaziland herpetofauna. The co-ordinates (degrees, minutes and seconds of latitude and longitude) of all localities where material has been collected by the present writer have been calculated using the tables (Tables 1 and 2) prepared

by Greig (1976). These spot-localities will allow easy conversion to the 1/8 degree grid at a later stage. Figure 2 indicates the coverage achieved during the study, in respect of the amphibians and reptiles, on both the 1/4 degree and 1/8 degree grids.

Minutes of latitude and longitude are included in the margins on the South African 1: 50 000 topographical maps. These are tabulated at five minute intervals. However, on the Swaziland series only the five minute intervals are indicated, not each minute. Each minute therefore had to be filled in, through accurate measurement, on the Swaziland maps to enable the calculation of spot-localities to be done. Reference to the tables of Greig (1976), reproduced with acknowledgement in Tables 1 and 2, will show that on southern African maps at the scale of 1: 50 000 each minute of latitude (down the sides) is 37mm long while the length of each minute of longitude (across the top and bottom) varies from 31mm to 35mm between latitudes 34°S and 20°S. In order to calculate the exact second of latitude, a metric ruler is used to measure the exact distance down each minute. This distance in millimetres is then converted to the exact second by referring to the table (Table 1). Similarly, this method is employed to determine the exact second of longitude, remembering that in Swaziland the length of a second of longitude is 33.5mm (Table 2) as most of the country is located between 26°S and 27°S. The latitude and longitude of each locality is determined by using a set square as the spot on the map is lined up at right angles to the margin and is marked on the relevant minute of latitude or longitude. Thereafter the altitude is read off the map (in feet) and converted to metres using an altitude conversion table (Table 3). All measurements are taken from the exact minute in a southerly direction (i.e. down the sides) in the case of latitude, and, in the case of longitude, in an easterly direction (i.e. across the top or bottom).

Unlike the South African 1: 50 000 topographical series, in which each map has a notation consisting of four numerals, two letters and a name (e.g. 2631AA FORBES REEF), the Swaziland series has a notation of four numerals and two letters only. As additional identification the Swaziland series has a Public Works Department sheet number (e.g. Sheet 2631AA (PWD No.5)). Nonetheless, on data cards and in the accession register I found it necessary to add a name to the sheet. This, together with the full co-ordinates, were recorded as a matter of course and facilitated the compilation of the distribution maps (e.g. 2631AC MBABANE 26°22'53"S; 31°12'38"E. Alt.1145m). The distributions of all species and

subspecies of amphibians and reptiles recorded from Swaziland are shown on individual maps (Figures 3 to 41), where all known localities are plotted on the quarter degree grid. Hollow squares indicate sight records (s.r.)(including photographs) or audio records (a.r.)(in the case of frog calls) that are based on the observations of reliable individuals.

1mm = 1,5"	21mm = 34"
2mm = 3"	22mm = 35,5"
3mm = 5"	23mm = 37,5"
4mm = 6,5"	24mm = 39"
5mm = 8"	25mm = 40,5"
6mm = 9,5"	26mm = 42"
7mm = 11,5"	27mm = 44"
8mm = 13"	28mm = 45,5"
9mm = 14,5"	29mm = 47"
10mm = 16"	30mm = 48,5"
11mm = 18"	31mm = 50,5"
12mm = 19,5"	32mm = 52"
13mm = 21"	33mm = 53,5"
14mm = 22,5"	34mm = 55"
15mm = 24,5"	35mm = 57"
16mm = 26"	36mm = 58,5"
17mm = 27,5"	37mm = 60"
18mm = 29"	
19mm = 31"	
20mm = 32,5"	

Table 1. Latitude conversion table. In order to calculate the exact second of latitude a metric ruler must be used to measure down the relevant minute of latitude. The reading in millimetres can then be converted into the exact second by consulting the conversion table. Should the distance be 13mm the seconds of latitude would be 21", should it be 20,5mm the seconds would be 33", and should it be 31mm the seconds could be rounded off to 50" or 51" at the discretion of the worker, depending on which side of the 31mm mark the locality would be fractionally located. (after Greig 1976)

Latitude	34°S	32°S	30°S	28°S	26°S	24°S	22°S	20°S
Length of ' "	31mm	31.5mm	32mm	32.5mm	33,5mm	34mm	34,5mm	35mm
1	2"	2"	2"	2"	2"	2"	1,5"	1,5"
2	4"	4"	4"	3,5"	3,5"	3,5"	3,5"	3,5"
3	6"	5,5"	5,5"	5,5"	5,5"	5,5"	5"	5"
4	7,5"	7,5"	7,5"	7,5"	7"	7"	7"	7"
5	9,5"	9,5"	9,5"	9"	9"	9"	8,5"	8,5"
6	11,5"	11,5"	11"	11"	10,5"	10,5"	10,5"	10,5"
7	13,5"	13,5"	13"	13"	12,5"	12,5"	12"	12"
8	15,5"	15"	15"	15"	14,5"	14"	14"	13,5"
9	17,5"	17"	17"	16,5"	16"	16"	15,5"	15,5"
10	19,5"	19"	19"	18,5"	18"	17,5"	17,5"	17"
11	21,5"	21"	20,5"	20,5"	19,5"	19,5"	19"	19"
12	23"	23"	22,5"	22"	21,5"	21"	21"	20,5"
13	25"	25"	24,5"	24"	23,5"	23"	22,5"	22,5"
14	27"		26"	26"	25"	24,5"	24,5"	24"
15	29"	26,5"2	28"	27,5"	27"	26,5"	26"	25,5"
16	31"	28,5"	30"	29,5"	28,5"	28"	28"	27,5"
17	33"	30,5"	32"	31,5"	30,5"	30"	29,5"	29"
18	35"	32,5"	34"	33"	32"	32"	31,5"	31"
19	37"	34,5"	35,5"	35"	34"	33,5"	33"	32,5"
20	38,5"	36"	37,5"	37"	36"	35,5"	35"	34,5"
21	40,5"	38"	39,5"	39"	37,5"	37"	36,5"	36"
22	42,5"	40"	41"	40,5"	39,5"	39"	38,5"	37,5"
23	44,5"	42"	43"	42,5"	41"	40,5"	40"	39,5"
24	46,5"	44"	45"	44,5"	43"	42,5"	41,5"	41"
25	48,5"	45,5"	47"	46"	45"	44"	43,5"	43"
26	50,5"	47,5"	49"	48"	46,5"	46"	45"	44,5"
27	52,5"	49,5"	50,5"	50"	48,5"	47,5"	47"	46,5"
28	54"	51,5"	52,5"	51,5"	50"	49,5"	48,5"	48"
29	56"	53,5"	54,5"	53,5"	52"	51"	50,5"	49,5"
30	58"	55"	56"	55,5"	53,5"	53"	52"	51,5"
31	60"	57"	58"	57"	55,5"	54,5"	54"	53"
31,5	--	59"	59"	58"	56,5"	55,5"	55"	54"
32	--	60"	60"	59"	57,5"	56,5"	55,5"	55"
32,5	--	--	--	60"	58"	57,5"	56,5"	55,5"
33	--	--	--	--	59"	58"	57,5"	56,5"
33,5	--	--	--	--	60"	59"	58,5"	57,5"
34	--	--	--	--	--	60"	59"	58,5"
34,5	--	--	--	--	--	--	60"	59"
35	--	--	--	--	--	--	--	60"

TABLE 2. Longitude conversion table. In order to calculate the exact second of longitude a metric ruler must be used to measure along the relevant minute of longitude. The reading in millimetres can then be converted into the exact second by consulting the conversion table. At 26°S the length of a minute of longitude is 33,5mm. Should the distance be 9mm the seconds of longitude would be 16", should it be 18,5mm the seconds would be 33", and should it be 30mm the seconds could be rounded off to 53" or 54" at the discretion of the worker, depending on which side of the 30mm mark the locality would be fractionally located. (after Greig 1976)

ft	m	ft	m	ft	m	ft	m
50	15	1800	550	3550	1080	5300	1615
100	30	1850	565	3600	1095	5350	1630
150	45	1900	580	3650	1115	5400	1645
200	60	1950	595	3700	1130	5450	1660
250	75	2000	610	3750	1145	5500	1675
300	90	2050	625	3800	1160	5550	1690
350	105	2100	640	3850	1175	5600	1705
400	120	2150	655	3900	1190	5650	1720
450	135	2200	670	3950	1205	5700	1735
500	150	2250	685	4000	1220	5750	1755
550	170	2300	700	4050	1235	5800	1770
600	185	2350	715	4100	1250	5850	1785
650	200	2400	730	4150	1265	5900	1800
700	215	2450	745	4200	1280	5950	1815
750	230	2500	760	4250	1295	6000	1830
800	245	2550	775	4300	1310	6050	1845
850	260	2600	790	4350	1325	6100	1860
900	275	2650	810	4400	1340	6150	1875
950	290	2700	825	4450	1355	6200	1890
1000	305	2750	840	4500	1370	6250	1905
1050	320	2800	855	4550	1385	6300	1920
1100	335	2850	870	4600	1400	6350	1935
1150	350	2900	885	4650	1415	6400	1950
1200	365	2950	900	4700	1435	6450	1965
1250	380	3000	915	4750	1450	6500	1980
1300	395	3050	930	4800	1465	6550	1995
1350	410	3100	945	4850	1480	6600	2010
1400	425	3150	960	4900	1495	6650	2025
1450	440	3200	975	4950	1510	6700	2040
1500	455	3250	990	5000	1525	6750	2055
1550	470	3300	1005	5050	1540	6800	2075
1600	490	3350	1020	5100	1555	6850	2090
1650	505	3400	1035	5150	1570	6900	2105
1700	520	3450	1050	5200	1585	6950	2120
1750	535	3500	1065	5250	1600	7000	2135

TABLE 3. Altitude conversion table

Two linear transects were employed to evaluate the data and to investigate species turnover from the coastal Mozambique plain to the Transvaal highveld, and from the northern lowveld to the southern lowveld. The transect was routed from Maputo (32°30'E) to Johannesburg (28°E) at latitude 26°S. The method of application is based on earlier studies done elsewhere in southern Africa (Poynton and Broadley 1991, Poynton 1992).

2.5. Taxonomic philosophy

The writer's concept of taxonomy mostly concurs with that of Mayr (1969). A taxon represents a group that is sufficiently distinct to be worthy of being distinguished by name and to be ranked in a definite category. The basic category in classification is the species, a biological entity represented by a group of interbreeding individuals that make up a population that appears to be reproductively isolated from other such populations. In general terms a species is defined as a population of individuals that look alike, behave similarly and interbreed. In certain circumstances some taxonomists believe that further subdivision below the species level is necessary and the subspecies category is used. As can be expected, groupings at this level of the classification system are often controversial, depending as they do on the differing opinions of individuals. There is some merit in using this category even if solely for the conservation of local populations. I should imagine one would have great difficulty in persuading the conservation authorities to surrender their efforts in the conservation of the rare bontebok (*Damaliscus dorcas dorcas*) arguing that the blesbok (*Damaliscus dorcas phillipsi*), which is quite similar to the bontebok, is more common and widespread. Nonetheless, a subspecies should represent a geographically defined aggregate of local populations that differs from other such subdivisions of the same species. Different subspecies of the same species interbreed with each other and, in the natural state, areas of intergradation are usually detectable. The oft-quoted amphibian example in southern Africa is the painted reed frog (*Hyperolius marmoratus*). The species occurs from the southern Cape Province to the northern and north-eastern regions of South Africa and beyond. Three subspecies are currently recognised in South Africa and these represent local geographic populations that are easily identifiable. They are, from the south to the north east, *H. m. verrucosus*, *H. m. marmoratus* and *H. m. taeniatus*. They are all known as the painted reed frog. Each has its own cumbersome vernacular name that indicates their relationship quite

plainly. These are respectively the southern spotted form, the mottled form, and the northern striped form of the painted reed frog (Wager 1965, 1986).

Historically, taxonomists placed most of the emphasis on morphological characters when classifying organisms. This has to some extent been revolutionised and scientists are now looking more closely at ecological, behavioural and biochemical aspects of the organisms they study. In my own work on some amphibian groups such as *Strongylopus* (Greig, Boycott and de Villiers 1979) and *Heleophryne* (Boycott 1982, 1989) and in the works of Channing (1978, 1986), Passmore and Carruthers (1979) and others, much emphasis has been placed on the importance of differences in the mating calls of frogs, an aspect that was seldom if ever used by earlier frog workers. Jacobsen (1989) emphasises the importance of considering colour-pattern as a taxonomic character. Colour-pattern in species such as the flat rock lizards (Genus *Platysaurus*) and dwarf chameleons (Genus *Bradypodion*) can really be helpful in identifying difficult species and can be as good a character as any other morphological character. Observations on behaviour are also currently considered more important. One of the characteristics of a species is that its members behave similarly and any differences in behaviour could reflect differences between cryptic species. The development and function of secondary sexual characteristics are closely tied to behaviour, and these characters can be used confidently to distinguish between species, as was shown by Boycott (1982, 1989) in respect of closely related species of *Heleophryne*. Habitat selection and, in the case of frogs, call site selection, are other aspects that warrant further attention. It is therefore the writer's opinion that as many aspects as possible of the ecology of a species should be taken into consideration by the taxonomist.

2.6. Biogeographic philosophy

Some eighty years ago Hewitt perceived a zoogeographical transformation in southern Africa from north to south. His studies, mainly on lizard distributions, revealed that "in passing southwards from the Zambesi to Cape Colony, there is a gradual and successive disappearance of the widely-distributed tropical forms simultaneous with the appearance of an increasingly greater proportion of peculiarly South African species" (Hewitt 1910). Hewitt also noted that the tropical forms were widely distributed over large areas, while the South African forms

were more localised in distribution and that there was very little overlap between the two groups. Poynton (1964) took this further and suggested that the amphibia of southern Africa is polarised into two main faunal groups, one centred in the north-east and one in the south-west, and acknowledged that the faunal pattern between the two poles is very complex. He advocated the recognition of a Tropical Fauna, a Cape Fauna and a Transitional Complex. This concept has been adhered to in many of the subsequent contributions to the zoogeography of southern Africa (Poynton and Broadley 1978; Poynton 1980; Bruton and Haacke 1980; Poynton 1989; Poynton 1990).

Different approaches have been used by other workers but these have mostly involved the east African herpetofauna. Loveridge (1937) in his treatment of the zoogeography of eastern Africa referred to different "life zones" of which he recognised nine (Poynton and Broadley 1991). Schiøtz (1976) recognised, in eastern Africa, five zoogeographic elements based on different vegetational types. Two of these were depicted as penetrating the southern African region, namely, a savanna fauna and an East African lowland fauna. It would seem that nothing is to be gained by pursuing these or any other variations and the present writer believes that Poynton's approach is more appropriate. In Swaziland, for example, a temperate highveld fauna and a tropical middleveld, lowveld and Lubombo fauna can be identified. Within the greater context of southern Africa these are, in effect, part of Poynton's (1964) Cape Fauna and Tropical Fauna respectively. It does not make sense to look at the biogeography of small regions like Swaziland, Natal or the Transvaal in isolation when each is an integral part of the whole southern African picture.

CHAPTER THREE
SYSTEMATIC ACCOUNT OF THE HERPETOFAUNA

3.1. Checklist of the amphibians of Swaziland

CLASS AMPHIBIA

ORDER ANURA

FAMILY PIPIDAE

Xenopus laevis laevis (Daudin, 1802)

Xenopus muelleri (Peters, 1844)

FAMILY HELEOPHRYNIDAE

Heleophryne natalensis Hewitt, 1913

FAMILY BUFONIDAE

Bufo gariensis gariensis Smith, 1848

Bufo gutturalis Power, 1927

Bufo garmani Meek, 1897

Bufo maculatus Hallowell, 1854

Bufo rangeri Hewitt, 1935

Bufo fenoulheti fenoulheti Hewitt and Methuen, 1913

Schismaderma carens (Smith, 1848)

FAMILY MICROHYLIDAE

Breviceps adpersus adpersus Peters, 1882

Breviceps adpersus pentheri Werner, 1899

Breviceps mossambicus Peters, 1854

Breviceps mossambicus X *adpersus*

Phrynomerus bifasciatus bifasciatus (Smith, 1847)

FAMILY HEMISIDAE

Hemisis marmoratus marmoratus (Peters, 1854)

FAMILY RANIDAE

Rana angolensis Bocage, 1866

Strongylopus grayii grayii (Smith, 1849)

Strongylopus fasciatus fasciatus (Smith, 1849)

Ptychadena anchietae (Bocage, 1867)

Ptychadena oxyrhynchus (Smith, 1849)

Ptychadena mossambica (Peters, 1854)

Ptychadena porosissima (Steindachner, 1867)

Pyxicephalus adpersus adpersus Tschudi, 1838

Pyxicephalus adpersus edulis Peters, 1854

Tomopterna cryptotis (Boulenger, 1907)

Tomopterna krugerensis Passmore and Carruthers, 1975

Tomopterna natalensis (Smith, 1849)

Hildebrandtia ornata ornata (Peters, 1878)

Phrynobatrachus natalensis (Smith, 1849)

Phrynobatrachus mababiensis FitzSimons, 1932

Cacosternum boettgeri (Boulenger, 1882)

Cacosternum nanum nanum Boulenger, 1887

Cacosternum nanum parvum Poynton, 1963

FAMILY RHACOPHORIDAE

Chiromantis xerampelina Peters, 1854

FAMILY HYPEROLIIDAE

Leptopelis mossambicus Poynton, 1985

Kassina maculata (Duméril, 1853)

Kassina senegalensis (Duméril and Bibron, 1841)

Semnodactylus wealii (Boulenger, 1882)

Afrixalus aureus Pickersgill, 1984

Hyperolius marmoratus taeniatus Peters, 1854

Hyperolius pusillus (Cope, 1862)

Hyperolius semidiscus Hewitt, 1927

Hyperolius tuberilinguis Smith, 1849

3.2. Checklist of the reptiles of Swaziland

CLASS REPTILIA

ORDER CROCODYLIA

FAMILY CROCODYLIDAE

Crocodylus niloticus Laurenti, 1768

ORDER CHELONI

FAMILY PELOMEDUSIDAE

Pelomedusa subrufa subrufa (Lacépède, 1788)

Pelusios sinuatus (Smith, 1838)

FAMILY TESTUDINIDAE

Geochelone pardalis (Bell, 1828)

Kinixys belliana spekii Gray, 1863

Kinixys natalensis Hewitt, 1935

ORDER SQUAMATA

SUBORDER SAURIA

FAMILY GEKKONIDAE

Afroedura pondolia marleyi (FitzSimons, 1930)

Afroedura pondolia major Onderstall, 1984

Lygodactylus capensis capensis (Smith, 1849)

Lygodactylus ocellatus Roux, 1907

Hemidactylus mabouia mabouia (Moreau de Jonnes, 1818)

Homopholis wahlbergii (Smith, 1849)

Pachydactylus maculatus maculatus Gray, 1845

Pachydactylus capensis vansoni FitzSimons, 1933

Pachydactylus bibronii Smith, 1846

FAMILY AGAMIDAE

Agama atricollis Smith, 1849

Agama atra atra Daudin, 1802

Agama aculeata distanti Boulenger, 1902

Agama aculeata armata Peters, 1854

FAMILY CHAMAELEONIDAE

Chamaeleo dilepis dilepis Leach, 1819

Bradypodion sp.

FAMILY SCINCIDAE

Scelotes mira (Roux, 1907)

Scelotes brevipes Hewitt, 1925

Mabuya quinquetaeniata margaritifera (Peters, 1854)

Mabuya capensis (Gray, 1830)

Mabuya varia (Peters, 1867)

Mabuya striata striata (Peters, 1844)

Mabuya striata punctatissima (Smith, 1849)

Lygosoma sundevallii (Smith, 1849)

Panaspis wahlbergii (Smith, 1849)

Acontias plumbeus Bianconi, 1849

FAMILY LACERTIDAE

Nucras lalandii (Milne-Edwards, 1829)

Nucras taeniolata holubi (Steindachner, 1882)

Nucras ornata (Gray, 1864)

FAMILY VARANIDAE

Varanus albigularis (Daudin, 1802)

Varanus niloticus niloticus (Linnaeus, 1762)

FAMILY GERRHOSAURIDAE

Gerrhosaurus validus validus Smith, 1849

Gerrhosaurus flavigularis flavigularis Wiegmann, 1828

Gerrhosaurus major major Duméril, 1851

Tetradactylus africanus africanus (Gray, 1838)

FAMILY CORDYLIDAE

Chamaesaura aenea (Wiegmann) Fitzinger, 1843

Chamaesaura anguina anguina (Linnaeus, 1758)

Chamaesaura macrolepis macrolepis (Cope, 1862)

Cordylus warreni warreni (Boulenger, 1908)

Cordylus warreni barbertonensis (van Dam, 1921)

Cordylus tropidosternum jonesii (Boulenger, 1891)

Cordylus vittifer vittifer (Reichenow, 1887)

Pseudocordylus melanotus transvaalensis FitzSimons, 1943

Platysaurus intermedius natalensis FitzSimons, 1948

Platysaurus intermedius "Lebombo"

ORDER SQUAMATA

SUBORDER SERPENTES

FAMILY TYPHLOPIDAE

Typhlops bibronii (Smith, 1846)

Typhlops schlegelii schlegelii Bianconi, 1850

FAMILY LEPTOTYPHLOPIDAE

Leptotyphlops longicaudus (Peters, 1854)

Leptotyphlops conjunctus conjunctus (Jan, 1861)

Leptotyphlops conjunctus incognitus Broadley and Watson, 1976

Leptotyphlops scutifrons scutifrons (Peters, 1854)

Leptotyphlops telloi Broadley and Watson, 1976

FAMILY BOIDAE

Python sebae natalensis Smith, 1840

FAMILY COLUBRIDAE

Lycodonomorphus laevisissimus fitzsimonsi Raw, 1973

Lycodonomorphus rufulus (Lichtenstein, 1823)

Lycodonomorphus whytii obscuriventris FitzSimons, 1964

Lamprophis inornatus Duméril and Bibron, 1854

Lamprophis guttatus (Smith, 1843)

Lamprophis fuliginosus (Boie, 1827)

Lamprophis swazicus Schaefer, 1970

Lycophidion capense capense (Smith, 1831)

Lycophidion variegatum Broadley, 1969

Mehelya capensis capensis (Smith, 1847)

Mehelya nyassae (Günther, 1888)

Duberria lutrix lutrix (Linnaeus, 1758)

Pseudaspis cana (Linnaeus, 1754)

Hemirhagerrhis nototaenia nototaenia (Günther, 1864)

Psammophylax rhombeatus rhombeatus (Linnaeus, 1754)

Psammophis subtaeniatus subtaeniatus Peters, 1854

Psammophis sibilans brevirostris Peters, 1881

Psammophis phillipsii (Hallowell, 1844)

Psammophis crucifer (Daudin, 1803)

Aparallactus lunulatus lunulatus (Peters, 1854)
Aparallactus capensis (Smith, 1849)
Amblyodipsas concolor (Smith, 1849)
Amblyodipsas polylepis polylepis (Bocage, 1873)
Homoroselaps lacteus (Linnaeus, 1754)
Homoroselaps dorsalis (Smith, 1849)
Atractaspis bibronii Smith, 1849
Prosymna sundevallii lineata (Peters, 1871)
Prosymna ambigua stuhlmannii (Pfeffer, 1893)
Meizodon semiornatus (Peters, 1854)
Philothamnus hoplogaster (Günther, 1863)
Philothamnus natalensis natalensis (Smith, 1848)
Philothamnus natalensis occidentalis Broadley, 1966
Philothamnus semivariiegatus semivariiegatus (Smith, 1840)
Crotaphopeltis hotamboeia (Laurenti, 1768)
Dipsadoboa aulica aulica (Günther, 1864)
Telescopus semiannulatus semiannulatus Smith, 1849
Dispholidus typus typus (Smith, 1829)
Thelotornis capensis capensis Smith, 1849
Dasypeltis inornata Smith, 1849
Dasypeltis scabra (Linnaeus, 1758)

FAMILY ELAPIDAE

Elapsoidea sundevallii sundevallii (Smith, 1848)
Elapsoidea sundevallii decosteri Boulenger, 1888
Elapsoidea semiannulata boulengeri Boettger, 1895
Hemachatus haemachatus (Lacépède, 1788)
Aspidelaps scutatus intermedius Broadley, 1968
Naja haje annulifera Peters, 1854
Naja mossambica Peters, 1854
Dendroaspis polylepis Günther, 1864

FAMILY VIPERIDAE

Causus rhombeatus (Lichtenstein, 1823)

Causus defilippii (Jan, 1862)

Bitis atropos (Linnaeus, 1754)

Bitis arietans arietans (Merrem, 1820)

3.3. Species accounts: amphibians

CLASS AMPHIBIA

Family PIPIDAE

Xenopus laevis laevis (Daudin, 1802)

Common platanna

Xenopus laevis laevis (Daudin). Poynton 1964,p.31; Boycott 1992a,p.3; Boycott 1992b,p.65; Boycott and Culverwell 1992,p.39.

Distribution in Swaziland (Figure 3a)

Occurs throughout the country in the highveld, middleveld, lowveld and Lubombo regions, less common in the lowveld and Lubombo regions (Boycott 1992a). Recorded altitude is between 335m and 1465m a.s.l.

Recorded localities: Big Bend Sugar Estate (TM); Hluti, 1,5km SE of (TM); Malkerns road, 1,5km down (TM); Matsamo, 13km S of (TM); Mbabane, 5km NW of (TM); Mcandatshe Farm (Poytn.1964); Mortimer's Dam (RCBS); Motshane (TM); Motshane River (NM); Nhlangano, 15km W of (TM); Piggs Peak, 30km SE of (TM); Sandlane, 7,5km NE of (TM); Tshaneni/Mliba road (TM); Tunzini Estate (TM).

Remarks

Reference to the Natal Museum catalogue necessitates Poynton's (1964) "Mbabane" record being emended to Motshane River (Boycott 1992b).

Xenopus muelleri (Peters, 1844)**Tropical platanna**

Xenopus muelleri (Peters). Passmore and Carruthers 1979,p.47; Boycott 1992a,p.3; Boycott 1992b,p.65; Boycott and Culverwell 1992,p.39.

Distribution in Swaziland (Figure 3b)

New record for Swaziland. Occurs in the middleveld, lowveld and Lubombo regions, absent from the highveld (Boycott 1992a). Recorded altitude is between 185m and 490m a.s.l.

Recorded localities: Big Bend (NMZB); Big Bend, 14km NW of (TM); Bordergate, 2,5km S of (TM); Dinedor Farm (TM); Lavumisa, 9,5km NW of (TM); Mpofu River, 1,5km S of (TM); Piggs Peak, 30km SE of (TM); Shalt's Dam (TM); Tshaneni (NMZB,TM); Tshaneni/Mliba road (TM); Umbuluzi Pan (TM).

Remarks

Previously unrecorded in Swaziland except for photographs in Passmore and Carruthers (1979).

FAMILY HELEOPHRYNIDAE

Heleophryne natalensis Hewitt, 1913**Natal ghost frog**

Heleophryne natalensis Hewitt. Boycott 1992a,p.3; Boycott 1992b,p.65; Boycott and Culverwell 1992,p.39.

Distribution in Swaziland (Figure 3c)

Possible new record for Swaziland (see Remarks). Restricted to the highveld, this species has a limited distribution in Swaziland (Boycott 1992a). Recorded altitude is between 810m and 1465m a.s.l.

Recorded localities: Bulembu, 3km S of (RCBS); Hlatikulu (RCBS); Longadvumi River (RCBS); Majolomba River (RCBS); Makonjwa Range (RCBS); Maphandakazi River (RCBS); Ngwenya Forest (RCBS); Yinyayingeni River (RCBS).

Remarks

Previously recorded from Horo Forest (Poynton 1964) but the exact locality is unknown and could be in Swaziland or the Transvaal. The Transvaal Museum record cards list some *H. natalensis* material, presented by V.A.Wager, from "Horo Forest, (20mls. fr. Louws Creek) Swaziland". Poynton (1964) presumably listing the same material (TM) gives the locality as "Horo Forest, Transvaal" and in Wager (1965:99) the author refers to "Horo Bush, eastern Transvaal".

FAMILY BUFONIDAE

Bufo gariensis gariensis Smith, 1848

Karoo toad

Bufo gariensis gariensis Smith. Poynton 1964,p.46; Wager 1965,p.112; Passmore and Carruthers 1979,p.64; Boycott 1992a.p.3; Boycott 1992b.p.65; Boycott and Culverwell 1992,p.39.

Bufo gariensis Smith. Wager 1986,p.62.

Distribution in Swaziland (Figure 3d)

Recorded from a single locality in the highveld region (Boycott 1992a), this form appears to be quite rare in Swaziland. Recorded altitude is approximately 1200m a.s.l.

Recorded localities: Mbabane (NM,UM).

Remarks

This form is illustrated in Passmore and Carruthers (1979:64) and the authors conclude (p.257) that Swaziland material exhibits most of the morphological characteristics of *Bufo g. nubicolus*. Unfortunately no further collections were made during the present study. Fresh

material and ecological data are required if the true identity of the Swaziland population is to be realised.

Bufo gutturalis Power, 1927

Guttural toad

Bufo regularis (not Reuss). Poynton 1964,p.53

Bufo gutturalis Power. Boycott 1992a,p.3; Boycott 1992b,p.65; Boycott and Culverwell 1992,p.39.

Distribution in Swaziland (Figure 4a)

Occurs throughout the country in the highveld, middleveld, lowveld and Lubombo regions (Boycott 1992a). Recorded altitude is between 120m and 1435m a.s.l.

Recorded localities: Big Bend (JV,NMZB); Big Bend, 30km N of (JV); Big Bend and Sifunga, between (TM); Big Bend Sugar Estate (TM); Edwaleni road, 2km down (TM); Forbes Reef (TM); Hlatikulu, 8km N of (TM); Mafutseni, 8km N of (TM); Malkerns road, 1,5km down (TM); Malolotja Nature Reserve (TM); Matimatima River bridge (TM); Mbabane (Poytn. 1964); Mbabane, 15m N of (UM); Mbuyane River (RCBS); Mhlosheni (JV); Mhlosinga Nature Reserve (TM); Mlawula Nature Reserve (east)(TM); Mpofu River, near (TM); Nhlngano, 15km W of (TM); Nhlngano and Hlatikulu, between (TM); Nkomati River bridge near Balegane (TM); Piggs Peak, 8km NE of (TM); Piggs Peak, 15km NE of (TM); Piggs Peak, 15km SE of (TM); Sandlane, 10km NE of (TM); Shali's Dam (TM); Sidvokodvo turnoff (TM); Siphofaneni, 20km SW of (TM); Tambuti Estate (TM); Tshaneni (JV); Tshaneni and Bordergate, between (TM); Umbuluzi Estate (TM); Usutu Forest Plantation (TM).

Remarks

Listed from Mbabane as *Bufo regularis* by Poynton (1964). The specimen collected from Mbuyane River has red colouring on the thighs and lacks the typical pale cross marking on the snout of *gutturalis* which could indicate the presence of hybrids.

Bufo garmani Meek, 1897**Olive toad**

Bufo garmani Meek. Poynton 1964,p.57; Passmore and Carruthers 1979,p.72; Boycott 1992a,p.4; Boycott 1992b,p.65; Boycott and Culverwell 1992,p.39.

Distribution in Swaziland (Figure 4b)

Occurs in the middleveld, lowveld and Lubombo regions, absent from the highveld (Boycott 1992a). Recorded altitude is between 135m and 410m a.s.l.

Recorded localities: Balegane Ranch, near (TM); Big Bend (JV,TM); Bordergate, 2,5km S of (TM); Lavumisa, 7km NW of (TM); Mafutseni, 8km N of (TM); Maloma, 6km SW of (TM); Mcandatshe Farm (Poytn.1964); Mlaula Estate (Poytn.1964); Nsoko, 6km W of (TM); Nyetane Dam (TM); Shalt's Dam (TM); Siphofaneni, 3,5km E of (TM); Tshaneni and Bordergate, between (TM); Umbuluzi Estate (TM).

Remarks

Poynton and Broadley (1991) indicate that the *Bufo garmani* populations in southern Mozambique exhibit *B.powerilpseudogarmani* features. Any taxonomic change will undoubtedly affect the Swaziland populations as well.

Bufo maculatus Hallowell, 1854**Flat-backed toad**

Bufo pusillus Mertens. Poynton 1964,p.53.

Bufo maculatus Hallowell. Passmore and Carruthers 1979,p.71; Boycott 1992a,p.4; Boycott 1992b,p.65; Boycott and Culverwell 1992,p.39.

Distribution in Swaziland (Figure 4c)

New record for Swaziland. Occurs in the middleveld, lowveld and Lubombo regions, absent from the highveld (Boycott 1992a). Recorded altitude is between 90m and 490m a.s.l.

Recorded localities: Hlatikulu and Sidvokodvo, between (TM); Mlawula Nature Reserve (east)(TM); Mpofu River, near (TM); Nkomati River bridge near Balegane (TM); Nyetane River (TM); Piggs Peak, 15km NE of (TM); Piggs Peak, 17km NE of (TM); Piggs Peak, 29km SE of (TM).

Remarks

Previously unrecorded in Swaziland except for photograph in Passmore and Carruthers (1979).

Bufo rangeri Hewitt, 1935

Raucous toad

Bufo rangeri Hewitt. Poynton 1964,p.57; Boycott 1992a,p.4; Boycott 1992b,p.65; Boycott and Culverwell 1992,p.39.

Distribution in Swaziland (Figure 4d)

Restricted to the highveld region (Boycott 1992a). Recorded altitude is between 1100m and 1265m a.s.l.

Recorded localities: Malolotja Nature Reserve (TM); Mbabane (Poytn.1964); Mbuyane River (RCBS).

Remarks

This species occurs sympatrically with *Bufo gutturalis* in parts of the highveld region. In particular, the Mbuyane River locality is an interesting one as it appears as if the two species may be hybridising at this locality (refer to remarks under *B. gutturalis*).

Bufo fenoulheti fenoulheti Hewitt and Methuen, 1913

Pygmy toad

Bufo vertebralis fenoulheti Hewitt and Methuen. Passmore and Carruthers 1979,p.80.

Bufo fenoulheti fenoulheti Hewitt and Methuen. Boycott 1992a, p.4; Boycott 1992b,p.65; Boycott and Culverwell 1992,p.39.

Distribution in Swaziland (Figure 5a)

New record for Swaziland. Occurs in the lowveld and Lubombo regions, absent from the highveld and middleveld (Boycott 1992a). Recorded altitude is between 260m and 560m a.s.l. Recorded localities: Mlawula Nature Reserve (east)(s.r.); Siteki, 20km NE of (s.r.); Tshaneni (s.r.); Tshaneni, 1,5km SE of (TM).

Remarks

Previously unrecorded in Swaziland except for photographs (as *Bufo vertebralis fenoulheti*) in Passmore and Carruthers (1979).

Schismaderma carens (Smith, 1848)

Red toad

Bufo carens Smith. Poynton 1964,p.61,62; Passmore and Carruthers 1979,p.78.

Schismaderma carens (Smith). Boycott 1992a,p.4; Boycott 1992b, p.67; Boycott and Culverwell 1992,p.39.

Distribution in Swaziland (Figure 5b)

Occurs throughout the country in the highveld, middleveld, lowveld and Lubombo regions, but infrequently seen on the highveld above 1000m (Boycott 1992a). Recorded altitude is between 170m and 1050m a.s.l.

Recorded localities: Big Bend, 15km NW of (TM); Big Bend, 60km W of (JV); Hlatikulu, 3km N of (TM); Hlatikulu, 7km N of (TM); Lavumisa, 6km N of (TM); Mafutseni, 5km N of (TM); Malkerns/Bhunya road (TM); Maloma, 8km SW of (TM); Mambane, 2km SE of (TM); Matsamo, 15km SW of (TM); Mbabane/Piggs Peak road (TM); Mcandatshe Farm (Poytn.1964); Mpopfu River, 1,5km S of (TM); Nhlanguano, 15km W of (TM); Nsoko, 10km S of (TM); Ntungulubi River (s.r.); Piggs Peak, 30km SE of (TM); Sidvokodvo, 5km S of

(TM); Siphofaneni, 5km E of (TM); Siphofaneni, 21km SW of (TM); Siteki, 6km S of (TM); Siteki, 16km NE of (TM); Tambuti Estate (TM).

Family MICROHYLIDAE

Breviceps adpersus adpersus Peters, 1882

Bushveld rain frog

Breviceps adpersus adpersus Peters. Poynton 1964,p.81; Boycott 1992a,p.4; Boycott 1992b,p.67; Boycott and Culverwell 1992,p.39.

Distribution in Swaziland (Figure 5c)

Occurs in the middleveld, lowveld and Lubombo regions, absent from the highveld (Boycott 1992a). Recorded altitude is between 105m and 520m a.s.l.

Recorded localities: Big Bend (SAM); Big Bend, 3km S of (CAS); Big Bend, 30km N of (JV); Dinedor Farm (RCBS); Dinedor Farm, 1km from entrance (RCBS); Hlatikulu, 8km N of (RCBS); Kalwene (JV); Lavumisa, 4,5km N of (RCBS); Mafutseni, 1,5km N of (RCBS); Malkerns/Bhunya road (RCBS); Mambane, 3km E of (RCBS); Manzini (RCBS); Matsamo, 19km SW of (RCBS); Piggs Peak, 17km NE of (RCBS); Shalt's Dam (TM); Siphofaneni, 24,5km NW of (RCBS); Tambuti Estate (RCBS); Tshaneni (CAS,UM,RCBS,TM); Tunzini Estate (RCBS); Ubombo Sugar Estate (RCBS).

Remarks

Poynton's (1964) Swaziland records for this species (Mcandatshe Farm and Mlaula Estate) have been omitted as these were based on material subsequently identified as *B. mossambicus* (A.Lambiris in litt.). In the populations of the northern lowveld around Tshaneni and Tunzini there appears to be a mixing of *adpersus* and *mossambicus* characteristics. For example, in some specimens, the black throat marking extends to the armpit and the paravertebral spots are faint while in others, the paravertebral spots are distinct and the throat marking fails to extend to the armpit.

Breviceps adpersus pentheri Werner, 1899**Rain frog**

Breviceps adpersus pentheri Werner. Boycott 1992a,p.5; Boycott 1992b,p.67; Boycott and Culverwell 1992,p.39.

Distribution in Swaziland (Figure 5d)

New record for Swaziland. Occurs in the highveld and middleveld regions, absent from the lowveld and Lubombo regions (Boycott 1992a). Recorded altitude is between 730m and 1525m a.s.l.

Recorded localities: Malolotja Nature Reserve (RCBS, TM); Mantenga Ranch (TM); Mbabane (RCBS); Mbabane, 7km SW of (RCBS); Ngwenya borderpost, 500m E of (a.r.); Piggs Peak (RCBS); Piggs Peak, 4,5km SW of (RCBS).

Remarks

Some specimens of *pentheri* from the highveld region show the pale dorsal blotches more typical of *adpersus*. Specimens from the highveld never attain the same size as the typical form. Differences in the calls of *pentheri* and typical *adpersus* would seem to indicate that two species are involved.

Breviceps mossambicus Peters, 1854**Mozambique rain frog**

Breviceps mossambicus Peters. Passmore and Carruthers 1979,p.105; Boycott 1992a,p.4; Boycott 1992b,p.67; Boycott and Culverwell 1992,p.39.

Distribution in Swaziland (Figure 6a)

Only known from the Lubombo region (Boycott 1992a). Recorded altitude is between 595m and 715m a.s.l.

Recorded localities: Lomahasha (s.r.); Mcandatshe Farm (DM); Mlaula Estate (DM); Muti Muti Nature Reserve (south)(RCBS).

Remarks

Previously unrecorded except for photograph in Passmore and Carruthers (1979), in which the locality is erroneously given as Namaacha instead of Lomahasha (the correct Swaziland spelling). Poynton (1964) recorded *Breviceps adpersus adpersus* from two localities in eastern Swaziland, Mcandatshe Farm and Mlaula Estate. These specimens (DM) have subsequently been identified as *Breviceps mossambicus* (A.Lambiris in litt.).

Breviceps mossambicus X *adpersus*

Hybrid rain frog

Breviceps mossambicus X *adpersus*. Boycott 1992a,p.5; Boycott 1992b,p.69; Boycott and Culverwell 1992,p.39.

Distribution in Swaziland (Figure 6b)

New record for Swaziland. Occurs in the lowveld region and probably also in the Lubombo region. Recorded altitude is between 100m and 305m a.s.l.

Recorded localities: Big Bend (UM); Tshaneni (RCBS).

Remarks

Apparently hybrids are more frequently found in the north-eastern regions of southern Africa (Poynton and Broadley 1985a). The *breviceps* populations of the northern lowveld, in particular, should be studied more closely.

Phrynomerus bifasciatus bifasciatus (Smith, 1847)**Red-banded frog**

Phrynomerus bifasciatus (Smith). Passmore and Carruthers 1979,p.108; Boycott 1992a,p.5; Boycott and Culverwell 1992,p.39.

Phrynomerus bifasciatus bifasciatus (Smith). Boycott 1992b,p.67.

Distribution in Swaziland (Figure 6c)

New record for Swaziland. Occurs in the middleveld, lowveld and Lubombo regions, absent from the highveld (Boycott 1992a). Recorded altitude is between 185m and 490m a.s.l.

Recorded localities: Big Bend, 15km NW of (TM); Dinedor Farm (TM); Lavumisa, 1,5km N of (TM); Lavumisa, 9,5km NW of (TM); Lavumisa, 16km N of (TM); Mafutseni, 6,5km N of (TM); Mpaka, 3km W of (TM); Ngonini (TM); Piggs Peak and Matsamo, between (TM); Piggs Peak, 30km SE of (TM); Siphofaneni, 3,5km E of (TM); Tshaneni (TM,UM); Tshaneni/Mliba road (TM); Umbuluzi Estate (TM).

Remarks

Previously unrecorded from Swaziland except for photographs in Passmore and Carruthers (1979).

Family HEMISIDAE

Hemisis marmoratus marmoratus (Peters, 1854)**Mottled burrowing frog**

Hemisis marmoratum (Peters). Poynton 1964,p.166; Passmore and Carruthers 1979,p.212.

Hemisis marmoratus marmoratus (Peters). Boycott 1992a,p.5; Boycott 1992b,p.67; Boycott and Culverwell 1992,p.39.

Distribution in Swaziland (Figure 6d)

New record for Swaziland. Occurs in the middleveld and lowveld regions, absent from the highveld and Lubombo regions (Boycott 1992a). Recorded altitude is between 200m and 410m a.s.l.

Recorded localities: Big Bend (JV); Bordergate, 1km S of (TM); Dinedor Farm (TM); Siphofaneni, 3,5km E of (TM); Tshaneni (CAS,TM,UM); Tunzini Estate (TM); Umbuluzi Estate (TM).

Remarks

Previously unrecorded in Swaziland except for photographs in Passmore and Carruthers (1979).

Family RANIDAE

Rana angolensis Bocage, 1866**Common river frog**

Rana angolensis Bocage. Poynton 1964,p.104; Boycott 1992a,p.5; Boycott 1992b,p.67; Boycott and Culverwell 1992,p.39.

Distribution in Swaziland (Figure 7a)

Occurs throughout the country in the highveld, middleveld, lowveld and Lubombo regions (Boycott 1992a). Recorded altitude is between 120m and 1510m a.s.l.

Recorded localities: Big Bend (NMZB); Big Bend and Sifunga, between (TM); Elangeni Farm (TM); Helehele (TM); Hlatikulu (TM); Lavumisa, 9,5km NW of (TM); Malolotja Nature Reserve (TM); Mantenga Ranch (TM); Matsamo, 13km SW of (TM); Mbabane (TM); Mdzimba Hills (TM); Mlawula River crossing (TM); Mortimer's Dam (TM); Motshane River (NM); Mpofu River, near (TM); Mzimphofu River (TM); Nhlangano, 15km W of (TM); Nkomati River bridge near Balegane (TM); Ntungulubi River (TM); Piggs Peak, 29km SE of (TM); Sandlane, 6km NE of (TM); Sandlane, 10km NE of (TM); Shalt's Dam (TM); Umbuluzi Pan (TM).

Remarks

Reference to the Natal Museum catalogue necessitates Poynton's (1964) "Mbabane" record being emended to Motshane River (Boycott 1992b). Calls at night and during the day (especially in the early morning) all year round in suitable habitat.

Strongylopus grayii grayii (Smith, 1849)

Spotted rana

Strongylopus grayii grayii (Smith). Boycott 1992a,p.5; Boycott 1992b,p.67; Boycott and Culverwell 1992,p.39.

Distribution in Swaziland (Figure 7b)

New record for Swaziland. Confined to the highveld region (Boycott 1992a). Recorded altitude is approximately 1415m a.s.l.

Recorded localities: Forbes Reef Dam, near (TM); Forbes Reef forest (TM).

Remarks

Heard calling in Forbes Reef forest (comprising mostly alien black wattle) during and after thunderstorm at the end of March.

Strongylopus fasciatus fasciatus (Smith, 1867)

Striped rana

Rana fasciata fasciata Smith. Poynton 1964,p.116.

Strongylopus fasciatus fasciatus (Smith). Boycott 1992a,p.5; Boycott 1992b,p.67; Boycott and Culverwell 1992,p.39.

Distribution in Swaziland (Figure 7c)

Confined to the highveld region (Boycott 1992a). Recorded altitude is between 1175m and 1415m a.s.l.

Recorded localities: Malolotja Nature Reserve (TM); Mbabane (TM); Motshane River (NM).

Remarks

Reference to the Natal Museum catalogue necessitates Poynton's (1964) "Mbabane" record being emended to Motshane River (Boycott 1992b). Calls at night and during the day (especially in the early morning) in March, April and May in the Swaziland highveld.

Ptychadena anchietae (Bocage, 1867)

Savanna ridged frog

Ptychadena anchietae (Bocage). Poynton 1964,p.127; Passmore and Carruthers 1979,p.155; Boycott 1992a,p.6; Boycott 1992b,p.67; Boycott and Culverwell 1992,p.39.

Distribution in Swaziland (Figure 7d)

Occurs in the middleveld, lowveld and Lubombo regions, absent from the highveld (Boycott 1992b). Recorded altitude is between 90m and 625m a.s.l.

Recorded localities: Big Bend (NMZB,TM); Big Bend Sugar Estate (TM); Hlatikulu and Sidvokodvo, between (TM); Lavumisa, 9.5km NW of (TM); Mafutseni, 12km N of (TM); Malkerns/Manzini road (TM); Maloma, 8km SW of (TM); Mcandatshe Farm (Poytn.1964); Mlaula Estate (Poytn.1964); Mpofu River, near (TM); Mzimphofu River (TM); Nyetane Dam (TM); Nyetane River (TM); Nsoko, 10,5km S of (TM); Piggs Peak, 30km SE of (TM); Piggs Peak/Balegane/Matsamo road junction (TM); Sidvokodvo and Manzini, between (TM); Siphofaneni, 3,5km E of (TM); Siphofaneni, 21km SW of (TM); Siphofaneni, 25km SW of (TM); Tshaneni (JV,NMZB,TM,UM); Tshaneni and Bordergate, between (TM); Tshaneni/Mliba road (TM); Umbuluzi Dam (TM).

Ptychadena oxyrhynchus (Smith, 1849)**Sharp-nosed ridged frog**

Ptychadena oxyrhynchus (Smith). Boycott 1992a,p.6; Boycott 1992b,p.67; Boycott and Culverwell 1992,p.39.

Distribution in Swaziland (Figure 8a)

New record for Swaziland. Occurs throughout the country in the highveld, middleveld, lowveld and Lubombo regions (Boycott 1992a), rarely found on the highveld above 1000m. Recorded altitude is between 185m and 1400m a.s.l.

Recorded localities: Forbes Reef, 1km S of (TM); Kwaluseni, 2km W of (TM); Mafutseni, 12km N of (TM); Malkerns road, 1.5km down (TM); Maloma, 8km SW of (s.r.); Mambane, 3,5km N of (TM); Matsamo, 13km SW of (TM); Mnyame Gorge (TM); Mpofu River, near (TM); Nhlangano, 15km W of (TM); Piggs Peak, 18km SE of (TM); Piggs Peak, 30km SE of (TM); Sidvokodvo, 10km NW of (TM); Siphofaneni, 21km SW of (TM); Tshaneni/Mliba road (TM); Tunzini Estate (TM); Umbuluzi Dam (TM); Umbuluzi Pan (TM).

Remarks

Sympatric with *P. anchietae* over much of the latter's range and sympatric with *P. porosissima* in parts of the highveld (Boycott 1992a).

Ptychadena mossambica (Peters, 1854)**Mozambique ridged frog**

Ptychadena mossambica (Peters). Passmore and Carruthers 1979,p.160; Boycott 1992a,p.6; Boycott 1992b,p.67; Boycott and Culverwell 1992,p.39.

Distribution in Swaziland (Figure 8b)

New record for Swaziland. Occurs in the middleveld, lowveld and Lubombo regions, absent from the highveld (Boycott 1992a). Recorded altitude is between 135m and 410m a.s.l.

Recorded localities: Big Bend, 14km NW of (TM); Bordergate, 1km S of (TM); Bordergate, 2,5km S of (TM); Dinedor Farm (TM); Lavumisa, 6km N of (TM); Lavumisa, 10km N of (TM); Mafutseni, 15km NE of (TM); Mlawula Nature Reserve (east)(TM); Mloya River, 3km E of (TM); Simunye, 17,5km S of (TM); Tshaneni (TM); Tshaneni/Mliba road (TM); Tunzini Estate (TM); Umbuluzi Dam (TM); Umbuluzi Estate (TM).

Remarks

Previously unrecorded from Swaziland except for photographs in Passmore and Carruthers (1979).

Ptychadena porosissima (Steindachner, 1867)

Grassland ridged frog

Ptychadena porosissima (Steindachner). Boycott 1992a,p.6; Boycott 1992b,p.67; Boycott and Culverwell 1992,p.39.

Distribution in Swaziland (Figure 8c)

New record for Swaziland. Restricted to the highveld region (Boycott 1992a). Recorded altitude is between 1145m and 1495m a.s.l.

Recorded localities: Forbes Reef, 1km S of (TM); Malolotja Nature Reserve (TM); Mdzimba Hills (TM); Sandlane, 10km NE of (TM).

Remarks

Calls at night and during the day from bog systems and seepage zones in the Swaziland highveld. Also occurs around edges of man-made borrow-pits.

Pyxicephalus adspersus adspersus Tschudi, 1838**Bullfrog**

Pyxicephalus adspersus Tschudi. Passmore and Carruthers 1979,p.114 (part).

Pyxicephalus adspersus adspersus Tschudi. Lambiris 1989,p73; Boycott 1992a,p.6; Boycott 1992b,p.68; Boycott and Culverwell 1992,p.39.

Distribution in Swaziland (Figure 8d)

New record for Swaziland. Apparently occurring in the highveld region (Boycott 1992a). Recorded altitude is approximately 1360m a.s.l.

Recorded localities: Hawane Dam (s.r.) (V.Parker pers. comm.).

Remarks

Only known from a recent sighting in 1987 by Mr V. Parker. Mr Parker who knows the frogs from the Transvaal highveld, reports that he saw the frogs around the perimeter of the dam and in the shallows following torrential rain. At this time the dam was apparently still filling up. Lambiris (1989) erroneously lists this form from Swaziland citing Parry (1982) and Poynton and Broadley (1985b). Parry (1982) lists *P. a. edulis* from the Swaziland lowveld.

Pyxicephalus adspersus edulis Peters, 1854**Lowveld bullfrog**

Pyxicephalus adspersus Tschudi. Passmore and Carruthers 1979,p.114 (part).

Pyxicephalus adspersus edulis Peters. Passmore and Carruthers 1979,p.114 (part); Parry 1982,p.288; Boycott 1992a,p.6; Boycott 1992b,p.68; Boycott and Culverwell 1992,p.39.

Distribution in Swaziland (Figure 9a)

Occurs in the middleveld and lowveld regions (Boycott 1992a). Recorded altitude is between 170m and 425m a.s.l.

Recorded localities: Big Bend (SAM); Lavumisa, 10km N of (TM); Maloma, 5km E of (TM); Matsamo and Balegane, between (TM); Tshaneni (UM); Tshaneni and Bordergate, between (TM); Tunzini Estate (TM).

Remarks

The photograph of the "sub-adult" *P. adspersus* in Passmore and Carruthers (1979) is in fact an adult *P. a. edulis* (Boycott 1992a). Parry (1982) documented the first voucher specimen from Swaziland. At Tshaneni in the northern lowveld many juveniles have been seen to congregate on the main road between the town and Bordergate during heavy rain. Other species tend to move across the road while the bullfrogs sit around in shallow puddles on the road. The surrounding country is intensively and extensively used for cane and citrus production.

Tomopterna cryptotis (Boulenger, 1907)

Striped sand frog

Tomopterna cryptotis (Boulenger). Passmore and Carruthers 1979,p.120; Boycott 1992a,p.6; Boycott 1992b,p.68; Boycott and Culverwell 1992,p.39.

Distribution in Swaziland (Figure 9b)

New record for Swaziland. Occurs throughout the country but, with only one highveld record, apparently more common in the middleveld, lowveld and Lubombo regions (Boycott 1992a). Recorded altitude is between 135m and 1050m.

Recorded localities: Big Bend (NMZB); Bordergate, 1km S of (TM); Lavumisa, 6km N of (TM); Lavumisa, 9,5km NW of (TM); Mafutseni, 15km NE of (TM); Maloma, 3km E of (TM); Manzini, 10km NE of (TM); Mlawula Nature Reserve (east)(TM); Nhlangano, 15km W of (TM); Nsoko, 8km S of (TM); Nsoko, 10km S of (TM); Piggs Peak and Matsamo, between (TM); Sand River Dam, near (TM); Tambuti Estate, 1,5km W of (TM); Tshaneni (UM); Tunzini Estate (TM).

Remarks

Previously unrecorded from Swaziland except for photograph in Passmore and Carruthers (1979).

Tomopterna krugerensis Passmore and Carruthers, 1979

Sandveld sand frog

Tomopterna krugerensis Passmore and Carruthers. Boycott 1992a,p.6; Boycott 1992b,p.68; Boycott and Culverwell 1992,p.39.

Distribution in Swaziland (Figure 9c)

New record for Swaziland. Occurs in the lowveld region (Boycott 1992a). Recorded altitude is approximately 135m a.s.l.

Recorded localities: Mlawula Nature Reserve (west)(TM).

Remarks

This record serves to fill a major gap between Transvaal and Natal localities.

Tomopterna natalensis (Smith, 1849)

Natal sand frog

Tomopterna natalensis (Smith). Passmore and Carruthers 1979,p.126; Boycott 1992a,p.7; Boycott 1992b,p.68; Boycott and Culverwell 1992,p.39.

Distribution in Swaziland (Figure 9d)

New record for Swaziland. Occurs throughout the country in the highveld, middleveld, lowveld and Lubombo regions, more common in the highveld and middleveld (Boycott 1992a). Recorded altitude is between 105m and 1465m a.s.l.

Recorded localities: Bar Circle Ranch (TM); Big Bend (NMZB,SAM); Big Bend Sugar Estate (TM); Dinedor Farm (TM); Edwaleni road, 2,5km down (TM); Elangeni Farm (TM); Forbes Reef, 1km S of (TM); Hlatikulu (TM); Hlatikulu, 15km SE of (TM); Lavumisa, 9,5km NW of (TM); Lavumisa, 14km NW of (TM); Mafutseni, 4km SW of (TM); Malkerns/Bhunya road (TM); Malolotja Nature Reserve (TM); Mankayane, 13km SW of (TM); Mdzimba Hills (TM); Mlawula Nature Reserve (east)(TM); Mortimer's Dam (TM); Mpofu River, near (TM); Muti Muti Nature Reserve (TM); Muti Muti Nature Reserve (south) (TM); Ngwenya borderpost, 500m E of (a.r.); Nhlangano, 15km W of (TM); Nhlangano and Hlatikulu, between (TM); Piggs Peak, 18km SE of (TM); Piggs Peak and Matsamo, between (TM); Sandlane, 7,5km NE of (TM); Sandlane, 10km NE of (TM); Sidvokodvo, 7km NW of (TM); Siphofaneni, 20km SW of (TM); Tunzini Estate (TM); Umbuluzi Dam (TM).

Remarks

Previously unrecorded from Swaziland except for photograph in Passmore and Carruthers (1979).

Hildebrandtia ornata ornata (Peters, 1878)

Ornate burrowing frog

Hildebrandtia ornata ornata (Peters). Boycott and la Croix 1991,p.19; Boycott 1992a,p.7; Boycott 1992b,p.68; Boycott and Culverwell 1992,p.39.

Distribution in Swaziland (Figure 10a)

New record for Swaziland. Only known from the northern lowveld (Boycott 1992a). Recorded altitude is approximately 275m a.s.l.

Recorded localities: Tunzini Estate (TM).

Remarks

First record for Swaziland was documented by Boycott and la Croix (1991). This remains the only record for the country.

Phrynobatrachus natalensis (Smith, 1849)**Common puddle frog**

Phrynobatrachus natalensis (Smith). Poynton 1964,p.138; Passmore and Carruthers 1979,p.167; Boycott 1992a,p.7; Boycott 1992b,p.68; Boycott and Culverwell 1992,p.39.

Distribution in Swaziland (Figure 10b)

Occurs throughout the country but more common in the middleveld, lowveld and Lubombo regions (Boycott 1992a). Recorded altitude is between 170m and 1130m a.s.l.

Recorded localities: Big Bend (SAM); Big Bend, 14km NW of (TM); Bordergate, 1km S of (TM); Edwaleni road, 1,5km down (TM); Hlatikulu (TM); Malkerns/Bhunya road (TM); Mantenga Falls (TM); Matsamo, 2,5km SW of (TM); Mbabane (Poynt.1964); Mbabane, 15m N of (UM); Mcandatshe Farm (Poynt.1964); Mlaula Estate (Poynt.1964); Nhlangano and Hlatikulu, between (TM); Piggs Peak, 30km SE of (TM); Sidvokodvo, 10km NW of (TM); Siphofaneni, 3km E of (TM); Siphofaneni, 21km SW of (TM); Tshaneni (TM,UM); Tshaneni/Mliba road (TM); Tunzini Estate (TM); Umbuluzi Pan (TM).

Remarks

Poynton (1964) listed the species from Mbabane, based on University of Natal material (UN), later sent to the Natal Museum (Poynton in litt.). This material appears to be lost.

Phrynobatrachus mababiensis FitzSimons, 1932**Dwarf puddle frog**

Phrynobatrachus mababiensis FitzSimons. Boycott 1992a,p.7; Boycott 1992b,p.68; Boycott and Culverwell 1992,p.39.

Distribution in Swaziland (Figure 10c)

New record for Swaziland. Occurs in the middleveld and lowveld regions and exceptionally (with a single record) in the highveld region. Recorded altitude is between 185m and 490m a.s.l., although the species has been recorded once at 1495m.

Recorded localities: Lubombo foothills near Big Bend (JV); Malolotja Nature Reserve (TM); Matsamo, 2,5km SW of (TM); Mlawula Nature Reserve (east)(TM); Mloya River, 3km E of (a.r.); Mpofu River (TM); Piggs Peak, 30km SE of (TM); Tshaneni (TM); Umbuluzi Dam (TM).

Cacosternum boettgeri (Boulenger, 1882)

Dainty frog

Cacosternum boettgeri (Boulenger). Boycott 1992a,p.7; Boycott 1992b,p.68; Boycott and Culverwell 1992,p.39.

Distribution in Swaziland (Figure 10d)

New record for Swaziland. Occurs throughout the country in the highveld, middleveld, lowveld and Lubombo regions (Boycott 1992a). Recorded altitude is between 185m and 1400m a.s.l.

Recorded localities: Big Bend, 14km NW of (TM); Bordergate, 3,5km S of (TM); Forbes Reef, 1km S of (TM); Lavumisa, 9km NW of (TM); Lavumisa, 17,5km N of (TM); Simunye, 17,5km S of (a.r.); Siphofaneni, 3,5km E of (TM); Tshaneni (TM,UM); Tshaneni/Mliba road (TM); Tunzini Estate (TM); Umbuluzi Dam (TM).

Cacosternum nanum nanum Boulenger, 1887

Bronze dainty frog

Cacosternum nanum nanum Boulenger. Boycott 1992a,p.7; Boycott 1992b,p.68; Boycott and Culverwell 1992,p.39.

Distribution in Swaziland (Figure 11a)

New record for Swaziland. Only recorded from the highveld and Lubombo regions. Recorded altitude is between 610m and 1125m a.s.l.

Recorded localities: Bulembu, 3km S of (TM); Siteki, 2m N of (NM).

Cacosternum nanum parvum Poynton, 1963

Dwarf dainty frog

Cacosternum nanum parvum Poynton. Boycott 1992a,p.7; Boycott 1992b,p.68; Boycott and Culverwell 1992,p.39.

Distribution in Swaziland (Figure 11b)

New record for Swaziland. Restricted to the highveld region (Boycott 1992a). Recorded altitude is between 1020m and 1495m a.s.l.

Recorded localities: Kobolondo Mountain (a.r.); Malolotja Nature Reserve (TM); Mbabane (TM); Mdzimba Hills (TM); Nhlangano (TM); Sandlane, 6km NE of (TM); Usutu Forest Plantation (TM).

Family RHACOPHORIDAE

Chiromantis xerampelina Peters, 1854

Foam-nest tree frog

Chiromantis xerampelina Peters. Poynton 1964,p.158; Stewart 1967,p.117; Passmore and Carruthers 1979,p.202; Boycott 1992a,p.7; Boycott 1992b,p.68; Boycott and Culverwell 1992,p.39.

Distribution in Swaziland (Figure 11c)

Occurs in the middleveld, lowveld and Lubombo regions, absent from the highveld (Boycott 1992a). Recorded altitude is between 105m and 550m a.s.l.

Recorded localities: Balegane district (TM); Big Bend, 14km NW of (TM); Big Bend, 22km N of (CAS); Big Bend Sugar Estate (TM); Black and White Umbuluzi Rivers, confluence of (TM); Bordergate, 7km S of (TM); Bremersdorp (=Manzini)(Poytn.1964); Kalwene (JV); Lavumisa, 9,5km NW of (TM); Mafutseni, 11km E of (TM); Mafutseni, 15km NE of (TM); Maloma, 6m E of (TM); Mananga, near (DM); Mlawula Nature Reserve (east)(TM); Ngonini (TM); Simunye, 17,5km S of (TM); Siphofaneni, 21km SW of (TM); Siphofaneni, 3,5km E of (TM); Siteki, 20km SE of (TM); Tambuti Estate (TM); Tshaneni/Mliba road (TM); Umbuluzi Dam (TM).

Remarks

Poynton (1964) lists a Durban Museum specimen from "near Mananga". The entry in the Durban Museum catalogue is given as "near Mananga, Swaziland" and Poynton's gazetteer lists the locality as "Mananga, Transvaal". Although Mananga is on the border between Swaziland and the Transvaal, it appears as if this material was in fact collected within Swaziland (Boycott 1992a).

Family HYPEROLIIDAE

Leptopelis mossambicus Poynton, 1985

Brown-backed tree frog

Leptopelis sp. Passmore and Carruthers 1979,p.220

Leptopelis mossambicus Poynton. Poynton 1985,p.468; Poynton and Broadley 1987,p.170; Boycott 1992a,p.8; Boycott 1992b,p.68; Boycott and Culverwell 1992,p.39.

Distribution in Swaziland (Figure 11d)

New record for Swaziland. Occurs in the middleveld, lowveld and Lubombo regions, absent from the highveld (Boycott 1992a). Recorded altitude is between 150m and 490m a.s.l.

Recorded localities: Big Bend, 14km NW of (a.r.); Bordergate, 2,5km S of (TM); Lavumisa, 10km NW of (TM); Mafutseni, 15km NE of (TM); Matsamo, 13km SW of (TM); Mhlosinga Game Reserve (TM); Mloya River, 3km E of (TM); Mpofu River (TM); Nsoko, 8km S of

(TM); Piggs Peak, 30km SE of (TM); Piggs Peak/Balegane/Matsamo road junction (TM); Siteki, 6km S of (a.r.); Tshaneni (NMZB,UM); Umbuluzi Dam (TM); Umbuluzi Pan (TM).

Remarks

Previously unrecorded from Swaziland except for photograph in Passmore and Carruthers (1979). Poynton (1985), when stating that the species occurs within the limits of the 500m contour in Swaziland, was probably referring to the locality of the photographed specimen in Passmore and Carruthers (1979). The males have been observed calling on the ground next to roadside ditches.

Kassina maculata (Duméril, 1853)

Vlei frog

Kassina maculata (Duméril). Passmore and Carruthers 1979,p.227; Boycott 1992a,p.8; Boycott 1992b,p.68; Boycott and Culverwell 1992,p.39.

Distribution in Swaziland (Figure 12a)

New record for Swaziland. Occurs in the eastern middleveld, lowveld and Lubombo regions, absent from the western middleveld and highveld (Boycott 1992a). Recorded altitude is between 185m and 370m a.s.l. in the lowveld and middleveld but as high as 700m on top of the Lubombo plateau.

Recorded localities: Bordergate, 2.5km S of (a.r.); Mafutseni, 22km E of (a.r.); Mambane (TM); Manzini and Siphofaneni, between (a.r.); Siteki, 6km S of (a.r.); Tshaneni (UM); Umbuluzi Dam (TM).

Remarks

Previously unrecorded from Swaziland except for photograph in Passmore and Carruthers (1979).

Kassina senegalensis (Duméril and Bibron, 1841)**Running frog**

Kassina senegalensis (Duméril and Bibron). Passmore and Carruthers 1979,p.229; Boycott 1992a,p.8; Boycott 1992b,p.68; Boycott and Culverwell 1992,p.39.

Distribution in Swaziland (Figure 12b)

New record for Swaziland. Occurs throughout the country in the highveld, middleveld, lowveld and Lubombo regions (Boycott 1992a). Recorded altitude is between 105m and 1465m a.s.l.

Recorded localities: Big Bend, 14km NW of (TM); Big Bend Sugar Estate (TM); Forbes Reef, 1km S of (TM); Lavumisa, 8km NW of (TM); Mafutseni, 15km NE of (TM); Malkerns/Bhunya road (TM); Matsamo, 13km SW of (TM); Mbabane, 5km NW of (a.r.); Mhlambanyati, 17km NW of (a.r.); Mlawula Nature Reserve (east)(TM); Mortimer's Dam (TM); Nhlangano (TM); Nhlangano, 15km W of (TM); Piggs Peak, 15km SE of (TM); Piggs Peak, 30km SE of (TM); Sandlane, 10km NE of (TM); Siphofaneni, 3,5km E of (TM); Siphofaneni, 21km SW of (TM); Tshaneni (SAM,UM); Tshaneni/Mliba road (TM); Umbuluzi Dam (TM).

Remarks

Previously unrecorded from Swaziland except for photograph in Passmore and Carruthers (1979).

Semnodactylus wealii (Boulenger, 1882)**Long-toed running frog**

Semnodactylus wealii (Boulenger). Boycott 1992a,p.8; Boycott 1992b,p.69; Boycott and Culverwell 1992,p.39.

Distribution in Swaziland (Figure 12c)

New record for Swaziland. Restricted to the highveld region (Boycott 1992a). Recorded altitude is between 1400m and 1525m a.s.l.

Recorded localities: Forbes Reef, 1km S of (TM); Malolotja Nature Reserve (TM); Mhlambanyati, 17km NW of (TM); Nkaba, 1km N of (a.r.); Sandlane, 6km NE of (a.r.).

Remarks

This species is sympatric with *Kassina senegalensis* in parts of the highveld. The species occurs in bog systems, seepage zones and around the edges of man-made dams and borrow-pits.

Afixalus aureus Pickersgill, 1984

Spiny reed frog

Afixalus brachynemis brachynemis (Boulenger). Passmore and Carruthers 1979,p.234.

Afixalus aureus Pickersgill. Pickersgill 1984,p.206; Poynton and Broadley 1987,p.191; Lambiris 1988,p.86; Lambiris 1989,p.132; Boycott 1992a,p.8; Boycott 1992b,p.69; Boycott and Culverwell 1992,p.39.

Distribution in Swaziland (Figure 12d)

Occurs in the middleveld, lowveld and Lubombo regions, absent from the highveld region (Boycott 1992a). Recorded altitude is between 135m and 490m a.s.l. in the lowveld and middleveld but as high as 700m on top of the Lubombo plateau.

Recorded localities: Balegane district (TM); Big Bend, 14km NW of (TM); Mafutseni (Pickersgill 1984); Matsamo and Balegane, between (TM); Mhlosinga Game Reserve (TM); Piggs Peak, 30km SE of (TM); Shalt's Dam (TM); Siteki, 3.5km S of (TM); Tshaneni (TM); Tshaneni/Mliba road (TM); Umbuluzi Dam (TM).

Hyperolius marmoratus taeniatus Peters, 1854**Painted reed frog**

Hyperolius marmoratus Rapp. Passmore and Carruthers 1979,p.255.

Hyperolius marmoratus taeniatus Peters. Poynton 1964,p.197; Wager 1965,p.214; Wager 1986,p.159; Poynton and Broadley 1987,p.216; Lambiris 1989,p.147; Boycott 1992a,p.8; Boycott 1992b,p.69; Boycott and Culverwell 1992,p.39.

Distribution in Swaziland (Figure 13a)

Occurs throughout the country in the highveld, middleveld, lowveld and Lubombo regions (Boycott 1992a). Recorded altitude is between 105m and 1525m a.s.l.

Recorded localities: Balegane district (TM); Bar Circle Ranch (TM); Big Bend Sugar Estate (TM); Black Umbuluzi River (RCBS); Bordergate, 2,5km S of (TM); Dinedor Farm (TM); Edwaleni road, 1,2km down (TM); Hot Springs (Usutu River)(TM); Lavumisa, 14km NW of (TM); Malkerns/Bhunya road (TM); Malolotja Nature Reserve (TM); Mambane, 5km NW of (TM); Manzini (TM); Manzini/Malkerns road, 2km down (TM); Mbabane (CAS); Mbabane, 5km NW of (TM); Mbabane, 13km NE of (TM); Mbuyane Falls (RCBS); Mdzimba Hills (TM); Mhlambanyati (TM); Mhlambanyati, 17km NW of (TM); Mlawula Nature Reserve (east)(TM); Motshane River (NM); Mpofu River (TM); Nhlangano (TM); Piggs Peak (TM); Piggs Peak, 12km NE of (TM); Piggs Peak, 18km SE of (TM); Sandlane, 7,5km NE of (TM); Shalt's Dam (TM); Siphofaneni, 1km S of (TM); Siteki, 3km S of (TM); Tshaneni (SAM,TM,UM); Tshaneni/Mliba road (TM); Umbuluzi Dam (TM).

Remarks

Reference to the Natal Museum catalogue necessitates Poynton's (1964) "Mbabane" record being emended to Motshane River (Boycott 1992b).

Hyperolius pusillus (Cope, 1862)**Waterlily frog**

Hyperolius pusillus (Cope). Passmore and Carruthers 1979,p.251; Boycott 1992a,p.8; Boycott 1992b,p.69; Boycott and Culverwell 1992,p.39.

Distribution in Swaziland (Figure 13b)

New record for Swaziland. Occurs in the middleveld, lowveld and Lubombo regions, absent from the highveld (Boycott 1992a). Recorded altitude is between 185m and 610m a.s.l. However, the species has been recorded once at 990m (see remarks).

Recorded localities: Balegane district (TM); Bordergate, 2,5km S of (TM); Mafutseni, 22km E of (TM); Mambane (TM); Matsamo and Balegane, between (TM); Mlawula Nature Reserve (east)(a.r.); Piggs Peak (TM); Sand River Dam (TM); Siteki, 3km S of (TM); Siteki, 3,5km S of (TM); Umbuluzi Dam (TM).

Remarks

The species occurs sympatrically with *H. tuberilinguis* over much of its range. An interesting record is that of Piggs Peak in the transition zone between middleveld and highveld at 990m a.s.l. (see *H. tuberilinguis*).

Hyperolius semidiscus Hewitt, 1927**Yellow-striped reed frog**

Hyperolius semidiscus Hewitt. Passmore and Carruthers 1979,p.244; Boycott 1992a,p.9; Boycott 1992b,p.69; Boycott and Culverwell 1992,p.39.

Distribution in Swaziland (Figure 13c)

New record for Swaziland. Only known from the highveld region. Recorded altitude is between 960m and 1080m a.s.l.

Recorded localities: Black Umbuluzi Falls (s.r.); Mbabane, 13km NE of (NM, TM); Mbuyane Falls (RCBS); Black Umbuluzi River (RCBS).

Remarks

Previously unrecorded except for photograph in Passmore and Carruthers (1979). The Mbuyane Falls locality represents the northernmost record for the species. The species is threatened at this locality by the uncontrolled infestation of black wattle along the river's course.

Hyperolius tuberilinguis Smith, 1849

Green reed frog

Hyperolius tuberilinguis Smith. Passmore and Carruthers 1979, p.248; Boycott 1992a, p.9; Boycott 1992b, p.69; Boycott and Culverwell 1992, p.39.

Distribution in Swaziland (Figure 13d)

New record for Swaziland. Occurs in the middleveld, lowveld and Lubombo regions, absent from the highveld region (Boycott 1992a). Recorded altitude is between 135m and 610m a.s.l. However, the species has been recorded once at 990m (see remarks).

Recorded localities: Balegane district (TM); Bordergate, 2,5km S of (TM); Lubuli (DM); Matsamo and Balegane, between (TM); Mpopu River (TM); Piggs Peak (TM); Siteki, 3km S of (TM); Siteki, 3,5km S of (TM); Tshaneni (NM); Umbuluzi Dam (TM); Umbuluzi Pan (TM); van Eck Dam (TM).

Remarks

A population of these frogs occurs in Piggs Peak (at 990m a.s.l.) in sympatry with *H. pusillus* and *H. marmoratus*. As the Piggs Peak record represents an unusual locality for both *H. pusillus* and *H. tuberilinguis*, introduction of these populations should not be discounted (Boycott 1992a). The locality is a man-made dam and waterlilies and other aquatic plants could have been introduced to the site. The eggs of both these species could have been transported with aquatic plants.

3.4. Species accounts: reptiles

CLASS REPTILIA

ORDER CROCODYLIA

Family CROCODYLIDAE

Crocodylus niloticus Laurenti, 1768

Nile crocodile

Crocodylus niloticus Laurenti. Boycott 1992a,p.9; Boycott and Culverwell 1992,p.39.

Distribution in Swaziland (Figure 14a)

New record for Swaziland. Occurs in the middleveld, lowveld and Lubombo regions, absent from the highveld region. Recorded altitude is between 100m and 500m a.s.l.

Recorded localities: Invuvu Dam (s.r.); Mbuluzane River (s.r.); Umbuluzi Gorge (s.r.); Umbuluzi River (lowveld)(s.r.); Mkondo River (s.r.); Mlaula Estate (DM); Mlawula River (s.r.); Mlumati River (s.r.); Ngwavuma River (s.r.); Nkomati River (lowveld)(s.r.); Nyetane River (s.r.); Sand River Dam (s.r.); Sifunga Dam (s.r.); Siphiso River (s.r.); Tobotsa Dam (s.r.); Tshaneni settling ponds (s.r.); Usutu River (s.r.); van Eck Dam (s.r.).

Remarks

Once the species was more common and widespread in the middleveld. At present it appears to be holding its own, mostly in the lowveld and Lubombo regions.

ORDER CHELONII

Family PELOMEDUSIDAE

Pelomedusa subrufa subrufa (Lacépède, 1788)

Cape terrapin

Pelomedusa subrufa (Lacépède). Boycott 1992a,p.9.

Pelomedusa subrufa subrufa (Lacépède). Boycott and Culverwell 1992,p.39.

Distribution in Swaziland (Figure 14b)

New record for Swaziland. Occurs in the middleveld and lowveld regions, not yet recorded from the highveld and Lubombo regions. Recorded altitude is between 125m and 375m a.s.l. Recorded localities: Big Bend, just S of (JV); Big Bend, 16km NW of (JV); Hlane Game Reserve (s.r.); Lukhula (s.r.); Lukhula, S of (s.r.); Maphiveni (s.r.); Mlawula Station (s.r.); Siphofaneni, 3km E of (TM); Siphofaneni, 25km SW of (TM).

Pelusios sinuatus (Smith, 1838)

Serrated hinged terrapin

Pelusios sinuatus (Smith). Broadley 1981a,p.680; Boycott 1992a,p.9; Boycott and Culverwell 1992,p.39.

Distribution in Swaziland (Figure 14c)

Occurs in the middleveld, lowveld and Lubombo regions (Boycott 1992a). Recorded altitude is between 90m and 625m a.s.l.

Recorded localities: Balegane district (s.r.); Dinedor Farm (TM); Mafutseni, 3m E of (s.r.); Mafutseni, 15km NE of (s.r.); Matsapha (s.r.); Mbuluzane River (s.r.); Umbuluzi Gorge (s.r.); Umbuluzi River (lowveld)(s.r.); Mlawula Nature Reserve (east)(s.r.); Mlawula River (s.r.);

Nkomati River bridge (new), near (s.r.); Nyetane Dam (s.r.); Piggs Peak, 30km SE of (s.r.); Tshaneni (Brdly.1981a).

Remarks

Broadley's (1981a) locality, Tshaneni, was misplotted as 2631BB instead of 2531DD.

Family TESTUDINIDAE

Geochelone pardalis (Bell, 1828)

Leopard tortoise

Geochelone pardalis (Bell). Boycott 1992a,p.10; Boycott and Culverwell 1992,p.39.

Distribution in Swaziland (Figure 14d)

New record for Swaziland. Occurs in the middleveld, lowveld and Lubombo regions, absent from the highveld region. Recorded altitude is between 90m and 450m a.s.l.

Recorded localities: Big Bend (s.r.); Hlane Game Reserve (s.r.); Lavumisa (s.r.); Manzini (s.r.); Manzini, 8m E of (s.r.); Mlawula Nature Reserve (west)(s.r.); Mpaka (s.r.); Ndzindza Nature Reserve (s.r.); Oribi Ranch (s.r.); Siteki, 10m NE of (s.r.); Siteki, 13km E of (s.r.).

Remarks

No voucher specimens collected during the survey. Currently only known from eleven sight records.

Kinixys belliana spekii Gray, 1863

Savanna hinged tortoise

Kinixys belliana Gray. Greig and Burdett 1976,p.257.

"*Kinixys spekii*". Broadley 1989,p.53.

Kinixys belliana spekii Gray. Broadley 1981b,p.215; Boycott 1988b,p.90; Boycott and Bourquin 1988,p.124; Boycott and Jacobsen 1988,p.93; Boycott 1992a,p.10; Boycott and Culverwell 1992,p.39.

Distribution in Swaziland (Figure 15a)

Occurs in the middleveld, lowveld and Lubombo regions, absent from the highveld region (Boycott 1992a). Recorded altitude is between 125m and 625m a.s.l.

Recorded localities: Big Bend, 13km NW of (s.r.); Hlane Game Reserve (s.r.); Manzini (Brdly.1981b); Manzini, N of (TM); Manzini, 21km E of (Brdly.1981b); Mlawula Nature Reserve (west)(s.r.); Mlawula Nature Reserve (east)(s.r.); Mpaka, 18m NE of (s.r.); Siphofaneni, 5km NW of (TM); Mapokane, near (s.r.); Tambuti Estate (TM); Tshaneni (Brdly.1981b); Tunzini Estate (TM).

Remarks

The taxonomic status of this form is being reviewed (Broadley pers. comm.). Broadley's (1981b) locality, Tshaneni, was misplotted as 2631BB instead of 2531DD.

Kinixys natalensis Hewitt, 1935

Natal hinged tortoise

Kinixys natalensis Hewitt. Broadley 1981b,p.195; Boycott 1988b,p.90; Boycott and Bourquin 1988,p.127; Boycott and Jacobsen 1988,p.93; Broadley 1989,p.61; Boycott 1992a,p.10; Boycott and Culverwell 1992,p.39.

Distribution in Swaziland (Figure 15b)

Restricted to the Lubombo region this species has a limited distribution in Swaziland (Boycott 1992a). Recorded altitude is between 125m and 655m a.s.l.

Recorded localities: Big Bend, 6km E of (TM); Groenpan Farm (Brdly.1981b); Mbuluzi Game Reserve (east)(s.r.); Mlawula Nature Reserve (west)(s.r.); Mlawula Nature Reserve (east)(s.r.); Ndzindza Nature Reserve (Brdly.1981b).

Remarks

Broadley (1981b) re-instated *K. natalensis* as a full species. The species occurs sympatrically with *K. b. spekii* in parts of the Lubombo mountains (Boycott and Jacobsen 1988). Broadley's (1981b) Ndzinda (*sic*) Nature Reserve record was misplotted. Correct spelling is Ndzindza. Ndzindza is located in 2632AA not 2632AC (J.Culverwell pers. comm.).

ORDER SQUAMATA

SUBORDER SAURIA

Family GEKKONIDAE

Afroedura pondolia marleyi (FitzSimons, 1930)**Marley's thick-tailed rock gecko**

Afroedura pondolia marleyi (FitzSimons). Onderstall 1984,p.508; Boycott 1992a,p.10; Boycott and Culverwell 1992,p.39.

Distribution in Swaziland (Figure 15c)

Apparently restricted to the lowveld and Lubombo regions. Recorded altitude is between 125m and 625m a.s.l.

Recorded localities: Kalwene (TM); Lubombo Mountains (Onderstall 1984); Lubombo Mountains above Big Bend (JV); Mambane (NMZB); Mlawula Nature Reserve (west)(TM); Siphofaneni (SAM); Siteki, 5km N of (TM); Uhombo Ranches (NMZB); Umbuluzi Estate (TM).

Remarks

First recorded from Swaziland by Onderstall (1984), who failed to provide specific locality data. An *Afoedura* that evaded capture in the Mkondo Valley could have been of this form, in which case the distribution of this subspecies could extend considerably further west than depicted.

Afroedura pondolia major Onderstall, 1984

Swazi thick-tailed rock gecko

Afroedura pondolia major Onderstall 1984, Ann. Transvaal Mus. 33, p.497 (Type locality: Black Umbeluzi Falls, Hhohho District, Swaziland); Branch 1988b,p.192; Boycott 1992a,p.10; Boycott and Culverwell 1992,p.39.

Distribution in Swaziland (Table 15d)

Endemic to Swaziland, where it is restricted to the highveld and middleveld regions (Boycott 1992a). Recorded altitude is between 500m and 930m a.s.l.

Recorded localities: Black Umbuluzi Falls (TM); Mahulungwane Gorge (TM); Mantenga Falls (TM); Mbulukudvu Gorge (TM); Mdzimba Plateau (TM); Nkomati Bridge (TM).

Remarks

The spelling employed by Onderstall (1984) for some localities is incorrect, these are "Matenga Falls" instead of Mantenga Falls, "Mdimba Plateau" instead of Mdzimba Plateau and "Komati Bridge" instead of Nkomati Bridge. Furthermore, the usual spelling of Umbeluzi is Umbuluzi.

Lygodactylus capensis capensis (Smith, 1849)

Common dwarf gecko

Lygodactylus capensis capensis (Smith). FitzSimons 1943,p.52; Boycott 1992a,p.10; Boycott and Culverwell 1992,p.39.

Distribution in Swaziland (Figure 16a)

Occurs throughout the country in the highveld, middleveld, lowveld and Lubombo regions, less common in the highveld above 1000m (Boycott 1992a). Recorded altitude is between 135m and 1205m a.s.l.

Recorded localities: Big Bend (JV); Ezulwini (s.r.); Forbes Reef (s.r.); Hlane Game Reserve (s.r.); Hlatikulu (JV); IYSIS barrage (s.r.); Libetse (s.r.); Malolotja Nature Reserve (TM); Manzini (s.r.); Maphiveni (s.r.); Matsapha (s.r.); Mbabane (s.r.); Mbabane, 4km S of (RCBS); Mkondo Valley (s.r.); Mlawula Nature Reserve (west)(s.r.); Mlawula Nature Reserve (east)(TM); Mlilwane Wildlife Sanctuary (s.r.); Mlondozi (TM); Ndzindza Nature Reserve (s.r.); Tambankulu Estate (s.r.); Tshaneni (s.r.); Wyldsedale (Fitz.1943).

Lygodactylus ocellatus Roux, 1907

Ocellated dwarf gecko

Lygodactylus ocellatus Roux. FitzSimons 1943,p.57; Welch 1982,p.30; Branch 1988b,p.198; Boycott 1992a,p.11; Boycott and Culverwell 1992,p.39.

Distribution in Swaziland (Figure 16b)

This species has a limited distribution in Swaziland where it is restricted to the highveld region (Boycott 1992a). Recorded altitude is between 1250m and 1510m a.s.l.

Recorded localities: Black Umbuluzi Falls (s.r.); Droxford Farm, 1km S of (TM); Forbes Reef (JV,TM); Forbes Reef, 3m S of (s.r.); Hawane Dam (s.r.); Malolotja Nature Reserve (TM); Malolotja Nature Reserve (north)(TM); Mbabane (TM); Mdzimba Hills (JV); Mdzimba Plateau (TM); Mhlambanyati (s.r.); Mlilwane Wildlife Sanctuary (s.r.); Polinjane (s.r.).

Hemidactylus mabouia mabouia (Moreau de Jonnes, 1818)

Tropical house gecko

Hemidactylus mabouia mabouia (Moreau de Jonnes). Boycott 1992a,p.11; Boycott and Culverwell 1992,p.39.

Distribution in Swaziland (Figure 16c)

Occurs throughout the country in the highveld, middleveld, lowveld and Lubombo regions. Recorded altitude is between 90m and 1145m a.s.l.

Recorded localities: Big Bend (JV,NMZB); Big Bend, 3km S of (JV); Ezulwini (s.r.); Hlane Game Reserve (s.r.); Manzini (TM); Manzini, 14m ESE of (TM); Mapokane (JV); Mbabane (s.r.); Mbuluzi Gorge (JV); Mlawula Nature Reserve (west)(s.r.); Mlilwane Wildlife Sanctuary (TM,CAS); Tambankulu Estate (TM); Tambuti Estate (TM); Timbutini Hills (TM); Tshaneni (TM); Tunzini Estate (RCBS).

Homopholis wahlbergii (Smith, 1849)

Wahlberg's velvety gecko

Homopholis wahlbergii (Smith). Boycott 1992a,p.11; Boycott and Culverwell 1992,p.39.

Distribution in Swaziland (Figure 16d)

Occurs mostly in the middleveld, lowveld and Lubombo regions but also known from two localities in the highveld (Boycott 1992a). Recorded altitude is between 395m and 1205m a.s.l.

Recorded localities: Ezulwini (s.r.); Lubombo foothills near Big Bend (JV); Malolotja Nature Reserve (TM); Manzini (TM); Mapokane (JV); Mbabane (s.r.); Mdzimba Hills (JV); Mkondo Bridge, 4km S of (TM); Mlawula Nature Reserve (east)(s.r.); Ndzindza Nature Reserve (s.r.); Piggs Peak, 25km SE of (TM).

Pachydactylus maculatus maculatus Gray, 1845

Spotted gecko

Pachydactylus maculatus maculatus Gray. FitzSimons 1943,p.81; Branch 1988b,p.204; Boycott 1992a,p.11; Boycott and Culverwell 1992,p.39.

Distribution in Swaziland (Figure 17a)

Occurs throughout the country in the highveld, middleveld, lowveld and Lubombo regions, but infrequently seen on the highveld (Boycott 1992a). Recorded altitude is between 90m and

Recorded localities: Big Bend (DM,JV); Big Bend, 20km NE of (TM); Goedgegun (=Nhlangano)(Fitz.1943); Jilobi Forest, E of (TM); Lubombo foothills near Big Bend (JV); Lubombo Mountains above Big Bend (JV); Malolotja Nature Reserve (TM); Mambane (NMZB); Mambane, 3,5km N of (TM); Manzini (s.r.); Mbabane, 7km SW of (TM); Mlawula Nature Reserve (west)(TM); Mlawula Nature Reserve (east)(s.r.); Mlilwane Wildlife Sanctuary (TM); Tshaneni (NMZB).

Pachydactylus capensis vansoni FitzSimons, 1933

van Son's thick-toed gecko

Pachydactylus capensis vansoni FitzSimons. Boycott 1992a,p.11; Boycott and Culverwell 1992,p.39.

Distribution in Swaziland (Figure 17b)

New record for Swaziland. Only known from the highveld and lowveld regions, unrecorded from the middleveld and Lubombo regions. Recorded altitude is between 90m and 1325m a.s.l.

Recorded localities: Big Bend (s.r.); Hlane Game Reserve (TM); Mahlangatsha Hills (TM); Manzini, 28m SE of (CAS); Mlawula Nature Reserve (west)(TM); Mlawula Nature Reserve (south-west) (TM); Nsoko, 5km W of (TM).

Pachydactylus bibronii Smith, 1846

Bibron's thick-toed gecko

Pachydactylus bibronii Smith. Boycott 1992a,p.11; Boycott and Culverwell 1992,p.39.

Distribution in Swaziland (Figure 17c)

New record for Swaziland. Occurs in the middleveld, lowveld and Lubombo regions, absent from the highveld region (Boycott 1992a). Recorded altitude is between 275m and 580m a.s.l.

Recorded localities: Bulungu Poort (s.r.); Hlane Game Reserve (s.r.); IYSIS barrage (s.r.); Lomahasha (TM); Mambane, 2km SE of (TM); Manzini (s.r.); Manzini, 14m ESE of (TM); Mapokane (JV); Mlawula Nature Reserve (west)(s.r.).

Family AGAMIDAE

Agama atricollis Smith, 1849

Tree agama

Agama atricollis Smith. Boycott 1992a,p.11; Boycott and Culverwell 1992,p.39.

Distribution in Swaziland (Figure 17d)

New record for Swaziland. Occurs throughout the country in the highveld, middleveld, lowveld and Lubombo regions (Boycott 1992a). Recorded altitude is between 170m and 1220m a.s.l. Recorded localities: Black Umbuluzi Falls (s.r.); Ezulwini (s.r.); Hlane Game Reserve (s.r.); Little Usutu River bridge, 3km S of (TM); Mandela Beacon (s.r.); Malolotja Nature Reserve (TM); Manzini (TM); Manzini Nazarene Mission (TM); Mbabane (TM); Mbabane, 4km S of (RCBS,TM); Mcandatshe Farm (DM); Mlaula Estate (DM); Mlawula Nature Reserve (west)(TM); Mlilwane Wildlife Sanctuary (CAS,TM); Mpaka, 6m NE of (s.r.); Tambuti Estate (TM); Tshaneni (s.r.).

Remarks

Some workers follow Moody (1980) in using the generic name, *Stellio*. This species has been observed at fairly high altitude (1220m a.s.l.) near Mandela Beacon in the highveld.

Agama atra atra Daudin, 1802**Rock agama**

Agama atra atra Daudin. Boycott 1992a,p.12; Boycott and Culverwell 1992,p.39.

Distribution in Swaziland (Figure 18a)

New record for Swaziland. Only known from the highveld region (Boycott 1992a). Approximate recorded altitude is 1150m a.s.l.

Recorded localities: Mdzimba Plateau (s.r.).

Remarks

This form was apparently collected by Onderstall on the Mdzimba Plateau (J.Culverwell pers. comm.), however, no trace of it exists in the Transvaal Museum and the record requires confirmation. Jacobsen (1989) records the species from localities on the Transvaal highveld west of Swaziland. Further surveys are necessary to investigate the species' possible occurrence in Swaziland.

Agama aculeata distanti Boulenger 1902**Distant's spiny agama**

Agama aculeata distanti Boulenger. Boycott 1992a,p.12; Boycott and Culverwell 1992,p.39.

Distribution in Swaziland (Figure 18b)

New record for Swaziland. Occurs in the highveld, middleveld and Lubombo regions absent from the lowveld region (Boycott 1992a). Recorded altitude is between 520m and 1615m a.s.l.

Recorded localities: Mahlangatsha Hills (TM); Malolotja Nature Reserve (TM); Mambane, 3km E of (TM); Mankayane, 8km NE of (TM); Mantjolo (TM); Mbabane (TM); Mbabane Clinic (TM); Mdzimba Plateau (TM); Piggs Peak, 22km SE of (TM); Tikhuba (TM); Usutu Forest Plantation (TM).

Agama aculeata armata Peters, 1854**Tropical spiny agama**

Agama hispida mertensi Wermuth. Welch 1982,p.48.

Agama aculeata armata Peters. Boycott 1992a,p.12; Boycott and Culverwell 1992,p.39.

Distribution in Swaziland (Figure 18c)

New record for Swaziland. Only known from the middleveld region (Boycott 1992a).

Recorded altitude is approximately 625m a.s.l.

Recorded localities: Manzini (TM).

Family CHAMAELEONIDAE*Chamaeleo dilepis dilepis* Leach, 1819.**Flap-necked chameleon**

Chamaeleo dilepis var. *quilensis* Bocage. FitzSimons 1943,p.156.

Chamaeleo dilepis dilepis Leach. Boycott 1992a,p.12; Boycott and Culverwell 1992,p.39.

Distribution in Swaziland (Figure 18d)

Occurs throughout the country in the highveld, middleveld, lowveld and Lubombo regions (Boycott 1992a). Recorded altitude is between 275m and 1400m a.s.l.

Recorded localities: Ezulwini (s.r.); Forbes Reef (Fitz.1943); Lomahasha (NMZB,TM); Lukhula (TM); Malolotja Nature Reserve (TM); Manzini (TM); Mbabane (TM); Mdzimba Plateau (s.r.); Ndzindza Nature Reserve (s.r.)

Remarks

FitzSimons (1943) recorded *C. d. var. quilensis* from Forbes Reef, however, the status of this form is uncertain and warrants further investigation.

Bradypodion sp.**Dwarf chameleon**

Bradypodion transvaalense (FitzSimons). Branch 1988b,p.185; Boycott 1992a,p.12; Boycott and Culverwell 1992,p.39.

Distribution in Swaziland (Figure 19a)

New record for Swaziland. Occurs in the highveld region only (Boycott 1992a). Recorded altitude is between 1350m and 1525m a.s.l.

Recorded localities: Forbes Reef Estate (TM); Malolotja Nature Reserve (TM); Waterford School (LR,TM).

Remarks

Initially, doubts were expressed about the natural occurrence of this form in Swaziland (J.Culverwell pers. comm.) as, for a long time, the only specimens known came from Waterford School and it was feared that these might represent an introduced population. However, more recently a number of specimens have been found in Malolotja Nature Reserve (at four widely separated localities) and in the Forbes Reef area. Furthermore, dwarf chameleons have been collected within 5km of the north-western border of Swaziland on the road between Bulembu and Barberton. The taxonomy of the group is very confused and as pointed out by Jacobsen (1989), *Bradypodion transvaalensis* (*sensu stricto*) is restricted to the north-eastern Transvaal. Several additional and predominantly isolated populations have been discovered in the Transvaal along the Drakensberg and escarpment slopes and these are awaiting treatment. Because of the existing taxonomic confusion the Swaziland material is listed as *Bradypodion* sp. It was perhaps premature for Branch (1988b), Boycott (1992a) and Boycott and Culverwell (1992) to refer to the Swaziland population as *B. transvaalense*. However, work on the genus is being carried out by other researchers and hopefully the problems will soon be resolved.

Family SCINCIDAE

Scelotes mira (Roux, 1907)**Montane burrowing skink**

Scelotes mira (Roux). FitzSimons 1943,p.183; Bourquin 1977,p.48; Welch 1982,p.76; Boycott 1992a,p.12; Boycott and Culverwell 1992,p.39.

Distribution in Swaziland (Figure 19b)

Occurs throughout the highveld region, absent from the middleveld, lowveld and Lubombo regions (Boycott 1992a). Recorded altitude is between 1160m and 1615m a.s.l.

Recorded localities: Droxford Farm (s.r.); Forbes Reef (Fitz.1943); Forbes Reef, 3m S of (s.r.); Forbes Reef, 4m N of (s.r.); Hawane Dam (s.r.); Hawane Nature Reserve, near (TM); Hlatikulu (TM); Hluti and Goedgegun (=Nhlangano), between (Fitz.1943); Mahlangatsha Hills (TM); Mandela Beacon (TM); Malolotja Nature Reserve (TM); Malolotja Nature Reserve (north)(TM); Mankayane, 8km NE of (TM); Mbabane (s.r.); Mdzimba Hills (RCBS); Motshane, 7km S of (TM); Usutu Forest Plantation (TM).

Scelotes brevipes Hewitt, 1925**Short-footed burrowing skink**

Scelotes brevipes Hewitt. Welch 1982,p.76; Boycott 1992a,p.12; Boycott and Culverwell 1992,p.39.

Distribution in Swaziland (Figure 19c)

New record for Swaziland. Occurs in the lowveld and Lubombo regions, absent from the highveld and middleveld (Boycott 1992a). Recorded altitude is between 170m and 580m a.s.l. Recorded localities: Big Bend, 6km E of (TM); Jilobi Forest, E of (TM); Lomahasha, 3km S of (TM); Lubombo Mountains above Big Bend (JV); Mambane (NMZB); Mambane, 3,5km N of (TM); Mlawula Nature Reserve (west)(TM); Siteki, 20km S of (JV); Tshaneni (TM).

Remarks

Welch (1982) erroneously lists *Scelotes arenicolor* (Peters) from Swaziland. It is restricted to the Mozambique coastal plain and northern Zululand east of the Lubombo Mountains.

Mabuya quinquetaeniata margaritifer (Peters, 1854)

Rainbow rock skink

Mabuya quinquetaeniata margaritifer (Peters). Boycott 1992a,p.13; Boycott and Culverwell 1992,p.39.

Distribution in Swaziland (Figure 19d)

New record for Swaziland. Occurs throughout the country in the highveld, middleveld, lowveld and Lubombo regions (Boycott 1992a). Recorded altitude is between 60m and 885m a.s.l.

Recorded localities: Balegane, 13m S of (s.r.); Bhunya (s.r.); Big Bend (SAM); Big Bend, 3m S of (s.r.); Big Bend, 15km S of (JV); Black Umbuluzi Falls (s.r.); Bulungu Poort (s.r.); Ezulwini (s.r.); Hlane Game Reserve (s.r.); Hloti, 6m E of (s.r.); IYSIS barrage (s.r.); Libertas (s.r.); Libetse Ranch (s.r.); Malolotja Nature Reserve (TM); Manzini (s.r.); Maphiveni (s.r.); Mapokane (JV); Matsamo, 3km SW of (TM); Mbabane (s.r.); Mcandatshe Farm (DM); Mission Falls (s.r.); Mkondo Valley (s.r.); Mlawula Estate (DM); Mlawula Nature Reserve (west)(s.r.); Mlawula Nature Reserve (east)(s.r.); Mnyame Gorge (s.r.); Nkomati bridge (TM); Nkomati River bridge (new), 1km S of (TM); Piggs Peak, 6km S of (TM); Piggs Peak, 22km SE of (TM); Siphofaneni (s.r.); Umbuluzi Gorge (JV); Usutu Gorge (TM).

Remarks

In the highveld this form is restricted to the lower regions of the larger, warmer valleys.

Mabuya capensis (Gray, 1830)**Cape skink**

Mabuya capensis (Gray). Boycott 1992a,p.13; Boycott and Culverwell 1992,p.39.

Distribution in Swaziland (Figure 20a)

New record for Swaziland. This species has a limited distribution in western Swaziland (Boycott 1992a). Recorded altitude is between 1415m and 1480m a.s.l.

Recorded localities: Forbes Reef, 10km N of (TM); Forbes Reef Estate (TM); Malolotja Nature Reserve (TM).

Remarks

A specimen was found in the stomach of a cross-marked grass snake, *Psammophis crucifer*, collected at Malolotja Nature Reserve. Most of the body had been digested but not the tail.

Mabuya varia (Peters, 1867)**Variable skink**

Mabuya varia (Peters). Boycott 1992a,p.13; Boycott and Culverwell 1992,p.39.

Distribution in Swaziland (Figure 20b)

New record for Swaziland. Occurs throughout the country in the highveld, middleveld, lowveld and Lubombo regions (Boycott 1992a). Recorded altitude is between 185m and 1615m a.s.l.

Recorded localities: Abercorn Hoek, 6km N of (TM); Big Bend (NMZB); Big Bend, just south of (JV); Big Bend, 16km NW of (TM); Big Bend, 20km NE of (TM); Ezulwini (s.r.); Forbes Reef (JV,UM); Hlane Game Reserve (s.r.); Hlatikulu (TM); Hluti, 6m E of (s.r.); Houdkop (s.r.); IYSIS barrage (s.r.); Lavumisa (s.r.); Libetse Ranch (s.r.); Lomahasha, 3km S of (TM); Lubombo Mountains above Big Bend (JV); Mahlangatsha Hills (TM); Malandela Beacon (TM); Malolotja Nature Reserve (TM); Mambane, 2km SE of (TM); Mambane, 7km

SW of (TM); Manzini (s.r.); Mankayane (TM); Maphiveni (s.r.); Mbabane (s.r.); Mbabane, 7km SW of (TM); Mcandatshe Farm (DM); Mdzimba Hills (s.r.); Mhlambanyati (s.r.); Mkondo Valley (s.r.); Ngwenya Mountain (TM); Nkomati River bridge (old), near (TM); Piggs Peak, 22km SE of (TM); Piggs Peak Plantation (TM); Sandlane, 6km E of (RCBS); Siphofaneni (s.r.); Siteki (s.r.); Sitsatsaweni (s.r.); Usutu Forest Plantation (TM); Velesiweni (s.r.).

Mabuya striata striata (Peters, 1844)

Common striped skink

Mabuya striata striata (Peters). Broadley 1977b,p.75; Boycott 1992a,p.13; Boycott and Culverwell 1992,p.39.

Distribution in Swaziland (Figure 20c)

Occurs in the middleveld, lowveld and Lubombo regions, absent from the highveld region (Boycott 1992a). Recorded altitude is between 185m and 1230m a.s.l.

Recorded localities: Bar Circle Ranch (TM); Big Bend (JV); Big Bend, 16km NW of (TM); Bremersdorp (=Manzini)(TM); Fiddlers Green (TM); Lubombo Mountains above Big Bend (JV); Malandela Beacon (TM); Mcandatshe Farm (DM); Mlula Estate (DM); Mlilwane Wildlife Sanctuary (s.r.); Nkomati River bridge (new), 1km S of (TM); Nyongane, SW of Balegane (TM); Siteki, 5,5km S of (TM); Tshaneni (JV); Tunzini Estate (TM); Umbuluzi Estate (TM).

Remarks

FitzSimons (1943) listed *Mabuya striata* from one locality in the southern highveld. This material is referred to *M. s. punctatissima* (Broadley 1977b). A sight record from Mlilwane Wildlife Sanctuary requires confirmation.

Mabuya striata punctatissima (Smith, 1849)**Highveld striped skink**

Mabuya striata (Peters). FitzSimons 1943,p.232.

Mabuya striata punctatissima (Smith). Broadley 1977b,p.64; Broadley 1988,p.378; Boycott 1992a,p.13; Boycott and Culverwell 1992,p.39.

Distribution in Swaziland (Figure 20d)

Occurs in the highveld region, absent from the middleveld, lowveld and Lubombo regions (Boycott 1992a). Recorded altitude is between 1150m and 1510m a.s.l.

Recorded localities: Forbes Reef (UM); Hluti and Goedgegung (=Nhlangano), between (TM); Malandela Beacon (TM); Malolotja Nature Reserve (TM); Mbabane (TM); Nkomati River bridge (new), 1km S of (TM); Sandlane, 6km E of (RCBS).

Remarks

The specimens from Malandela Beacon and Nkomati River bridge (both TM) possess tricarinate dorsal scales which may suggest intergrades with *M. s. striata* and *M. s. punctatissima* (W.D. Haacke pers. comm.).

Lygosoma sundevallii (Smith, 1849)**Sundevall's writhing skink**

Lygosoma sundevallii (Smith). Boycott 1992a,p.13; Boycott and Culverwell 1992,p.39.

Distribution in Swaziland (Figure 21a)

New record for Swaziland. Occurs in the lowveld region (Boycott 1992a). Recorded altitude is approximately 275m a.s.l.

Recorded localities: Tshaneni (NMZB,UM).

Panaspis wahlbergii (Smith, 1849)**Wahlberg's dwarf skink**

Panaspis wahlbergii (Smith). Welch 1982,p.91; Boycott 1992a,p.13; Boycott and Culverwell 1992,p.39.

Distribution in Swaziland (Figure 21b)

New record for Swaziland. Occurs throughout the country in the highveld, middleveld, lowveld and Lubombo regions (Boycott 1992a). Recorded altitude is between 260m and 1370m a.s.l.

Recorded localities: Bremersdorp (=Manzini)(TM); Droxford Farm (TM); Ezulwini (s.r.); Forbes Reef (s.r.); Mahlangatsha Hills (TM); Mandela Beacon (TM); Malolotja Nature Reserve (TM); Malolotja Nature Reserve (north)(RCBS); Maloma (DM); Maphiveni (s.r.); Mbabane (TM); Mbabane, 4km S of (TM); Mhlambanyati (s.r.); Mlilwane Wildlife Sanctuary (s.r.); Mlumati River valley (RCBS); Motshane, 7km S of (TM); Tembalihle (s.r.); Tshaneni (JV,TM,UM); Tunzini Estate (TM); Velesiwani (s.r.).

Acontias plumbeus Bianconi, 1849**Giant legless skink**

Acontias plumbeus Bianconi. FitzSimons 1943,p.246; Welch 1982,p.67; Boycott 1992a,p.13; Boycott and Culverwell 1992,p.39.

Distribution in Swaziland (Figure 21c)

Occurs throughout the country in the highveld, middleveld, lowveld and Lubombo regions (Boycott 1992a). Recorded altitude is between 260m and 1525m a.s.l.

Recorded localities: Dinedor Farm (s.r.); Forbes Reef (TM); Goedgegun (=Nhlangano)(TM); Kalwene (TM); Malolotja Nature Reserve (TM); Maphiveni (TM); Mbabane (TM); Mdzimba Plateau (s.r.); Mlawula Nature Reserve (west)(TM); Phophonyane Nature Reserve (s.r.); Pine

Valley (s.r.); Siteki, 5km S of (TM); Tshaneni (NMZB,TM); Tunzini Estate (TM); Umbuluzi Estate (TM).

Remarks

A specimen in the South African Museum is listed from "?Swaziland".

Family LACERTIDAE

Nucras lalandii (Milne-Edwards, 1829)

Delalande's sandveld lizard

Nucras lalandii (Milne-Edwards). Boycott 1990b,p.50; Boycott 1990c,p.57; Boycott 1992a,p.14; Boycott and Culverwell 1992,p.40.

Distribution in Swaziland (Figure 21d)

New record for Swaziland. Restricted to the highveld region, this species has a limited distribution in western Swaziland (Boycott 1992a). Recorded altitude is between 1385m and 1525m a.s.l.

Recorded localities: Forbes Reef, 3m S of (s.r.); Malolotja Nature Reserve (TM).

Nucras taeniolata holubi (Steindachner, 1882)

Spotted sandveld lizard

Nucras taeniolata holubi (Steindachner). Boycott 1992a,p.14; Boycott and Culverwell 1992,p.40.

Distribution in Swaziland (Figure 22a)

New record for Swaziland. Occurs in the middleveld, lowveld and Lubombo regions, absent from the highveld region. Recorded altitude is between 90m and 885m a.s.l.

Recorded localities: Big Bend (SAM); Helehele (s.r.); Mkondo Valley (s.r.); Mliba (s.r.); Piggs Peak. 22km SE of (TM); Sifunga/Siteki/Tikhuba road junction (TM); Siteki (DM); Tambankulu Estate (s.r.); Tshaneni (NMZB,TM,UM).

Remarks

Nomenclature follows Jacobsen (1989) and Broadley (pers. comm.). This species and *Nucras ornata* appear to differ specifically from one another. In Swaziland both species have been found in parapatry in the Lubombo region. Previous sight records of *N. taeniolata ornata* have been allocated to *N. t. holubi* but these all need to be individually confirmed by new sightings or collections.

Nucras ornata (Gray, 1864)

Ornate sandveld lizard

Nucras ornata (Gray). Boycott 1992a,p.14; Boycott and Culverwell 1992,p.40.

Distribution in Swaziland (Figure 22b)

New record for Swaziland. Occurs in the lowveld and Lubombo regions, absent from the highveld and middleveld regions (Boycott 1992a). Recorded altitude is between 135m and 580m a.s.l.

Recorded localities: Big Bend (SAM); Big Bend, 20km NE of (TM); Mhlumeni (TM); Mlawula Nature Reserve (east) (s.r.); Siteki (DM); Siteki, 3m S of (TM).

Remarks

Nomenclature follows Jacobsen (1989). *N. ornata* is a large distinctive species commonly encountered on top of the Lubombo Mountains. Specimens have also been found in the valleys of the Lubombos.

Family VARANIDAE

Varanus albigularis (Daudin, 1802)**White-throated monitor***Varanus exanthematicus albigularis* (Daudin). Boycott and Culverwell 1992,p.39.*Varanus albigularis* (Daudin). Boycott 1992a,p.14.**Distribution in Swaziland (Figure 22c)**

New record for Swaziland. Occurs throughout the country in the highveld, middleveld, lowveld and Lubombo regions, rare in the highveld. Recorded altitude is between 125m and 1450m a.s.l.

Recorded localities: Hlane Game Reserve (s.r.); Malolotja Nature Reserve (RCBS); Mambane, near (s.r.); Mhlume (s.r.); Mlawula Nature Reserve (west)(s.r.); Mpisi (s.r.); Nkaba, 3km N of (s.r.); Ndzindza Nature Reserve (s.r.); Tshaneni (s.r.); Tunzini Estate (s.r.).

Varanus niloticus niloticus (Linnaeus, 1762)**Nile monitor***Varanus niloticus* (Linnaeus). Boycott and Culverwell 1992,p.39.*Varanus niloticus niloticus* (Linnaeus). Boycott 1992a,p.14.**Distribution in Swaziland (Figure 22d)**

New record for Swaziland. Occurs throughout the country in the highveld, middleveld, lowveld and Lubombo regions (Boycott 1992a). Recorded altitude is between 125m and 1360m a.s.l.

Recorded localities: Bhunya, 6m E of (s.r.); Big Bend (s.r.); Black Umbuluzi Falls (s.r.); Ezulwini (s.r.); Forbes Reef (s.r.); Hawane Dam (s.r.); Hawane Falls (s.r.); IYSIS barrage (s.r.); Mahulungwane Gorge (s.r.); Malolotja Falls (s.r.); Manzini (s.r.); Maphiveni, 3,5km SW of (TM); Matsapha (s.r.); Mhlume (s.r.); Mkondo Valley (s.r.); Mlawula Nature Reserve

(west)(s.r.); Mlawula Nature Reserve (east)(s.r.); Mlilwane Wildlife Sanctuary (s.r.); Ndzindza Nature Reserve (s.r.); Sand River Dam (s.r.); Simunye (s.r.); Siphofaneni (s.r.); Siteki and Mpaka, between (TM); Tambankulu Estate (s.r.); Tambuti Estate (s.r.); Tembalihle (s.r.).

Remarks

Of the two species of *Varanus* in Swaziland, *niloticus* is by far the more common and it seems as if it has benefitted from the development of agricultural industries in the lowveld. Two road kills were found in areas surrounded by sugarcane.

Family GERRHOSAURIDAE

Gerrhosaurus validus validus Smith, 1849

Giant plated lizard

Gerrhosaurus validus validus Smith. Welch 1982,p.108; Broadley 1988,p.381; Boycott 1992a,p.14; Boycott and Culverwell 1992,p.40.

Distribution in Swaziland (Figure 23a)

New record for Swaziland. Occurs throughout the country in the highveld, middleveld, lowveld and Lubombo regions (Boycott 1992a). Recorded altitude is between 60m and 760m a.s.l.

Recorded localities: Bremersdorp (=Manzini)(TM); Bremersdorp (=Manzini), 15m ESE of (TM); Hlane Game Reserve (s.r.); Hluti, 6m E of (s.r.); IYSIS barrage (s.r.); Mlawula Nature Reserve (east)(s.r.); Mlilwane Wildlife Sanctuary (s.r.); Nkomati Valley (s.r.); Tambuti Estate (TM); Tshaneni (s.r.); Tshaneni, 13m S of (s.r.); Usutu Gorge (s.r.).

Remarks

In the highveld region this form is restricted to the warmer, larger river valleys.

Gerrhosaurus flavigularis flavigularis Wiegmann, 1828**Yellow-throated plated lizard**

Gerrhosaurus flavigularis flavigularis Wiegmann. Welch 1982,p.108; Boycott 1992a,p.15; Boycott and Culverwell 1992,p.40.

Distribution in Swaziland (Figure 23b)

New record for Swaziland. Occurs throughout the country in the highveld, middleveld, lowveld and Lubombo regions (Boycott 1992a). Recorded altitude is between 185m and 1585m a.s.l.

Recorded localities: Bremersdorp (=Manzini)(TM); Ezulwini (s.r.); Forbes Reef, 3m S of (s.r.); Lavumisa (TM); Malolotja Nature Reserve (TM); Manzini (TM); Mbabane (s.r.); Mlawula Nature Reserve (west)(s.r.); Mlawula Nature Reserve (east)(s.r.); Piggs Peak (TM); Tshaneni (NMZB); Umbuluzi Falls (s.r.).

Remarks

In June 1991 four of these lizards (and two blind snakes, *Typhlops bibronii*), were dug up in an ornamental flower-bed at Malolotja Nature Reserve, in the Swaziland highveld, when the flower-bed was moved during building operations. The lizards and snakes were released at the new site of the flower-bed.

Gerrhosaurus major major Duméril, 1851**Rough-scaled plated lizard**

Gerrhosaurus major grandis Boulenger. Welch 1982,p.108.

Gerrhosaurus major major Duméril. Boycott 1992a,p.15; Boycott and Culverwell 1992,p.40.

Distribution in Swaziland (Figure 23c)

New record for Swaziland. Occurs in the middleveld and lowveld regions (Boycott 1992a). Recorded altitude is between 275m and 600m a.s.l.

Recorded localities: Leeukop (s.r.); Mlawula Nature Reserve (west)(s.r.); Nkomati River bridge (old), near (s.r.); Tshaneni, SW of (s.r.).

Remarks

No voucher specimens collected during the survey. Currently only known from four sight records.

Tetradactylus africanus africanus (Gray, 1838)

African long-tailed seps

Tetradactylus africanus africanus (Gray). Boycott 1992a,p.15; Boycott and Culverwell 1992,p.40.

Distribution in Swaziland (Figure 23d)

New record for Swaziland. Only known from the middleveld region (Boycott 1992a). Recorded altitude is between 730m and 760m a.s.l.

Recorded localities: Hluti, 1,5km SE of (TM); Mlilwane Wildlife Sanctuary (TM).

Remarks

Only two records (both TM specimens) are known from Swaziland, a road kill and a dehydrated specimen found at the bottom of a 3 metre deep soil pit. The road kill, a gravid female (collected in October), has two undeveloped eggs in the oviducts.

Family CORDYLIDAE

Chamaesaura aenea (Wiegmann) Fitzinger, 1843

Transvaal snake-lizard

Chamaesaura aenea (Wiegmann) Fitzinger. Boycott 1992a,p.15; Boycott and Culverwell 1992,p.40.

Distribution in Swaziland (Figure 24a)

New record for Swaziland. Only known from the highveld region (Boycott 1992a). Recorded altitude is between 1385m and 1510m a.s.l.

Recorded localities: Forbes Reef, 3m S of (s.r.); Malolotja Nature Reserve (TM).

Remarks

This species occurs sympatrically with *C. a. anguina* in Malolotja Nature Reserve in the highveld.

Chamaesaura anguina anguina (Linnaeus, 1758)

Cape snake-lizard

Chamaesaura anguina (Linnaeus). FitzSimons 1943,p.412; Boycott 1990a,p.49.

Chamaesaura anguina anguina (Linnaeus). Boycott 1992a,p.15; Boycott and Culverwell 1992,p.40.

Distribution in Swaziland (Figure 24b)

Occurs in the highveld and middleveld regions, absent from the lowveld and Lubombo regions (Boycott 1992a). Recorded altitude is between 610m and 1465m a.s.l.

Recorded localities: Bremersdorp (=Manzini)(TM); Malolotja Nature Reserve (TM); Mbabane (NM); Umbuluzi Falls (s.r.).

Remarks

This and other members of the genus are under increasing pressure outside protected areas as a result of frequent fires and overgrazing. Boycott (1990a) reported on a large brood of nine developing embryos in a gravid female killed during a grass fire. The same specimen (TM67797) exceeds the maximum size recorded by FitzSimons (1943) and Branch (1988b) and measures 139+433=572mm (Boycott 1990a).

Chamaesaura macrolepis macrolepis (Cope, 1862)

Large-scaled snake-lizard

Chamaesaura macrolepis (Cope). FitzSimons 1943,p.413.

Chamaesaura macrolepis macrolepis (Cope). Welch 1982,p.111; Broadley 1988,p.383; Branch 1988b,p.156; Boycott 1992a,p.15; Boycott and Culverwell 1992,p.40.

Distribution in Swaziland (Figure 24c)

Occurs throughout the country in the highveld, middleveld, lowveld and Lubombo regions (Boycott 1992a). Recorded altitude is between 275m and 1020m a.s.l.

Recorded localities: Goedgegun (=Nhlangano)(TM); Mafutseni, 1m E of (TM); Mlilwane Wildlife Sanctuary (TM); Tshaneni (s.r.).

Cordylus warreni warreni (Boulenger, 1908)

Warren's girdled lizard

Cordylus warreni warreni (Boulenger). Boycott 1992a,p.15; Boycott and Culverwell 1992,p.40.

Distribution in Swaziland (Figure 24d)

New record for Swaziland. Restricted to the Lubombo region, this form has a limited distribution in Swaziland (Boycott 1992a). Recorded altitude is between 170m and 780m a.s.l.

Recorded localities: Abercom Hoek, 6km N of (s.r.); Big Bend, 6km E of (TM); Cyrildene (s.r.); Lomahasha (TM); Nyala Ranch (s.r.); Siteki Beacon (TM).

Remarks

This form, which is endemic to Swaziland and South Africa, has a restricted range outside Swaziland.

Cordylus warreni barbertonensis (van Dam, 1921)**Barberton girdled lizard**

Cordylus warreni barbertonensis (van Dam). FitzSimons 1943,p.427; Welch 1982,p.113; Branch 1988b,p.164; Boycott 1992a,p.15; Boycott and Culverwell 1992,p.40.

Distribution in Swaziland (Figure 25a)

Occurs in the middleveld region, absent from the highveld, lowveld and Lubombo regions (Boycott 1992a). Recorded altitude is between 580m and 730m a.s.l.

Recorded localities: Bremersdorp (=Manzini), 15m ESE of (TM,UM); Hluti and Goedgegun (=Nhlangano), between (TM); Maloma (JV); Nkomati Valley (RCBS).

Remarks

This form reaches its furthest west in Swaziland in the Nkomati Valley.

Cordylus tropidosternum jonesii (Boulenger, 1891)**Jones' girdled lizard**

Cordylus cordylus jonesii (Boulenger). Welch 1982,p.112.

Cordylus tropidosternum jonesii (Boulenger). Boycott 1992a,p.16; Boycott and Culverwell 1992,p.40.

Distribution in Swaziland (Figure 25b)

New record for Swaziland. Restricted to the lowveld region, this form has a limited distribution in Swaziland (Boycott 1992a). Recorded altitude is between 185m and 305m a.s.l.

Recorded localities: Hlane Game Reserve (s.r.); IYSIS barrage (TM); Tambuti Estate (TM).

Remarks

One specimen was collected from under the bark of a dead buffalo-thorn tree (*Acacia nigrescens*).

Cordylus vittifer vittifer (Reichenow, 1887)**Transvaal girdled lizard**

Cordylus vittifer (Reichenow). FitzSimons 1943,p.462.

Cordylus vittifer vittifer (Reichenow). Welch 1982,p.113; Branch 1988b,p.163; Boycott 1992a,p.16; Boycott and Culverwell 1992,p.40.

Distribution in Swaziland (Figure 25c)

Occurs throughout the country in the highveld, middleveld, lowveld and Lubombo regions (Boycott 1992a). Recorded altitude is between 90m and 1510m a.s.l.

Recorded localities: Big Bend (NMZB); Big Bend, just S of (JV); Bremersdorp (=Manzini)(TM); Forbes Reef (JV); Hawane Nature Reserve, near (TM); Helehele (s.r.); Hluti and Goedgegun (=Nhlangano), between (TM); Lomahasha (TM); Lubombo foothills near Big Bend (JV); Lubombo Mountains above Big Bend (JV); Mahlangatsha Hills (TM); Mandela Beacon (TM); Malolotja Nature Reserve (TM); Malolotja Nature Reserve (north)(RCBS); Maloma, 14km SW of (JV); Mambane (NMZB); Mankayane, 8km NE of (TM); Mbabane (DM); Mdzimba Hills (TM); Mlilwane Wildlife Sanctuary (s.r.); Ngwenya village (s.r.); Ngwenya borderpost, 500m E of (TM); Piggs Peak (TM); Piggs Peak, 22km SE of (TM); Polinjane (s.r.); Sandlane, 6km E of (RCBS); Sitsatsaweni turnoff (s.r.)

Pseudocordylus melanotus transvaalensis FitzSimons, 1943**Transvaal crag lizard**

Pseudocordylus subviridis transvaalensis FitzSimons. FitzSimons 1943,p.470.

Pseudocordylus melanotus transvaalensis FitzSimons. Branch 1988b,p.171; Boycott 1992a,p.16; Boycott and Culverwell 1992,p.40.

Distribution in Swaziland (Figure 25d)

Restricted to the highveld region, this form has a limited distribution in Swaziland (Boycott 1992a). Recorded altitude is between 1160m and 1525m a.s.l.

Recorded localities: Forbes Reef (JV,TM,UM); Malolotja Nature Reserve (TM); Mbabane (DM,TM); Mdzimba Hills (east)(TM); Motshane, 7km S of (TM).

Remarks

The taxonomy of this form is under review (N.Jacobsen pers. comm.). A Transvaal Museum specimen identified as *P. m. melanotus* (TM67396) is listed from Lomahasha in the Lubombo Mountains. This must be considered a dubious record as the genus is not otherwise recorded in these mountains.

Platysaurus intermedius natalensis FitzSimons, 1948

Natal flat lizard

Platysaurus wilhelmi (not Hewitt) FitzSimons. FitzSimons 1943,p.478.

Platysaurus guttatus natalensis FitzSimons. FitzSimons 1948,p.74.

Platysaurus intermedius natalensis FitzSimons. Broadley 1978,p.165; Welch 1982,p.114; Branch 1988b,p.167; Jacobsen and Newbery 1989,p.56; Boycott 1992a,p.16; Boycott and Culverwell 1992,p.40.

Distribution in Swaziland (Figure 26a)

Restricted to the middleveld region (Boycott 1992a). Recorded altitude is between 395m and 625m a.s.l.

Recorded localities: Bremersdorp (=Manzini)(NM); Bremersdorp (=Manzini), 25km ESE of (MCZ,UM); Maloma, 16km SW of (JV); Manzini, 20km S of (JV); Mapokane (JV); Mhlosheni (JV); Mkondo River bridge, 4km S of (TM); Timbutuni Hills (TM).

Platysaurus intermedius "Lebombo"

Lubombo flat lizard

Platysaurus intermedius wilhelmi Hewitt. Broadley 1978,p.164; Welch 1982,p.115.

Platysaurus intermedius "lebombo" *sensu* Jacobsen and Newbery. Jacobsen and Newbery 1989,p.58; Boycott 1992a,p.16; Boycott and Culverwell 1992,p.40.

Distribution in Swaziland (Figure 26b)

New record for Swaziland. Restricted to the Lubombo region (Boycott 1992a). Recorded altitude is between 230m and 580m a.s.l.

Recorded localities: Big Bend, 15km NE of (TM); Cyrildene (s.r.); Libertas (s.r.); Lomahasha (NMZB,TM); Mambane (NMZB); Mambane, 2km SE of (TM); Mcandatshe Farm (DM); Mlaula Estate (DM); Mlawula Nature Reserve (east)(TM); Mnyame Gorge (s.r.); Nyetane (DM); Ravelston (TM); Siteki (DM,JV); Siteki Beacon (UM); Sitsatsaweni (s.r.); Umbuluzi Gorge (JV).

Remarks

This form was confused with *P. i. wilhelmi* by earlier workers. *P. i. wilhelmi* occurs in the southern lowveld of the Transvaal (Jacobsen and Newbery 1989) and, according to Branch (1988b), in Zululand.

ORDER SQUAMATA

SUBORDER SERPENTES

Family TYPHLOPIDAE

Typhlops bibronii (Smith, 1846)

Bibron's blind snake

Typhlops bibronii Smith. FitzSimons 1962,p.69; Welch 1982,p.128; Broadley 1983,p.42; Boycott 1992a,p.16; Boycott and Culverwell 1992,p.40.

Distribution in Swaziland (Figure 26c)

Occurs throughout the country in the highveld, middleveld, lowveld and Lubombo regions. Recorded altitude is between 135m and 1525m a.s.l.

Recorded localities: Forbes Reef (s.r.); Hawane Dam (s.r.); Lomahasha, 3km S of (TM); Lubombo Mountains above Big Bend (JV); Mahlangatsha Hills (TM); Mandela Beacon (TM); Malolotja Nature Reserve (TM); Mambane, 3,5km N of (TM); Mbabane (TM); Mlawula Nature Reserve (west)(TM); Mlawula Nature Reserve (east)(TM); Motshane (s.r.); Nkomati River bridge (old), near (TM); Nkomati Valley (RCBS); Tambuti Estate (TM).

Remarks

The two specimens from Mahlangatsha Hills show some atypical *bibronii* characteristics, reminiscent of *T. forasini* (Haacke pers. comm.). These concern the poorly defined eye, the body colouring and low midbody scale counts which fall into the range of *T. bibronii*. More material is required from this population before anything unequivocal can be ventured on their identity. For the present they have been included in *T. bibronii*. The distribution is shown in Figure 27a.

Typhlops schlegelii schlegelii Bianconi, 1850

Giant blind snake

Rhinotyphlops schlegelii schlegelii (Bianconi). Welch 1982,p.127.

Typhlops schlegelii schlegelii Bianconi. FitzSimons 1962,p.74; Broadley 1983,p.47; Boycott 1992a,p.16; Boycott and Culverwell 1992,p.40.

Distribution in Swaziland (Figure 26d)

Occurs in the middleveld and lowveld regions, absent from the highveld and Lubombo regions (Boycott 1992a). Recorded altitude is between 90m and 410m a.s.l.

Recorded localities: Big Bend (DM,SAM); Bremersdorp (=Manzini) (TM); Dinedor Farm (TM); Mkondo River bridge (TM); Nsoko, 12,5km N of (TM); Nyetane (TM); Tambankulu Estate (TM); Tshaneni (NMZB,TM).

Remarks

Broadley (1983) plotted further localities for Swaziland but did not indicate the source of these records.

Family LEPTOTYPHLOPIDAE

Leptotyphlops longicaudus (Peters, 1854)

Long-tailed worm snake

Leptotyphlops longicaudus (Peters). Broadley and Watson 1976,p.489; Welch 1982,p.122; Broadley 1983,p.52; Broadley 1988,p.386; Broadley and Howell 1991,p.22; Boycott 1992a,p.17; Boycott and Culverwell 1992,p.40.

Distribution in Swaziland (Figure 27b)

Only known from the highveld and lowveld regions. Recorded altitude is between 280m and 1150m a.s.l.

Recorded localities: Mbabane (LR); Mlawula Nature Reserve (west)(TM).

Leptotyphlops conjunctus conjunctus (Jan, 1861)

Cape worm snake

Leptotyphlops conjuncta (Jan). FitzSimons 1962,p.86.

Leptotyphlops conjunctus conjunctus (Jan). Broadley and Watson 1976,p.494; Welch 1982,p.121; Broadley 1983,p.56; Boycott 1992a,p.17; Boycott and Culverwell 1992,p.40.

Distribution in Swaziland (Figure 27c)

Occurs in the highveld and middleveld regions, absent from the lowveld and Lubombo regions. Recorded altitude is between 395m and 1615m a.s.l.

Recorded localities: Big Bend, 6km E of (TM); Droxford Farm, 1km S of (TM); Mandela Beacon (TM); Malolotja Nature Reserve (TM); Matsamo, 3km SW of (TM); Mbabane

(TM,UM); Mlilwane Wildlife Sanctuary (TM); Piggs Peak (TM); Piggs Peak, 22km SE of (TM); Usutu Forest Plantation (TM); Waterford School (TM).

Remarks

A TM record of this form from the lowveld region warrants further investigation.

Leptotyphlops conjunctus incognitus Broadley and Watson, 1976

Worm snake

Leptotyphlops conjunctus incognitus Broadley and Watson. Broadley and Watson 1976,p.496; Welch 1982,p.122; Broadley 1983,p.57; Broadley 1988,p.386; Boycott 1992a,p.17; Boycott and Culverwell 1992,p.40.

Distribution in Swaziland (Figure 27d)

Occurs in the middleveld and lowveld regions, absent from the highveld and Lubombo regions (Boycott 1992a). Recorded altitude is between 90m and 660m a.s.l.

Recorded localities: Big Bend (NMZB); Helehele (TM); Mlawula Nature Reserve (west)(TM); Tshaneni (BM,TM).

Remarks

Broadley and Watson's (1976) and Broadley's (1983) Swaziland records of Tshaneni were misplotted as 2631BB instead of 2531DD.

Leptotyphlops scutifrons scutifrons (Peters, 1854)

Peter's worm snake

Leptotyphlops scutifrons (Peters). FitzSimons 1962,p.88.

Leptotyphlops scutifrons scutifrons (Peters). Broadley and Watson 1976,p.500; Boycott 1992a,p.17; Boycott and Culverwell 1992,p.40.

Distribution in Swaziland (Figure 28a)

Occurs in the middleveld, lowveld and Lubombo regions, absent from the highveld region (Boycott 1992a). Recorded altitude is between 250m and 780m a.s.l.

Recorded localities: Goedgegun (=Nhlangano)(TM); Hluti, 1,5km SE of (TM); Lomahasha, 3km S of (TM); Siteki (TM); Tshaneni (BM,TM,UM); Vuvulane (TM).

Leptotyphlops telloi Broadley and Watson, 1976

Tello's worm snake

Leptotyphlops telloi Broadley and Watson. Broadley and Watson 1976,p.501; Welch 1982,p.124; Boycott 1992a,p.17; Boycott and Culverwell 1992,p.40.

Distribution in Swaziland (Figure 28b)

Restricted to the Lubombo region, this species has a limited distribution in Swaziland (Boycott 1992a). Recorded altitude is between 125m and 610m a.s.l.

Recorded localities: Mambane (NMZB); Umbuluzi Gorge (TM).

Family BOIDAE

Python sebae natalensis Smith, 1840

Southern African python

Python sebae (not of Gmelin) FitzSimons. FitzSimons 1962,p.94.

Python sebae natalensis Smith. Broadley 1983,p.66; Broadley 1984,p.364; Boycott 1992a,p.17; Boycott and Culverwell 1992,p.40.

Distribution in Swaziland (Figure 28c)

Occurs in the middleveld, lowveld and Lubombo regions, absent from the highveld region (Boycott 1992a). The species occurs quite far west in the larger, warmer river valleys, such

as the Mlumati, Phophonyane, Nkomati and Mkondo. Recorded altitude is between 90m and 790m a.s.l.

Recorded localities: Big Bend (s.r.); Ezulwini (s.r.); Groenpan Farm (TM); Hlane Game Reserve (TM); Malolotja Nature Reserve (s.r.); Matsapha (s.r.); Mhlosinga Game Reserve (s.r.); Mkondo Valley (TM); Mlawula Nature Reserve (east)(TM); Mliba (TM); Nkomati Valley (s.r.); Nsoko (s.r.); Phophonyane Nature Reserve (TM); Tambankulu Estate (s.r.); Tshaneni (s.r.).

Remarks

FitzSimons (1962) and Broadley (1983) listed the additional localities of Bremersdorp (=Manzini), Piggs Peak, Singceni and Stegi (=Siteki) based on Durban Snake Park specimens. This material has not been traced.

Family COLUBRIDAE

Lycodonomorphus laevisimus fitzsimonsi Raw, 1973

Northern dusky-bellied water snake

Lycodonomorphus laevisimus fitzsimonsi Raw. Boycott 1992a,p.17; Boycott and Culverwell 1992,p.40.

Distribution in Swaziland (Figure 28d)

New record for Swaziland. Restricted to the highveld region, this form has a limited distribution in Swaziland (Boycott 1992a). Recorded altitude is between 1250m and 1310m a.s.l.

Recorded localities: Hawane Dam (s.r.); Hawane Falls (RCBS); Black Umbuluzi Falls (s.r.).

Remarks

This species occurs sympatrically with *L. rufulus* at all three recorded localities in the highveld. One specimen was collected from a narrow vertical rock crack at the base of Hawane Falls.

Lycodonomorphus rufulus (Lichtenstein, 1823)

Common brown water snake

Lycodonomorphus rufulus rufulus (Lichtenstein). FitzSimons 1962,p.108.

Lycodonomorphus rufulus (Lichtenstein). Boycott 1992a,p.18; Boycott and Culverwell 1992,p.40.

Distribution in Swaziland (Figure 29a)

Occurs throughout the country in the highveld, middleveld, lowveld and Lubombo regions (Boycott 1992a). Recorded altitude is between 90m and 1450m a.s.l.

Recorded localities: Forbes Reef (TM); Forbes Reef dam (s.r.); Malolotja Nature Reserve (TM); Malolotja Nature Reserve, 6km S of entrance (TM); Mlawula Nature Reserve (east)(s.r.); Mlilwane Wildlife Sanctuary (TM); Pine Valley (TM); Tshaneni (NMZB); Tshaneni, SE of (UM); Waterford School (TM).

Remarks

FitzSimons (1962) and Broadley (1983) listed the additional locality of Piggs Peak based on Durban Snake Park specimens. This material has not been traced. Broadley (1983) plotted a further locality for Swaziland, presumably Tshaneni (in which case the locality has been misplotted as 2631BB instead of 2531DD), but did not provide any details. This species occurs sympatrically with *Lycodonomorphus whytii obscuriventris* in the northern lowveld.

Lycodonomorphus whytii obscuriventris FitzSimons, 1964

Whyte's water snake

Lycodonomorphus whytii obscuriventris FitzSimons. Broadley 1983,p.79; Broadley 1988,p.390; Branch 1988a,p.178; Boycott 1992a,p.18; Boycott and Culverwell 1992,p.40.

Distribution in Swaziland (Figure 29b)

Only known from the northern lowveld region (Boycott 1992a). Recorded altitude is approximately 275m a.s.l.

Recorded localities: Mhlume (s.r.); Tshaneni (NMZB, TM).

Remarks

Broadley's (1983) locality, Tshaneni, was misplotted as 2631BB instead of 2531DD. These snakes were once very common in a rice paddy field which has since been filled in and used for sugarcane.

Lamprophis inornatus Duméril and Bibron, 1854

Olive house snake

Lamprophis inornatus Duméril and Bibron. Boycott 1992a,p.18; Boycott and Culverwell 1992,p.40.

Distribution in Swaziland (Figure 29c)

New record for Swaziland. Restricted to the highveld region, this species has a limited distribution in Swaziland (Boycott 1992a). Recorded altitude is between 885m and 1480m a.s.l.

Recorded localities: Forbes Reef (s.r.); Ka-Dake (TM); Malolotja Nature Reserve (s.r.); Mbabane (TM); Motshane (TM); Nkaba School (TM); Piggs Peak, 6km NE of (TM); Waterford School (TM).

Remarks

Welch (1982) recorded the closely related species *L. aurora* from Swaziland, presumably using FitzSimons (1974) as his source. FitzSimons (1970, 1974) included Swaziland in the notes on distribution, however, I have failed to find any material of this species from Swaziland. Although the species is likely to occur here its presence needs to be confirmed.

Lamprophis guttatus (Smith, 1843)**Spotted house snake**

Lamprophis guttatus (Smith). Broadley 1983,p.87; Boycott 1992,p.18; Boycott and Culverwell 1992,p.40.

Distribution in Swaziland (Figure 29d)

Occurs in the highveld, middleveld and Lubombo regions, unrecorded from the lowveld (Boycott 1992a). Recorded altitude is between 500m and 1250m a.s.l.

Recorded localities: Lomahasha (TM); Mahamba (TM); Malolotja Nature Reserve (TM); Mbabane (DM,TM); Mbabane, 5km W of (TM); Swazi Spa (TM); Waterford School (TM).

Remarks

Broadley (1983) used the alternative spelling Nomahasha for Lomahasha. The latter spelling is more frequently used, at least in Swaziland.

Lamprophis fuliginosus (Boie, 1827)**Brown house snake**

Boaedon fuliginosus fuliginosus (Boie). FitzSimons 1962,p.121.

Lamprophis fuliginosus (Boie). Boycott 1992a,p.18; Boycott and Culverwell 1992,p.40.

Distribution in Swaziland (Figure 30a)

Occurs throughout the country in the highveld, middleveld, lowveld and Lubombo regions (Boycott 1992a). Recorded altitude is between 90m and 1355m a.s.l.

Recorded localities: Bar R Ranch (TM); Big Bend (SAM); Big Bend, 5km NW of (TM); Big Bend, 9km S of (TM); Bremersdorp (=Manzini) (TM); Ezulwini (TM); Malolotja Nature Reserve (TM); Mantenga Falls (TM); Matsamo, 11km SW of (TM); Mbabane (s.r.); Mkondo Valley (s.r.); Mlawula Nature Reserve (west)(RCBS); Manzini Nazarene Mission (TM);

Nhlangano, 1km N of (TM); Piggs Peak, 6km NE of (TM); Piggs Peak, 22km SE of (TM); Siphofaneni, 11km SE of (TM); Tunzini Estate (TM); Tshaneni (UM); Tshaneni, SE of (UM).

Remarks

FitzSimons (1962) listed the additional localities of Malkerns and Stegi (=Siteki) based on Durban Snake Park specimens. This material has not been traced. Broadley (1983) listed an additional locality, presumably Tshaneni, without providing any details, in which case it has been misplotted as 2631BB instead of 2531DD.

Lamprophis swazicus Schaefer, 1970

Swazi rock snake

Lamprophis swazicus Schaefer 1970, Ann. Cape Prov. Mus.8,p.205 (Type locality: Forbes Reef, Swaziland); Visser 1978,p.11; Visser 1979,p.31; Welch 1982,p.152; Broadley 1983,p.91; Branch 1988a,p.97; Branch 1988b,p.60; Boycott 1992a,p.18; Boycott and Culverwell 1992,p.40.

Distribution in Swaziland (Figure 30b)

Restricted to the highveld region this species has a limited distribution in Swaziland (Boycott 1992a). Recorded altitude is between 1200m and 1615m a.s.l.

Recorded localities: Forbes Reef (PEM); Havelock (=Bulembu)(TM); Malolotja Nature Reserve (TM); Mbabane (Visser 1978); Usutu Forest Plantation (TM); Waterford School (s.r.).

Remarks

The Durban Natural Science Museum catalogue lists a *L. swazicus* (DM682) from Big Bend in the Swaziland lowveld. The specimen could not be traced (A.Lambiris pers. comm.). Mr B. Washington who has collected extensively throughout Swaziland is listed as the collector. However, he assures me that he has never collected or sent any *L. swazicus* to the Durban Snake Park of Museum. Recognising the known range of the species as the highveld and escarpment slopes of Swaziland and the eastern Transvaal, and because of the confusion surrounding the specimen, this record is rejected.

Lycophidion capense capense (Smith, 1831)**Cape wolf snake**

Lycophidion capense capense (Smith). Boycott 1992a,p.18; Boycott and Culverwell 1992,p.40.

Distribution in Swaziland (Figure 30c)

Occurs throughout the country in the highveld, middleveld, lowveld and Lubombo regions (Boycott 1992a). Recorded altitude is between 90m and 1145m a.s.l.

Recorded localities: Big Bend (DM,LR,NMZB,SAM); Lubombo Mountains above Big Bend (TM); Malolotja Nature Reserve (s.r.); Manzini, 5km NE of(TM); Mbabane (TM); Mbabane, 4m SW of (s.r.); Hlatikulu and Sidvokodvo, between (TM); Mlawula Nature Reserve (west)(TM); Piggs Peak, 10km NE of (s.r.); Siteki (DM); Tshaneni (NMZB,TM,UM); Tunzini Estate (TM); Umbuluzi Estate (TM).

Remarks

Broadley (1983) plotted additional localities for Swaziland but did not indicate the source. These are presumably Tshaneni and Big Bend of which the former has misplotted as 2631BB instead of 2531DD.

Lycophidion variegatum Broadley, 1969**Variegated wolf snake**

Lycophidion variegatum Broadley. Boycott 1992a,p.18; Boycott and Culverwell 1992,p.40.

Distribution in Swaziland (Figure 30d)

New record for Swaziland. Only known from the northern Lubombo region (Boycott 1992a).

Recorded altitude is approximately 360m a.s.l.

Recorded localities: Lomahasha, 3m S of (TM).

Mehelya capensis capensis (Smith, 1847)**Cape file snake**

Mehelya capensis capensis (Smith). Boycott 1992a,p.19; Boycott and Culverwell 1992,p.40.

Distribution in Swaziland (Figure 31a)

Occurs in the middleveld, lowveld and Lubombo regions, absent from the highveld (Boycott 1992a). Recorded altitude is between 90m and 625m a.s.l.

Recorded localities: Big Bend (SAM); Cyrildene (s.r.); Grand Valley (s.r.); Hlane Game Reserve (s.r.); Lavumisa, N of (s.r.); Likhula (TM); Likhula, 12m S of (s.r.); Lusoti (TM); Macnabs Ranch (TM); Mafutseni, 7km E of (TM); Sidvokodvo, 14km NW of (TM); Siphofaneni, 19km NW of (TM); Tshaneni (UM).

Mehelya nyassae (Günther, 1888)**Black file snake**

Mehelya nyassae (Günther). Boycott 1992a,p.19; Boycott and Culverwell 1992,p.40.

Distribution in Swaziland (Figure 31b)

Only known from the lowveld region (Boycott 1992a). Recorded altitude is between 275m and 320m a.s.l.

Recorded localities: Bordergate, 8km S of (TM); Mhlume (s.r.); Tshaneni (TM,UM).

Duberria lutrix lutrix (Linnaeus, 1758)**Southern slug-eater**

Duberria lutrix lutrix (Linnaeus). Boycott 1992a,p.19; Boycott and Culverwell 1992,p.40.

Distribution in Swaziland (Figure 31c)

Occurs in the highveld and western middleveld (Boycott 1992a). Recorded altitude is between 1190m and 1525m a.s.l.

Recorded localities: Forbes Reef (s.r.); Hawane Dam (TM); Malkerns (TM); Malolotja Nature Reserve (TM); Mankayane (s.r.); Mbabane (RCBS,TM); Mlilwane Wildlife Sanctuary (TM).

Remarks

FitzSimons (1962) listed the additional localities of Bremersdorp (=Manzini) and Piggs Peak based on Durban Snake Park specimens. This material has not been traced. Broadley (1983) plotted an additional locality but did not indicate the source.

Pseudaspis cana (Linnaeus, 1754)

Mole snake

Pseudaspis cana (Linnaeus). Boycott 1992a,p.19; Boycott and Culverwell 1992,p.40.

Distribution in Swaziland (Figure 31d)

Occurs throughout the country in the highveld, middleveld, lowveld and Lubombo regions (Boycott 1992a). Recorded altitude is between 90m and 1415m a.s.l.

Recorded localities: Big Bend, 15km S of (TM); Big Bend, 20km NW of(TM); Forbes Reef (TM); Forbes Reef, 3km S of (RCBS); Malolotja Nature Reserve (TM); Malolotja Nature Reserve entrance, 6km S of (TM); Malkerns (TM); Mbabane (s.r.); Motshane, 1km SE of (s.r.); Mozaan (TM); Nkomati River bridge (new), near (TM); Tambankulu Estate (s.r.); Vuvulane (s.r.).

Remarks

FitzSimons (1962) listed the additional localities of Bremersdorp (=Manzini), Goedgegun (=Nhlangano) and Piggs Peak based on Durban Snake Park specimens. This material has not been traced.

Hemirhagerrhis nototaenia nototaenia (Günther, 1864)

Mopane snake

Hemirhagerrhis nototaenia nototaenia (Günther). Boycott 1992a,p.21; Boycott and Culverwell 1992,p.40.

Distribution in Swaziland (Figure 32a)

New record for Swaziland. Only known from one locality in the northern lowveld (Boycott 1992a). Recorded altitude is approximately 275m a.s.l.

Recorded localities: Mhlume (LR).

Psammophylax rhombeatus rhombeatus (Linnaeus, 1754)

Rhombic skaapsteker

Psammophylax rhombeatus rhombeatus (Linnaeus). Broadley 1977a,p.28; Welch 1982,p.171; Boycott 1992a,p.19; Boycott and Culverwell 1992,p.40.

Distribution in Swaziland (Figure 32b)

Occurs in the highveld region, absent from the middleveld, lowveld and Lubombo regions.

Recorded altitude is between 1150m and 1525m a.s.l.

Recorded localities: Droxford Farm (s.r.); Forbes Reef (TM); Hawane Dam (s.r.); Malolotja Nature Reserve (TM); Malolotja Nature Reserve entrance, 500m S of (TM); Mbabane (DM,TM); Motshane, 6km S of (TM).

Remarks

FitzSimons (1962) listed the additional locality of Havelock based on Durban Snake Park specimens. This material has not been traced.

Remarks

Broadley (1983) plotted an additional locality but did not indicate the source. Contained within the digestive tract of a dead-on road specimen from Malolotja Nature Reserve, are the remains of a snake-lizard, *Chamaesaura* (tentatively identified as *C. a. anguina*). This could represent the first documentation of predation by this snake on these lizards.

Psammophis phillipsii (Hallowell, 1844)

Olive grass snake

Psammophis phillipsii (Hallowell). Welch 1982,p.170; Broadley 1988,p.394; Broadley and Howell 1991,p.28; Boycott 1992a,p.19; Boycott and Culverwell 1992,p.40.

Distribution in Swaziland (Figure 33a)

Occurs throughout the country in the highveld, middleveld, lowveld and Lubombo regions (Boycott 1992a). Recorded altitude is between 90m and 1355m a.s.l.

Recorded localities: Big Bend (NMZB); Bremersdorp (=Manzini)(TM); Gollela (=Lavumisa)(DM); Hlatikulu, 7km NE of (TM); Lubombo Mountains above Big Bend (SAM); Lusoti (TM); Mafutseni (TM); Malkerns (TM); Malolotja Nature Reserve (TM,RCBS); Mhlumeni borderpost, near (TM); Tambankulu Estate (NMZB); Tshaneni (BM,SAM,UM); Umbuluzi Estate (TM).

Psammophis crucifer (Daudin, 1803)

Cross-marked grass snake

Psammophis crucifer (Daudin). Boycott 1992a,p.20; Boycott and Culverwell 1992,p.40.

Distribution in Swaziland (Figure 33b)

New record for Swaziland. Restricted to the highveld region, this species has a limited distribution in Swaziland (Boycott 1992a). Recorded altitude is between 1150m and 1525m a.s.l.

Remarks

Broadley (1983) plotted an additional locality but did not indicate the source. Contained within the digestive tract of a dead-on road specimen from Malolotja Nature Reserve, are the remains of a snake-lizard, *Chamaesaura* (tentatively identified as *C. a. anguina*). This could represent the first documentation of predation by this snake on these lizards.

Psammophis phillipsii (Hallowell, 1844)

Olive grass snake

Psammophis phillipsii (Hallowell). Welch 1982,p.170; Broadley 1988,p.394; Broadley and Howell 1991,p.28; Boycott 1992a,p.19; Boycott and Culverwell 1992,p.40.

Distribution in Swaziland (Figure 33a)

Occurs throughout the country in the highveld, middleveld, lowveld and Lubombo regions (Boycott 1992a). Recorded altitude is between 90m and 1355m a.s.l.

Recorded localities: Big Bend (NMZB); Bremersdorp (=Manzini)(TM); Gollela (=Lavumisa)(DM); Hlatikulu, 7km NE of (TM); Lubombo Mountains above Big Bend (SAM); Lusoti (TM); Mafutseni (TM); Malkerns (TM); Malolotja Nature Reserve (TM,RCBS); Mhlumeni borderpost, near (TM); Tambankulu Estate (NMZB); Tshaneni (BM,SAM,UM); Umbuluzi Estate (TM).

Psammophis crucifer (Daudin, 1803)

Cross-marked grass snake

Psammophis crucifer (Daudin). Boycott 1992a,p.20; Boycott and Culverwell 1992,p.40.

Distribution in Swaziland (Figure 33b)

New record for Swaziland. Restricted to the highveld region, this species has a limited distribution in Swaziland (Boycott 1992a). Recorded altitude is between 1150m and 1525m a.s.l.

Recorded localities: Droxford Farm (TM); Forbes Reef (s.r.) Forbes Reef, 2km S of (TM); Forbes Reef, 3m SSE of (s.r.); Malolotja Nature Reserve (TM); Mbabane (TM); Motshane (s.r.).

Aparallactus lunulatus lunulatus (Peters, 1854)

Reticulated centipede-eater

Aparallactus lunulatus lunulatus (Peters). Boycott 1992a,p.20; Boycott and Culverwell 1992,p.40.

Distribution in Swaziland (Figure 33c)

New record for Swaziland. Only known from the northern lowveld (Boycott 1992a). Recorded altitude is approximately 135m a.s.l.

Recorded localities: Mlawula Nature Reserve (west) (s.r.).

Aparallactus capensis (Smith, 1849)

Cape centipede-eater

Aparallactus capensis (Smith). Boycott 1992a,p.20; Boycott and Culverwell 1992,p.40.

Distribution in Swaziland (Figure 33d)

Occurs throughout the country in the highveld, middleveld, lowveld and Lubombo regions (Boycott 1992a). Recorded altitude is between 90m and 1615m a.s.l.

Recorded localities: Big Bend (DM,SAM); Big Bend, N of (SAM); Black Umbuluzi Falls (s.r.); Droxford Farm, 1km S of (TM); Forbes Reef (s.r.); Helehele (s.r.); Hlatikulu (TM); Jilobi Forest, E of (TM); Libetze Ranch (s.r.) Lubombo Mountains above Big Bend (SAM); Mafutseni, 10km NE of (TM); Malolotja Nature Reserve (TM); Mantenga Falls (SAM); Maphiveni (s.r.); Mbabane (s.r.); Nkumbane district (RCBS); Piggs Peak, 25km SE of (TM); Siteki (NM); Siteki, 10km NE of (NM); Tshaneni (TM,UM); Usutu Forest Plantation (TM); Waterford School (TM).

Remarks

FitzSimons (1962) listed a Natal Museum specimen (NM) from Stegi (=Siteki). A list of Swaziland amphibians and reptiles held in the Natal Museum was kindly supplied by A.J.L.Lambiris. Only three reptiles are listed in the catalogue, one of which is an *Aparallactus capensis* (NM606) from " ?Swaziland ". This could represent FitzSimons' "Stegi" specimen as it was collected in 1936.

Amblyodipsas concolor (Smith, 1849)

Natal purple-glossed snake

Amblyodipsas concolor (Smith). Boycott 1992a,p.20; Boycott and Culverwell 1992,p.40.

Distribution in Swaziland (Figure 34a)

New record for Swaziland. Only known from the Lubombo region (Boycott 1992a). Recorded altitude is between 650m and 715m a.s.l.

Recorded localities: Muti Muti Nature Reserve (TM); Ndzindza Nature Reserve (TM).

Amblyodipsas polylepis polylepis (Bocage, 1873)

Common purple-glossed snake

Amblyodipsas polylepis polylepis (Bocage). Broadley 1988,p.395; Boycott 1992a,p.20; Boycott and Culverwell 1992,p.40.

Distribution in Swaziland (Figure 34b)

Occurs in the lowveld region, absent from the highveld, middleveld and Lubombo regions (Boycott 1992a). Recorded altitude is between 90m and 275m a.s.l.

Recorded localities: Bar R Ranch (TM); Big Bend (NMZB); Lukhula (TM); Mbuluzi Game Reserve (west) (TM); Mpisi (DM); Tshaneni (TM,UM).

Homoroselaps lacteus (Linnaeus, 1754)**Spotted harlequin snake**

Homoroselaps lacteus (Linnaeus). Boycott 1992a,p.20; Boycott and Culverwell 1992,p.40.

Distribution in Swaziland (Figure 34c)

New record for Swaziland. Occurs in the highveld region, absent from the middleveld, lowveld and Lubombo regions (Boycott 1992a). Recorded altitude is between 1150m and 1400m a.s.l.

Recorded localities: Forbes Reef (RCBS); Mbabane (SAM).

Remarks

The Forbes Reef record is based on a record sized specimen of 610mm.

Homoroselaps dorsalis (Smith, 1849)**Striped harlequin snake**

Homoroselaps dorsalis (Smith). Boycott 1992a,p.20; Boycott and Culverwell 1992,p.40.

Distribution in Swaziland (Figure 34d)

Occurs in the highveld region, absent from the middleveld, lowveld and Lubombo regions (Boycott 1992a). Recorded altitude is approximately 1150m a.s.l.

Recorded localities: Mbabane, 4m SE of (TM).

Atractaspis bibronii Smith, 1849**Bibron's burrowing asp**

Atractaspis bibronii Smith. Broadley 1991,p.510; Boycott 1992a,p.20; Boycott and Culverwell 1992,p.40.

Distribution in Swaziland (Figure 35a)

Occurs throughout the country in the highveld, middleveld, lowveld and Lubombo regions (Boycott 1992a). Recorded altitude is between 90m and 1065m a.s.l.

Recorded localities: Big Bend (NMZB,SAM); Black Umbuluzi Falls (s.r.); Ezulwini (s.r.); Kubuta, S of (s.r.); Mambane, 2km SE of (TM); Mlawula Nature Reserve (west)(s.r.); Mnyokane, 5km E of (RCBS); Phuzamoya, E of (s.r.); Siteki (DM); Tshaneni (NMZB,RCBS,TM,UM).

Remarks

FitzSimons (1962) lists the additional locality of Bremersdorp (=Manzini) based on Durban Snake Park specimens. This material has not been traced. Broadley (1983) plotted an additional locality but did not indicate the source.

Prosymna sundevallii lineata (Peters, 1871)

Lineolate shovel-snout

Prosymna sundevallii lineata (Peters). Boycott 1992a,p.21; Boycott and Culverwell 1992,p.40.

Distribution in Swaziland (Figure 35b)

New record for Swaziland. Only known from the northern lowveld region (Boycott 1992a).

Recorded altitude is approximately 275m a.s.l.

Recorded localities: Tshaneni (TM).

Prosymna ambigua stuhlmannii (Pfeffer, 1893)

East African shovel-snout

Prosymna ambigua stuhlmannii (Pfeffer). Broadley 1980,p.542; Boycott 1992a,p.21; Boycott and Culverwell 1992,p.40.

Distribution in Swaziland (Figure 35c)

Occurs in the lowveld and Lubombo regions, absent from the highveld and middleveld regions (Boycott 1992a). Recorded altitude is between 90m and 275m a.s.l.

Recorded localities: Big Bend (NMZB,SAM,TM); Big Bend, 6km E of (s.r.); Maloma, 10km SW of (s.r.); Mlawula Nature Reserve (west) (s.r.); Tambankulu Estate (s.r.); Tshaneni (JV,TM,UM); Umbuluzi Estate (TM).

Meizodon semiornatus (Peters, 1854)**Semiornate snake**

Meizodon semiornatus semiornatus (Peters). Broadley 1988,p.397; Broadley and Howell 1991,p.30.

Meizodon semiornatus (Peters). Branch 1988a,p.191; Boycott 1992a,p.21; Boycott and Culverwell 1992,p.40.

Distribution in Swaziland (Figure 35d)

Only known from the lowveld region (Boycott 1992a). Recorded altitude is between 90m and 275m a.s.l.

Recorded localities: Big Bend, 10km NW of (JV); Tshaneni (LR,NMZB,TM,UM).

Philothamnus hoplogaster (Günther, 1863)**Green water snake**

Philothamnus hoplogaster (Günther). Boycott 1992,p.21; Boycott and Culverwell 1992,p.40.

Distribution in Swaziland (Figure 36a)

Occurs in the highveld, middleveld and lowveld regions, not yet recorded from the Lubombo region (Boycott 1992a). Recorded altitude is between 90m and 1465m a.s.l.

Recorded localities: Big Bend (NMZB,SAM); Droxford Farm (TM); Ezulwini (TM); Malolotja Nature Reserve (TM); Malolotja Nature Reserve, 5km S of entrance (TM);

Mananga borderpost (TM); Matsapha (TM); Mbabane (RCBS,TM,UM); Mbabane and Pigg's Peak, between (TM); Mlawula Nature Reserve (west)(TM); Pine Valley (TM); Tshaneni (TM,UM); Vuvulane (TM).

Remarks

FitzSimons' (1962) record, based on TM material, is given as "...Matapa, east of Bremersdorp (=Manzini), Swaziland". According to the TM catalogue the locality data is given as "...Matapa, 6 miles from Bremersdorp" with no mention of direction. It is presumed that Matsapha (which is 6 miles west of Manzini) is the correct locality, and that the "east" in FitzSimons' (1962) was a typographical error.

Philothamnus natalensis natalensis (Smith, 1848)

Eastern Natal green snake

Philothamnus natalensis natalensis (Smith). Boycott 1992a,p.21; Boycott and Culverwell 1992, p.40.

Distribution in Swaziland (Figure 36b)

Occurs in the lowveld and Lubombo regions, absent from the highveld and middleveld regions (Boycott 1992a). Recorded altitude is between 135m and 750m a.s.l.

Recorded localities: Siteki, 10km S of (TM); Tshaneni, SW of (UM); Umbuluzi Game Reserve (west)(TM).

Remarks

One specimen from the lowveld (UM) is considered an intergrade between *P.n.natalensis* and *P.n.occidentalis* by Broadley (1983).

Philothamnus natalensis occidentalis Broadley, 1966**Western Natal green snake**

Philothamnus natalensis occidentalis Broadley. Boycott 1992a,p.21; Boycott and Culverwell 1992,p.40.

Distribution in Swaziland (Figure 36c)

New record for Swaziland. Occurs in the highveld region, presently unrecorded from the middleveld, lowveld and Lubombo regions (Boycott 1992a). Recorded altitude is between 810m and 1150m a.s.l.

Recorded localities: Umbuluzi Falls (TM); Hawane Dam (s.r.); Malolotja Falls (s.r.); Yingayingeni River (s.r.).

Philothamnus semivariiegatus semivariiegatus (Smith, 1840)**Spotted bush snake**

Philothamnus semivariiegatus semivariiegatus (Smith). Boycott 1992a,p.21; Boycott and Culverwell 1992,p.40.

Distribution in Swaziland (Figure 36d)

Occurs throughout the country in the highveld, middleveld, lowveld and Lubombo regions (Boycott 1992a). Recorded altitude is between 90m and 1400m a.s.l.

Recorded localities: Big Bend (NMZB,SAM,TM); Hlane Game Reserve (s.r.); Lukhula, 2m W of (TM); Mafutseni (TM); Mafutseni, 15km NE of (TM); Malolotja Nature Reserve (RCBS,TM); Mbuyane Farm (RCBS); Mlawula Nature Reserve (west)(s.r.); Simunye (TM); Simunye, 8km E of (TM); Tambankulu Estate (TM); Tambuti Estate (TM); Tshaneni (TM,UM); Tshaneni, W of (TM,UM).

Crotaphopeltis hotamboeia (Laurenti, 1768)**Herald snake**

Crotaphopeltis hotamboeia (Laurenti). Boycott 1992a,p.21; Boycott and Culverwell 1992,p.40.

Distribution in Swaziland (Figure 37a)

Occurs throughout the country in the highveld, middleveld, lowveld and Lubombo regions (Boycott 1992a). Recorded altitude is between 90m and 1495m a.s.l.

Recorded localities: Bar Circle Ranch (TM); Big Bend (SAM); Bremersdorp (=Manzini)(TM); Bulembu, 3km S of (TM); Dinedor Farm (TM); Edwaleni (s.r.); Ezulwini (s.r.); Forbes Reef (s.r.); Lavumisa/Golles (SAM); Lavumisa/Golles, 45km N of (SAM); Lomahasha (UM); Lubombo Mountains above Big Bend (SAM); Lubombo Mountains near Siteki (SAM); Malandela Beacon (TM); Malkerns (TM); Malolotja Nature Reserve (RCBS,TM); Manzini (TM); Mbabane (s.r.); Mbabane, 4km S of (RCBS); Mdzimba Hills (SAM); Mdzimba Hills (east)(RCBS); Mission Falls (s.r.); Mlawula Nature Reserve (west) (s.r.); Mliba, 1km E of (RCBS); Sidvokodvo, 13km NW of (TM); Siphofaneni, 24km NW of (TM); Siteki, 8km NE of (TM); Tshaneni (TM,UM).

Dipsadoboa aulica aulica (Günther, 1864)**Marbled tree snake**

Dipsadoboa aulica (Günther). Broadley and Howell 1991,p.31.

Dipsadoboa aulica aulica (Günther). Broadley 1988,p.398; Boycott 1992a,p.22; Boycott and Culverwell 1992,p.40.

Distribution in Swaziland (Figure 37b)

Only known from the lowveld and Lubombo regions, absent from the highveld and middleveld regions (Boycott 1992a). Recorded altitude is between 90m and 300m a.s.l.

Recorded localities: Big Bend (DM,NMZB,TM); Bordergate, 7km SW of (s.r.); Hlane Game Reserve (TM); Lavumisa, 13km N of (TM); Maphiveni (s.r.); Mhlume (LR); Mlawula Nature Reserve (west)(TM); Tshaneni (LR,TM,UM); Tshaneni/Mliba road (s.r.).

Telescopus semiannulatus semiannulatus Smith, 1849

Eastern tiger snake

Telescopus semiannulatus semiannulatus Smith. Welch 1982,p.150; Boycott 1992a,p.22; Boycott and Culverwell 1992,p.40.

Distribution in Swaziland (Figure 37c)

Occurs in the middleveld and lowveld regions, absent from the highveld and Lubombo regions (Boycott 1992a). Recorded altitude is between 90m and 350m a.s.l.

Recorded localities: Big Bend (NMZB,SAM,TM); Maleba (=Mliba) Ranch (TM); Mpala Ranch (TM); Sidvokodvo, 10km S of (TM); Simunye (TM); Tshaneni (UM); Tunzini Estate (TM); Vuvulane (s.r.).

Remarks

Bremersdorp (=Manzini) is plotted but not listed in FitzSimons (1962). Impala Ranch and Mpala Ranch are listed by FitzSimons (1962), the former is given as being in "NE Swaziland (2631BA)" and the latter in "Swaziland (2631CA)". I have failed to find an Impala or Mpala Ranch in 2631CA and conclude that these are one and the same record, as the only record in the TM catalogue is Mpala Ranch. A Natal Museum specimen (NM1131) is listed from Mbabane. Acknowledging the recognised distribution of the species, namely the middleveld and lowveld, this record is rejected as Mbabane is in the highveld. Furthermore, this specimen which was collected in 1939, was ignored by FitzSimons (1962).

Dispholidus typus typus (Smith, 1829)**Boomslang**

Dispholidus typus typus (Smith). Boycott 1992a,p.22; Boycott and Culverwell 1992,p.40.

Distribution in Swaziland (Figure 37d)

Occurs throughout the country in the highveld, middleveld, lowveld and Lubombo regions (Boycott 1992a). Recorded altitude is between 275m and 1400m a.s.l.

Recorded localities: Bremersdorp (=Manzini)(TM); Dinedor Farm (TM); Ezulwini (s.r.); Forbes Reef Estate (TM); Forbes Reef, 1km S of (TM); Hlane Game Reserve (s.r.); Mafutseni (TM); Manzini, 5km NE of (TM); Maphiveni (TM); Mbabane (TM); Mhlumeni borderpost, near (TM); Mlaula Estate (DM); Mlawula Nature Reserve (west)(s.r.); Mlawula Nature Reserve (east)(s.r.); Mliba (TM); Phophonyane Nature Reserve (TM); Piggs Peak, 16km NE of (TM); Pine Valley (RCBS); Scotts Ranch (TM); Tambankulu Estate (s.r.); Tshaneni (UM); Umbuluzi Estate (s.r.).

Remarks

FitzSimons (1962) listed the additional locality of Malkerns based on Durban Snake Park specimens. This material has not been traced. Broadley (1983) plotted additional localities but did not indicate the source.

Thelotornis capensis capensis Smith, 1849**Southern vine snake**

Thelotornis capensis capensis Smith. Broadley 1988,p.399; Boycott 1992a,p.22; Boycott and Culverwell 1992,p.40.

Distribution in Swaziland (Figure 38a)

Occurs throughout the country in the highveld, middleveld, lowveld and Lubombo regions, less common in the highveld (Boycott 1992a). Recorded altitude is between 90m and 1080m a.s.l.

Recorded localities: Balegane (s.r.); Big Bend (SAM); Dinedor Farm (TM); Hlane Game Reserve (s.r.); IYSIS barrage (s.r.); Lomahasha, S of (s.r.); Lukhula, 1m N of (s.r.); Malolotja Nature Reserve (RCBS); Mbabane (UM); Mdzimba Hills (s.r.); Mlawula Nature Reserve (west)(s.r.); Ndzindza Nature Reserve (s.r.); Siphofaneni, 15km NW of (TM).

Remarks

FitzSimons (1962) listed the additional locality of Piggs Peak based on Durban Snake Park specimens. This material has not been traced. Broadley (1983) plotted additional localities but did not indicate the source.

Dasypeltis inornata Smith, 1849

Brown egg-eater

Dasypeltis inornata Smith. Welch 1982,p.157; Boycon 1992a,p.22; Boycott and Culverwell 1992,p.40.

Distribution in Swaziland (Figure 38b)

Only known from the highveld and western middleveld regions (Boycott 1992a). Recorded altitude is between 1130m and 1200m a.s.l.

Recorded localities: Malagwane Hill (s.r.); Mbabane, 6km SW of (TM); Waterford School (s.r.).

Remarks

FitzSimons (1962) listed the additional locality of Malkerns based on Durban Snake Park specimens. This material has not been traced.

Dasypeltis scabra (Linnaeus, 1758)**Rhombic egg-eater**

Dasypeltis scabra (Linnaeus). Boycott 1992a,p.22; Boycott and Culverwell 1992,p.40.

Distribution in Swaziland (Figure 38c)

Occurs throughout the country in the highveld, middleveld, lowveld and Lubombo regions (Boycott 1992a). Recorded altitude is between 90m and 1525m a.s.l.

Recorded localities: Balegane (s.r.); Big Bend (DM,NMZB,SAM,TM,UM); Dinedor Farm (TM); Ezulwini (NMZB); Lomahasha (TM); Lubombo Mountains above Big Bend (SAM); Malolotja Nature Reserve (TM); Malolotja Nature Reserve km S of entrance (RCBS); Matsamo, 3km SW of (TM); Mbabane/Piggs Peak road (TM); Mlawula Nature Reserve (west)(s.r.); Mpisi (DM); Nsoko, 10km S of (TM); Tambankulu Estate (TM); Tambuti Estate (TM); Tshaneni (NMZB,TM,UM); Tunzini Estate (TM).

Remarks

FitzSimons (1962) listed the additional localities of Bremersdorp (=Manzini) and Malkerns based on Durban Snake Park specimens. This material has not been traced.

Family ELAPIDAE

Elapsoidea sundevallii sundevallii (Smith, 1848)**Sundevall's garter snake**

Elapsoidea sundevallii sundevallii (Smith). Welch 1982,p.188; Boycott 1992,p.22; Boycott and Culverwell 1992,p.40.

Distribution in Swaziland (Figure 38d)

Probably occurs in the highveld region.

Remarks

An old Transvaal Museum specimen (TM6198) from "Swaziland" is listed by Broadley (1983). No further collections have been made. Two other Transvaal Museum specimens come from localities near the Swaziland border and it is likely that the Swaziland specimen originated from the south-western part of the country, possibly from Nhlngano.

Elapsoidea sundevallii decosteri Boulenger, 1888

de Coster's garter snake

Elapsoidea sundevallii decosteri Boulenger. Boycott 1992a,p.23; Boycott and Culverwell 1992, p.40.

Distribution in Swaziland (Figure 39a)

Only known from the lowveld region (Boycott 1992a). Recorded altitude is approximately 275m a.s.l.

Recorded localities: Tshaneni (TM).

Elapsoidea semiannulata boulengeri Boettger, 1895

Zambesi garter snake

Elapsoidea semiannulata boulengeri Boettger. Boycott 1992a,p.23; Boycott and Culverwell 1992,p.40.

Distribution in Swaziland (Figure 39b)

Only known from the lowveld region (Boycott 1992a). Recorded altitude is between 90m and 275m a.s.l.

Recorded localities: Big Bend (LR,SAM); Tshaneni (NMZB).

Remarks

This species occurs sympatrically with *Elapsoidea sundevallii* in the northern lowveld.

Hemachatus haemachatus (Lacépède, 1788)**Rinkhals**

Hemachatus haemachatus (Lacépède). Welch 1982,p.188; Broadley 1988,p.388; Boycott 1992a,p.23; Boycott and Culverwell 1992,p.40.

Distribution in Swaziland (Figure 39c)

Restricted to the highveld region this species has a limited distribution in Swaziland (Boycott 1992a). Recorded altitude is between 1150m and 1510m a.s.l.

Recorded localities: Forbes Reef (TM); Forbes Reef, 2km S of (TM); Hawane Nature Reserve (s.r.); Ka-Dake, 1km E of (TM); Malolotja Nature Reserve (TM); Mbabane (s.r.); Ngwenya Village (s.r.); Usutu Forest Plantation (s.r.); Waterford School (s.r.).

Remarks

Broadley (1983) plotted an additional locality but did not indicate the source.

Aspidelaps scutatus intermedius Broadley, 1968**Intermediate shield-nose snake**

Aspidelaps scutatus intermedius Broadley. Boycott 1992a,p.23; Boycott and Culverwell 1992,p.40.

Distribution in Swaziland (Figure 39d)

Only known from the lowveld region, absent from the highveld, middleveld and Lubombo regions (Boycott 1992). Recorded altitude is between 90m and 400m a.s.l.

Recorded localities: Big Bend (DM); Siphofaneni, N of (DM).

Remarks

The Swaziland records represent the southernmost for the species.

Naja haje annulifera Peters, 1854**Egyptian cobra**

Naja haje annulifera Peters. Broadley 1988,p.389; Boycott 1992a,p.23; Boycott and Culverwell 1992,p.40.

Distribution in Swaziland (Figure 40a)

Occurs in the middleveld and lowveld regions, absent from the highveld and Lubombo regions (Boycott 1992a). Recorded altitude is between 275m and 640m a.s.l.

Recorded localities: Bremersdorp (=Manzini)(TM); Dinedor Farm (s.r.); Ezulwini (s.r.); Macnabs Ranch, 1km W of (TM); Malkerns (s.r.); Mantenga (s.r.); Manzini (TM); Mlilwane Wildlife Sanctuary (s.r.); Mpopu River (TM); Piggs Peak/Matsamo road (s.r.); Tshaneni (NMZB,TM); Tunzini Estate (TM); Vuvulane (s.r.).

Naja mossambica Peters, 1854**Mozambique spitting cobra**

Naja mossambica Peters. Boycott 1992a,p.23; Boycott and Culverwell 1992,p.40.

Distribution in Swaziland (Figure 40b)

Occurs throughout the country in the highveld, middleveld, lowveld and Lubombo regions, less common in the highveld (Boycott 1992a). Recorded altitude is between 90m and 1150m a.s.l.

Recorded localities: Big Bend (NMZB); Big Bend, 16km NW of (TM); Bremersdorp (=Manzini)(TM); Dinedor Farm (TM); Hlane Game Reserve (TM); Hlaukulu and Sidvokodvo, between (TM); Lavumisa (s.r.); Macnabs Ranch (TM); Malolotja Nature Reserve (s.r.); Mambane, 3,5km N of (TM); Manzini, 5km NE of (TM); Mbabane (s.r.); Mcandatshe Farm (DM); Mdzimba Hills (SAM); Mhlosheni, 5m E of (s.r.); Mlawula Nature Reserve (west)(s.r.); Mlawula Nature Reserve (east)(s.r.); Mlilwane Wildlife Sanctuary (s.r.); Ndzindza Nature Reserve (s.r.); Nkomati River bridge (new), near (TM); Nsoko, 2m S of (s.r.); Pine

Valley (s.r.); Simunye, 17,5km S of (TM); Simunye village (TM); Tshaneni (TM); Tunzini Estate (RCBS); Ubombo Ranches (TM).

Remarks

FitzSimons (1962) listed the additional localities of Piggs Peak and Malkerns based on Durban Snake Park specimens. This material has not been traced.

Dendroaspis polylepis Günther, 1864

Black mamba

Dendroaspis polylepis polylepis Günther. Welch 1982,p.186.

Dendroaspis polylepis Günther. Boycott 1992a,p.23; Boycott and Culverwell 1992,p.40.

Distribution in Swaziland (Figure 40c)

Occurs in the eastern middleveld, lowveld and Lubombo regions, absent from the western middleveld and highveld (Boycott 1992a). The species does occur quite far west in the larger, warmer river valleys such as the Mlumati, Phophonyane and Nkomati that penetrate the highveld. Recorded altitude is between 90m and 700m a.s.l.

Recorded localities: Big Bend (TM); Dinedor Farm (TM); Hlane Game Reserve (s.r.); IYSIS barrage (s.r.); Mafutseni, 15km NE of (TM); Manzini, 14m ESE of (TM); Mbuluzi Nature Reserve (west)(TM); Mlawula Nature Reserve (west)(s.r.); Ndzindza Nature Reserve (s.r.); Phophonyane Nature Reserve (RCBS); Siteki, N of (s.r.); Tshaneni (NMZB,UM); Tunzini Estate (TM).

Family VIPERIDAE

Causus rhombeatus (Lichtenstein, 1823)

Rhombic night adder

Causus rhombeatus (Lichtenstein). Boycott 1992a,p.24; Boycott and Culverwell 1992,p.40.

Distribution in Swaziland (Figure 40d)

Occurs in the highveld and middleveld regions, absent from the lowveld and Lubombo regions (Boycott 1992a). Recorded altitude is between 750m and 1480m a.s.l.

Recorded localities: Droxford Farm (s.r.); Ezulwini (s.r.); Forbes Reef, 3m SE of (s.r.); Malkerns (TM); Malolotja Nature Reserve (TM); Mankayane, 7m S of (s.r.); Mankayane, 8km NE of (TM); Matsapha (s.r.); Mbabane (s.r.); Mdzimba Hills (TM); Mlilwane Wildlife Sanctuary (TM); Pine Valley (s.r.).

Remarks

FitzSimons (1962) listed the additional localities of Bremersdorp (=Manzini) and Goedgegun (=Nhlangano) based on Durban Snake Park specimens. This material has not been traced.

Causus defilippii (Jan, 1862)**Snouted night adder**

Causus defilippii (Jan). Boycott 1992a,p.24; Boycott and Culverwell 1992,p.40.

Distribution in Swaziland (Figure 41a)

Occurs in the middleveld, lowveld and Lubombo regions, absent from the highveld region. Recorded altitude is between 135m and 700m a.s.l.

Recorded localities: Groenpan Farm (TM); Hlane Game Reserve (s.r.); Kobolondo Mountain (RCBS); Lukhula, 3m W of (TM); Mlawula Nature Reserve (west) (s.r.); Mnjoli Dam (TM); Phophonyane Nature Reserve (s.r.); Simunye (TM).

Remarks

An interesting record is that of Kobolondo Mountain where a specimen was found dead on road within a forestry plantation at an altitude of 700m a.s.l. (R. de Vletter pers. comm.).

Bitis atropos (Linnaeus, 1754)**Berg adder**

Bitis atropos (Linnaeus). Haagner and Hurter 1988,p.74; Boycott 1992a,p.24; Boycott and Culverwell 1992,p.40.

Distribution in Swaziland (Figure 41b)

Restricted to the highveld region this species has a limited distribution in Swaziland (Boycott 1992a). Recorded altitude is between 1125m and 1370m a.s.l.

Recorded localities: Kobolondo Peak (TM); Makhungutsha (TM); Malolotja Nature Reserve (north)(TM); Mdzimba Hills (TM); Ntondozi (TM).

Remarks

First recorded from Swaziland by Haagner and Hurter (1988) who misspelt two of the Swaziland localities namely, Kobolondo as Kolombo and Makhungutsha as Makungutsha.

Bitis arietans arietans (Merrem, 1820)**Puff adder**

Bitis arietans arietans (Merrem). Boycott 1992a,p.24; Boycott and Culverwell 1992,p.40.

Distribution in Swaziland (Figure 41c)

Occurs throughout the country in the highveld, middleveld, lowveld and Lubombo regions (Boycott 1992a). Recorded altitude is between 40m and 145m a.s.l.

Recorded localities: Bremersdorp (=Manzini)(TM); Cyrildene (s.r.); Dinedor Farm (TM); Ezulwini (s.r.); Forbes Reef (s.r.); Forbes Reef, 2km N of (TM); Forbes Reef, 3m S of (s.r.); Grand Valley (s.r.); Helehele, 700m S of (TM); Hlane Game Reserve (s.r.); Likhula, 4m S of (s.r.); Malolotja Nature Reserve (TM); Malolotja Nature Reserve (north)(RCBS); Malolotja Nature Reserve entrance, 7km N of (TM); Mafutseni (s.r.); Mbabane (s.r.); Mlawula Nature Reserve (west)(s.r.); Mlilwane Wildlife Sanctuary (s.r.); Mlinda (=Malinda) Hills (TM);

Mpaka (s.r.); Ndzindza Nature Reserve (s.r.); Nhlangano and Hlatikulu, between (TM); Nsoko (s.r.); Piggs Peak/Balegane/Matsamo road junction, 9km N of (TM); Tshaneni (s.r.); Tunzini Estate (TM).

Remarks

FitzSimons (1962) listed the additional localities of Big Bend, Goedgegun (=Nhlangano) and Kabuta based on Durban Snake Park specimens. This material has not been traced.

CHAPTER FOUR

DISCUSSION

4.1. Palaeoclimatic comment

A limited amount of archaeological research has been carried out in Swaziland, most of it between 1976 and 1986. Much of the work has concentrated on soil analyses (looking mostly at colluvial sediments and palaeosols), descriptions of artifacts and carbon dating of charcoal deposits (Price Williams 1981, Price Williams *et. al.* 1982, Barham 1989a, 1989b). However, a few contributions on the prehistory and palaeoclimate of Swaziland have appeared (Price Williams and Watson 1982, Prior and Price Williams 1985), and in 1983, an international symposium on "Late Cainozoic Palaeoclimates of the Southern Hemisphere" was hosted in the country. The results of this relatively short research period, however, do fit into the overall picture that is emerging in other parts of the southern African region.

Pollen analysis is a useful tool in reconstructing past vegetational types and climates (Scott 1982). However, one of the limitations of this method is that, apparently, it can only be used effectively to assess deposits from the present back to the late Pleistocene and not beyond. Organic spring deposits in the Transvaal have yielded detailed pollen data that show a long series of conspicuous changes in vegetation composition and climate over the last 35 000 years (Scott 1982). These changes apparently included expansions of sub-humid montane, relatively dry savanna and cool ericaceous elements in the late Pleistocene and relatively warm, dry and also slightly more mesic types of woodland in the Holocene (Scott 1982).

Investigations in Swaziland have largely concentrated on the Holocene deposits at three rock shelters, Siphiso, Nyonyane and Sibebe. These sites are located respectively in the Lubombo, middleveld and highveld regions. Changing taxa indicated by charcoal fragments from the Siphiso rock shelter clearly indicate minor shifts in Holocene climate, from moist to dry and back to moist in recent times (Prior and Price Williams 1985). This site appears to have been abandoned between approximately 6 500 yrs BP and 2 000 yrs BP and then re-occupied in the late Holocene (Barham 1989a). At Nyonyane rock shelter excavations also revealed a gap (between 8 000 to 10 000 yrs BP and 3 000 yrs BP) that corresponds roughly with the mid-

Holocene gap observed at Siphiso rock shelter (Barham 1989b) and elsewhere in the interior of southern Africa (Deacon 1984). The indications are that the climate was humid and warmer in the early Holocene, followed by a much drier phase in the mid-Holocene, succeeded by locally wet conditions in recent times. The abandonment of the Siphiso shelter by man is likely to have been influenced by climatic and vegetational change. Such an event is bound to have affected the distributions of the herpetofauna. As a result of increased aridity the vegetation would have been transformed from a bushveld type to a more open grassland type where temperatures would have been slightly lower than the present. Such an event could have favoured the expansion of the ranges of a temperate herpetofauna and enabled some to have colonised the Lubombo region (*viz.* *Cordylus vittifer vittifer* and *Agama aculeata distanti*). The varied topography of Swaziland must have produced a wide range of environmental conditions in any climatic period. The essentially drier mid-Holocene climate was succeeded locally by wetter, warmer and more humid conditions. This could presently be favouring the expansion of the ranges of the tropical herpetofauna while the temperate fauna could be experiencing a reduction in their distribution ranges. This could explain the current distribution of the temperate herpetofauna at higher altitudes and at higher latitudes. Temperature is likely to be a critical factor preventing the colonisation of the higher altitudes and higher latitudes by the tropical herpetofauna.

It is perhaps necessary to introduce at this stage a note of caution in our attempts to reconstruct palaeoclimates for southern Africa. van Zinderen Bakker (1978) observed that our knowledge of former vegetation in southern Africa is "...far too limited" to reconstruct meaningful palaeoclimates. Poynton (1986), referring to Werger's (1978) *Biogeography and Ecology of southern Africa*, drew attention to the lack of a standard approach among contributors. As a result of this it is virtually impossible to make meaningful biogeographical comparisons between groups treated by different authors. The critical issue is to put biogeographers and earth scientists in contact with each other. This was first done in 1985/1986 when a symposium on Historical Biogeography was convened in Stellenbosch. The proceedings were published in volume 17 of *Palaeoecology of Africa*. It is hoped that this marriage of disciplines will, in time, produce significant results.

In conclusion, further research is needed on the palaeoenvironment and climate of Swaziland over the last 35 000 years. However, the available evidence does seem to support the concept of a tidal expansion and contraction of the distributions of the temperate and tropical herpetofaunas of south-eastern Africa, as presented in the next section on biogeography.

4.2. Biogeography

It becomes obvious that a diverse herpetofauna should exist in Swaziland as soon as one studies a detailed topographical map of the country. Such an examination will reveal, in the western part of the country, a fairly extensive area of highveld (above 1 000m altitude) with some prominent mountain ranges; in the central part there are more mountains and low hills (between 300m and 1 000m altitude); to the east of this region the mountains peter out into the lowveld, a flat, almost featureless alluvial plain (between 150m and 300m altitude); and still further to the east, the Lubombo Mountains rise abruptly from the lowveld, forming a plateau that slopes down to the east (between 150m and 780m altitude). Also noticeable are several large rivers flowing through the country, generally in a west-east direction. In the western highveld these rivers have carved deep valleys while in the east they meander through the lowveld before flowing through steep-sided gorges in the Lubombo Mountains. In addition to the above, if one studies maps of southern Africa that depict aspects such as distribution centres of the southern African amphibia (Poynton 1964, Map 2), Bruton and Haacke's (1980, Figure 1) zoogeographical zones, or maps that show the effect that climate may have on amphibian and reptile distributions (Poynton 1964, Map 3; Stuckenberg 1969, Figure 5), evidence of certain diversity will be reinforced. Poynton (1964) divided the southern African amphibia into three biogeographical categories, the Tropical fauna, the Cape fauna, and the Transitional fauna. The 18°C mean July isotherm is taken as the limit of the tropical fauna and the 13°C mean July isotherm is taken to represent the limit of the Cape fauna. These two isotherms slice through parts of Swaziland. Stuckenberg's (1969) Effective Temperature (ET) map of southern Africa shows that some significant ET isolines cut through parts of Swaziland. Within Swaziland it appears as if the 1 000 mm isohyet may well represent another limit of the Cape fauna. This too passes through the western part of the country. Other factors such as geology and vegetation zones of the country also hint at a fascinating assemblage. Birds perhaps more so than amphibians and reptiles are tied to the vegetation

zones, and within Swaziland more than 460 species have been recorded. This emphasises the sort of diversity one can expect in Swaziland.

Amphibian and reptile distributions define certain regions. In an attempt to identify and describe the major habitat types in Swaziland in relation to the distributions of amphibians and reptiles, all the lines demarcating amphibian and reptilian distributions were drawn on a single map. The distributions of all species were plotted on the quarter degree grid and many of the lines coincided. Those species that have a trans-national distribution were ignored. It was soon discovered, as a result of the abrupt changes in topography, that the quarter degree grid was too large and ideally more intensive collecting should be undertaken in order to utilise the eighth degree grid if more accurate resolution were desired. However, the quarter degree grid does give an indication of the major habitat types to be found in the country. By filling in the lines where the distribution limits of many species coincided, a map was obtained (Figure 42). This map resembles the traditional map of the four major topographical regions of Swaziland (Goudie and Price Williams 1983). However, only three distinct zones can be identified. These are a broad western zone closely representing the extent of Goudie and Price Williams' highveld region, a narrow eastern zone resembling their Lubombo region and a broad central zone resembling the combination of their middleveld and lowveld regions. The map of amphibian and reptile distributions therefore compares favourably with Goudie and Price Williams' map of the major topographical regions of Swaziland. Virtually all the lines of species' distributional limits run north-south thereby tying in well with the limits of the topographical regions (see Figures 1 and 42).

It does not appear as if any of the major rivers of Swaziland, virtually all of which flow in a west-east direction, are effective geographical barriers to the distribution of the herpetofauna. This can be seen in the distributions of, for example, many highveld amphibians and reptiles that are found throughout the highveld region from the north to the south. The distributions of the following verify this: the frogs, *Heleophryne natalensis*, *Breviceps adspersus pentheri*, *Cacosternum nanum parvum*, *Ptychadena porosissima* and *Semnodactylus wealii*; the lizards, *Lygodactylus ocellatus*, *Scelotes mira* and *Mabuya striata punctatissima*; and the snakes, *Duberria lutrix lutrix*, *Psammophylax rhombeatus* and *Bitis atropos*. The South African highveld extends from the Transvaal into Swaziland in a series of highveld

promontories or peninsulas between the major rivers such as the Mlumati, Nkomati, Umbuluzi, Great Usutu, Little Usutu, Ngwempisi and Mkondo (Figure 1). Some of the species listed above have extensive distributions on the Transvaal highveld and reach the eastern limits of their distributions on these promontories which could have represented earlier dispersal routes. Alternatively, before the major rivers had eroded their valleys, the highveld fauna could have been more widespread on a highveld that looked different to that of the present. However, there are some species that are associated exclusively with the escarpment, whose distribution ranges do not extend very far to the west or east. Examples are the frogs, *H. natalensis* and *C. n. parvum*; the lizards, *Bradypodion* sp. and *S. mira*; and the snakes, *Lamprophis swazicus* and *B. atropos*.

In similar fashion to the presence of eastward projecting highveld promontories into the middleveld, so too are there westward intrusions into the highveld of middleveld habitats. Savanna type and heavily wooded type habitats penetrate far up the valleys or basins into the eastern highveld and these valleys could be effective corridors permitting tropical species to expand their distributions quite far west. The Mlumati and Nkomati River basins in the northern part of the country and the Mkondo River basin (or Grand Valley) in the south are good examples (Figure 1). In these as well as in other basins the distributions of the following tropical forms serve as examples, the frogs *Xenopus muelleri*, *Bufo maculatus*, *Phrynomerus bifasciatus bifasciatus*, *Ptychadena anchietae*, *Chiromantis xerampelina* and *Leptopelis mossambicus*; the terrapin, *Pelusios sinuatus*; the lizards, *Mabuya striata striata*, *M. quinquetaeniata margaritifera*, *Gerrhosaurus major major* and *Platysaurus intermedius natalensis*; and the snakes, *Python sebae natalensis*, *Mehelya capensis capensis*, *Telescopus semiannulatus semiannulatus*, *Thelotornis capensis capensis* and *Dendroaspis polylepis*. The middleveld is essentially a transitional zone between the highveld and lowveld. As demonstrated by superimposing the distribution ranges of the Swaziland herpetofauna on a single map, no distinction could be found between the lowveld and middleveld herpetofauna (Figure 42). Some species appear to be confined to this transitional zone, perhaps more specifically to the eastern middleveld and lowveld. These would include the frogs, *Hemisis marmoratus marmoratus* and *Pyxicephalus adpersus edulis*; the lizards, *G. m. major*, *Cordylus warreni barbertonensis*, *C. tropidosternum jonesii* and *P. i. natalensis*; and the snakes, *Typhlops schlegelii schlegelii*, *Telescopus s. semiannulatus*, *Aspidelaps scutatus*

intermedius and *Naja haje annulifera*. The majority of species occurring in the lowveld are also represented in the middleveld and Lubombo regions. However, there are a number of species whose distribution ranges within Swaziland are restricted to the Lubombo Plateau and foothills. This applies to species such as the frog, *Breviceps mossambicus*; the tortoise, *Kinixys natalensis*; the lizards, *Scelotes brevipes*, *C. w. warreni* and *Platysaurus intermedius* "Lebombo" (*sensu* Jacobsen and Newbery 1989); and the snakes, *Leptotyphlops telloi* and *Amblyodipsas concolor*.

From the above it can be seen that within Swaziland there are distinct faunas, a highveld fauna, a middleveld/lowveld fauna and a Lubombo fauna, their composition varying substantially. However, the similarities between the Lubombo plateau and the middleveld suggest that this region be considered as part of the middleveld/lowveld region insofar as the herpetofauna is concerned. Within Swaziland therefore, two discreet zones can be identified, characterised by a western, temperate fauna and an eastern, tropical fauna. In the context of the present account, the western, temperate fauna includes some species classified by Poynton (1964) as transitional forms.

It appears as if geographical barriers exist rather in a west-east direction than in a north-south direction. Within the middleveld/lowveld/Lubombo region there is no evidence to support the argument that Swaziland's major rivers form geographical barriers to the distribution of the herpetofauna. A similar pattern emerges in the eastern regions of Swaziland as that which emerged in the highveld, that many species occur in the northern middleveld/lowveld/Lubombo region as well as in the southern regions thereof, irrespective of the existence of the larger rivers. Dispersal routes between the river systems probably existed before the Lubombo plateau was raised above the surrounding lowveld and coastal plain. Alternatively the Lubombos have failed to represent a significant geographical barrier. This appears to be evidenced by the fact that many tropical forms occur on the coastal plain, on top of the Lubombos and in the lowveld/middleveld region west of the Lubombos. In the earlier maps of Poynton (1962,1964) this fact was not known and the western range boundaries of many tropical forms were drawn along the Lubombos. If the distributions of closely related subspecies are indicative of the possible existence of geographical barriers, then there is some support for the recognition of a west-east geographical barrier within

Swaziland. The plains of the lowveld, for example, would appear to be an effective but selective barrier between the rockier habitats of the middleveld and the Lubombos, as is shown by the distributions of rupicolous forms such as *Cordylus warreni barbertonensis* and *Cordylus warreni warreni*; and *Platysaurus intermedius natalensis* and *Platysaurus intermedius* "Lebombo" (*sensu* Jacobsen and Newbery 1989). In both these examples the former taxon occurs in the middleveld/lowveld region and the latter taxon on the Lubombo plateau. Could isolation during the possible silting up of the lowveld have given rise to this situation? This hypothesis becomes more believable when one looks further afield at the distributions of some highveld forms in relation to that of their nearest relatives. Examples include, *Afoedura pondolia major* and *Afoedura pondolia marleyi* (rupicolous geckos); *Leptotyphlops conjunctus conjunctus* and *Leptotyphlops conjunctus incognitus* (fossorial snakes); and *Philothamnus natalensis occidentalis* and *Philothamnus natalensis natalensis* (terrestrial snakes). In these examples the former taxon occurs in the highveld region or in the highveld/middleveld region while the latter taxon occurs in the lowveld and Lubombo regions. If the plains of the lowveld represent a geographical barrier, the above examples clearly indicate that the barrier has not affected rupicolous forms alone, as examples of fossorial and terrestrial forms are also involved. Some amphibians can be considered as well, namely *Breviceps adspersus pentheri* and *Breviceps adspersus adspersus*; and *Pyxicephalus adspersus adspersus* and *Pyxicephalus adspersus edulis*. These reflect a slightly different pattern as the former taxon in each case is restricted to the highveld while the latter taxon occurs in the middleveld and lowveld (and, in the case of *B. a. adspersus* on the Lubombos as well.).

The great variety of habitats characteristic of the highveld region support a similarly wide variety of species. Typical examples of the western, temperate herpetofauna (hereafter referred to as the highveld fauna) of Swaziland include the amphibians, *H. natalensis*, *B. a. pentheri*, *C. n. parvum*, *Strongylopus f. fasciatus*, *S. g. grayii*, *Semnodactylus wealii* and *H. semidiscus*; the lizards, *L. ocellatus*, *A. a. distanti*, *Bradypodion* sp., *S. mira*, *M. capensis*, *Nucras lalandii* and *Pseudocordylus melanotus transvaalensis*; and the snakes, *Lycodonomorphus laevis fitzsimonsi*, *Lamprophis inornatus*, *L. swazicus*, *Psammophylax rhombeatus rhombeatus*, *Psammophis crucifer*, *Homoroselaps lacteus*, *Dasypeltis inornata* and *Hemachatus haemachatus*. Some species are habitat specific, typical grassland forms include *B. a. pentheri*,

S. mira, *N. lalandii*, *Chamaesaura aenea*, *C. anguina anguina*, *P. r. rhombeatus* and *P. crucifer*. Species associated with rock habitats include *Lygodactylus ocellatus*, *Agama aculeata distanti*, *P. m. transvaalensis*, *L. guttatus*, *L. swazicus* and *Biris atropos*. Arboreal species include *Bradypodion* sp. and *Dispholidus typus*. Species found in upland vleis systems include *C. n. parvum*, *Ptychadena porosissima*, *S. f. fasciatus* and *L. l. fitzsimonsi*. The highveld region of Swaziland can be seen as a refuge for many temperate forms which once may have had wider distributions. Many of the amphibians and reptiles listed above have distribution ranges that extend south-westwards into the Cape region. The genera *Heleophryne*, *Strongylopus*, *Bradypodion* and *Pseudocordylus* are essentially Cape in distribution and indeed many of the members of these genera, if not all, are found in the Cape region. There is therefore a distinct temperate element, an Afrotropical element, in the Swaziland highveld fauna.

The middleveld/lowveld/Lubombo herpetofauna show strong Afrotropical affinities. Close links with the fauna of the Mozambique plain can be seen in many cases. Within Swaziland many tropical forms are found surprisingly far west. Examples include the frogs, *Xenopus muelleri*, *Bufo maculatus*, *Phrynomerus b. bifasciatus*, *Afraxalus aureus*, *Hyperolius pusillus* and *H. tuberilinguis*; the chelonians, *Pelusios sinuatus* and *Kinixys belliana speckii*; the lizards, *Mabuya s. striata*, *Gerrhosaurus v. validus* and *G. m. major*; and the snakes, *Python sebae natalensis*, *Mehelya c. capensis*, *Telescopus s. semiannulatus*, *Thelotornis c. capensis*, *Naja haje annulifera* and *Dendroaspis polylepis*. The Lubombo Mountains do not appear to constitute a faunal barrier, although, in the case of localised forms, the mountains could be important. The lizards, *Cordylus w. warreni* and *Scelotes brevipes*, the thread snake, *Leptotyphlops telloi* and the tortoise, *Kinixys natalensis*, are all confined to the Lubombos. However, it should also be noted that all these forms have been found in the foothills of the Lubombos on the Swaziland side. Unexpected discoveries in the Lubombos include the more typically highveld lizards, *Cordylus v. vittifer* and *Agama aculeata distanti*; and the snakes, *Lamprophis guttatus* and *Amblyodipsas concolor*. The Lubombos north of Siteki are both lower and drier than that to the south, but there is no clear evidence of this corresponding to any clines in the herpetofauna. It is possible that the Lubombos were wetter and more heavily forested in the recent past, forest relics on the western rim of the plateau, south of Siteki, such as Jilobi Forest and Muti Muti show affinities with both the nearby coastal forests on the

Mozambique plain and the vegetation of the highveld. The trees *Heywoodia*, *Oxyanthus*, *Albizia* and *Gardenia* demonstrate the case for the former, whilst species of *Raphanea*, *Protea*, *Protorhus* and *Aloe* (specifically *A. arborescens*) are evidence for the latter. This could be substantiated further by the presence in Muti Muti Forest of *Breviceps mossambicus* and an unidentified species of *Arthroleptis* (tape recordings of the call have been made but these frogs are very difficult to find). There are other floral links with the highveld in respect of the grassland patches found in parts of the Lubombos. This could explain further the occurrence in the Lubombos of *Cordylus v. vittifer* (a rupicolous species found in most rock outcrops in the highveld) and *Agama aculeata distanti* (a terrestrial/rupicolous form also commonly found throughout the highveld). The populations of *C. v. vittifer*, *A. a. distanti* and of the spotted house snake, *Lamprophis guttatus*, in this region could be considered to represent relict populations left over from a time when the temperate herpetofauna was more widespread, possibly as a result of the climatic changes during the Holocene. Perhaps this could also explain the existence today of the subspecific populations of *Cordylus warreni*, *Platysaurus intermedius*, *Leptotyphlops conjunctus*, *Afroedura pondolia*, *Breviceps adpersus* and *Pyxicephalus adpersus* in the tropical and temperate regions of Swaziland.

Poynton (1980) stated that the southern part of Maputaland presents a zoogeographical transformation of unsurpassed interest, since the tropical amphibian fauna of the region begins to undergo precipitous subtraction, and is to some extent replaced by a non-tropical complex. Poynton was referring more specifically to the situation east of the Lubombo Mountains. However, within Swaziland where most of the country is west of the Lubombos, further evidence of the subtraction of the tropical fauna is to be found. The distribution patterns of amphibians and reptiles in Swaziland indicate both a southern subtraction and a western subtraction of tropical forms (shown by the Dice-Sorenson Similarity indices given in section 4.2). The westward subtraction of tropical forms evident within Swaziland provides a clearer picture than that in southern Maputaland, where fewer species subtract. Species such as the snakes, *Duberria variegata*, *Dasypeltis m. medici*, *Dendroaspis angusticeps* and *Bitis gabonica* are closely associated with the dune forests of the coastal plain. Other species such as the frogs, *Ptychadena taenioscelis*, *Phrynobatrachus acridoides*, *Afrixalus fornasinii* and *Hyperolius argus*; and the chelonians, *Pelusios rhodesianus*, *P. c. castanoides*, and *Kinixys b. belliana* all occur on the coastal plain but are absent from the Lubombos and Swaziland

lowveld. Many tropical forms occur on the coastal plain, the Lubombos and the Swaziland lowveld. These include the frogs, *Xenopus muelleri*, *Phrynomerus b. bifasciatus*, *Ptychadena anchietae*, *Chiromantis xerampelina*, *Kassina maculata*, *Hyperolius pusillus*, and *H. tuberilinguis*; the chelonian, *Geochelone pardalis*; and the snakes, *Typhlops s. schlegelii*, *Python sebae natalensis*, *Mehelya c. capensis* and *Dipsadoboa a. aulica*. Westwards from the middleveld there is a changeover to more temperate forms and these forms are absent from the highveld. The westernmost records of the tropical forms are found in the larger river basins that penetrate the highveld.

Several tropical forms reach their southernmost distribution in Swaziland (or just south of the country), their greatest area of distribution being to the north. This is the case with the frogs, *Bufo maculatus* and *Hildebrandtia o. ornata* (whose southernmost limits reach northern Natal); the lizards, *Mabuya s. striata* and *Cordylus tropidosternum jonesii*; and the snakes, *Hemirhagerrhis n. nototaenia*, *Psammophis s. subtaeniatus*, *Aparallactus l. lunulatus* and *Aspidelaps scutatus intermedius*. Furthermore, some species such as *Meizodon semiornatus* occur in Swaziland that do not appear to be represented immediately north of Swaziland in the eastern Transvaal lowveld. Conversely a number of forms have been recorded in the Transvaal lowveld north of Swaziland but do not appear to be found in Swaziland. Examples are the frog, *Tomopterna marmorata*; the snakes, *Rhamphiophis oxyrhynchus rostratus* and *Psammophis angolensis* and some lizards. This pattern is repeated with some mammals such as the tree squirrel, *Paraxerus cepapi*, the galago, *Galago senegalensis* and birds such as the white-crowned shrike, double banded sandgrouse and greater blue-eared glossy starling, despite an apparent absence of any physical or vegetational change. It appears therefore, as if southward subtraction of East African species commences north of Swaziland.

Summarising the above, the middleveld/lowveld/Lubombo herpetofauna shows strong Afrotropical affinities. The major area of distribution of this fauna lies to the north and east. The highveld herpetofauna shows strong Afrotropical affinities. The major area of distribution of this fauna lies to the south and west. Swaziland therefore is located in a critical overlap region of the tropical subtraction margin of south-eastern Africa and the temperate subtraction margin of south-western Africa.

Speculations could be made in respect of the distribution of the Swaziland temperate and tropical herpetofaunas and how this came about. One interpretation could be of the periodic expansion and contraction of the distributions of these faunas. During cooler glacial periods it is possible that the highveld fauna could have expanded its range north-eastwards. Such major changes in climatic conditions could explain the presence of the more typically highveld forms such as *Agama aculeata distanti* and *Cordylus v. vittifer* on the Lubombo plateau. The occurrence of some of the flora on the Lubombos mentioned earlier adds substance to this theory. During warmer interglacial periods, climatic conditions could have favoured the westward colonisation of the tropical fauna. Such conditions could explain the occurrence, in the highveld/middleveld ecotone of today, of the frogs, *Hyperolius pusillus* and *H. tuberilinguis* in Piggs Peak, and, at Malolotja Nature Reserve, in the highveld proper, of species such as *Ptychadena oxyrhynchus*, *Phrynobatrachus mababiensis* and even *Hyperolius marmoratus taeniatus*. Some reptiles found in parts of the highveld, specifically at Malolotja Nature Reserve, add further substance to a model of an expanding and contracting tidal affect of tropical colonisation to the west and re-population of temperate forms to the east. The Nkomati River basin and other basins could be the ideal dispersal routes for the tropical herpetofauna. Forms that come to mind are the lizards, *Mabuya s. striata*, *M. quinquetaeniata margaritifera*, *Agama atricollis* and the snakes, *Python sebae natalensis*, *Thelotornis c. capensis* and *Dendroaspis polylepis*. Some of these are found at fairly high altitude between 900m and 1 200m a.s.l. (for example, *A. atricollis* has been observed at an altitude of 1230m at Mandela Beacon in the highveld), and in respect of the striped skink, *Mabuya striata*, the picture is blurred as the respective distributions of both subspecies, the tropical *s. striata* and temperate *s. punctatissima*, are unclear. Intergrades between the two subspecies have been found at altitudes as varied as 685m in the Nkomati River basin and 1 230m at Mandela Beacon just south of the Nkomati basin. Maybe this species is indicative of the possible tidal flow and mingling of the two faunas, as their distributions expand and contract under varying climatic and topographic conditions.

4.3. Investigating species turnover by means of a transect.

No tropical form occurs throughout the whole of southern Africa. Two of the most widespread tropical forms, *Phrynobatrachus natalensis* and *Kassina senegalensis* fail to reach

the western Cape Province. Their respective distribution patterns, radiating out as they do from the tropical north-east, take on a distinctive bifurcated shape in South Africa, and in southern Africa, a distinct trifurcated shape (see Poynton 1962, 1964). Other tropical forms show a similar pattern in South Africa except that the prongs do not reach as far down the south-east coast or into the northern Cape Province. Examples include, amongst others, *Phrynomerus b. bifasciatus*, *Schismaderma carens* and *Chiromantis xerampelina*. The tropical pattern therefore indicates the distribution ranges of these and other species as extending south-westwards along the coastal lowlands, up the Limpopo basin and up the Zambesi basin. Conversely some of the distribution ranges of the typical Cape temperate fauna, and even the transitional fauna (*sensu* Poynton 1964), have a characteristic north-eastward projecting prong located between the coastal lowland and Limpopo basin prongs of the tropical fauna. Examples include, amongst others, *Breviceps adspersus pentheri*, *Strongylopus grayii grayii*, *S. fasciatus fasciatus*, *Semnodactylus wealii* and *Tomopterna natalensis*. Poynton (1962) placed emphasis on, amongst other factors, the 13°C mean mid-winter isotherm that marks a zone where the fauna changes from being predominantly tropical to being predominantly temperate.

In southern Africa the herpetofauna is composed of tropical and temperate elements. The same can be said of the herpetofauna of Swaziland, Natal and the Transvaal. Zimbabwe has relict populations of the essentially Cape temperate fauna. Poynton (1962) states that the Natal Drakensberg shows a relatively high incidence of very localised endemics. The same was said of the eastern highlands of Zimbabwe (Poynton and Broadley 1991). Such a situation does not prevail in Swaziland or in the Transvaal. Poynton and Broadley (1991) and Poynton (1992), in order to assess and investigate current biogeographical classification and species turnover in southern Africa, introduced for the first time the use of a transect.

Poynton and Broadley (1991) ran a transect from Beira through Mutare and Harare to Chinhoyi, and Poynton (1992) ran a transect from Durban through Underberg and Maseru to Bloemfontein. In the first instance this was chosen as the route followed a fairly well collected area. However, in the second instance, the transect passed through some fairly well collected areas, but also through the generally poorly collected region of Lesotho. In both cases frequent use was made of the presumed ranges of amphibians as there were few

alternatives, and in the present study, this was also necessary, particularly for those regions outside Swaziland. Furthermore, because the coastline and inland contours ran diagonally through the latitude/longitude grid in these parts of southern Africa, both transects had to be stepped as this created problems with distribution records based on the quarter degree grid. In the present study it was decided to run a transect, along the 26°S line of latitude, from Maputo through Swaziland to Johannesburg, as such a route passes through well collected areas, especially within Swaziland, and the coastline and inland contours run virtually due north-south and tie in well with the lines of longitude. In addition to this, there are no centres of endemism, at least in the amphibian fauna, along this route. The route passes from the coastal Mozambique plain over the Lubombo Mountains through the lowveld and middleveld of Swaziland onto the highveld in western Swaziland and across the Transvaal highveld to Johannesburg (Figure 43). For the reasons listed above, the transect route in the present study appears to be a better choice than the Beira/Chinhoyi and Durban/Bloemfontein transects. Furthermore, these transects should possibly have been extended further west. Had this been done, there would undoubtedly have been a re-emergence, at the western limit of each transect, of the the tropical fauna, as revealed by the transect in the present account.

Amphibian distribution records from two quarter degree squares north and south of the 26°S line of latitude were used. These records were obtained from the maps of Poynton and Broadley (1991), Jacobsen (1989) and the maps presented in the present study. Reptile records were not as numerous along the length of the transect and only amphibian records were used so that comparisons could be made with the earlier transects of Poynton and Broadley. Columns arranged by longitude (as in Poynton 1991) between 28°E and 32°45'E appear in the table (Table 4). A positive record is replicated in the table by a + symbol and a presumed occurrence by a o symbol. If a species was, for example, unrecorded from Maputo but expected to occur there, and if there was a positive record of that species on the coast north-east of, or south of Maputo, it was included as a presumed occurrence. If there was a species range boundary at one point of the transect but that species reappeared further along the transect, the distant records were also shown by an * symbol. Such records were used by Poynton and Broadley (1991) to indicate possible relict populations. In the present study these represent south-central range limits of the forms involved. What appears to be a genuine break

in distribution along the transect is shown by a / symbol (this was necessary in two cases only).

Four species sets were arrived at. Set one includes those forms that occur throughout the transect and do not show any range boundaries along the transect. Set two includes those forms that occur at the eastern end of the transect, whose ranges end somewhere along the transect. Set three includes those forms that occur at the western end of the transect, whose ranges end somewhere along the transect.

Set four includes those forms whose ranges cut the transect line somewhere between the western and eastern limits and whose ranges fail to reach those limits.

Interpretations

Table 4 shows the composition of the sets, Table 5 the estimated percentage success of the sampling along the transect, and Table 6 shows the number of presumed range boundaries occurring in each quarter degree interval within the transect. The most significant factor emerging from the transect is that at quarter degree interval 31a no less than 18 presumed range boundaries occur while at quarter degree interval 31b, one interval to the east, 9 occur, and at quarter degree interval 30d, one interval west of 31a, 4 occur. It appears therefore as if there is a significant changeover of species in this region. Referring to this position on the map (Figure 43) it can be seen that this changeover occurs in the ecotone between the Transvaal and Swaziland highveld and the Swaziland middleveld and lowveld region. In other words it reflects a changeover from the Afrotropical region to the Afrotemperate region. Further east there is a less dramatic changeover between the Lubombo plateau and the lowveld to the west and the coastal plain to the east. At the extreme western limit of the transect there is the indication of another changeover where the Transvaal highveld peters out into the upper Limpopo basin. Here there is a re-emergence of tropical forms such as *Breviceps a. adpersus*, *Phrynomerus b. bifasciatus*, *Bufo garmani* and *Pyxicephalus adpersus edulis*; and this is brought about by the existence west and north-west of Pretoria of smaller basins that link up with the Limpopo basin which introduces, at the western limit

	28				29				30				31				32		
	a	b	c	d	a	b	c	d	a	b	c	d	a	b	c	d	a	b	c
SET 1																			
<i>Bufo gutturalis</i>	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	o	+
<i>Schismaderma carens</i>	+	o	+	o	+	+	+	o	o	+	+	+	+	+	+	+	+	o	o
<i>Tomopterna cryptotis</i>	+	+	o	o	o	o	o	+	+	o	o	+	o	+	+	+	+	o	+
<i>Phrynobatrachus natalensis</i>	+	o	+	+	+	+	+	+	o	+	+	+	+	+	+	+	+	+	o
<i>Kassina senegalensis</i>	+	+	o	+	+	+	+	o	+	+	o	+	+	+	+	+	+	o	+
<i>Cacosternum boettgeri</i>	+	o	+	+	+	+	+	+	+	o	o	+	o	+	+	+	o	o	+
SET 2																			
<i>Afrivalus fornasinii</i>																			+
<i>Hyperolius argus</i>																			+
<i>Phrynobatrachus acridoides</i>																			+
<i>Ptychadena m. mascareniensis</i>																			+
<i>Breviceps mossambicus</i>																			+
<i>Tomopterna krugerensis</i>																			+
<i>Kassina maculata</i>																			+
<i>Henisus m. marmoratus</i>																			+
<i>Ptychadena mossambica</i>																			+
<i>Hildebrandtia o. ornata</i>																			+
<i>Xenopus muelleri</i>																			+
<i>Phrynomerus b. bifasciatus</i>	+																		+
<i>Pyxicephalus a. edulis</i>	+																		+
<i>Leptopelis mossambicus</i>																			+
<i>Afrivalus aureus</i>																			+
<i>Bufo garniani</i>	+																		+
<i>Ptychadena anchietae</i>																			+
<i>Bufo maculatus</i>																			+
<i>Ptychadena oxyrhynchus</i>																			+
<i>Phrynobatrachus mababiensis</i>																			+
<i>Chiromantis xerampelina</i>																			+
<i>Hyperolius pusillus</i>																			+
<i>Hyperolius tuberilinguis</i>																			+
<i>Breviceps a. adspersus</i>	+																		+
<i>Hyperolius m. taeniatus</i>																			+
SET 3																			
<i>Pyxicephalus a. adspersus</i>	+	o	+	o	o	+	o	o	o	o	o	o	+						
<i>Strongylopus f. fasciatus</i>	o	+	o	o	o	o	+	+	+	o	o	o	+						
<i>Semnodactylus wealii</i>	o	o	o	o	o	o	+	+	+	+	o	+	+						
<i>Bufo rangeri</i>	+	+	+	+	+	+	+	+	+	+	+	+	+	+					
<i>Rana angolensis</i>	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+				
<i>Tomopterna natalensis</i>	+	+	+	o	o	+	+	+	o	+	o	+	+	+	+	+			
<i>Xenopus l. laevis</i>	+	+	+	o	o	o	+	o	o	+	+	+	+	+	+	+			
<i>Bufo f. fenoulheti</i>	+	o	+	+	o	+	+	/	/	/	/	/	+	o	+	+			
SET 4r																			
<i>Heleophryne natalensis</i>													+	+					
<i>Bufo g. gariensis</i>													+						
<i>Breviceps v. verrucosus</i>													+						
<i>Rana fuscigula</i>					+	o	+	o	+				+						
<i>Strongylopus g. grayii</i>									+	+	o	+	+						
<i>Ptychadena porosissima</i>						+	o	o	+	o	o	+	+	/	/	/	+		
<i>Cacosternum n. nanum</i>												+	o	+	+	o	+	+	
<i>Cacosternum n. parvum</i>												+	+						
<i>Hyperolius semidiscus</i>												+	+						
<i>Breviceps a. pantheri</i>												+	o	o	+				
									+	+	+	o	+						
n = 49 spp.	18	14	14	14	15	16	16	16	17	19	18	22	31	28	29	32	33	30	31

able 4. Recorded species ranges along the Maputo to Johannesburg transect grouped into sets. (Symbols are explained in the text)

of the transect, a tropical influence. The contours in Figure 43 clearly show the basins formed by the Crocodile River west of Pretoria and the Pienaars River north-west of Pretoria. Having extended the transect from Maputo through to Johannesburg and Pretoria the characteristic bifurcated range pattern of the tropical fauna in South Africa, as envisaged by Poynton (1962), is given further substance. Other interesting aspects that emerge from the transect are the southern central limits of the ranges of *Bufo maculatus* and *Bufo garmani* at quarter degree intervals 29d and 30b respectively.

The distribution patterns of the forms listed in set four (as shown in Table 4) appear at first to be confused, however, the majority of them (70%) can be linked to the escarpment and show greater affinities with the temperate fauna than the tropical fauna. Only two of the forms in set four have ranges that extend eastwards beyond the escarpment and both occur on the Lubombo plateau or within the immediate vicinity thereof. *Ptychadena porosissima* occurs in the Swaziland highveld where its preferred habitat consists of marshy seepage zones and vlei systems. Here it occurs sympatrically with *Strongylopus f. fasciatus* and *Cacosternum nanum parvum*, both of which also appear to favour similar habitat. Perhaps the unusual distribution pattern of *P. porosissima* revealed by the transect is a reflection of taxonomic uncertainty with regard to the species as presently conceived. This species appears to have been a problem in Poynton's (1992) Durban to Bloemfontein transect as well. Further attention should be given to this once more highland and lowland material of *P. porosissima* has been collected. Within Swaziland *Cacosternum nanum nanum* has been collected only in the northern highveld and on the Lubombo plateau, and again I believe its affinities lie more with the temperate fauna than the tropical fauna. At 26°S the transect picked up *Rana fuscigula* between quarter degree intervals 29a and 30a. The range of this Cape temperate form extends onto the southern Transvaal highveld, hence no records west or east of the two quarter degree intervals mentioned above. Taking the above considerations into account, most if not all of the members in set four are closely linked to the Cape temperate fauna. This appears to be reinforced by the location of the eastern range boundaries of the majority of these forms as shown in the transect.

Looking at the estimated percentage success achieved along the length of the transect it can be seen that the highest percentages appear between quarter degree intervals 31a and 32a

(Table 5). This corresponds with that section of the transect that passes through Swaziland. It would seem therefore that better coverage has been achieved in Swaziland although many gaps remain. With regard to areas west and east of Swaziland it is clear that more collecting is necessary. In fact more data is needed for the whole transect.

Percentage similarities between transect intervals, based on presumed ranges, using the Dice-Sorenson formula are presented in Table 7. The percentage similarity between quarter degree intervals 28b and 28c is 100%, while between intervals 29c and 32c it is 26%. Other tests carried out between intervals 28a and 32c (41%), 30d and 32c (30%), 30d and 31b (52%) and 29c and 31d (42%) clearly indicate how dissimilar the intervals are, and reveal a significant changeover of species along the transect. A similar test was run between the northern lowveld and the southern lowveld (between Tshaneni and Lavumisa), and a value of 89% was obtained, indicating some changeover of species. It appears therefore as if there is evidence of a western and southern subtraction of tropical species within the region. The present study has shown the usefulness of a transect as a means of testing biogeographical classifications and of assessing species turnover in southern Africa.

28				29				30				31				32		
a	b	c	d	a	b	c	d	a	b	c	d	a	b	c	d	a	b	c
89	57	71	50	53	69	81	63	71	79	44	73	97	93	97	97	85	47	55

Table 5. Estimated percentage intensity of sampling in quarter degree intervals from Maputo to Johannesburg.

	28				29				30				31				32		
	a	b	c	d	a	b	c	d	a	b	c	d	a	b	c	d	a	b	c
SET 2	4	0	0	0	0	0	0	1	0	2	0	2	6	7	3	3	0	3	1
SET 3	0	0	0	0	0	0	1	0	0	0	0	0	4	1	0	0	4	0	0
SET 4	0	0	0	0	1	1	0	0	3	1	1	2	8	1	0	0	2	0	0
TOTAL	4	0	0	0	1	1	1	1	3	3	1	4	18	9	3	3	6	3	1

Table 6. Number of presumed range boundaries occurring in each quarter degree interval along the Maputo to Johannesburg transect.

Transect intervals	Percentage similarity	No. of forms common
50km E of JHB (28b) - 70km E of JHB (28c)	100%	14/14
JHB (28a) - Maputo (32c)	41%	10/39
Swazi/Tvl border (30d) - Maputo (32c)	30%	8/45
Swazi-Tvl border (30d) - Manzini (31b)	52%	13/37
Belfast/Ermelo (29c) - Tshaneni (31d)	42%	10/38
Belfast/Ermelo (29c) - Maputo (32c)	26%	6/41

Table 7. Percentage similarities (Dice-Sorenson) between quarter degree intervals, based on presumed ranges, along the Maputo to Johannesburg transect.

At the same time the transect shows the weakness of the existing ragged nature of the distributional data. It is not possible to assess the distribution of diversity of the herpetofauna of Swaziland since the distribution of collecting is so uneven, as the transect clearly shows. The uneven distribution of collecting precludes the use of standardised mathematical procedures such as cluster analysis and ordination.

CHAPTER FIVE

CONSERVATION OF THE SWAZILAND HERPETOFAUNA

5.1. Background

Swaziland has thirteen conservation areas, the majority of which are privately owned. These reserves are evenly scattered throughout the four major topographical regions, with three in the highveld, two in the transition between highveld and middleveld, one in the middleveld, four in the lowveld, one in the transition between lowveld and Lubombo, and two in the Lubombo region. The two largest reserves in the country are managed by the Swaziland National Trust Commission. These are Malolotja Nature Reserve (approximately 18 000ha) in the highveld region and Mlawula Nature Reserve (approximately 16 000ha) partially located in both the lowveld and Lubombo regions. The National Trust Commission also manages some smaller reserves, Mantenga Falls Nature Reserve, Hawane Nature Reserve and Mahamba Gorge Nature Reserve. The former is located in the middleveld region while the latter two are in the highveld region.

Swaziland has no endemic amphibians but has one endemic reptile, the lizard, *Afroedura pondolia major*, which occurs in Malolotja and Mantenga Falls Nature Reserves. However, the type locality of this form, the Black Umbuluzi Falls (Onderstall 1984), does not fall into a protected area. Unfortunately the locality has been much abused and polluted as a result of the lack of protection and must hardly resemble the locality Onderstall knew. The Swazi rock snake, *Lamprophis swazicus*, is a rare snake in Swaziland and has been recorded from just four localities. Two of these localities, including the type locality (J.Culverwell pers. comm.), are located in Malolotja Nature Reserve. The Lubombo flat lizard, *Platysaurus intermedius* "Lebombo" (*sensu* Jacobsen and Newbery 1989), is endemic to the Lubombo range in Swaziland and South Africa. This form occurs in at least three nature reserves in Swaziland. The endemic thread snake, *Leptotyphlops telloi*, described from Mozambique and adjacent Swaziland by Broadley and Watson (1976), has been recorded from two localities in Swaziland, one of which falls within a nature reserve. The distribution of the Natal hinged tortoise, *Kinixys natalensis*, extends from the Natal midlands to the eastern Transvaal (Boycott and Jacobsen 1988). In Swaziland the species is restricted to the Lubombo range and foothills

where it has been found to occur in three nature reserves. Of the remaining forms one frog, six lizards and seven snakes are only known from a single locality (not all the same locality) in Swaziland. Only four of these, all lizards, have been recorded from nature reserves, three in Malolotja Nature Reserve and one in Mlilwane Wildlife Sanctuary. Large reptiles such as the crocodile, *Crocodylus niloticus*, and monitor lizards, *Varanus niloticus* and *V. albigularis*, are adequately protected in the country's nature reserves although some concern should be shown for the crocodile outside these areas. A good representation of the country's herpetofauna, approximately 76 percent (75 percent of the amphibians and 77 percent of the reptiles), has been found to occur within protected areas but outside these areas the continued survival of many is threatened.

5.2. Threats to the herpetofauna

5.2.1. Legislation

There is no legislation pertaining to the protection of Swaziland's herpetofauna except within nature reserves where "The National Trust Commission Act" and "The Game Act" apply. Although amphibians and reptiles are not specifically mentioned in these acts, in the former act an animal is defined as "any vertebrate member of the animal kingdom other than a human being, an animal of a usually domesticated species or a fish, and includes the eggs of birds and reptiles"; in the latter act an animal is defined as "any vertebrate animal which is indigenous to Swaziland". Three schedules appear in the revised Game Act (1990), the first schedule lists "Specially protected game" (elephant, white and black rhinoceros); the second schedule lists "Royal game" and includes some mammals and all species of birds, and the third schedule lists "Common game" which includes some common mammal and bird species. No amphibian or reptile appears in any of the schedules and their exclusion constitutes a major threat to this fauna.

5.2.2. Fires

Burning the veld is a common, traditional exercise synonymous with the African way of life. It is an exercise that has been carried out for many years, yet it is doubtful whether any

person is in a position to know what the long term effects of burning are on the herpetofauna. In parts of southern Africa the devastating effect that fires have on local tortoise populations is well known and has, in some instances, been documented (Greig and Boycott 1980, Stuart and Meakin 1983, de Villiers 1985, Boycott and Bourquin 1988). Other reptiles that are susceptible to the effects of fire include certain species of lizards as was shown by Fyfe (1980) and Boycott (1990a). Little or no follow-up work after such events has been carried out and one just has to be hopeful that the local populations are capable of recovery. The truth of the matter is that we simply do not know.

In Swaziland grass fires occur with monotonous regularity in the highveld region and in parts of the Lubombo region, while bush fires occur in the middleveld and lowveld regions. Many of the rural inhabitants of Swaziland burn around their homesteads to keep snakes away as well as other unwanted creatures. Fire is used as a management tool in some of the protected areas and also on cattle ranches in the middleveld and lowveld, mainly to control bush encroachment but also for grazing purposes. In the highveld region fire is used specifically to improve grazing for stock animals. In Malolotja Nature Reserve, fire is used for management purposes and the policy is to try and burn approximately fifty percent of the utilizable grazing once every two years. The grazing pressure on plant communities is thereby relieved as the wild ungulates are forced to move from area to area in search of grazing. Some areas are protected against fire for longer periods. Such areas include the upland bog and vlei systems. However, there are, inevitably, some areas that are burned every year such as the protective firebreaks around buildings, the camp and picnic sites and the firebreaks along the boundary fence. In Swaziland the fire burning period is mostly confined to the winter and early summer months, from May to October (with June, July and August prominent) although natural fires, caused by lightning strikes, can occur later than this. Since the summer of 1986/1987 three fires were caused by lightning strikes at Malolotja, one in September and two in January. During the winter months fires are unlikely to affect most hibernating reptiles except for snake-lizards (or grass lizards) and seps lizards of the genera, *Chamaesaura* (three species in Swaziland) and *Tetradactylus* (one species in Swaziland). Boycott (1990a) reported on the susceptibility of *Chamaesaura anguina* to fire in the highveld region of Swaziland. Fires over extensive areas expose the bareness below the grass cover and make it easier for predators (especially birds) to capture these lizards. In roads and tracks

adjacent to such burns these lizards have been seen to take refuge from the fire. Here, if they survive the fire, they are even more vulnerable to predators and are exposed to the additional danger of being run over by vehicles. Although some individuals do survive the grass fires, many do succumb, either as a direct result of being burned or indirectly through increased predator pressure and road kills.

5.2.3. Overgrazing

Over-utilisation by stock animals can have devastating effects on the environment. This leads to a reduction in plant cover and plant species richness, which enables predators to find reptiles more easily and adversely affects the diet available to herbivorous reptiles such as tortoises. The major threat from over-utilisation by stock animals is that it causes erosion and destroys habitats, especially sensitive habitats, such as natural springs, drainage lines, bog and vlei systems. The combined effect of over-stocking and too frequent fires has devastated huge tracts of the highveld outside the nature reserves. Many bog and vlei systems have been badly degraded or even destroyed. Most of the middleveld habitats have been permanently damaged, as have parts of the lowveld and Lubombo regions. The degradation of the middleveld was apparent in the 1960s as evidenced by Compton's (1966) comment that "the greater part of it (the middleveld) has been modified (and botanically spoilt!) by cultivation, burning and overgrazing.". The same is now true of other regions including the highveld, the wettest and coolest part of the country, where catchments - the life-blood of the rest of the country - remain generally unprotected. The upland bog and vlei systems, the natural sponges that hold water in times of floods and release water in times of drought, support a highveld amphibian fauna unique to the country. Through the reduction of healthy bog and vlei systems, species such as *Semnodactylus wealii*, *Ptychadena porosissima*, *Strongylopus f. fasciatus* and *Cacosternum nanum parvum* are coming under increasing pressure and their survival outside protected areas is being threatened.

5.2.4. Rural settlement and agriculture

Modern pressures such as increasing rural settlement and agriculture are undoubtedly altering the composition of the herpetofauna. Increasing rural settlement in the middleveld, lowveld

and Lubombo regions is accompanied by changes to woody vegetation through burning and ploughing which is likely to affect the species composition of the herpetofauna. The resultant "green deserts" of agro-industry such as forestry in the highveld, pineapples in the middleveld, and, of greater magnitude, the development of the sugarcane, citrus and cotton industries in the lowveld have resulted in the loss of huge expanses of natural habitat and the concomitant loss of species diversity. It is perhaps arguable that such changes have benefited some species (which is usually the case) but it is more likely that it has adversely affected the herpetofauna as a whole.

5.2.5. Dam construction and artificial drainage

It is a falsehood to believe that anything to do with water, such as the construction of a dam, will only affect the amphibian fauna. The reptile fauna is also very much affected by such a project. A dam might appear as an increase in amphibian habitat but it also represents a reduction in the terrestrial habitats utilised by other forms of life. When the H.F. Verwoerd Dam was filling up in the arid north-eastern Cape Province, many Cape worm lizards, *Monopeltis capensis*, a fossorial reptile, were being found in the immediate vicinity (J. Jooste pers. comm.). It is highly likely that these creatures were being forced out of their subterranean habitat as the soil became saturated and presumably unliveable due to the increase in water as a result of the dam. In Swaziland, dams and reservoirs in the middleveld and lowveld are soon populated by crocodiles which then occur in areas from which they were previously absent. Dams have been constructed on some of the larger rivers in Swaziland and in some cases these have been located in the lowveld region with the result that they are not very deep but cover extensive areas. This has led to a reduction in natural lowveld habitats. Plans are afoot to dam the Nkomati River in the middleveld near Balegane, which would then enable large areas of the northern lowveld to be irrigated. This would result in the establishment of more agro-industries in this region. Several species and subspecies of amphibians and reptiles, of which there are only one or two records in Swaziland, have been recorded from the sandveld habitats in this region and nowhere else. Other dam building projects outside the borders of Swaziland, such as the Jozini Dam in the south-east and the Driekoppies Dam in the north-west, have altered the natural habitats formerly found in these regions.

In parts of the middleveld and lowveld, artificial drainage ditches have been dug in areas where, after rains, water collects in low-lying hollows. These ditches effectively allow for the movement of water away from natural amphibian breeding sites, thereby rendering the sites unsuitable for many breeding amphibians. Some particularly bad examples of this are to be found in the vicinity of Balegane Ranch in the north-western middleveld. Some species of amphibians will utilise the ditches but for many others such a breeding site is unsuitable. However, man has created, albeit ignorantly and inadvertently, some suitable artificial breeding sites. A fairly common sight next to the dirt roads in the Swaziland middleveld and lowveld are borrow-pits and quarries utilised once or twice by the road maintenance crews. It usually takes a few years for marginal vegetation to establish itself at these artificial sites thereby providing suitable conditions for many amphibian species to breed.

5.2.6. Trade and traditional medicine

The traditional medicine trade is a minor threat in the face of the widespread habitat alteration and destruction that is taking place. However, there is room for concern as some southern African endangered species such as the python, *Python sebae natalensis*, and crocodile, *Crocodylus niloticus*, are exploited. The python is killed in order to acquire the much desired skin and fat and, apparently, the liver of the crocodile is regarded as being an extremely powerful traditional medicine. In areas where pythons do not occur or where they are extinct, other snakes are used for their medicinal properties. Reports have been received of python skins being sold at the roadside in parts of the country and of tortoises being sold at the markets in Mbabane and Manzini. On one particular sugar estate in the Big Bend area rewards are offered to employees to kill snakes.

5.3. Conservation recommendations

It is imperative that amphibians and reptiles be mentioned specifically and be incorporated in the Game Act. Some reptiles are worthy of placement in the first schedule listing "specially protected game". These would include the African rock python as well as other threatened or endangered (on a national scale) species. Several rare species could also be placed in the first schedule, while all other species and subspecies of amphibian and reptile indigenous to

Swaziland could be included in the second schedule and be listed as "Royal game". Perhaps the dangerously venomous species of snake such as the black mamba, Mozambique spitting cobra, Egyptian cobra, boomslang and puff adder could be excluded.

Education of the people in respect of amphibians and reptiles is an important aspect worthy of serious consideration. Swaziland has no botanical or zoological gardens, nor a snake park, and admission tariffs to the parks and reserves are frequently beyond the means of the average resident. It is impossible to generate an interest in and an awareness of the diversity of Swaziland's wildlife without such institutions. A reptile park would be an excellent way of generating an awareness of the herpetofauna and such a project could be financed by the government or alternatively, the initiative could be taken by the private sector. Such a project should be fully supported by both the government and the people of Swaziland. Conservation through education is the route to follow.

With only 76 percent of the Swaziland herpetofauna having been recorded from protected areas, it is important that more detailed survey work be carried out in the nature reserves. By conducting such research it will be possible to establish more accurately what the conservation status of the herpetofauna is. This would furthermore facilitate the compilation of an inventory of species in protected areas. Ideally more nature reserves should be proclaimed, particularly in areas of high species diversity. However, funds are not always available for the outright purchase of land for conservation and the land ownership system in Swaziland is a complex one, as much of Swaziland is Swazi Nation land that is held in trust for the nation by the King. Private ownership does exist in the country but on a small scale. It is essential that individual farmers, ranchers and other land owners (such as the forestry and agricultural companies) be encouraged to set aside portions of their properties and manage them as private nature reserves. Some of the sugar companies such as Ubombo Ranches and Simunye Sugarcane Corporation have done so but many more companies need to do the same.

Attempts should be made to reduce wild fires, overgrazing and the wanton destruction of natural habitats. More respect and concern should be shown for the land and educational programmes should be set up. Swaziland has a fascinating and very rich herpetofauna, a fauna

which surpasses most other areas of equal size within southern Africa. This is all the more reason why greater efforts should be made to conserve this fascinating and rich assemblage.

It may be said that conservation planning in Swaziland has been based on the traditional reductionist approach. There is the need for a more holistic approach and future detailed herpetological surveys in Swaziland must form part of a broader initiative that is aimed at developing comprehensive biological databases for the entire region. The transect which extends into neighbouring countries makes this point in itself. If the regional landscape is planned as a functional whole, the above conservation recommendations might have a chance of long-term success.

As mentioned earlier distribution of diversity cannot be studied in a rigorous manner because there are too many gaps in Swaziland and the surrounding areas. This is clearly shown by the transect data. Recorded diversity is high in nature reserve areas because it is really only in reserve areas that collecting has reached a reasonable level and that is as far as any correlation can be taken at the present time.

CHAPTER SIX

ACHIEVEMENTS OF THE STUDY

FitzSimons' monographic revisions of the lizards (1943) and snakes (1962) of South and southern Africa respectively listed very few records from Swaziland. In the former, 13 lizard forms from 6 localities were recorded and in the latter, 25 snake forms were listed from 17 localities. Most of the snake records were based on specimens in the Durban Snake Park and none of these exist today as voucher specimens. Loveridge and Williams (1957), in their revision of African tortoises, listed no specimens and cited no records from Swaziland. Similarly, Loveridge's (1941) revision of the African terrapins listed nothing from the region. Poynton (1964), in his revision of the southern African amphibians, listed 13 forms from four localities in Swaziland. Between 1970 and 1985 two new reptiles, a snake (Schaefer 1970) and a lizard (Onderstall 1984), and a frog (Pickersgill 1984), were discovered and described from Swaziland. The above emphasises just how poorly known the herpetofauna of Swaziland is and this represents a major flaw in the overall southern African picture. The past twenty years has seen a bit more interest in reptile collecting in Swaziland (J.Culverwell pers. comm.) and, in the last four years, the present writer has been conducting an amphibian survey of Swaziland. Boycott and Culverwell (1992) drew attention to the diversity of the herpetofauna of Swaziland by publishing a preliminary checklist, but there is a desperate need to document it more fully. It is my belief that the present study has gone a long way towards this. Earlier collections have been documented for the first time and through the collection of fresh material, the herpetofauna of the region is now better known. Boycott (1992a) lists 154 forms, 44 amphibians and 110 reptiles. Through studying the distribution patterns of the herpetofauna, it has been shown that Swaziland, together with Natal and southern Mozambique, forms an integral part of the tropical subtraction zone of south-east Africa. The present study has contributed significantly to a better understanding of the biogeography of southern Africa as it has complemented other recent regional studies conducted by Lambiris (1989) and Jacobsen (1989). A better knowledge of the distribution, diversity and conservation status of Swaziland's, and indeed southern Africa's, herpetofauna has been acquired and it has been shown that Swaziland has a diversity of forms unequalled in southern Africa by any region of comparable size.

REFERENCES

- BARHAM, L.S. 1989a. A preliminary report on Later Stone Age artefacts from Siphiso Shelter in Swaziland. *South African Archaeological Bulletin* 44:33-43.
- BARHAM, L.S. 1989b. Radiocarbon dates from Nyonyane Shelter, Swaziland. *South African Archaeological Bulletin* 44:117-118.
- BOURQUIN, O. 1977. The Transvaal montane skink - a new record for Natal. *Lammergeyer* 23: 48.
- BOYCOTT, R.C. 1982. On the taxonomic status of *Heleophryne regis* Hewitt, 1909 (Anura:Leptodactylidae). *Ann. Cape Prov. Mus. (nat. Hist.)* 14(3): 89-108.
- BOYCOTT, R.C. 1988a. Description of a new species of *Heleophryne* Sclater, 1899 from the Cape Province, South Africa (Anura: Heleophrynidae). *Ann. Cape Prov. Mus. (nat. Hist.)* 16(11): 309-319.
- BOYCOTT, R.C. 1988b. *Kinixys natalensis* species account. In: *South African Red Data Book - Reptiles and Amphibians*. Ed. W.R. Branch. S. Afr. Nat. Sci. Prog. Rept. 151.
- BOYCOTT, R.C. 1990a. *Chamaesaura anguina* : Size, reproduction and susceptibility to fire. *J. Herp. Assoc. Afr.* 37: 49.
- BOYCOTT, R.C. 1990b. *Nucras lalandii* : Reproduction. *J. Herp. Assoc. Afr.* 37: 49.
- BOYCOTT, R.C. 1990c. *Nucras lalandii* : Geographical distribution. *J. Herp. Assoc. Afr.* 37: 57.
- BOYCOTT, R.C. 1992a. *An annotated checklist of the amphibians and reptiles of Swaziland*. The Conservation Trust of Swaziland. 27pp.
- BOYCOTT, R.C. 1992b. New amphibian records for Swaziland. *Durban Mus. Novit.* 17: 64-70.
- BOYCOTT, R.C. and BOURQUIN, O. 1988. *The South African Tortoise Book - A Guide to South African Tortoises, Terrapins and Turtles*. Southern Book Publishers. Johannesburg.
- BOYCOTT, R.C. and CULVERWELL, J.B. 1992. Swaziland Herpetofauna - a preliminary synthesis. *J. Herp. Assoc. Afr.* 40: 38-41.

- BOYCOTT, R.C. and JACOBSEN, N.H.G. 1988. On the distribution, habitat and identification of *Kinixys natalensis* Hewitt, 1935 (Cryptodira: Testudinidae) in southern Africa. *Durban Mus. Novit.* 14: 93-101.
- BOYCOTT, R.C. and LA CROIX, N. 1991. *Hildebrandtia ornata ornata* : Geographical distribution. *J. Herp. Assoc. Afr.* 39: 19.
- BRANCH, W.R.(ed.)1988a. *South African Red Data Book - Reptiles and Amphibians.* S.Afr.Nat.Sci.Prog.Rept.151.pp.1-241.
- BRANCH, W.R. 1988b. *Field guide to the snakes and other reptiles of southern Africa.* Struik Publishers. Cape Town.
- BROADLEY, D.G. 1977a. A revision of the African snakes of the genus *Psammophylax* Fitzinger (Colubridae). *Occas. pap. Natl. Mus. Rhod. B. Nat. sci.* 6(1): 1-44.
- BROADLEY, D.G. 1977b. A review of the *Mabuya striata* complex in south-east Africa (Sauria: Scincidae). *Occas. pap. Natl. Mus. Rhod. B. Nat. sci.* 6(2): 45-79.
- BROADLEY, D.G. 1978. A revision of the genus *Platysaurus* A.Smith (Sauria: Cordylidae). *Occas. pap. Natl. Mus. Rhod. B. Nat. sci.* 6(4): 129-185.
- BROADLEY, D.G. 1980. A revision of the African snake genus *Prosymna* Gray (Colubridae). *Occas. pap. Natl. Mus. Rhod. B. Nat. sci.* 6(7): 481-556.
- BROADLEY, D.G. 1981a. A review of the genus *Pelusios* Wagler in southern Africa (Pleurodira: Pelomedusidae). *Occas. pap. Natl. Mus. Rhod. B. Nat. sci.* 6(9): 633-689.
- BROADLEY, D.G. 1981b. A review of the populations of *Kinixys* (Testudinidae) occurring in south-eastern Africa. *Ann. Cape Prov. Mus. (nat. Hist.).* 13: 195-216.
- BROADLEY, D.G. 1983. *FitzSimons' snakes of southern Africa.* Delta Books. Johannesburg.
- BROADLEY, D.G. 1984. A review of geographical variation in the African python, *Python sebae* (Gmelin). *British J. Herpetol.* 6(10): 359-367.
- BROADLEY, D.G. 1988. A check list of the Reptiles of Zimbabwe, with synoptic keys. *Arnoldia Zimbabwe* 9(30): 369-430.
- BROADLEY, D.G. 1989. *Kinixys* species accounts. In: *The Conservation Biology of Tortoises.* Eds. I.R.Swingland and M.W.Klemens. Occasional Papers of the IUCN Species Survival Commission No.5. pp.43-64.
- BROADLEY, D.G. 1991. A review of the southern African stiletto snakes of the genus *Atractaspis* A. Smith (Serpentes: Atractaspididae). *Arnoldia Zimbabwe* 9(36): 495-517.

- BROADLEY, D.G. and HOWELL, K.M. 1991. A Check List of the Reptiles of Tanzania, with Synoptic Keys. *Syntarsus* 1: 1-70.
- BROADLEY, D.G. and WATSON, G. 1976. A revision of the Worm Snakes of southeastern Africa (Serpentes: Leptotyphlopidae). *Occas. pap. Natl. Mus. Rhod. B. Nat. sci.* 5(8): 465-510.
- BRUTON, M.N. and HAACKE, W.D. 1980. The reptiles of Maputaland. In: *Studies on the Ecology of Maputaland*. Eds. M.N. Bruton and K.H. Cooper. pp. 251-287.
- CHANNING, A. 1978. A new *Rana* from the Lesotho plateau (Amphibia: Anura). *Ann. Natal Mus.* 23: 361-365.
- CHANNING, A. 1986. A new species of the genus *Strongylopus* Tschudi from Namaqualand, Cape Province, South Africa (Anura: Ranidae). *Ann. Cape Prov. Mus. (nat. Hist.)*. 16(5): 127-135.
- COMPTON, R.H. 1966. *An Annotated Check List of the Flora of Swaziland*. Journal of South African Botany. Supplementary Volume No. VI.
- CROWE, T. 1990. A quantitative analysis of patterns of distribution, species richness and endemism in southern African vertebrates. In: *Vertebrates in the tropics*. Eds. G. Peters and R. Hutterer. Museum Alexander Koenig, Bonn. pp.145-160.
- DAVIS, D.H.S. 1962. Distribution patterns of southern Africa Muridae, with notes on some of their fossil antecedents. *Ann. Cape Prov. Mus.* 2: 56-76.
- DEACON, J. 1984. Later Stone Age people and their descendants in southern Africa. In: *Southern African Prehistory and Palaeoenvironments*. Ed. R.G.Klein.
- DE VILLIERS, A.L. 1985. Plight of the geometric tortoise. *South African Panorama* (March) pp.48-50.
- DE WAAL, S.W.P. 1978. The Squamata (Reptilia) of the Orange Free State, South Africa. *Mem. nas. Mus. Bloemfontein* 11: 1-160.
- DE WAAL, S.W.P. 1980a. The Testudines (Reptilia) of the Orange Free State, South Africa. *Navors. nas. Mus. Bloemfontein* 4(3): 85-91.
- DE WAAL, S.W.P. 1980b. The Salienta (Amphibia) of the Orange Free State, South Africa. *Navors. nas. Mus. Bloemfontein* 4(4): 93-119.
- FITZSIMONS, V.F.M. 1943. *The Lizards of South Africa*. Mem. Transvaal Mus. 1: 1-528.

- FITZSIMONS, V.F.M. 1948. Notes on some reptiles and amphibians from the Drakensberg, together with a description of a new *Platysaurus* from northern Natal. *Ann. Transv. Mus.* 21:73-80.
- FITZSIMONS, V.F.M. 1962. *Snakes of Southern Africa*. Purnell. Cape Town.
- FITZSIMONS, V.F.M. 1970. *Field Guide to the snakes of southern Africa*. Collins. London.
- FITZSIMONS, V.F.M. 1974. *Field Guide to the snakes of southern Africa*. Revised edition. Collins. London.
- FYFE, G. 1980. Effects of fire on lizard populations in Central Australia. *Herpetofauna* 12(1): 1-9.
- GOUDIE, A.S. and PRICE WILLIAMS, D. 1983. *The Atlas of Swaziland*. Occ. Paper No.4. Swaziland National Trust Commission.
- GREIG, J.C. 1976. Notes on Herpetology in the Cape Province. Unpubl. Rpt. Cape Department of Nature and Environmental Conservation.
- GREIG, J.C. 1978. Biological distribution mapping in southern Africa: a brief history and review of candidate mapping systems. Unpubl. Res. Rpt. Cape Department of Nature and Environmental Conservation.
- GREIG, J.C. and BOYCOTT, R.C. 1980. The Eastern Cape - a tortoise paradise. *The Eastern Cape Naturalist* 69: 8-10.
- GREIG, J.C. and BURDETT, P.D. 1976. Patterns in the distribution of southern African terrestrial tortoises (Cryptodira: Testudinidae). *Zoologica Africana* 11(2): 249-273.
- GREIG, J.C., BOYCOTT, R.C. and DE VILLIERS, A.L. 1979. Notes on the elevation of *Rana fasciata montana* FitzSimons, 1946 to specific rank, and on the identity of *Rana fasciata sensu* Burchell, 1824 (Anura: Ranidae). *Ann. Cape Prov. Mus. (nat. Hist.)* 13(1): 1-30.
- HAAGNER, G.V. and HURTER, J. 1988. Additional Distribution Records of the Berg Adder *Bitis atropos* in the South-eastern Transvaal and Swaziland. *Koedoe* 31: 71-76.
- HEWITT, J. 1910. The zoological region of southern Africa as deduced from the composition of its Lacertilia. *Ann. Trans. Mus.* 2: 56-71.
- L'ONS, J.H. 1967. Veld types of Swaziland. Bulletin No.18. Swaziland Ministry of Agriculture.
- JACOBSEN, N.H.G. 1989. A Herpetological Survey of the Transvaal. Unpubl. Ph.D. thesis. University of Natal. Durban.

- JACOBSEN, N.H.G. and NEWBERY, R.E. 1989. The genus *Platysaurus* A. Smith 1844 in the Transvaal. *J. Herp. Assoc. Afr.* 36: 51-63.
- LAMBIRIS, A.J.L. 1988. *Afrixalus aureus* species account. In: *South African Red Data Book - Reptiles and Amphibians*. Ed. W.R. Branch. S. Afr. Nat. Sci. Prog. Rept. 151.
- LAMBIRIS, A.J.L. 1989. A review of the Amphibians of Natal. *Lammergeyer* 39: 1-210.
- LOVERIDGE, A. 1937. Scientific results of an expedition to rain forest regions in eastern Africa. IX. Zoogeography and itinerary. *Bull. Mus. comp. Zool.* 79: 479-541.
- LOVERIDGE, A. 1941. Revision of the African terrapin of the family Pelomedusidae. *Bull. Mus. comp. Zool.* 88: 465-524.
- LOVERIDGE, A. and WILLIAMS, E.E. 1957. Revision of the African tortoises and turtles of the suborder Cryptodira. *Bull. Mus. comp. Zool.* 115: 161-557.
- MOODY, S.M. 1980. Phylogenetic and historical biogeographical relationships of the genera in the Family Agamidae (Reptilia: Lacertilia). Unpubl. Ph.D. thesis. University of Michigan.
- MAYR, E. 1969. *Principles of systematic zoology*. McGraw-Hill. New York.
- MURDOCH, G. 1970. *Soil and land capability in Swaziland*. pp.1-360. Swaziland Ministry of Agriculture.
- ONDERSTALL, D. 1984. Descriptions of two new subspecies of *Afroedura pondolia* (Hewitt) and a discussion of species groups within the genus (Reptilia: Gekkonidae). *Ann. Transvaal Mus.* 33(30): 497-509.
- PARRY, C.R. 1982. A revision of southern African *Pyxicephalus* Tschudi (Anura: Ranidae). *Ann. Natal Mus.* 25(1): 281-292.
- PASSMORE, N.I. and CARRUTHERS, V.C. 1979. *South African Frogs*. Witwatersrand University Press. Johannesburg.
- PICKERSGILL, M. 1984. Three new *Afrixalus* (Anura: Hyperoliidae) from south-eastern Africa. *Durban Mus. Novit.* 13(17): 203-220.
- PIENAAR, U.deV, HAACKE, W.D. and JACOBSEN, N.H.G. 1978. *The Reptiles of the Kruger National Park*. National Parks Board of South Africa.
- POYNTON, J.C. 1962. Patterns in the Distribution of the Southern African Amphibia. *Ann. Cape Prov. Mus.* 2: 252-272.
- POYNTON, J.C. 1964. The Amphibia of southern Africa: a faunal study. *Ann. Natal Mus.* 17: 1-334.

- POYNTON, J.C. 1980. The Amphibia of Maputaland. In: *Studies on the Ecology of Maputaland*. Eds. M.N. Bruton and K.H. Cooper. pp.245-250.
- POYNTON, J.C. 1985. Nomenclatural revision of southeast African treefrogs of the genus *Leptopelis* (Amphibia: Hyperoliidae). *S. Afr. J. Sci.* 81: 466-468.
- POYNTON, J.C. 1986. Historical biogeography: Theme and South African variations. In: *Palaeoecology of Africa* 17:139-153.
- POYNTON, J.C. 1989. Evolutionary activity in the southern part of Africa: evidence from the Amphibia. *J. Herp. Assoc. Afr.* 36: 2-6.
- POYNTON, J.C. 1990. Composition and subtraction patterns of the East African lowland amphibian fauna. In: *Vertebrates in the tropics*. Eds. G. Peters and R. Hutterer. Museum Alexander Koenig, Bonn, pp. 285-296.
- POYNTON, J.C. 1992. Amphibian diversity and species turnover in southern Africa: Investigation by means of a Bloemfontein-Durban transect. *J. Herp. Assoc. Afr.* 40: 2-8.
- POYNTON, J.C. and BROADLEY, D.G. 1978. The Herpetofauna. In: *Biogeography and Ecology of southern Africa*. Eds. M.J.A. Weger and A.C. van Bruggen. pp.925-948.
- POYNTON, J.C. and BROADLEY, D.G. 1985a. Amphibia Zambesiaca 1. Scolecomorphidae, Pipidae, Microhylidae, Hemisidae, Arthroleptidae. *Ann. Natal Mus.* 26: 503-553.
- POYNTON, J.C. and BROADLEY, D.G. 1985b. Amphibia Zambesiaca 2. Ranidae. *Ann. Natal Mus.* 27: 115-181.
- POYNTON, J.C. and BROADLEY, D.G. 1987. Amphibia Zambesiaca 3. Rhacophoridae and Hyperoliidae. *Ann. Natal Mus.* 28: 161-229.
- POYNTON, J.C. and BROADLEY, D.G. 1991. Amphibia Zambesiaca 5. Zoogeography. *Ann. Natal Mus.* 32: 221-277.
- PRICE WILLIAMS, D. 1981. A preliminary report on recent excavations of Middle and Late Stone Age levels at Sibebe Shelter, north west Swaziland. *South African Archaeological Bulletin* 36:22-28.
- PRICE WILLIAMS, D. and WATSON, A. 1982. New observations on the prehistory and palaeoclimate of the Late Pleistocene in southern Africa. *World Archaeology* 13(3): 372-381.

- PRICE WILLIAMS, D., WATSON, A. and GOUDIE, A.S. 1982. Quaternary colluvial stratigraphy, archaeological sequences and palaeoenvironment in Swaziland, southern Africa. *The Geographical Journal* 148(1):50-67.
- PRIOR, J. and PRICE WILLIAMS, D. 1985. An Investigation of Climatic Change in the Holocene Epoch using Archaeological Charcoal from Swaziland, Southern Africa. *Journal of Archaeological Science* 12:457-475.
- SAYER, J.A. 1977. Conservation of large mammals in the Republic of Mali. *Biol. Conserv.* 12(4): 245-263.
- SCHAEFER, N. 1970. A new species of House Snake from Swaziland, with notes on the status of the two Genera *Lamprophis* and *Boaedon*. *Ann. Cape Prov. Mus. (nat. Hist.)* 8(14): 205-208.
- SCHIØTZ, A. 1976. Zoogeographical patterns in the distribution of East African treefrogs (Anura: Ranidae). *Zoologica Africana* 11(2): 335-338.
- SCOTT, L. 1982. Pollen analyses of Late Cainozoic deposits in the Transvaal, South Africa, and their bearing on palaeoclimates. In: *Palaeoecology of Africa* 15:101-107. Eds. J.A. Coetzee and E.M. van Zinderen Bakker Snr.
- STEWART, M.M. 1967. *Amphibians of Malawi*. State University of New York Press. New York.
- STUART, C.T. and MEAKIN, P. 1983. A note on the effect of fire on a population of angulate tortoises, *Chersina angulata* (Cryptodira: Testudinidae), with an estimate of biomass. *J. Herp. Assoc. Afr.* 29: 7-8.
- STUCKENBERG, B.R. 1969. Effective temperature as an ecological factor in southern Africa. *Zoologica Africana* 4: 145-197.
- VAN ZINDEREN BAKKER, E.M. 1978. Quaternary vegetation changes in southern Africa. In: *Biogeography and Ecology of Southern Africa*. Ed. M.J.A. Werger.
- VISSER, J. 1978. Notes on two rare house snakes - 1 *Lamprophis fiskii* Boulenger (1887) and *L. swazicus* Schaefer (1970). *J. Herp. Assoc. Afr.* 19:10-13.
- VISSER, J. 1979. Notes on two rare house snakes - 2 The generic status of *Lamprophis fiskii* Boulenger (1887) and *Lamprophis swazicus* Schaefer (1970). *J. Herp. Assoc. Afr.* 21:31-37.
- WAGER, V.A. 1965. *The Frogs of South Africa*. Purnell. Cape Town.

- WAGER, V.A. 1986. *Frogs of South Africa their fascinating life stories*. Delta Books. Craighall.
- WELCH, K.R.G. 1982. *Herpetology of Africa: A Checklist and bibliography of the Orders Amphisbaenia, Sauria and Serpentes*. Robert Krieger Publishing Company. Florida.
- WERGER, M.J.A. (Ed.) 1978. *Biogeography and Ecology of southern Africa*. The Hague: Junk.

GAZETTEER (amphibians and reptiles)

A

Abercorn Hoek, 6km N of (2632CC)

B

Balegane (2631BA)

Balegane, 13km S of (2631BA)

Balegane, 13m S of (2631BA)

Balegane and Matsamo, between (2631BA)

Balegane district (2631BA)

Balegane Ranch, near (2631BA)

Balegane/Piggs Peak/Matsamo road junction, 9km N of (2631BA)

Bar Circle Ranch (2631DB)

Bar R Ranch (2631DB)

Bhunya (2631CA)

Bhunya, 6m E of (2631CA)

Big Bend (2631DD)

Big Bend, just S of (2631DD)

Big Bend, 3km S of (2631DD)

Big Bend, 3m S of (2631DD)

Big Bend, 5km NW of (2631DD)

Big Bend, 6km E of (2632CC)

Big Bend, 9km S of (2631DB)

Big Bend, 10km NW of (2631DB)

Big Bend, 13km NW of (2631DB)

Big Bend, 14km NW of (2631DB)

Big Bend, 15km NE of (2632CA)

Big Bend, 15km NW of (2631DB)

Big Bend, 15km S of (2631DD)

Big Bend, 15m S of (2631DD)

Big Bend, 16km NW of (2631DB)

Big Bend, 20km NE of (2632CA)
Big Bend, 22km N of (2631DB)
Big Bend, 30km N of (2631DB)
Big Bend, 60km W of (2631CD)
Big Bend and Sifunga, between (2631DB)
Big Bend Sugar Estate (2631DD)
Black and White Umbuluzi Rivers, confluence of (2631BB)
Black Umbuluzi Falls (2631AC)
Black Umbuluzi River (2631AA)
Black Umbuluzi River bridge (2631AA)
Bordergate, 2.5km S of (2531DD)
Bordergate, 7km S of (2531DC)
Bordergate, 8km S of (2531DC)
Bremersdorp (=Manzini) (2631AD)
Bremersdorp (=Manzini), 15m ESE of (2631DA)
Bremersdorp (=Manzini), 25km ESE of (2631DA)
Bulembu (2531CC)
Bulembu, 3km S of (2531CC)
Bulungu Poort (2631DA)

C

Cyrildene Farm (2631BD)

D

Dalreich (2631AC)
Dinedor Farm (2631BC)
Dinedor Farm, 1km from entrance (2631BC)
Droxford Farm (2630BD)
Droxford Farm, 1km S of (2630BD)

E

Edwaleni (Nhlangano dist.)(2731AB)

Edwaleni road, 1,2km down (2631CB)

Edwaleni road, 1,5km down (2631CB)

Edwaleni road, 2km down (2631CB)

Elangeni Farm (2630BD)

Ezulwini (2631AC)

F

Fiddlers Green (2631DC)

Forbes Reef (2631AA)

Forbes Reef, 1km S of (2631AA)

Forbes Reef, 2km N of (2631AA)

Forbes Reef, 2km S of (2631AA)

Forbes Reef, 3m S of (2631AA)

Forbes Reef, 3m SE of (2631AA)

Forbes Reef, 4m N of (2631AA)

Forbes Reef, 10km N of (2631AA)

Forbes Reef Dam, Malolotja Nature Reserve (2631AA)

Forbes Reef Estate (2631AA)

Forbes Reef Forest, Malolotja Nature Reserve (2631AA)

G

Goedgegun (=Nhlangano)(2731AA)

Golela, Swaziland (=Lavumisa)(2731BD)

Grand Valley (2631CD)

Groenpan Farm (2631BD)

H

Havelock (=Bulembu)(2531CC)

Hawane Dam (2631AA)

Hawane Nature Reserve, near (2631AA)

Hawane Falls (2631AA)

Helehele (2631AD)

Helehele, 700m S of (2631AD)
 Hlane Game Reserve (2631BD)
 Hlatikulu (2631CD)
 Hlatikulu, 3km N of (2631CD)
 Hlatikulu, 7km N of (2631CD)
 Hlatikulu, 7km NE of (2631CD)
 Hlatikulu, 8km N of (2631CD)
 Hlatikulu and Sidvokodvo, between (2631CD)
 Hluti, 1,5km SE of (2731BA)
 Hluti, 6m E of (2731BA)
 Hluti and Goedgegung (=Nhlangano), between (2731AB)
 Horo Forest, ?Swaziland or Transvaal (2531CB)
 Hot Springs (Usutu River)(2631AC)
 Houdkop (2630DD)

I

Invuvu Dam (2631DB)
 IYSIS barrage (2631BA)

J

Jilobi Forest, E of (2632CA)

K

KaDake (2631AA)
 KaDake, 1km E of (2631AA)
 Kalwene (2731BA)
 Kobolondo Mountain (2531CC and 2531CD)
 Kolombo (=Kobolondo) Peak (2531CD)
 Kubuta, S of (2631DC)

L

Lavumisa (2731BD)

Lavumisa, N of (2731BB)
Lavumisa, 1,5km N of (2731BD)
Lavumisa, 4,5km N of (2731BD)
Lavumisa, 6km N of (2731BD)
Lavumisa, 7km NW of (2731BD)
Lavumisa, 8km NW of (2731BD)
Lavumisa, 9,5km NW of (2731BD)
Lavumisa, 10km N of (2731BB)
Lavumisa, 10km NW of (2731BD)
Lavumisa, 13km N of (2731BB)
Lavumisa, 14km NW of (2731BB)
Lavumisa, 16km N of (2731BB)
Lavumisa, 17,5km N of (2731BB)
Lavumisa/Gollel (2731BD)
Lavumisa/Gollel, 45km N of (2631DD)
Leeukop (2631BA)
Libertas (2632AC)
Libetse Ranch (2631CB)
Little Usutu River bridge, 3km S of (2631AC)
Lomahasha (2531DD)
Lomahasha, S of (2631BB)
Lomahasha, 3km S of (2631BB)
Lomahasha, 3m S of (2631BB)
Lomahasha, 3m S of (2631BB)
Longadvumi River (2631AA)
Lubombo foothills near Big Bend (2632CC)
Lubombos Mountains above Big Bend (2632CA)
Lubuli (2731BB)
Lukhula (2631BD)
Lukhula, S of (2631BD)
Lukhula, 1m N of (2631BD)
Lukhula, 2m W of (2631BD)

Lukhula, 3m W of (2631BD)

Lukhula, 4m S of (2631BD)

Lukhula, 12m S of (2631DB)

Lusoti (=Simunye)(2631BB)

M

Macnabs Ranch (2631BC)

Macnabs Ranch, 1km W of (2631BC)

Mafutseni (2631BC)

Mafutseni, 1m E of (2631BC)

Mafutseni, 3km NE of (2631BC)

Mafutseni, 3m E of (2631BC)

Mafutseni, 7km E of (2631BC)

Mafutseni, 8km N of (2631BC)

Mafutseni, 10km NE of (2631BC)

Mafutseni, 11km E of (2631BC)

Mafutseni, 12km N of (2631BC)

Mafutseni, 15km NE of (2631BC)

Mahamba (2731AA)

Mahamba Gorge. mouth of (2731AA)

Mahlangatsha Hills (2631CC)

Mahulungwane Gorge, Malolotja Nature Reserve (2631AA)

Majolomba River, Malolotja Nature Reserve (2631AA)

Makonjwa Range (2531CD)

Makhungutsha (2631CB)

Malandela Beacon (2631AB)

Malinda Hills (2631BC)

Malkerns (2631CA)

Malkerns/Bhunya road (2631CA)

Malkerns/Manzini road (2631CB)

Malkerns Road, 1,5km down (2631CA)

Malolotja Falls, Malolotja Nature Reserve (2631AA)

Malolotja Nature Reserve (2631AA)
Malolotja Nature Reserve (north)(2531CC)
Malolotja Nature Reserve, 5km S of entrance (2631AA)
Malolotja Nature Reserve, 6km S of entrance (2631AA)
Malolotja Nature Reserve, 7km N of entrance (2631AA)
Malolotja Nature Reserve, near entrance (2631AA)
Malolotja Vlei, Malolotja Nature Reserve (2631AA)
Maloma (2731BA)
Maloma, 3km E of (2631DC)
Maloma, 5km E of (2631DC)
Maloma, 6km SW of (2731BA)
Maloma, 8km SW of (2731BA)
Maloma, 9km E of (2631DC)
Maloma, 10km SW of (2731BA)
Maloma, 14km SW of (2731BA)
Maloma, 16km SW of (2731BA)
Mambane (2632CC)
Mambane, 2km SE of (2632CC)
Mambane, 3km E of (2632CC)
Mambane, 3,5km N of (2632CA)
Mambane, 7km SW of (2632CC)
Mambane, 15km N of (2632CA)
Mananga, near (2531DD)
Mananga borderpost (2531DD)
Mankayane (2631CA)
Mankayane, 7km S of (2631CA)
Mankayane, 8km NE of (2631CA)
Mantenga (2631AC)
Mantenga Falls (2631AC)
Mantenga Ranch (2631AC)
Mantjolo (2631AC)
Manzini (2631AD)

Manzini, N of (2631AD)
Manzini, 5km NE of (2631AD)
Manzini, 8m E of (2631DA)
Manzini, 14m ESE of (2631DA)
Manzini, 15m ESE of (2631DA)
Manzini, 20km S of (2631CB)
Manzini, 21km E of (2631DA)
Manzini, 28km SE of (2631DA)
Manzini, 28m SE of (2631DA)
Manzini Nazarene Mission (2631CB)
Manzini/Malkerns road, 2km down (2631CA)
Maphandakazi River, Malolotja Nature Reserve (2631AA)
Maphiveni (2631BB)
Mapokane (2631DA)
Matimatima River bridge (2731AA)
Matsamo, 2,5km SW of (2531CD)
Matsamo, 3km SW of (2531CD)
Matsamo, 13km SW of (2531CD)
Matsamo, 15km SW of (2531CD)
Matsamo and Balegane, between (2531CD)
Matsapha (2631CB)
Mbabane (2631AC)
Mbabane, NE of (2631AC)
Mbabane, 2km SE of (2631AC)
Mbabane, 4km S of (2631AC)
Mbabane, 4m SE of (2631AC)
Mbabane, 4m SW of (2631AC)
Mbabane, 5km W of (2631AC)
Mbabane, 6km SW of (2631AC)
Mbabane, 7km SW of (2631AC)
Mbabane, 13km NE of (2631AA)
Mbabane, 15m N of (2631AA)

Mbabane and Piggs Peak, between (2631AA)
Mbabane/Piggs Peak road (2631AA)
Mbabane Clinic (2631AC)
Mbulukudvu Gorge, Malolotja Nature Reserve (2631AA)
Mbuluzane River (2631BB)
Mbuluzi Game Reserve (west)(2631BB)
Mbuluzi Game Reserve (east)(2632AA)
Mbuyane Falls (2631AA)
Mbuyane Farm (2631AA)
Mbuyane River (2631AA)
Mcandatshe Farm (2631BB)
Mdzimba Hills (2631AC)
Mdzimba Hills (east) (2631AD)
Mdzimba Plateau (2631AC)
Mdzimba Plateau, 10km from edge of (2631AD)
Mhlambanyati (2631AC)
Mhlambanyati, 17km NW of (2630BD)
Mhlosheni (2731AB)
Mhlosheni, 5m E of (2731AB)
Mhlosinga Game Reserve (2631DD)
Mhlume (2631BB)
Mhlumeni (2632AC)
Mhlumeni borderpost, near (2632AC)
Mission Falls (2631AC)
Mkondo River (2631CB)
Mkondo River bridge (2631CB)
Mkondo River bridge, 4km S of (2631CB)
Mkondo Valley (2631CD)
Mlaula Estate (2632AA)
Mlawula Nature Reserve (west) (2631BB)
Mlawula Nature Reserve (east) (2632AA)
Mlawula River (2632AA)

Mlawula River crossing, Mlawula Nature Reserve (2632AA)

Mlawula Station (2632AA)

Mliba (2631BA)

Mliba Ranch (2631BA)

Mlilwane Wildlife Sanctuary (2631AC)

Mlinda (=Malinda) hills (2631BC)

Mlondozi, Malolotja Nature Reserve (2631AA)

Mloya River, 3km E of (2631DC)

Mlumati River (2531CD)

Mlumati River valley (2531CD)

Mnjoli Dam (2631BA)

Mnyame Gorge (2632AC)

Mooihoek (2631CD)

Mortimer's Dam, Malolotja Nature Reserve (2631AA)

Motshane (2631AA)

Motshane, 1m SE of (2631AC)

Motshane, 6km SW of (2631AC)

Motshane River (2631AA)

Mozaan (2631CC)

Mpaka (2631BD)

Mpaka, 3m W of (2631BC)

Mpaka, 6m NE of (2631BD)

Mpaka, 18m NE of (2631BB)

Mpala Ranch (2631BA)

Mpisi (2631BC)

Mpofu River (2531DC)

Mpofu River, 1,5km S of (2531DC)

Mpofu River, near (2531DC)

Muti Muti Nature Reserve (2631BD)

Muti Muti Nature Reserve (south)(2631DB)

Mzimphofu River (2631DA)

N

- Ndzindza Nature Reserve (2632AA)
- New Haven clinic (2731BA)
- Ngonini (2531CD)
- Ngwavuma River (2731BB)
- Ngwenya borderpost, 500m E of (2630BB)
- Ngwenya Forest, Malolotja Nature Reserve (2631AA)
- Ngwenya Mountain, Malolotja Nature Reserve (2631AA)
- Ngwenya village (2631AA)
- Nhlangano (2731AA)
- Nhlangano, 1km N of (2731AA)
- Nhlangano, 15km W of (2731AA)
- Nhlangano and Hlatikulu, between (2631CC)
- Nkaba, 3km N of (2631AA)
- Nkaba school (2631AA)
- Nkomati Bridge (2631AA)
- Nkomati River (lowveld) (2631DC)
- Nkomati River bridge (new), near (2631AA)
- Nkomati River bridge (new), 1km S of (2631AA)
- Nkomati River bridge (old)(2631AA)
- Nkomati River bridge (old), near (2631AA)
- Nkomati River bridge, Balegane district (2631BA)
- Nkomati Valley (2631AA and 2631AB)
- Nkumbane, Malolotja Nature Reserve (2631AA)
- Nkumbane district (2631AA)
- Nomahasha (=Lomahasha)(2531DD)
- Nsoko (2731BB)
- Nsoko, 2m S of (2731BB)
- Nsoko, 5km W of (2731BB)
- Nsoko, 6km W of (2731BB)
- Nsoko, 8km S of (2731BB)
- Nsoko, 10km S of (2731BB)

Nsoko, 10,5km S of (2731BB)
Nsoko, 12,5km N of (2631DD)
Ntondozi (2631CA)
Ntungulubi River (2631CC)
Nyala Ranch (2632AC)
Nyetane (2631DB)
Nyetane Dam (2631DB)
Nyetane River (2631DB)
Nyongane, SW of Balegane (2631BA)

O

Oribi Ranch (2632AC)

P

Phophonyane Nature Reserve (2531CD)
Phuzamoya, E of (2631DB)
Piggs Peak (2531CC)
Piggs Peak, 6km NE of (2531CD)
Piggs Peak, 6km S of (2631AA)
Piggs Peak, 8km NE of (2531CD)
Piggs Peak, 10km NE of (2531CD)
Piggs Peak, 12km NE of (2531CD)
Piggs Peak, 15km SE of (2631AB)
Piggs Peak, 15km NE of (2531CD)
Piggs Peak, 16km NE of (2531CD)
Piggs Peak, 17km NE of (2531CD)
Piggs Peak, 18km SE of (2631AB)
Piggs Peak, 22km SE of (2631AB)
Piggs Peak, 25km SE of (2631AB)
Piggs Peak, 29km SE of (2631AB)
Piggs Peak, 30km SE of (2631AB)
Piggs Peak and Matsamo, between (2531CD)

Piggs Peak/Matsamo road (2531CD)
 Piggs Peak/Balegane/Matsamo road junction (2631BA)
 Piggs Peak/Balegane/Matsamo road junction, 9km N of (2531DC)
 Piggs Peak Plantation (2531CC)
 Pine Valley (2631AC)
 Polinjane (2631AC)

R

Ravelston Farm (2631DB)

S

Sandlane, 6km NE of (2630DB)
 Sandlane, 7,5km NE of (2630DB)
 Sandlane, 10km NE of (2630DB)
 Sand River Dam (2531DC and 2631BA)
 Sand River Dam, near (2531DC)
 Shalt's Dam (2631BB)
 Sidvokodvo, 5km S of (2631CB)
 Sidvokodvo, 7km NW of (2631CB)
 Sidvokodvo, 10km S of (2631CB)
 Sidvokodvo, 10km NW of (2631CB)
 Sidvokodvo, 14km NW of (2631CB)
 Sidvokodvo and Manzini, between (2631CB)
 Sidvokodvo turnoff (2631CB)
 Sifunga Dam (2631DB)
 Sifunga/Siteki/Tikhuba road junction (2631DB)
 Simunye (2631BB)
 Simunye, 8km E of (2631BB)
 Simunye, 17,5km S of (2631BD)
 Singceni (2631DC)
 Siphiso River, Mlawula Nature Reserve (2631BB and 2631BD)
 Siphofaneni (2631DA)

Siphofaneni, N of (2631DA)
Siphofaneni, 1km S of (2631DA)
Siphofaneni, 3km E of (2631DA)
Siphofaneni, 3,5km E of (2631DA)
Siphofaneni, 5km E of (2631DA)
Siphofaneni, 5km NW of (2631DA)
Siphofaneni, 11km SE of (2631DB)
Siphofaneni, 15km NW of (2631DA)
Siphofaneni, 19km NW of (2631DA)
Siphofaneni, 20km SW of (2631DC)
Siphofaneni, 21km SW of (2631DC)
Siphofaneni, 25km SW of (2631DC)
Siteki (2631BD)
Siteki, 2m N of (2631BD)
Siteki, 3km S of (2631BD)
Siteki, 3,5km S of (2631BD)
Siteki, 5km N of (2631BD)
Siteki, 5km S of (2631BD)
Siteki, 6km S of (2631BD)
Siteki, 8km NE of (2631BD)
Siteki, 10km NE of (2631BD)
Siteki, 10km S of (2632CA)
Siteki, 13km E of (2632AC)
Siteki, 16km NE of (2631BD)
Siteki, 20km NE of (2632AC)
Siteki, 20km S of (2631DB)
Siteki, 20km SE of (2632CA)
Siteki and Mpaka, between (2631BD)
Siteki Beacon (2631BD)
Sitsatsaweni (2632CA)
Sitsatsaweni turnoff (2631BD)
Swazi Spa, near (2631AC)

T

Tambankulu Estate (2631BB)
Tambutu Estate (2631DB)
Tembalihle (2631AA)
Tikhuba (2632CA)
Timbutini Hills (2631DA)
Tobotsa Dam (2631DB)
Tshaneni (2531DD)
Tshaneni, SE of (2631BB)
Tshaneni, 1,5km SE of (2531DD)
Tshaneni, SW of (2631BA)
Tshaneni, 3km S of (2631BB)
Tshaneni, 13m S of (2631BA)
Tshaneni and Bordergate, between (2531DC and 2531DD)
Tshaneni/Mliba road (2631BA)
Tunzini Estate (2531DC)

U

Ubombo Ranches (2631DD)
Ubombo Sugar Estate (2631DD)
Umbuluzi Dam, Mbuluzi Game Reserve (west) (2631BB)
Umbuluzi Estate (2631BB)
Umbuluzi Falls (=Black Umbuluzi Falls)(2631AC)
Umbuluzi Gorge (2632AA)
Umbuluzi Pan, Mbuluzi Game Reserve (east) (2632AA)
Umbuluzi River (lowveld) (2631BB)
Usutu Forest Plantation (2630BD)
Usutu Gorge (2632CC)
Usutu River (2631DA)

V

Van Eck Dam (2631DD)

Velesizweni (2631CA)

Vuvulane (2631BB)

W

Waterford School (2631AC)

Wyldsedale (2531CD)

Y

Yingayingeni River, Malolotja Nature Reserve (2631AA)

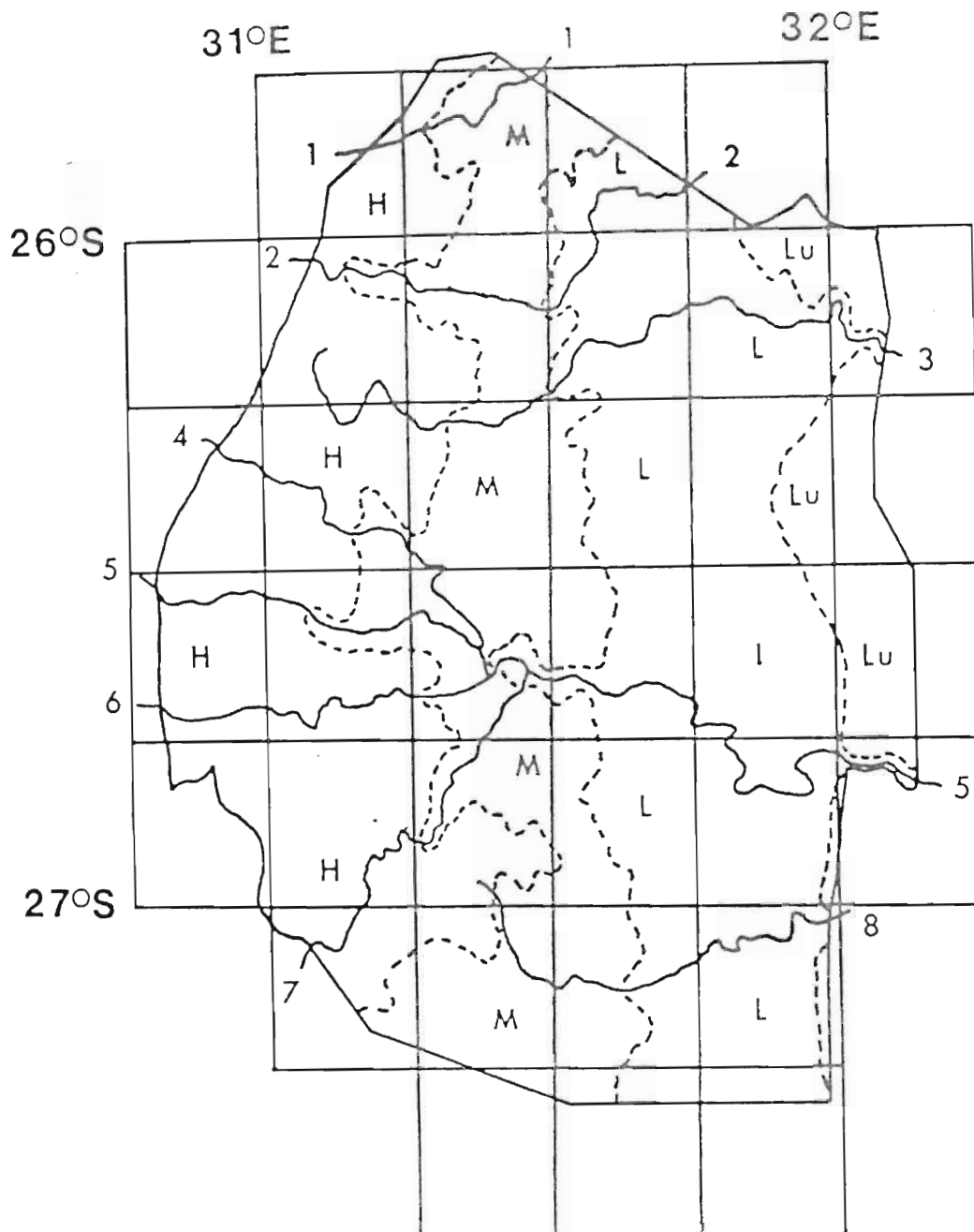


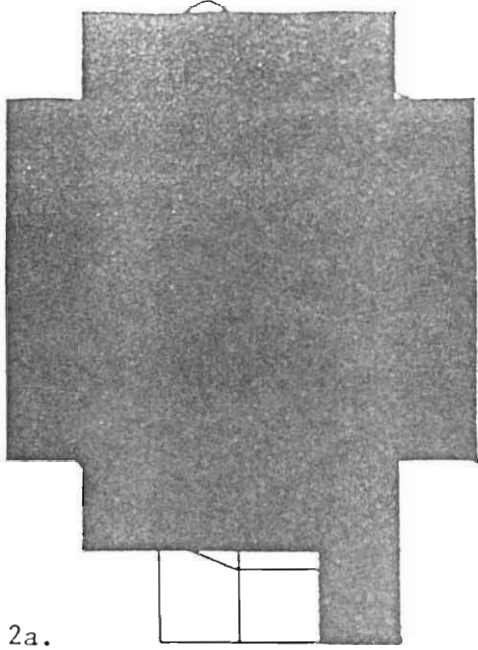
FIGURE 1. The major topographical features of Swaziland overlain by the quarter degree latitude/longitude grid. H= Highveld region, M= Middleveld region, L= Lowveld region, Lu= Lubombo region. 1= Mlumati River, 2= Nkomati River, 3= Black Umbuluzi River, 4= Little Usutu River, 5= Great Usutu River, 6= Ngwempisi River, 7= Mkondo River, 8= Ngwavuma River.

31°E

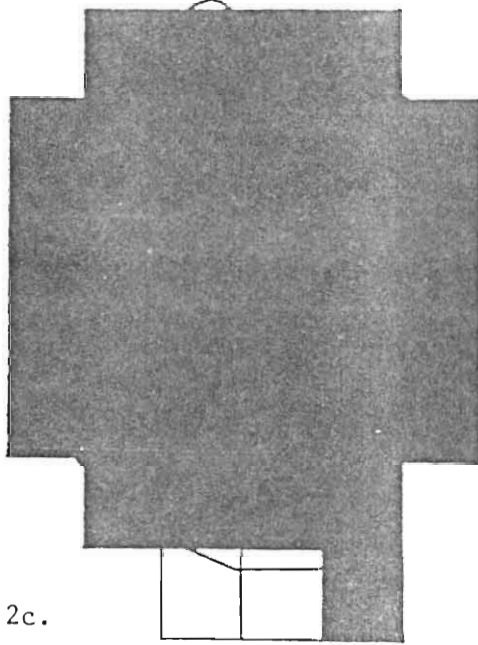
32°E

26°S

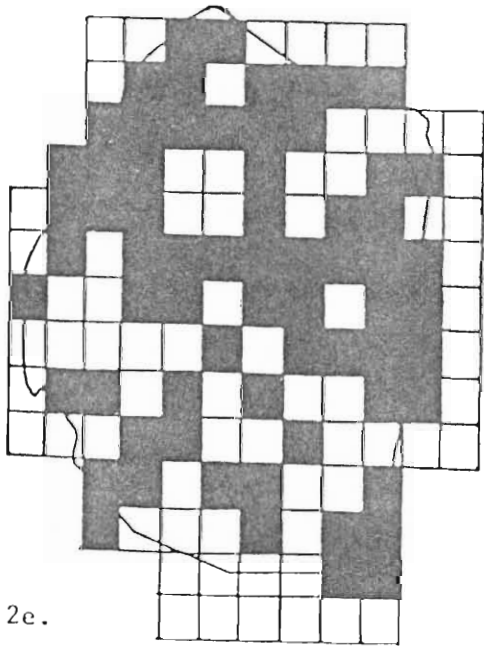
27°S



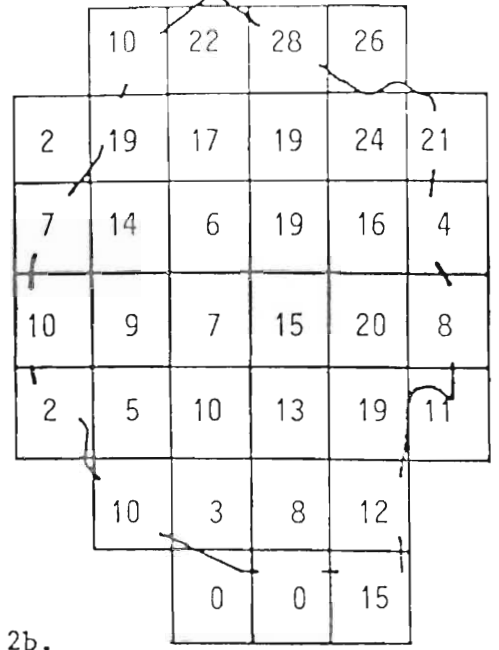
2a.



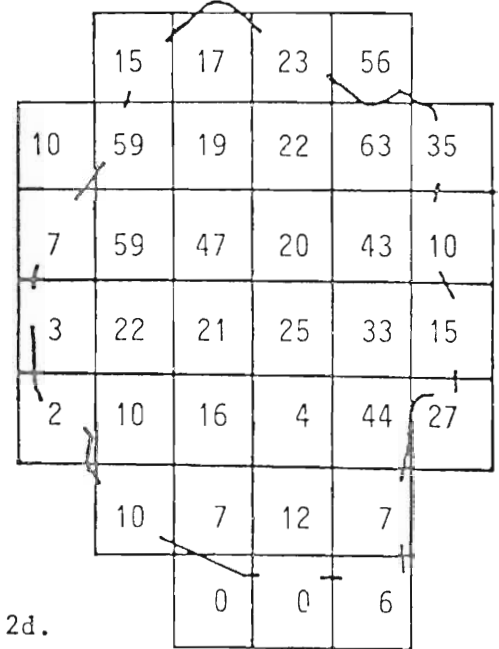
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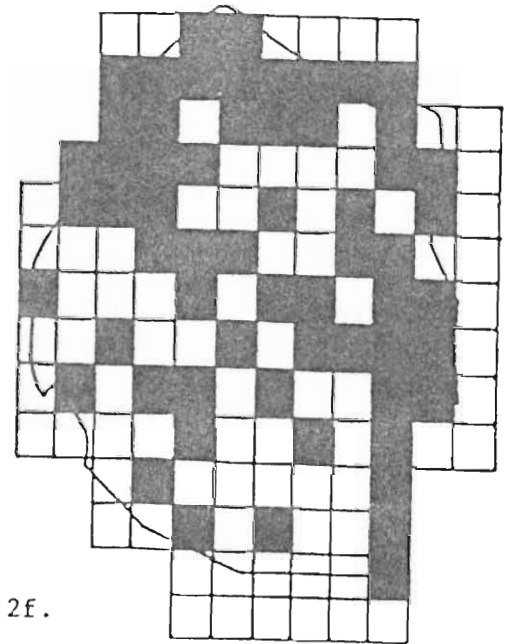
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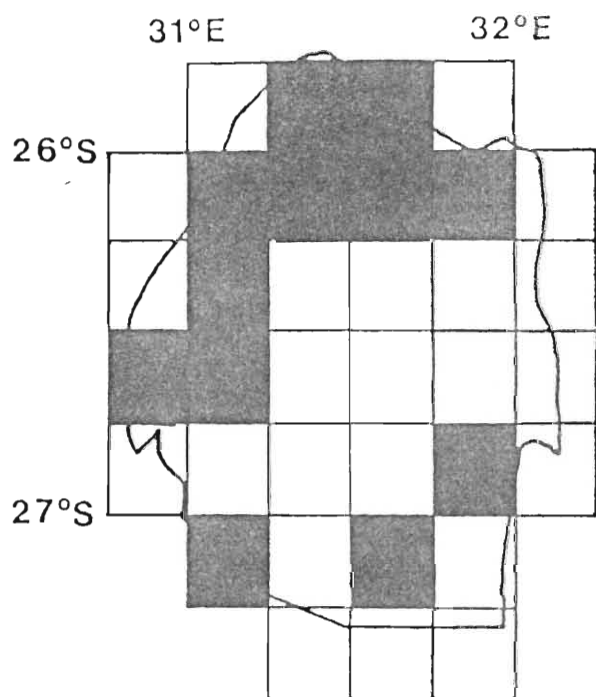
2b.



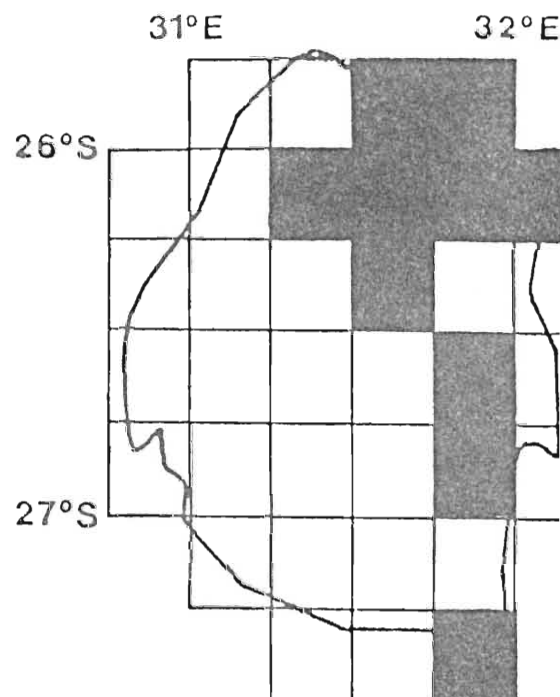
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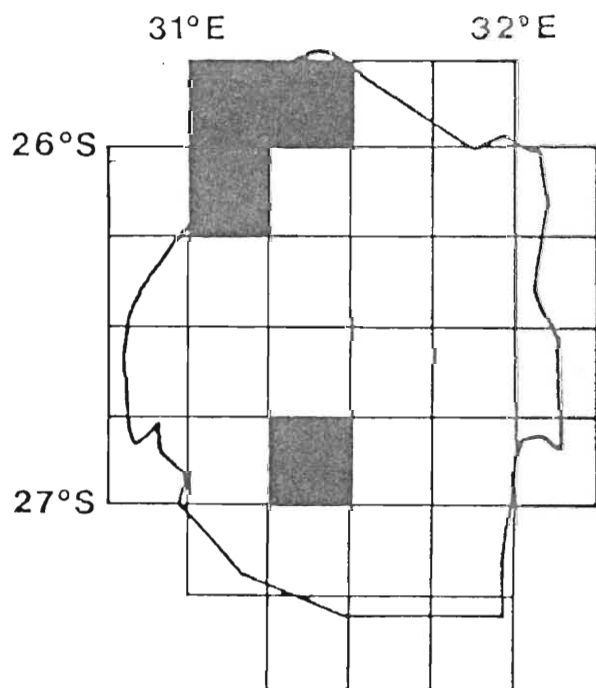
2f.



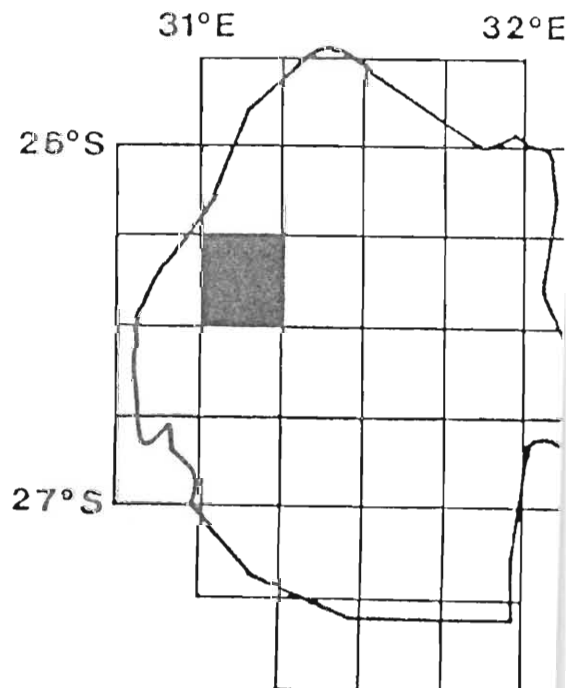
(3a) *Xenopus laevis laevis*



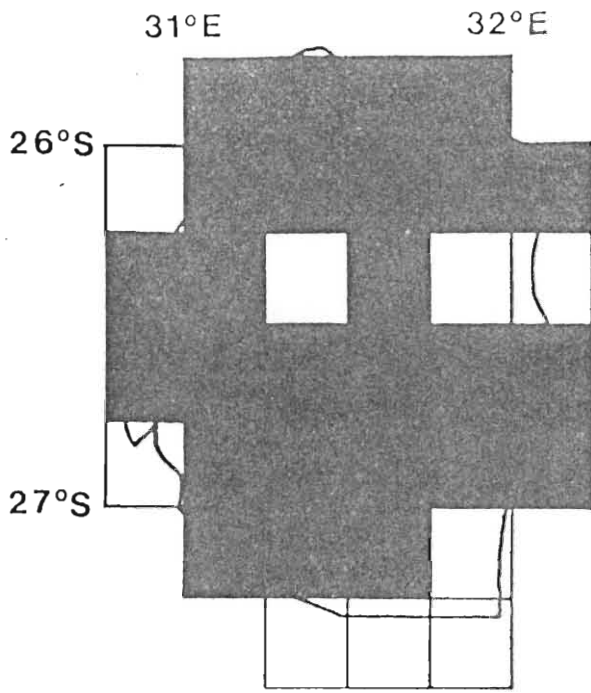
(3b) *Xenopus muelleri*



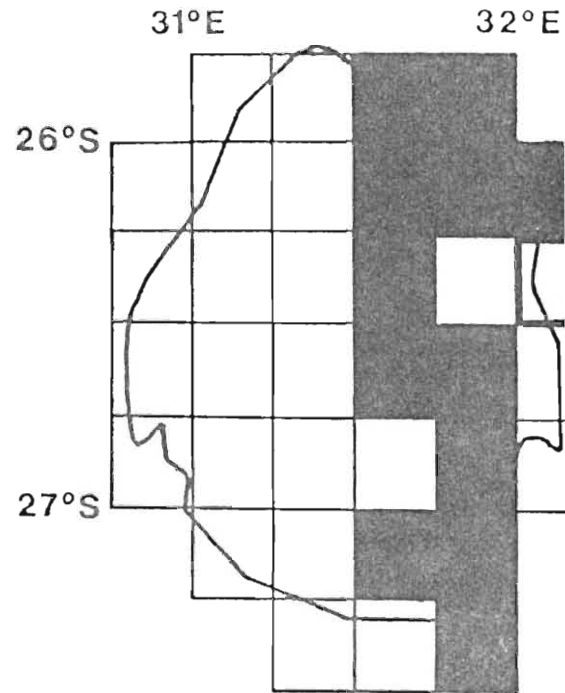
(3c) *Heleophryne natalensis*



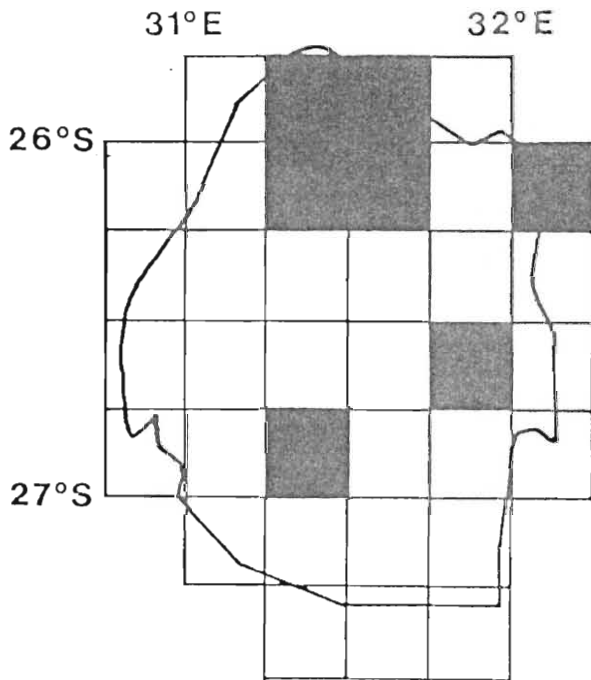
(3d) *Bufo gariiepensis gariiepensis*



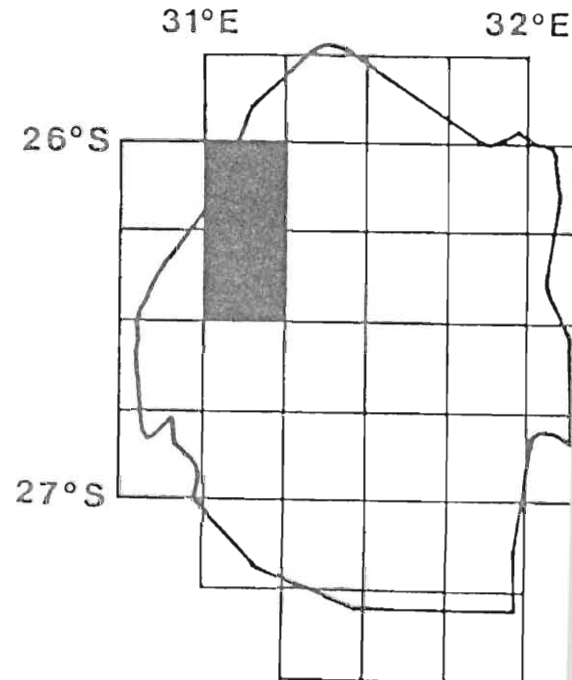
(4a) Bufo gutturalis



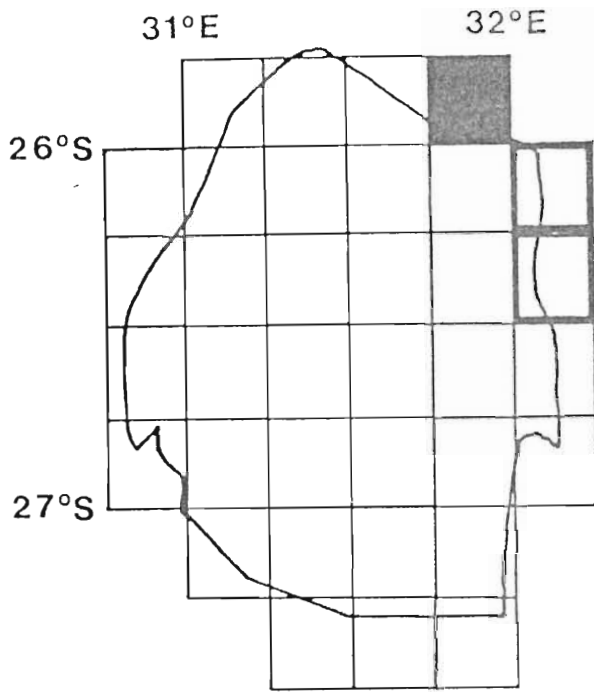
(4b) Bufo garmani



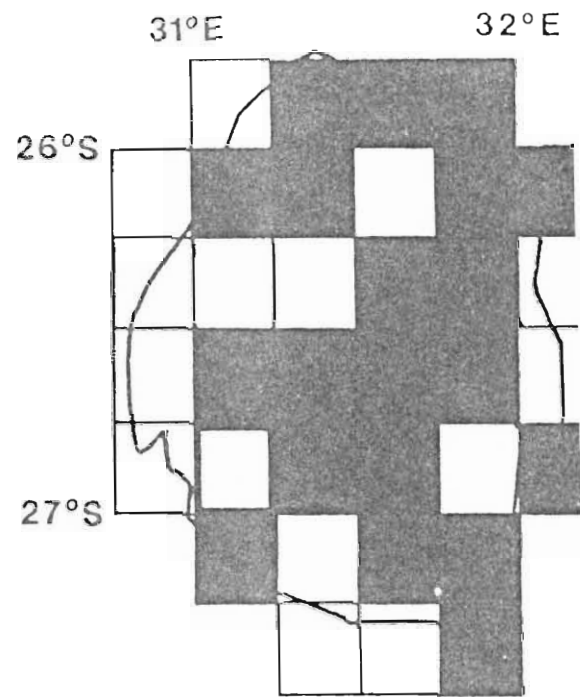
(4c) Bufo maculatus



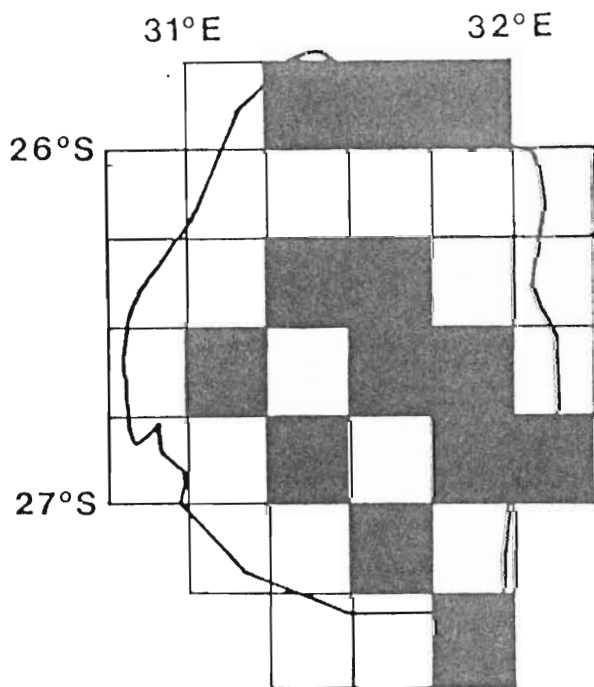
(4d) Bufo rangeri



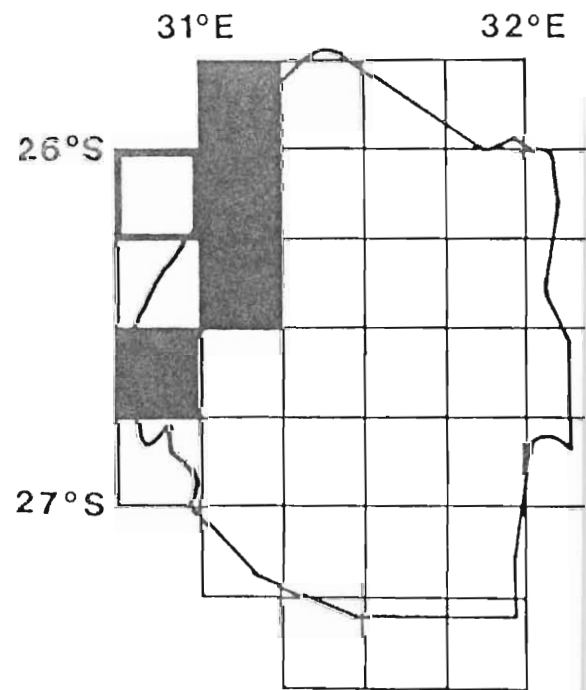
(5a) Bufo fenoulheti fenoulheti



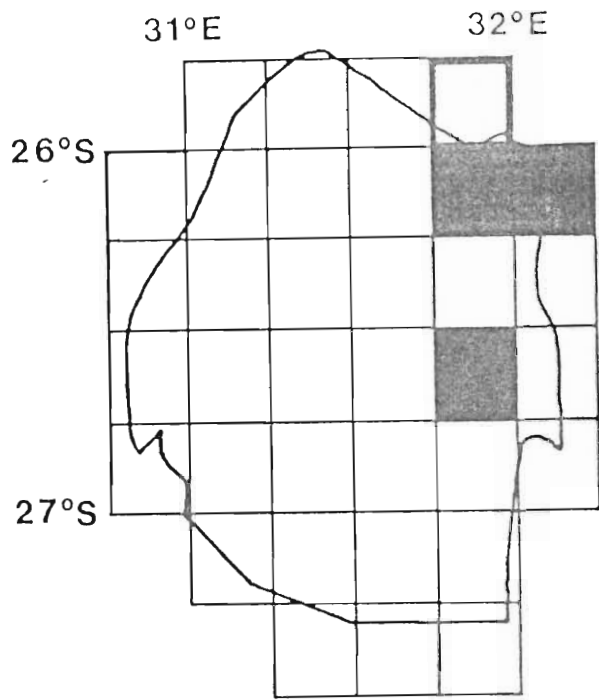
(5b) Schismaderma carens



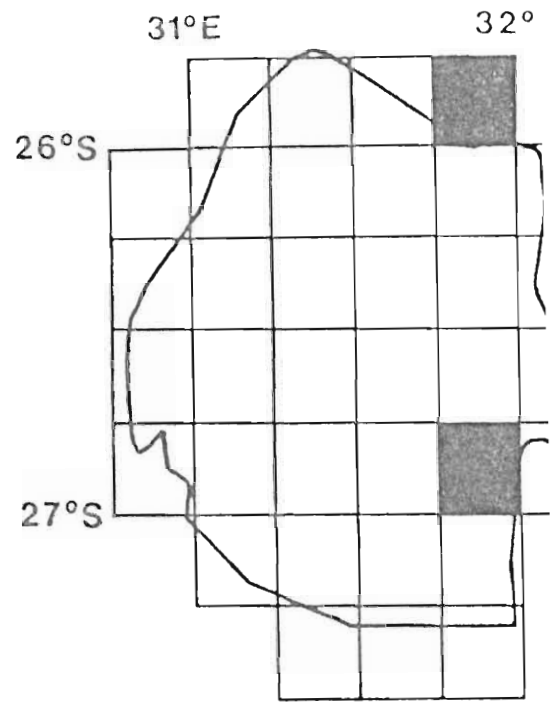
(5c) Breviceps adpersus adpersus



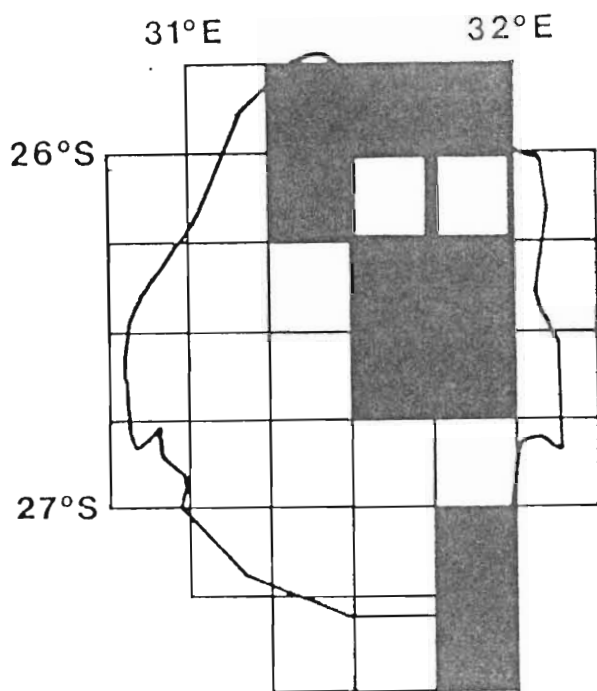
(5d) Breviceps adpersus penther



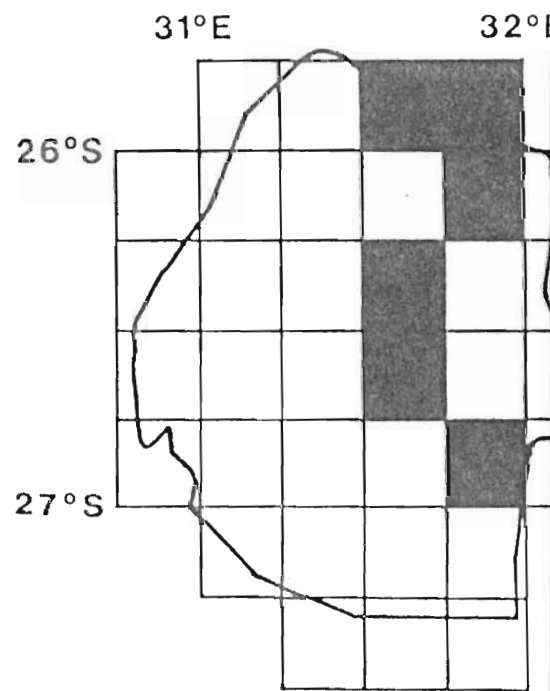
(6a) Breviceps mossambicus



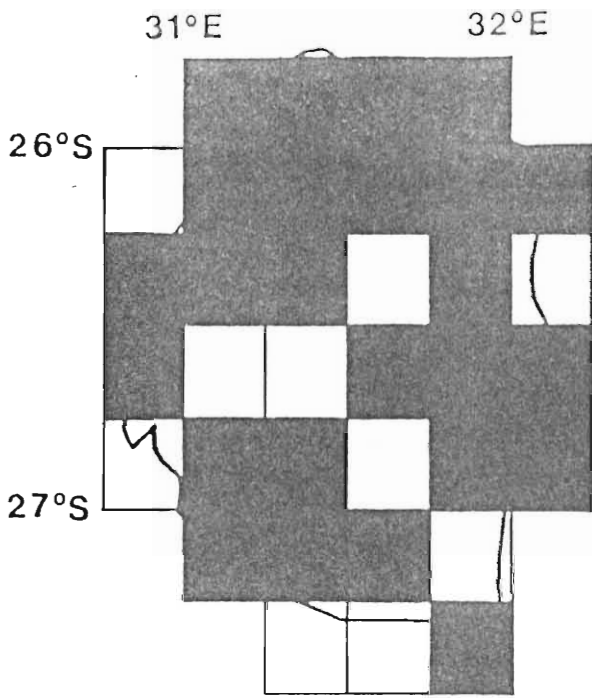
(6b) Breviceps mossambicus X adpersus



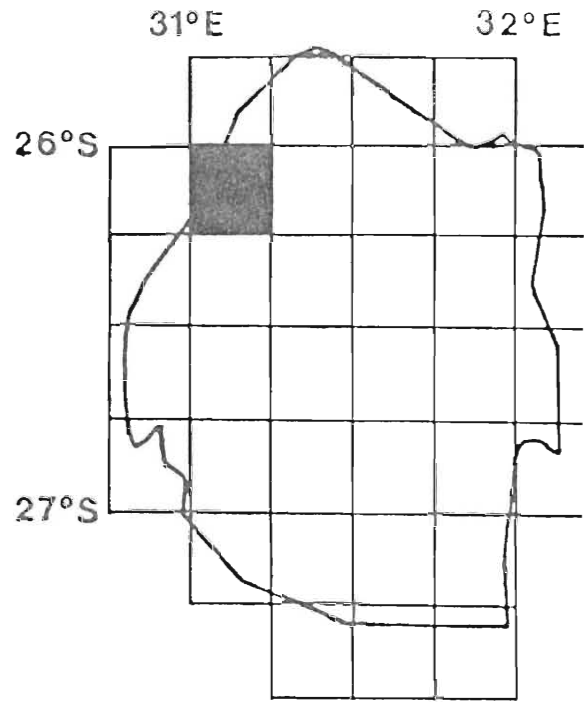
(6c) Phrynomerus bifasciatus bifasciatus



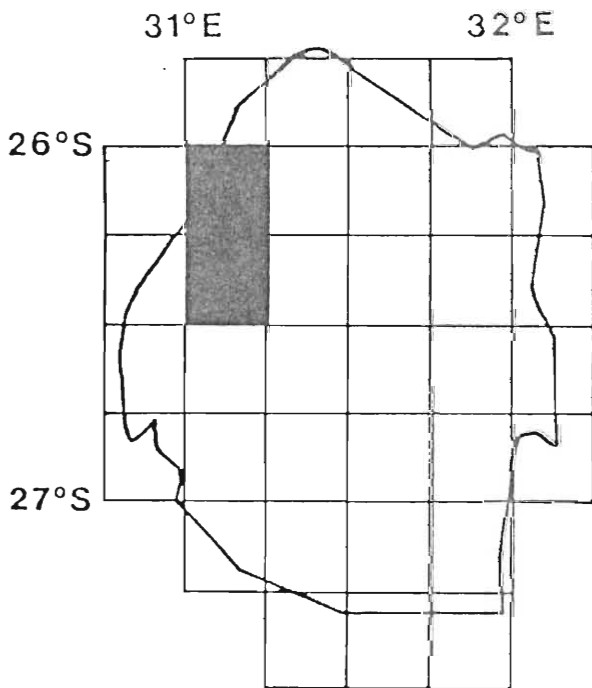
(6d) Hemisus marmoratus marmoratus



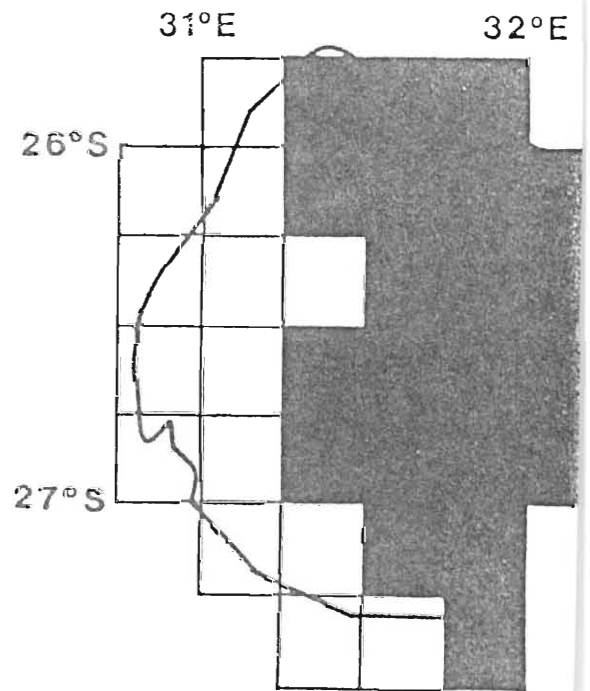
(7a) *Rana angolensis*



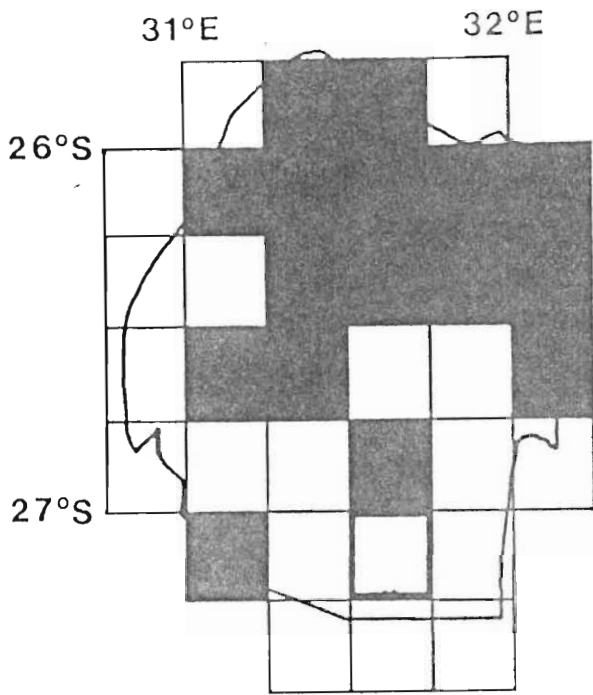
(7b) *Strongylopus grayii grayii*



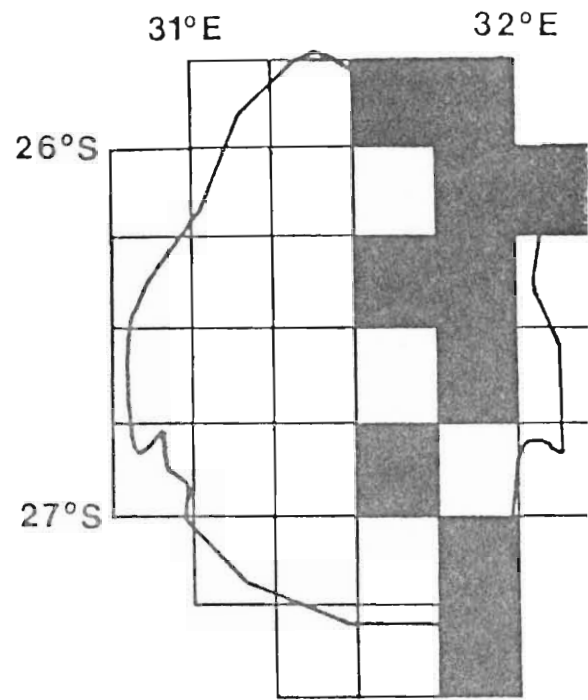
(7c) *Strongylopus fasciatus fasciatus*



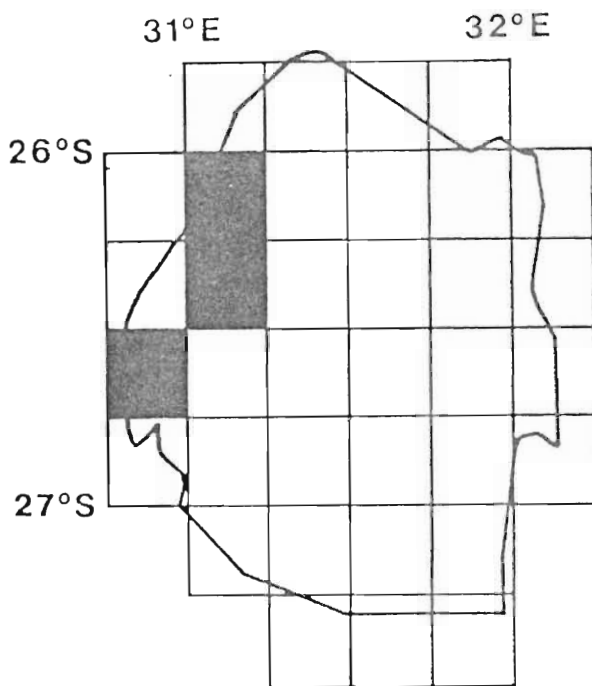
(7d) *Ptychadena anchietae*



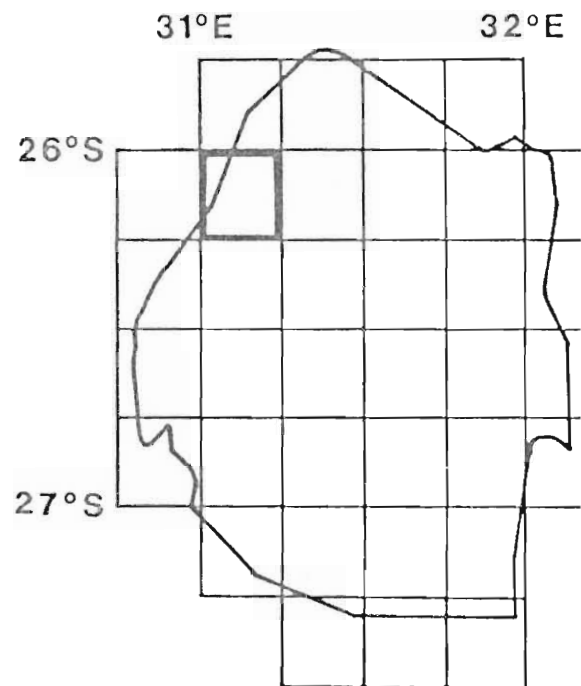
(8a) *Ptychadena oxyrynchus*



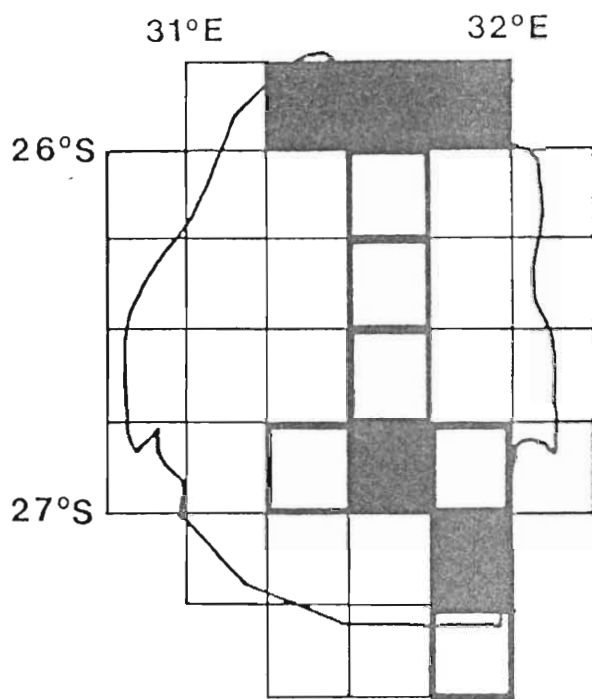
(8b) *Ptychadena mossambica*



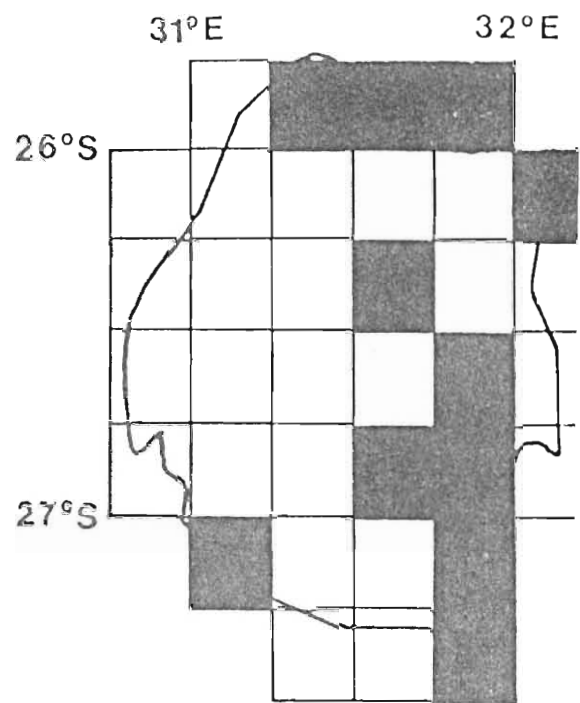
(8c) *Ptychadena porosissima*



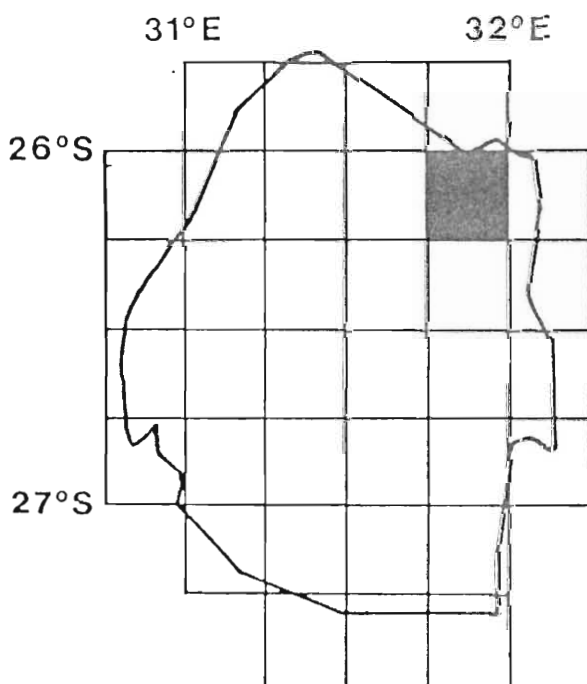
(8d) *Pyxicephalus adspersus adspersus*



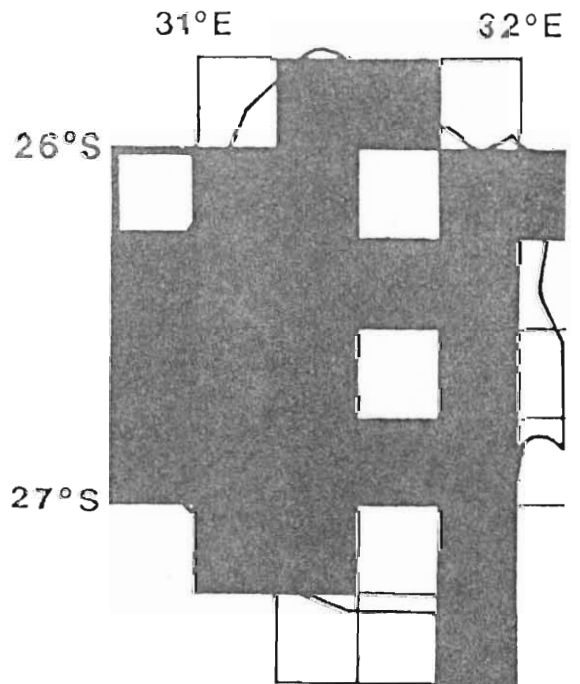
(9a) *Pyxicephalus adpersus edulis*



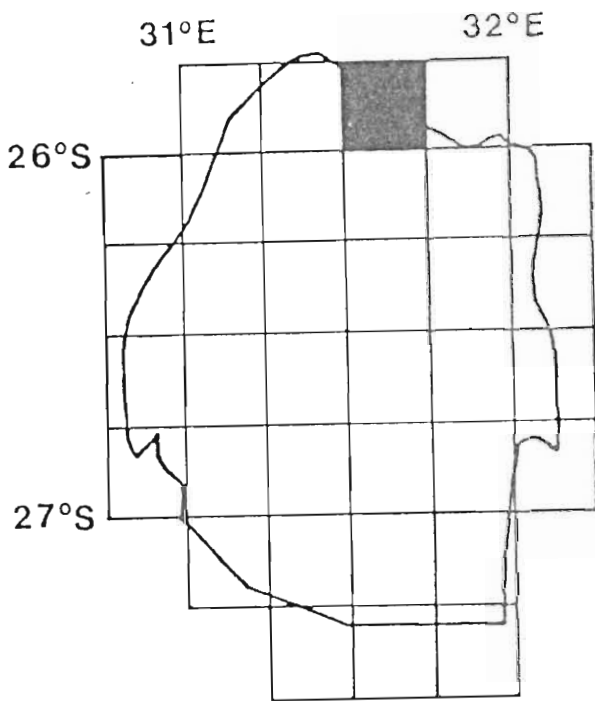
(9b) *Tomopterna cryptotis*



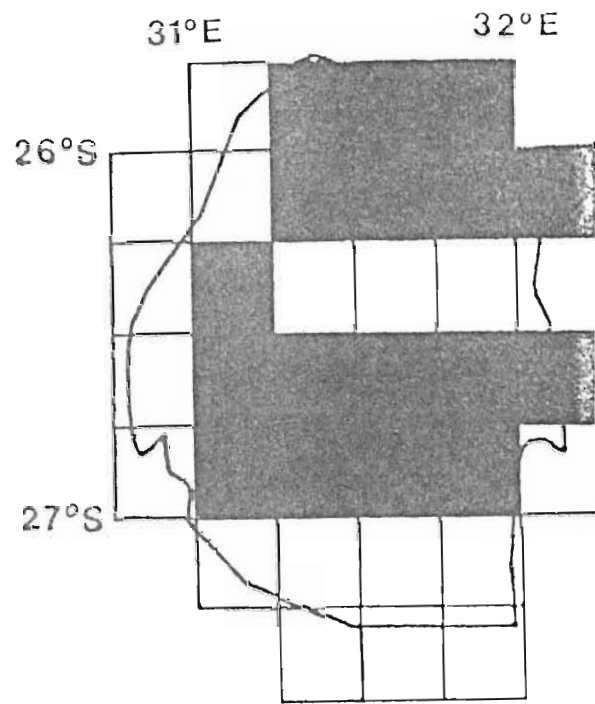
(9c) *Tomopterna krugerensis*



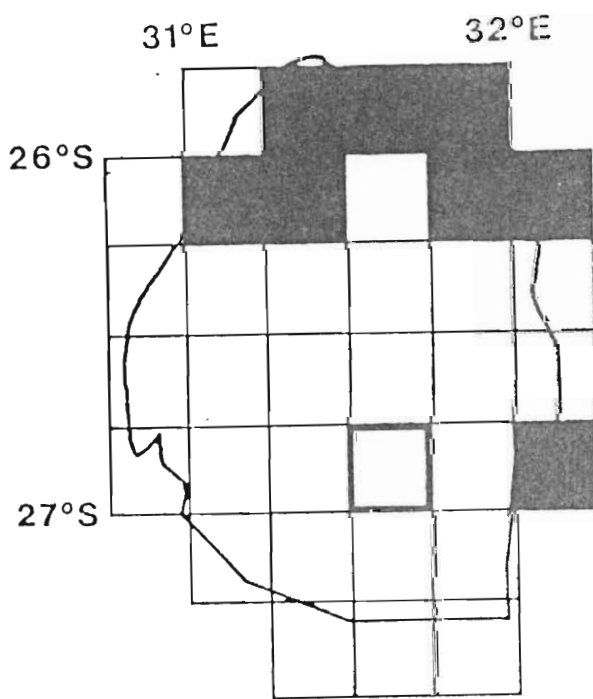
(9d) *Tomopterna natalensis*



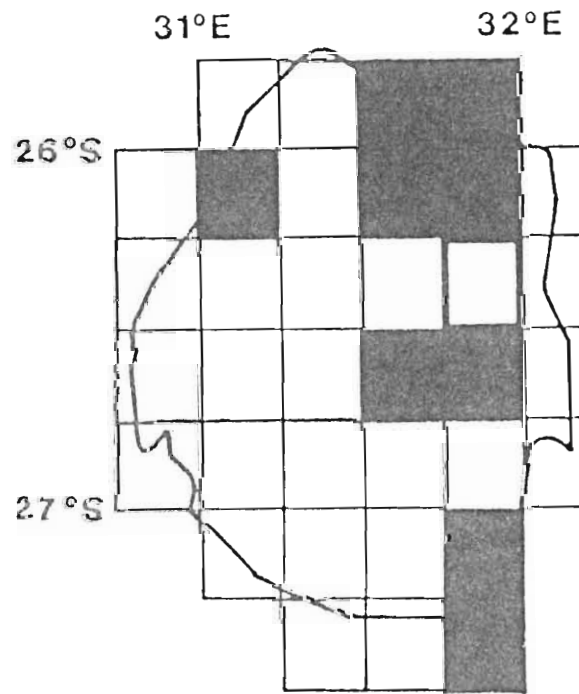
(10a) Hildebrandtia ornata ornata



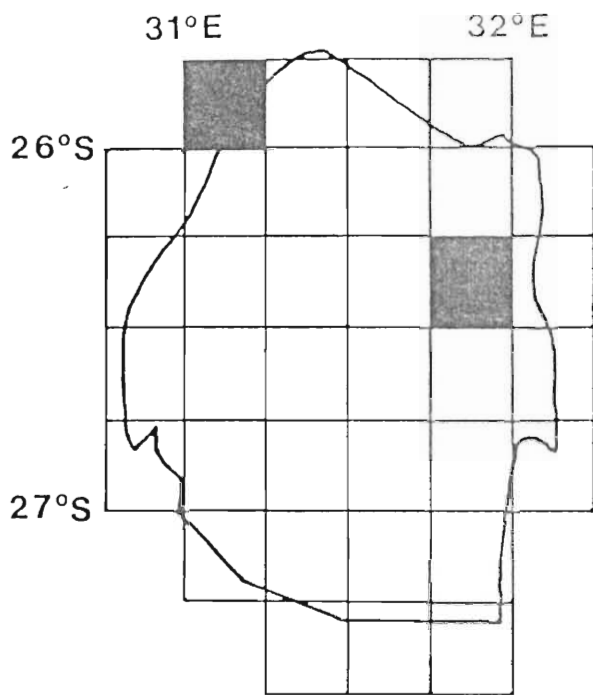
(10b) Phrynobatrachus natalensis



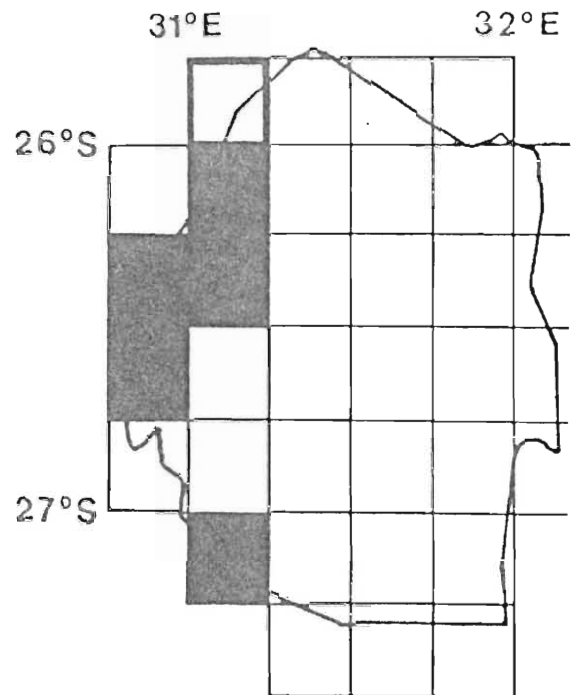
(10c) Phrynobatrachus nababiensis



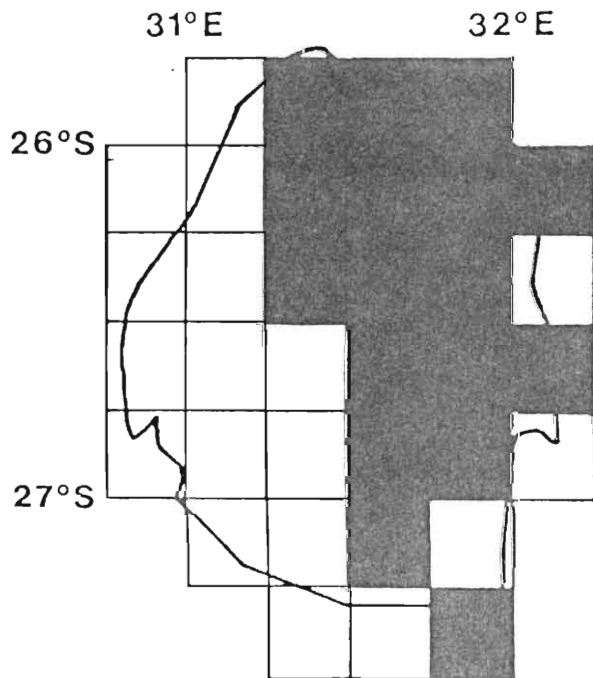
(10d) Cacosternum boettgeri



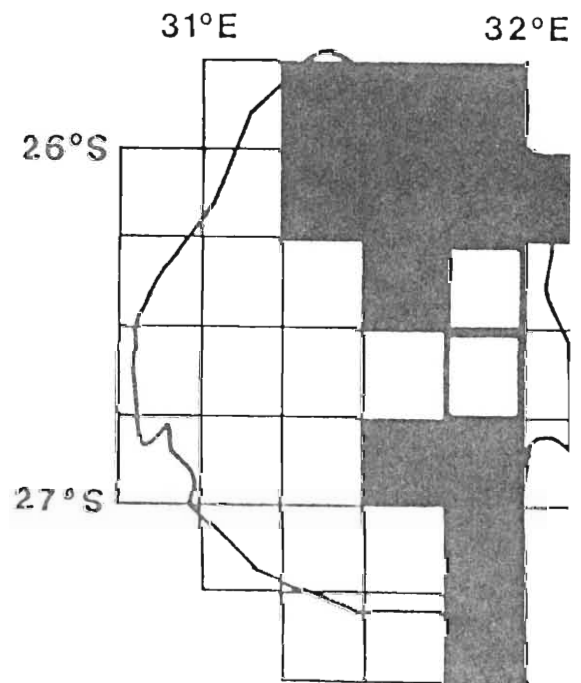
(11a) Cacosternum nanum nanum



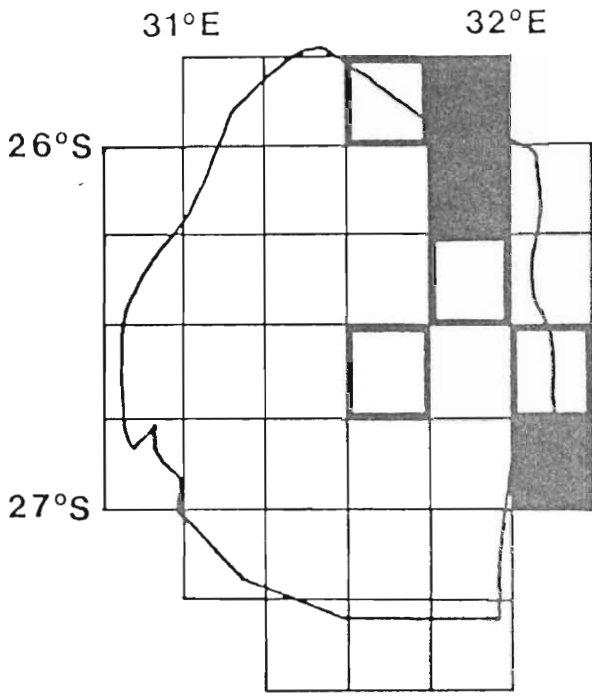
(11b) Cacosternum nanum parvum



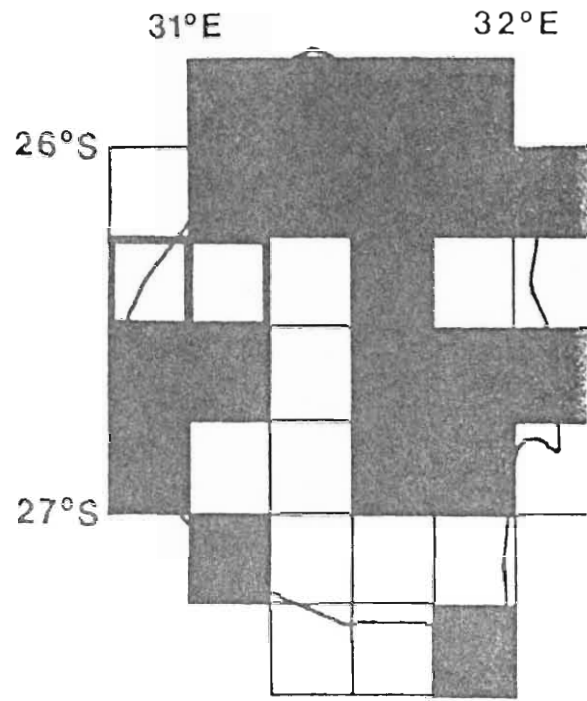
(11c) Chiromantis xerampelina



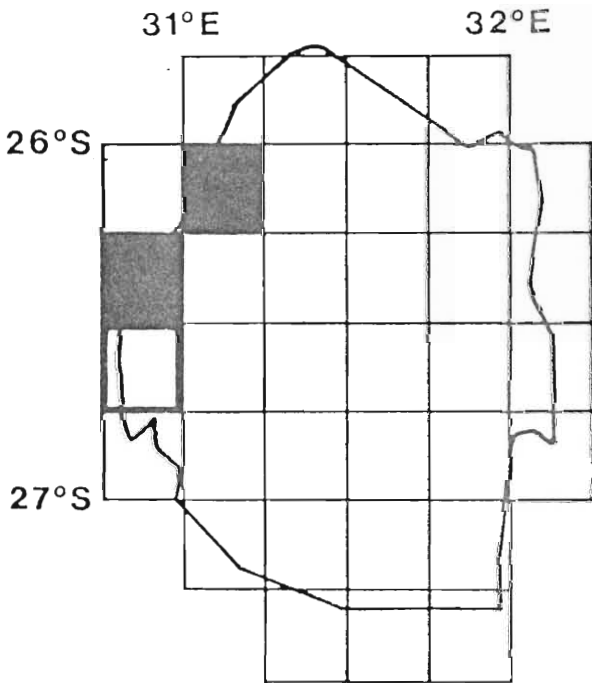
(11d) Leptopelis mossambicus



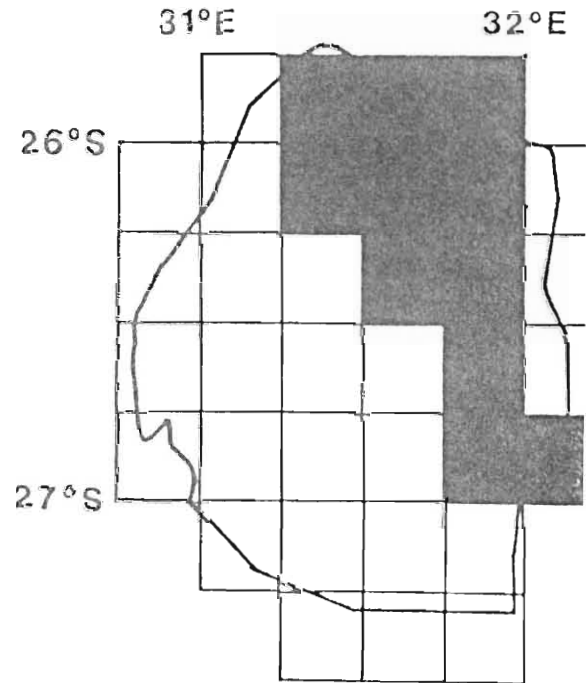
(12a) Kassina maculata



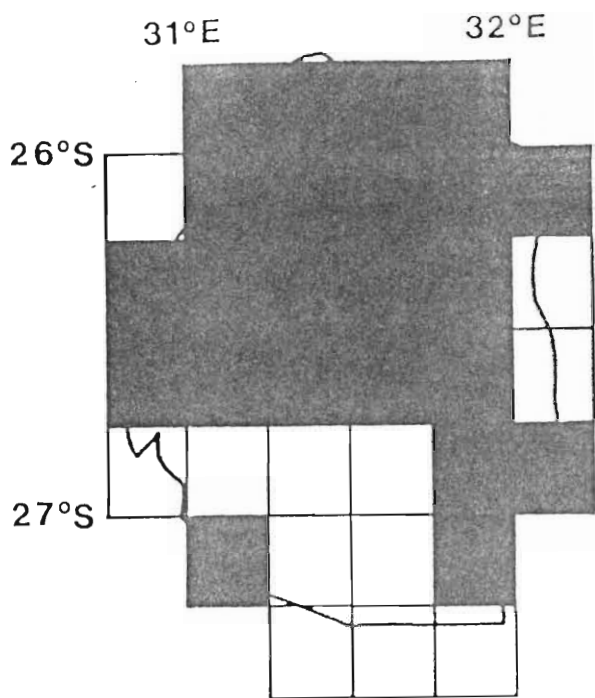
(12b) Kassina senegalensis



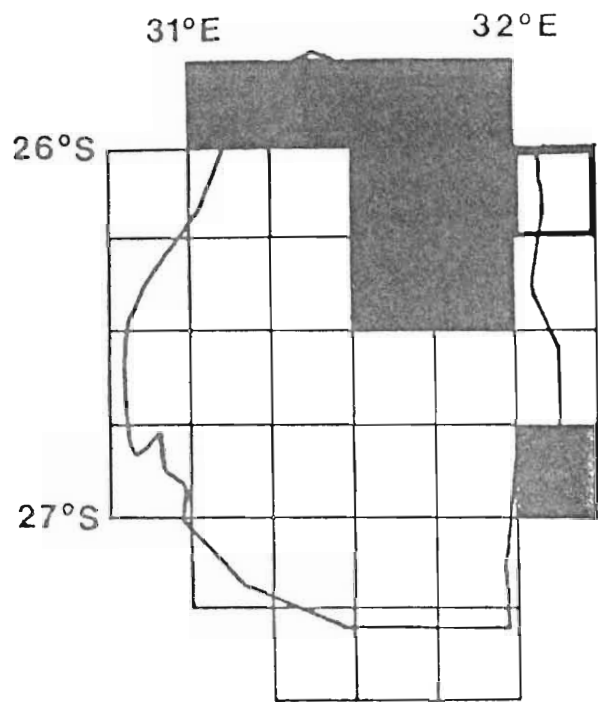
(12c) Semnodactylus wealii



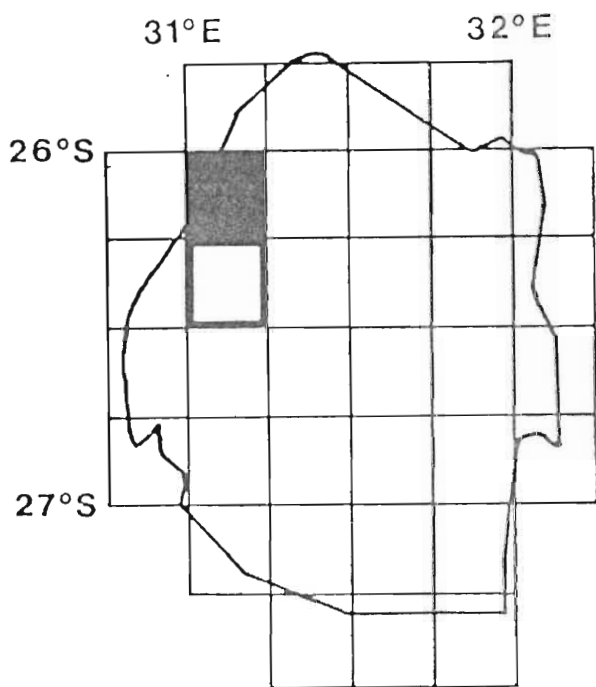
(12d) Afrivalus aureus



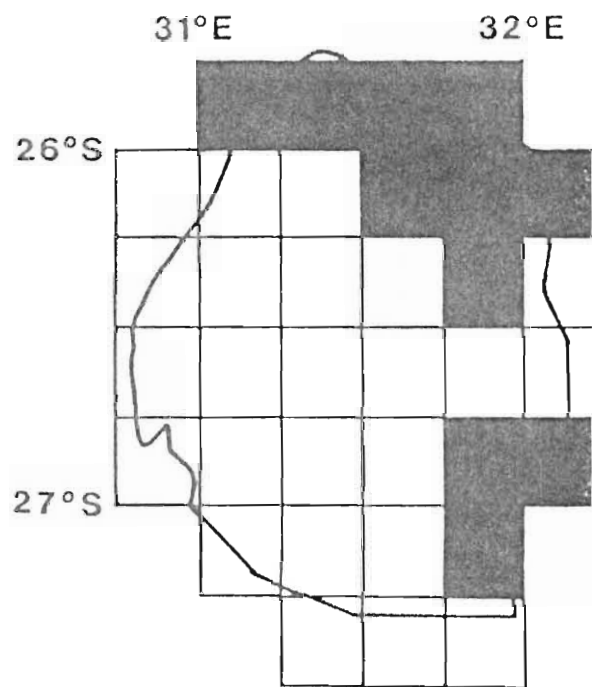
(13a) Hyperolius marmoratus taeniatus



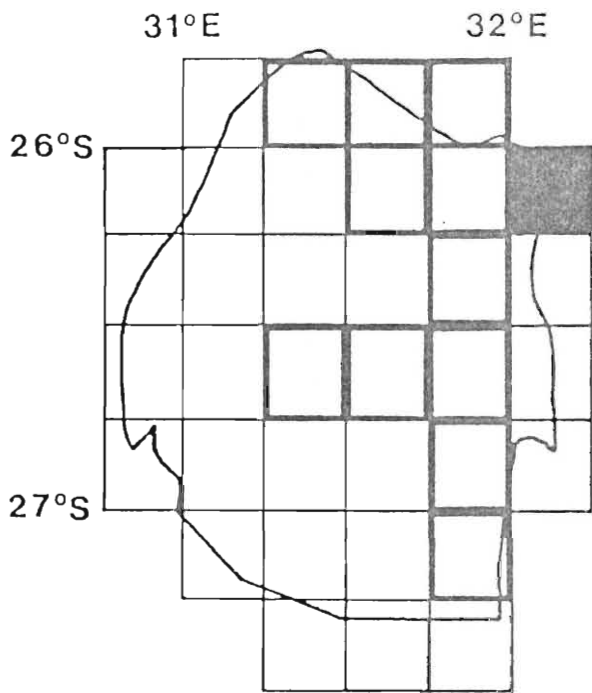
(13b) Hyperolius pusillus



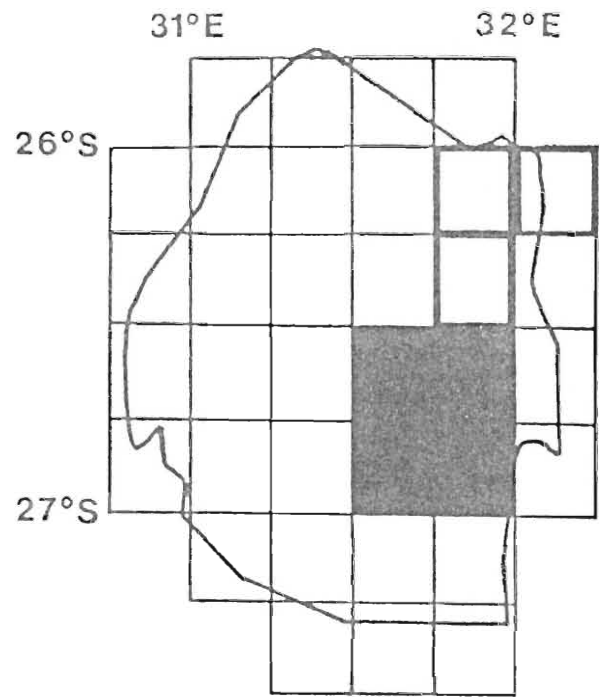
(13c) Hyperolius semidiscus



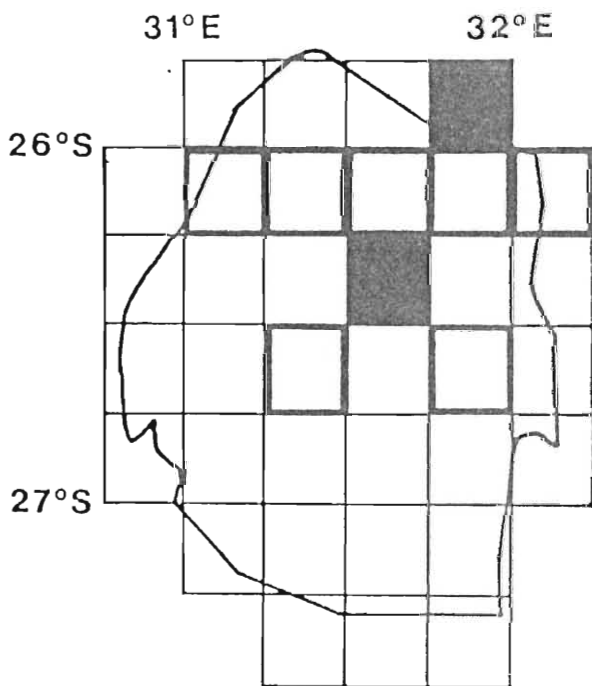
(13d) Hyperolius tuberilinguis



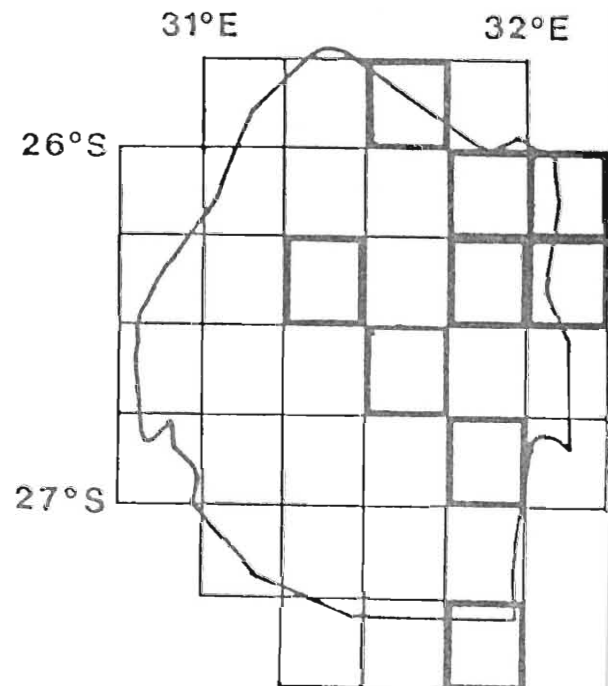
(14a) Crocodylus niloticus



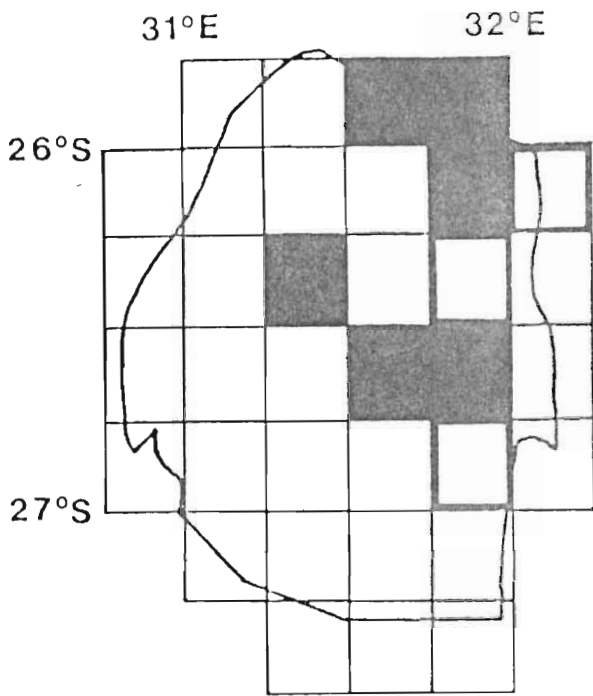
(14b) Pelomedusa subrufa subrufa



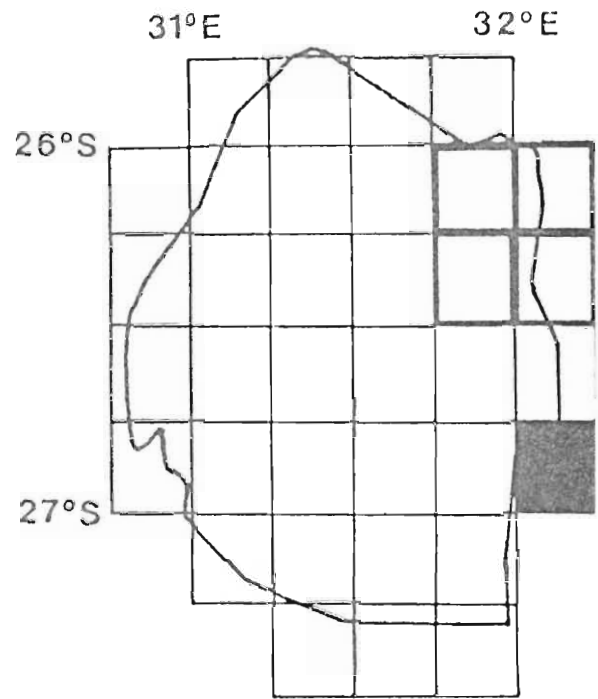
(14c) Pelusios sinuatus



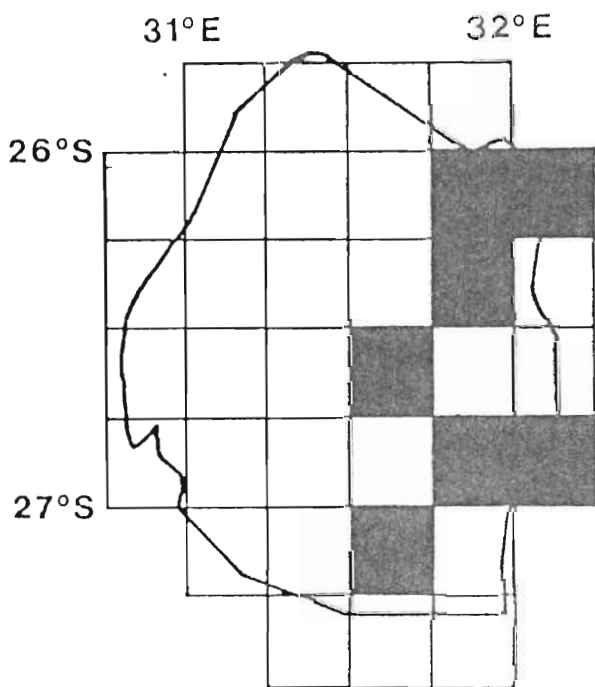
(14d) Geochelone pardalis



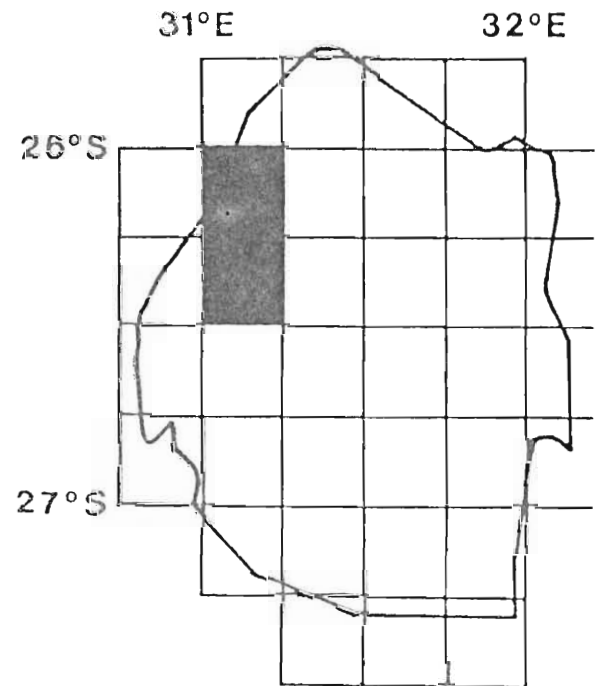
(15a) Kinixys belliana spekii



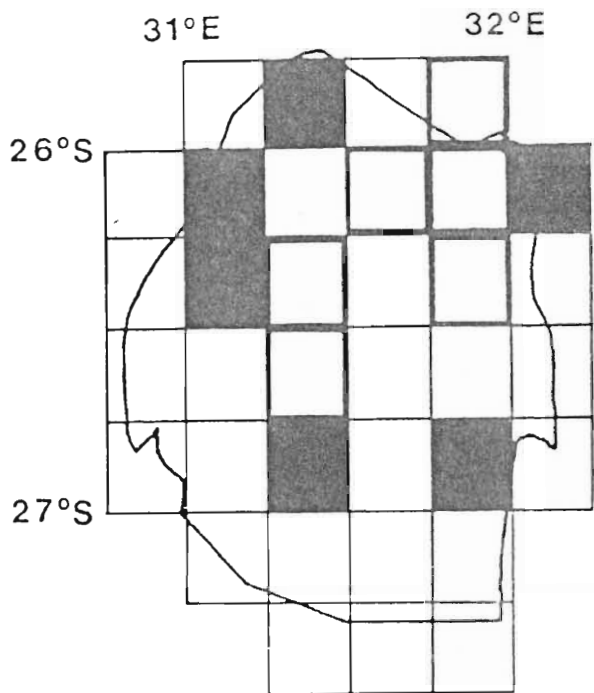
(15b) Kinixys natalensis



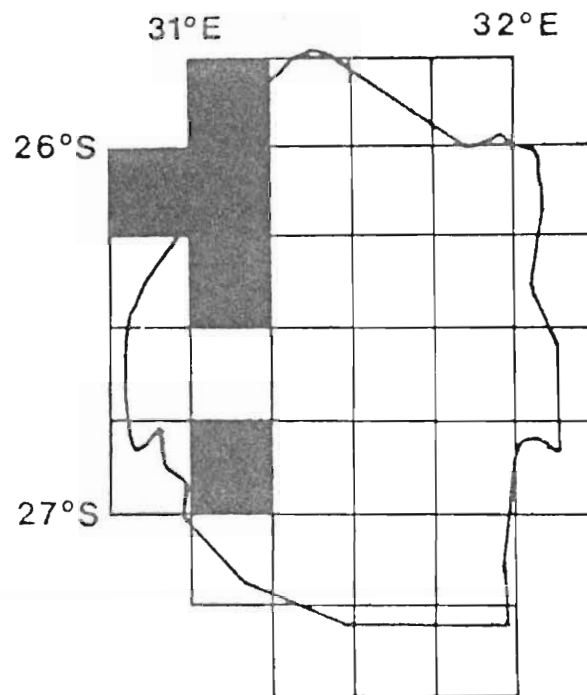
(15c) Afroedura pondolia marleyi



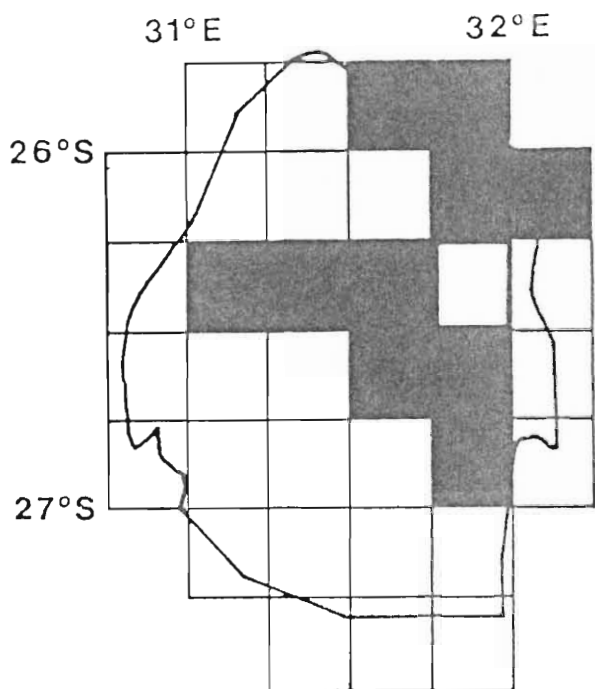
(15d) Afroedura pondolia major



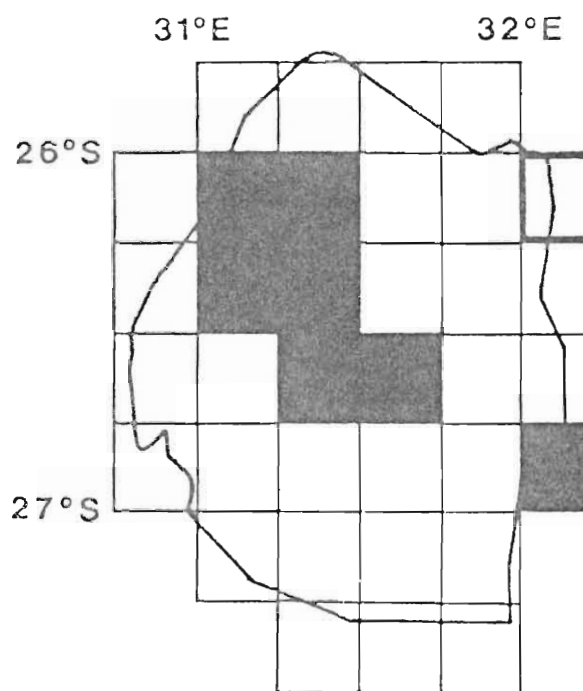
(16a) Lygodactylus capensis capensis



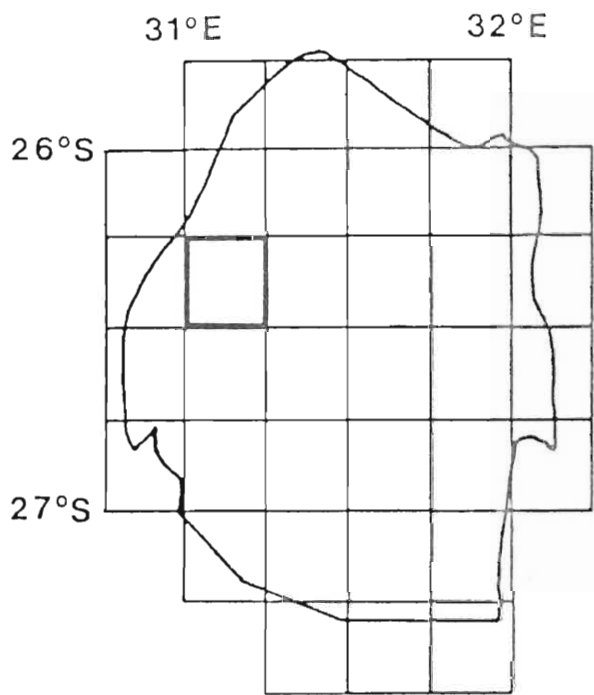
(16b) Lygodactylus ocellatus



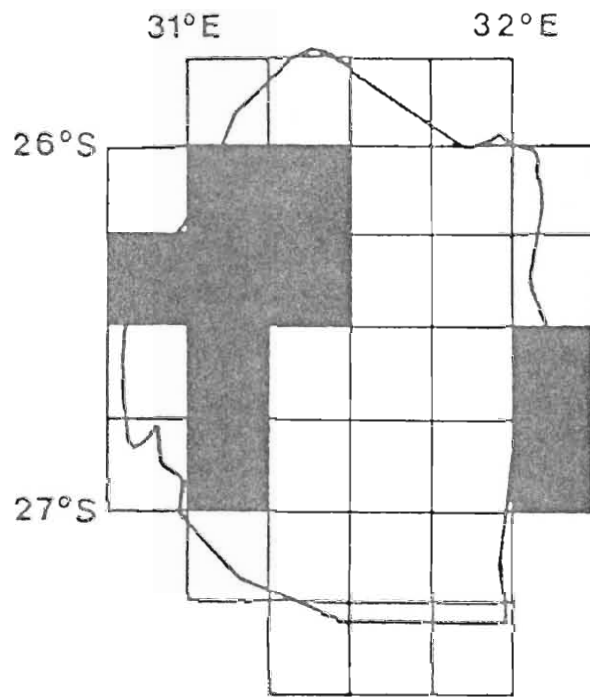
(16c) Hemidactylus mabouia mabouia



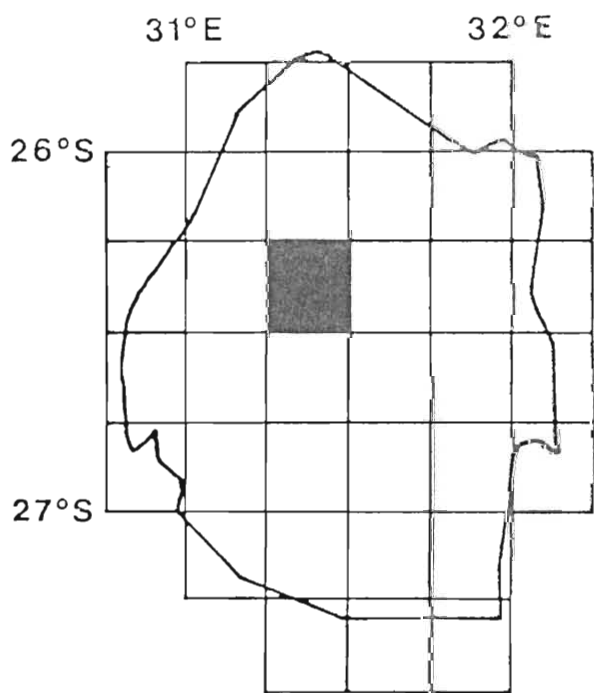
(16d) Homopholis wahlbergii



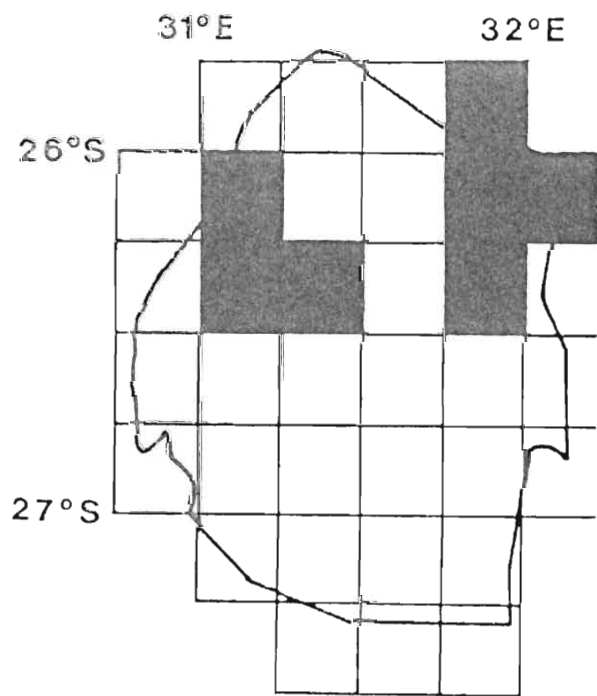
(18a) Agama atra atra



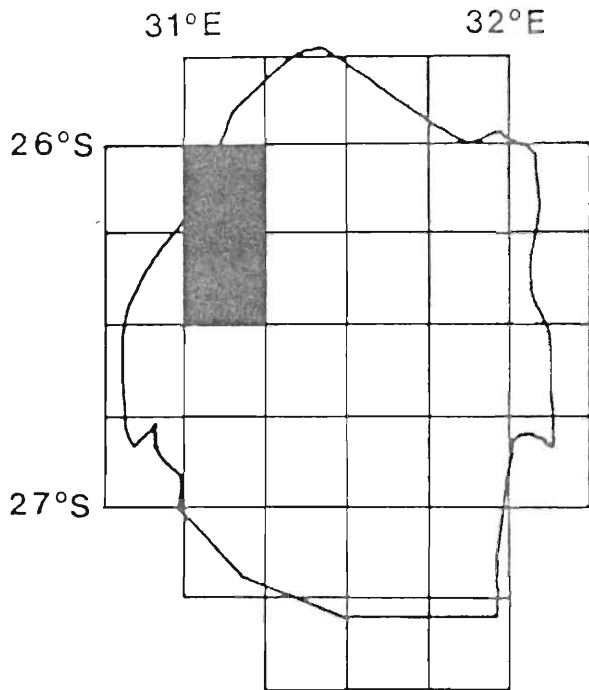
(18b) Agama aculeata distanti



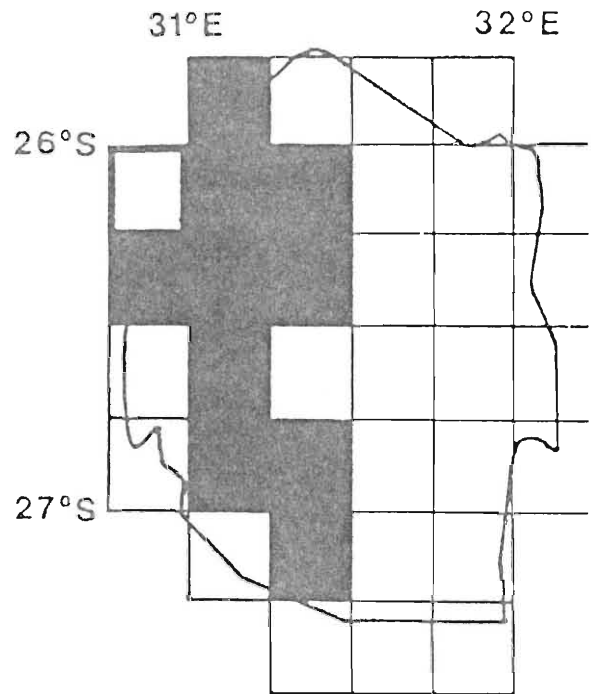
(18c) Agama aculeata armata



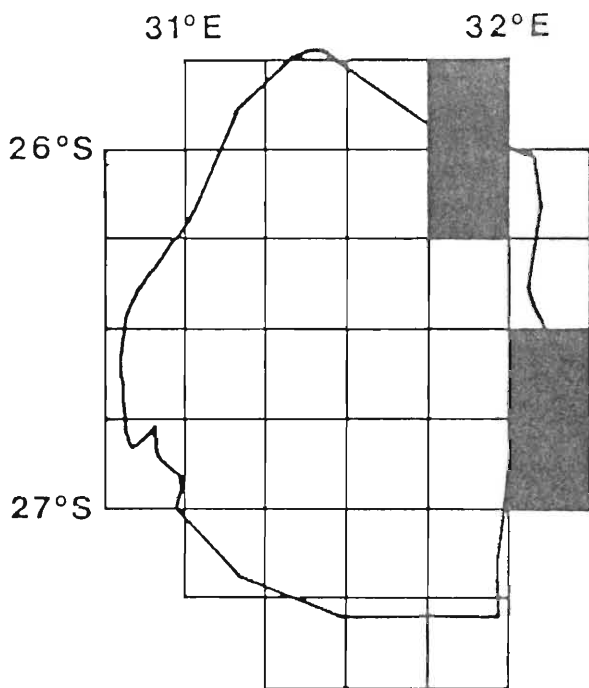
(18d) Chamaeleo dilepis dilepis



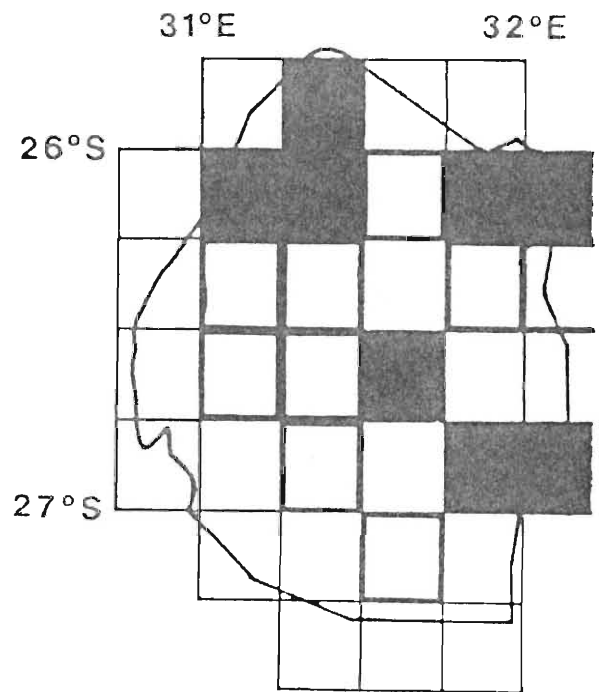
(19a) *Bradypodion* sp.



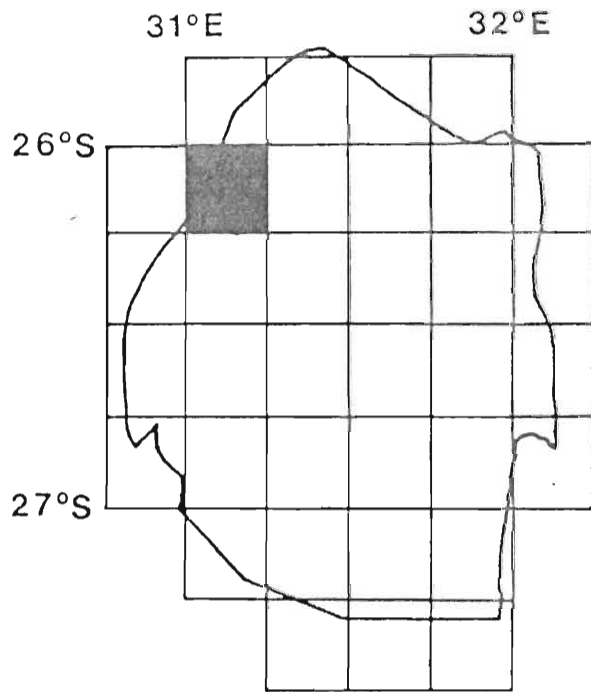
(19b) *Scelotes mira*



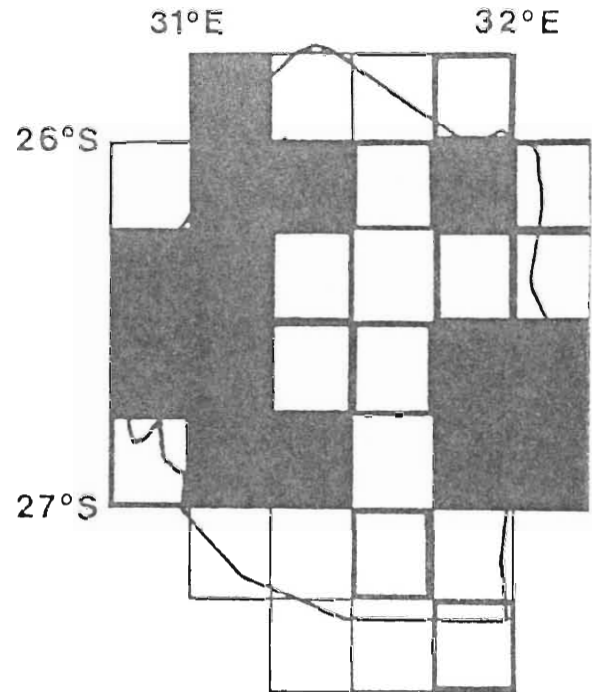
(19c) *Scelotes brevipes*



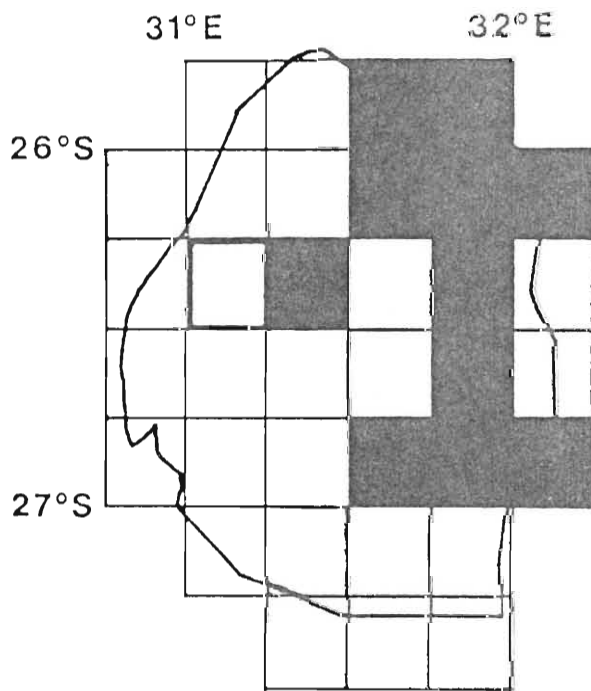
(19d) *Mabuya quinquetaeniata margaritifera*



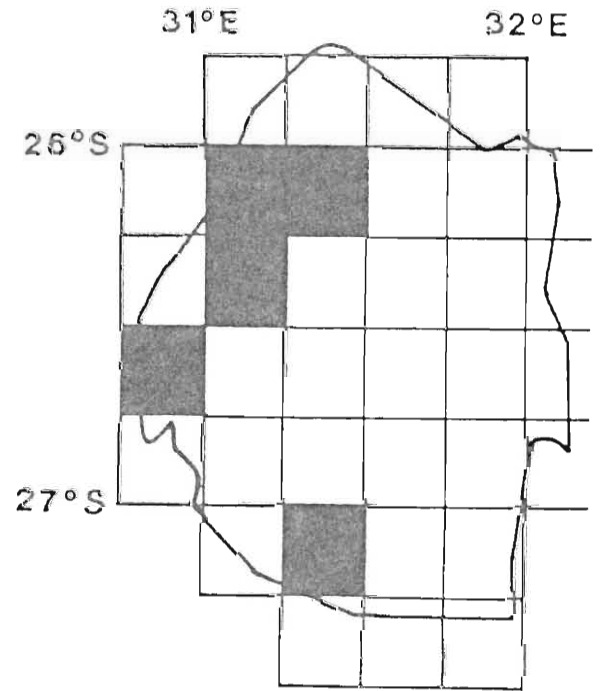
(20a) Mabuya capensis



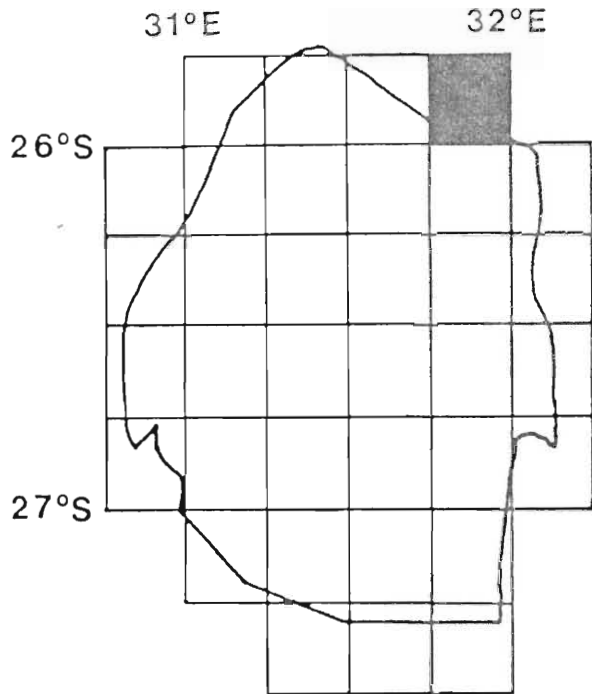
(20b) Mabuya varia



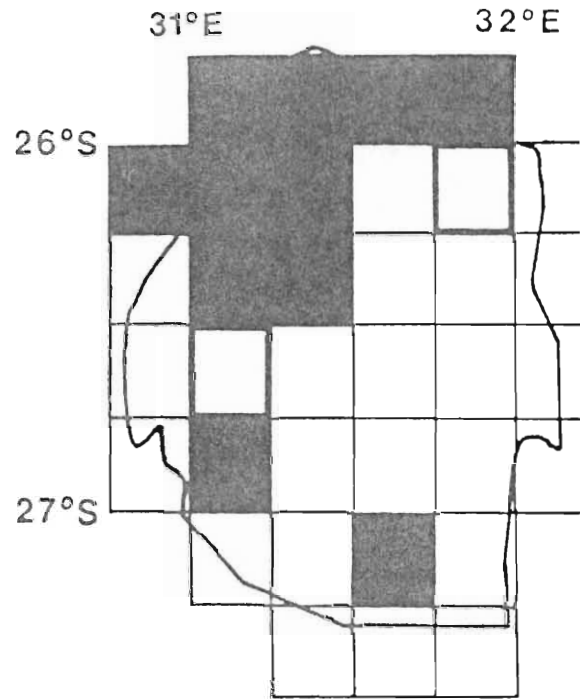
(20c) Mabuya striata striata



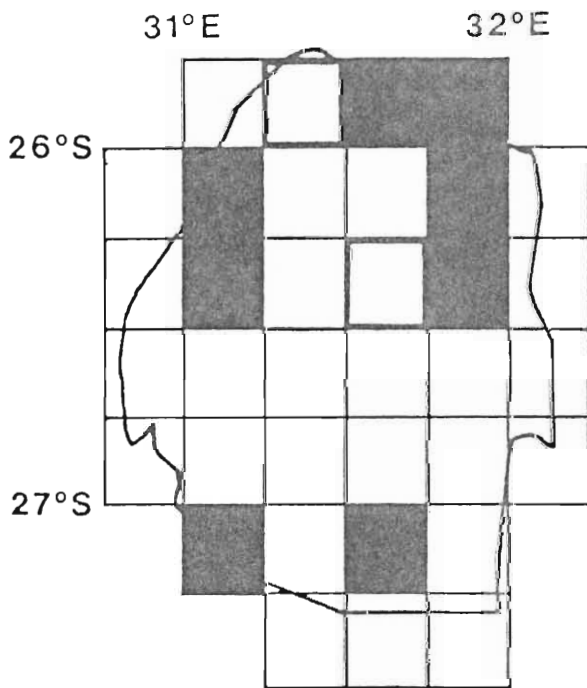
(20d) Mabuya striata punctatissima



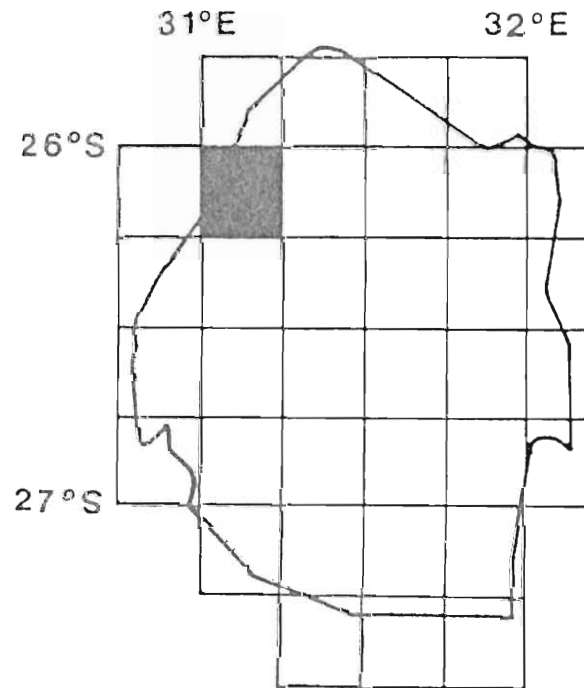
(21a) Lygosoma sundevallii



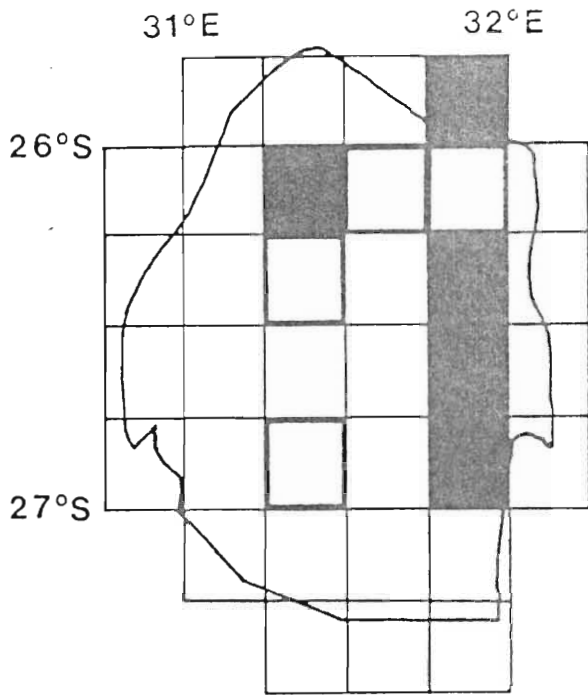
(21b) Panaspis wahlbergii



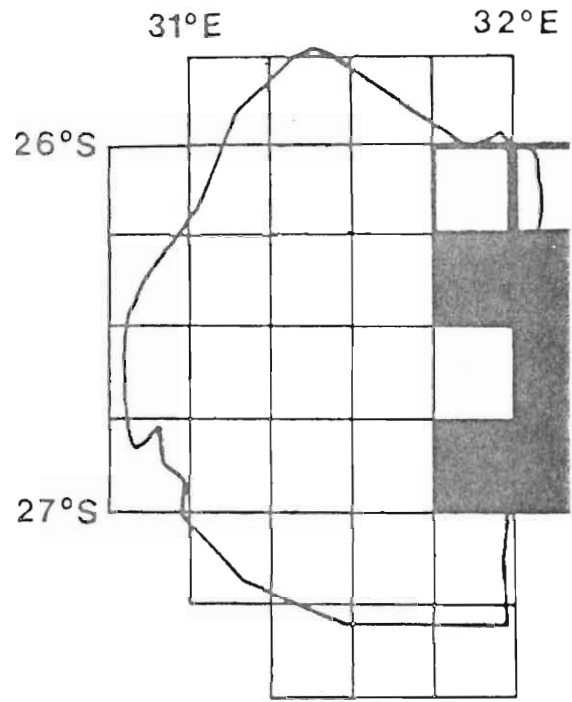
(21c) Acontias plumbeus



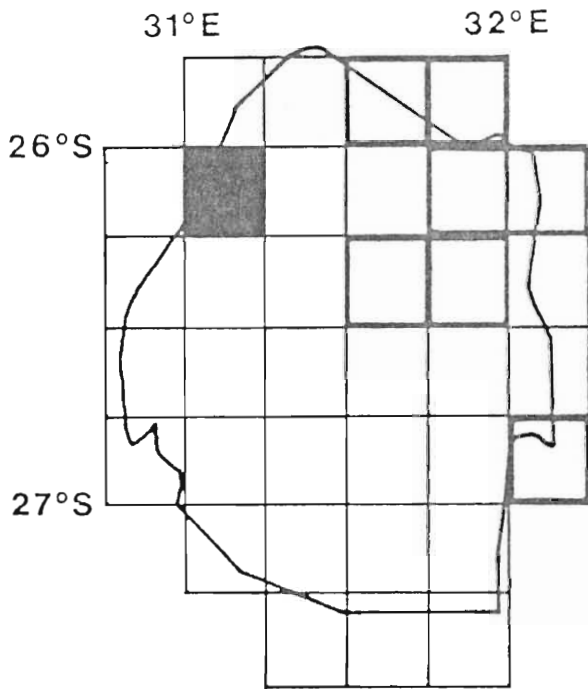
(21d) Nucras lalandii



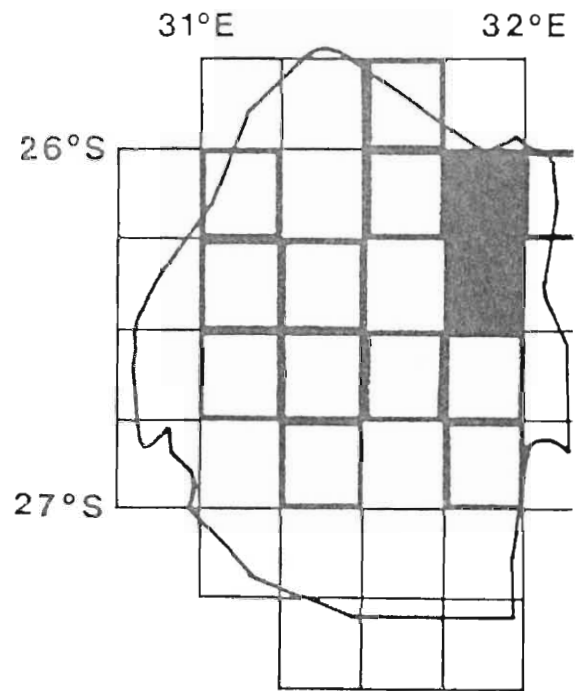
(22a) Nucras taeniolata holubi



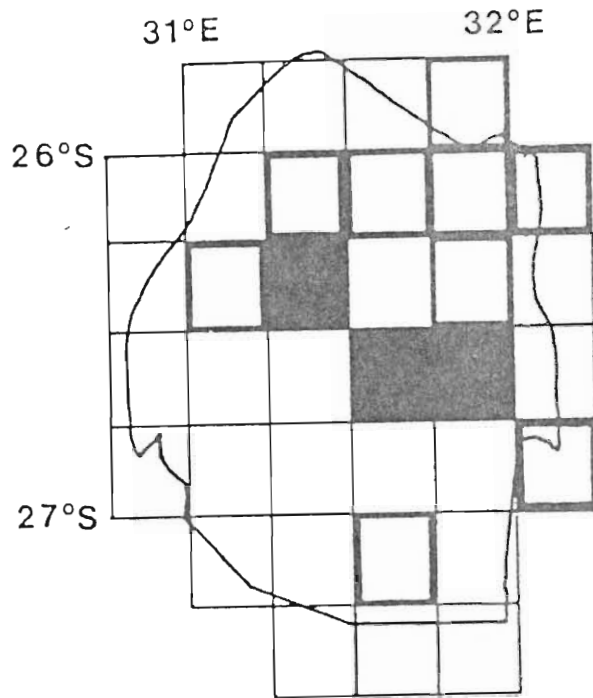
(22b) Nucras ornata



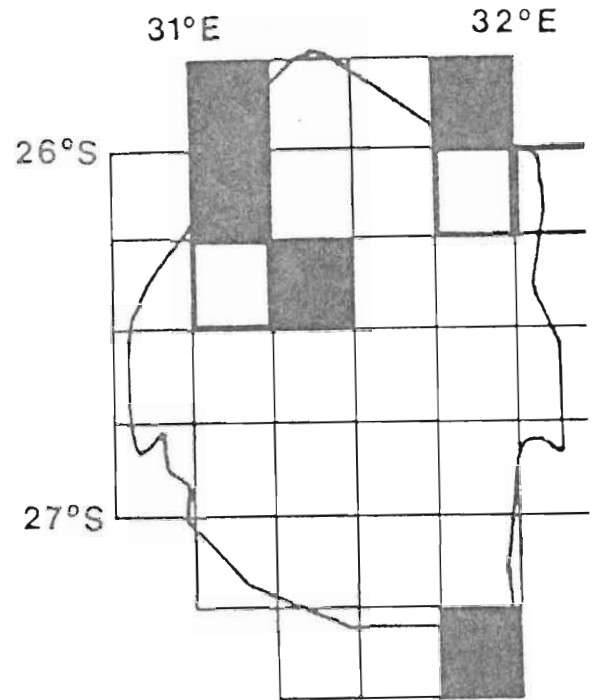
(22c) Varanus albigularis



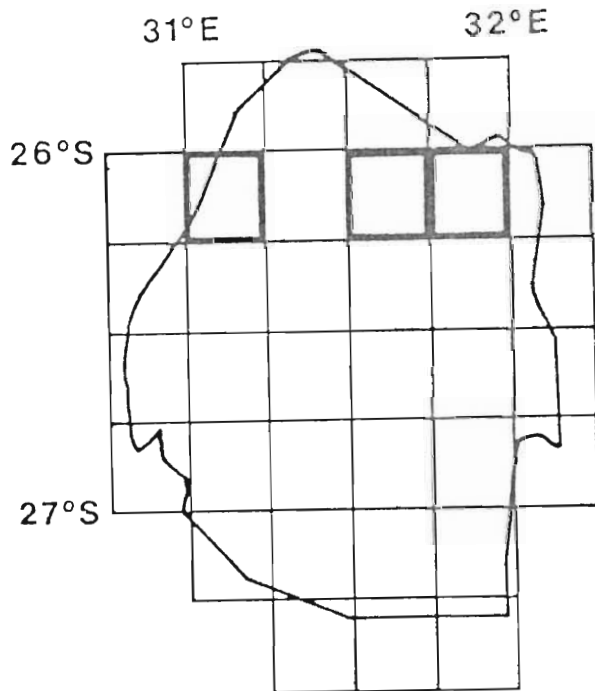
(22d) Varanus niloticus niloticus



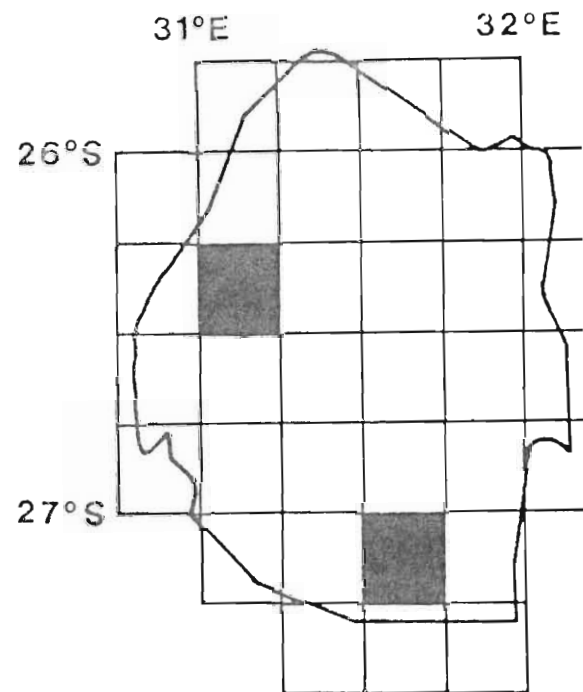
(23a) Gerrhosaurus validus validus



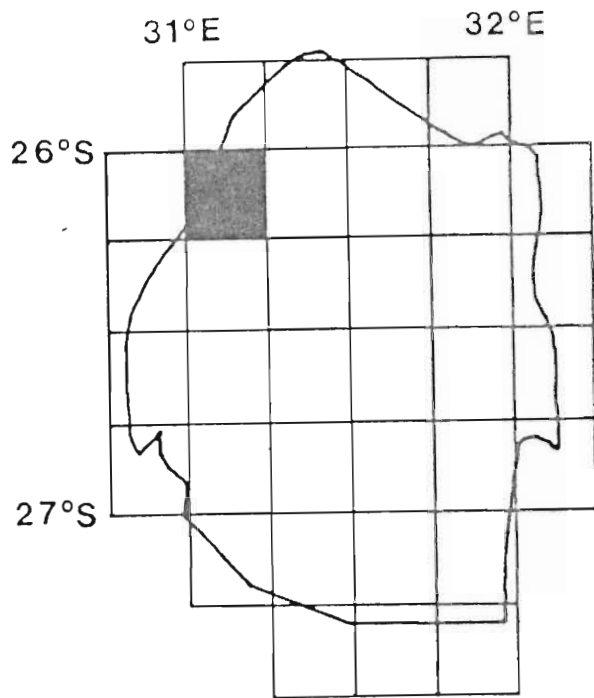
(23b) Gerrhosaurus flavigularis flavigularis



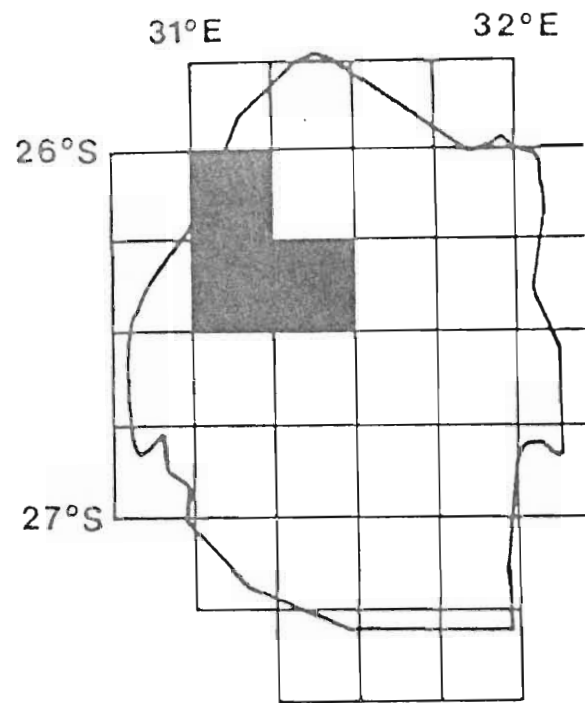
(23c) Gerrhosaurus major major



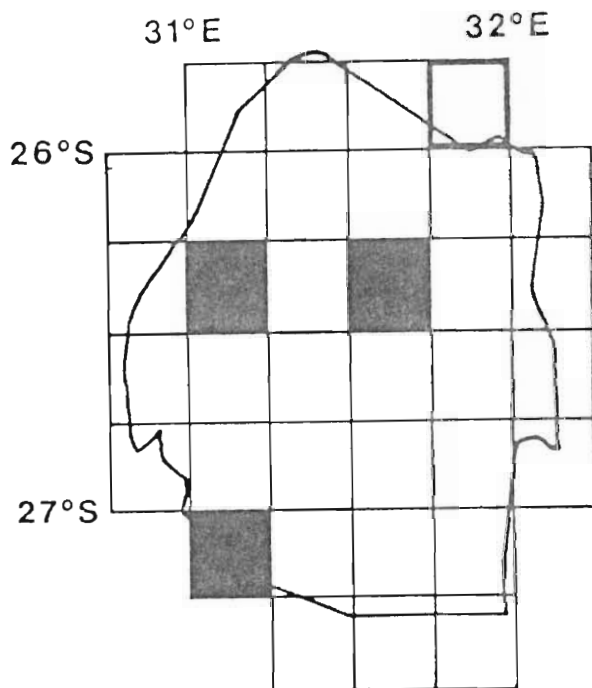
(23d) Tetradactylus africanus africanus



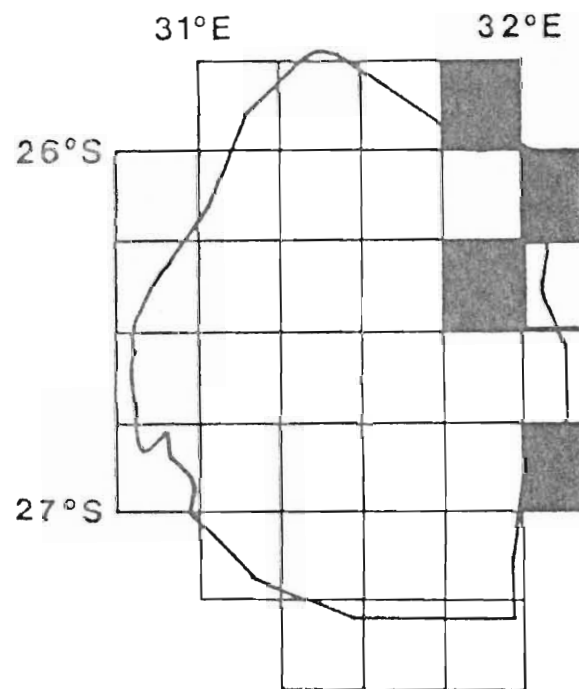
(24a) Chamaesaura aenea



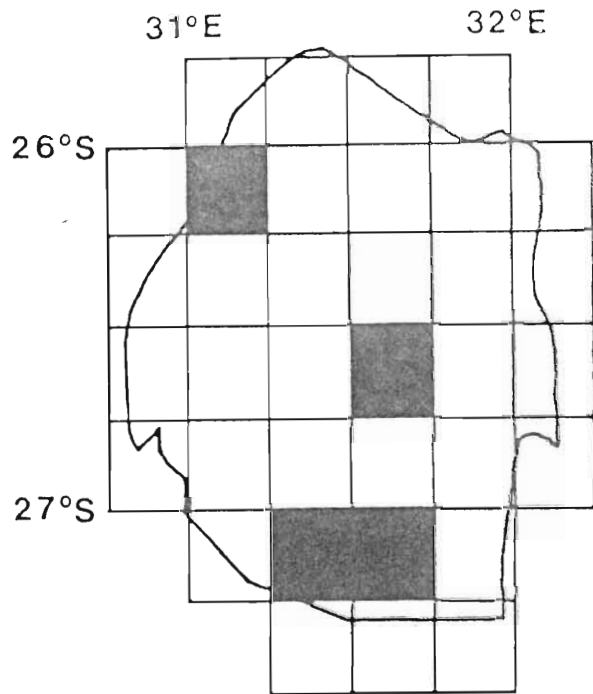
(24b) Chamaesaura anguina anguina



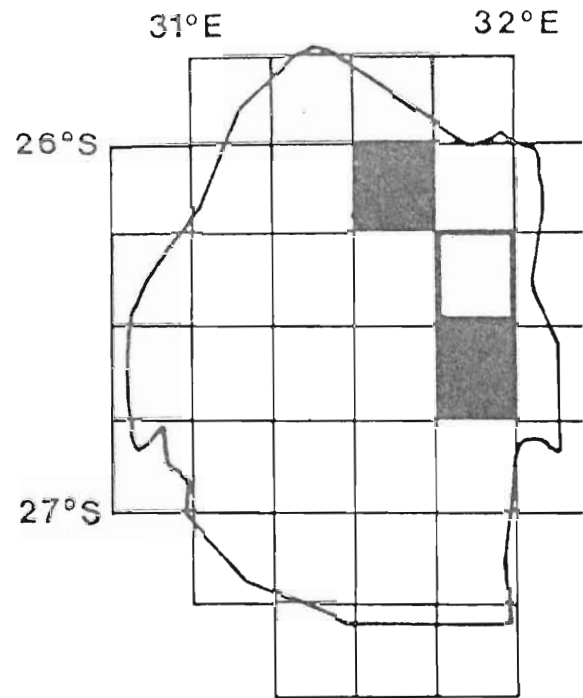
(24c) Chamaesaura macrolepis macrolepis



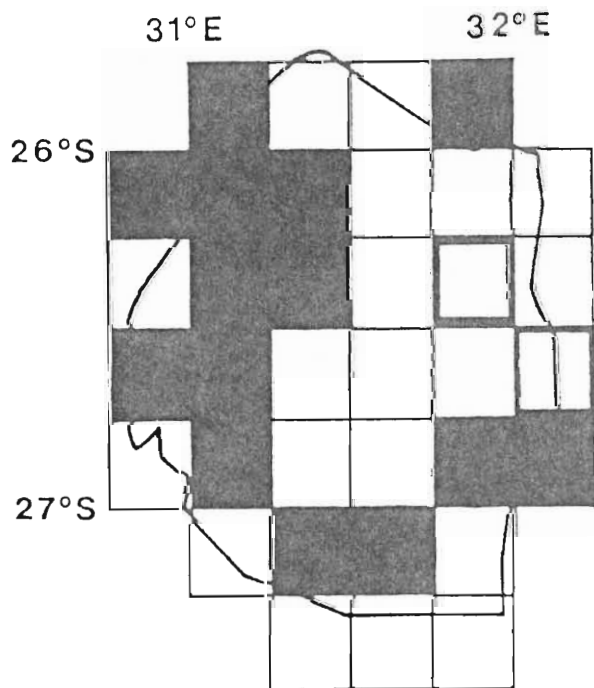
(24d) Cordylus warreni warreni



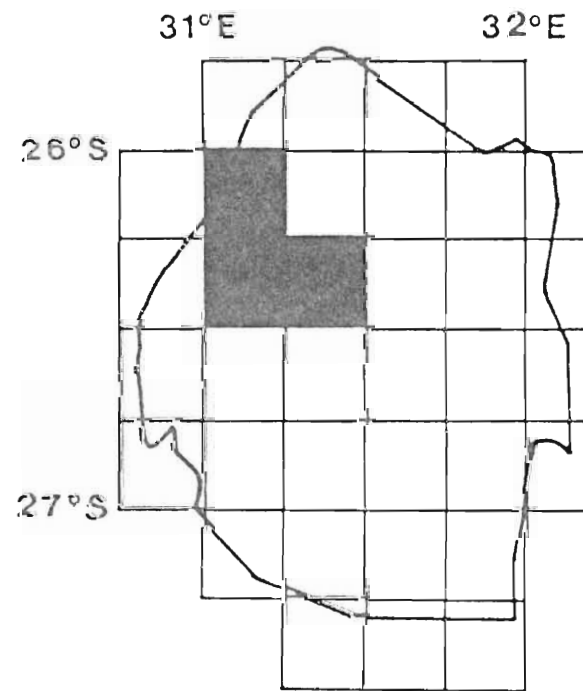
(25a) Cordylus warreni barbertonensis



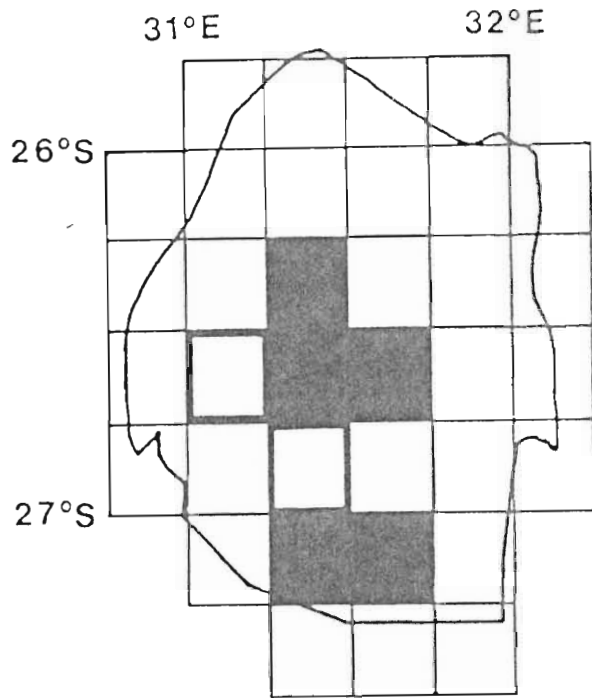
(25b) Cordylus tropidosternum jonesi



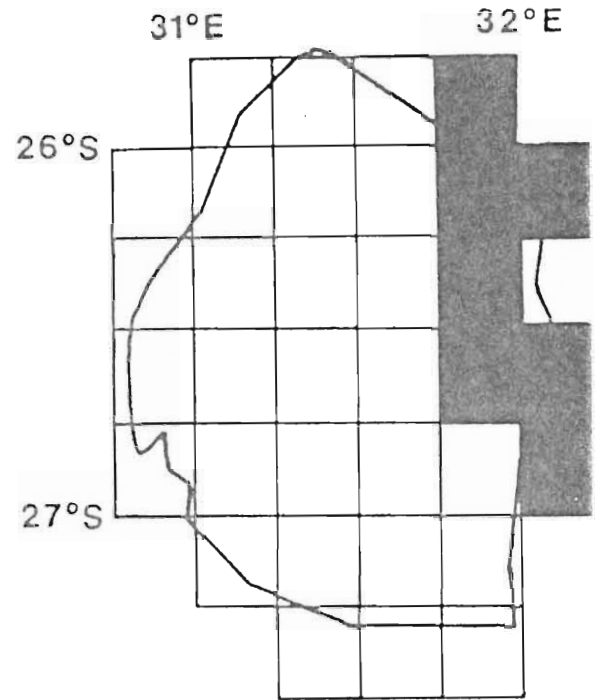
(25c) Cordylus vittifer vittifer



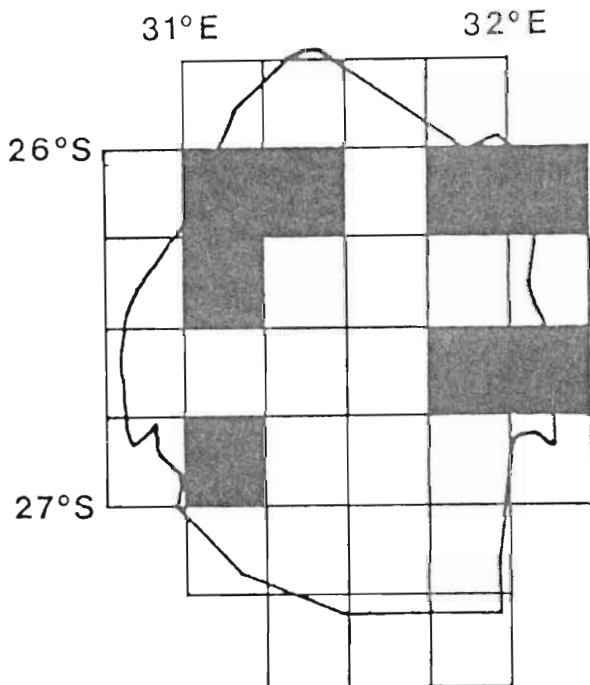
(25d) Pseudocordylus melanotus transvaalensi



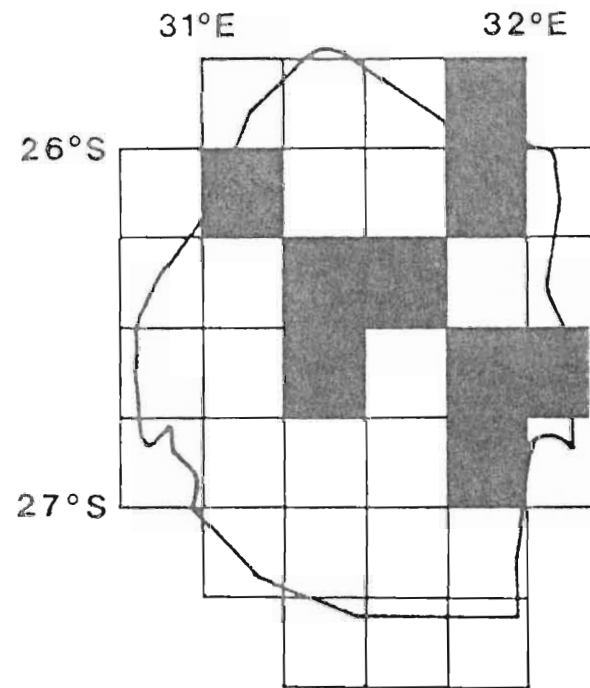
(26a) Platysaurus intermedius natalensis



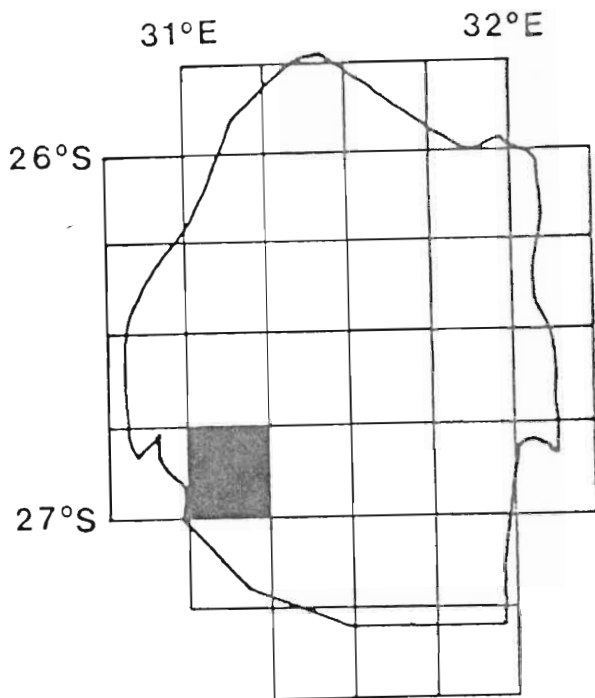
(26b) Platysaurus intermedius 'lebombo'



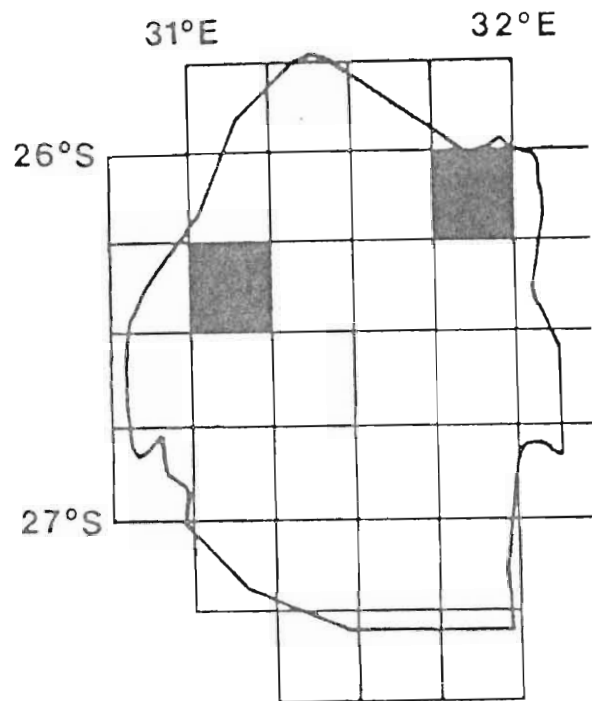
(26c) Typhlops bibronii



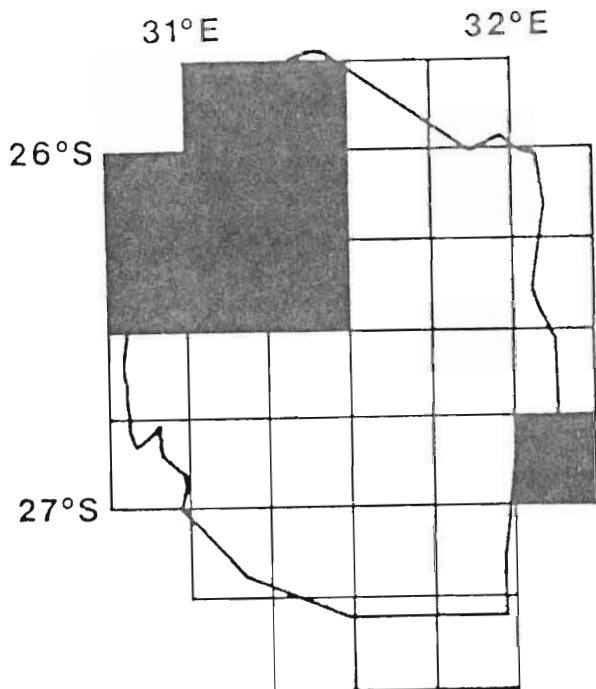
(26d) Typhlops schlegelii schlegelii



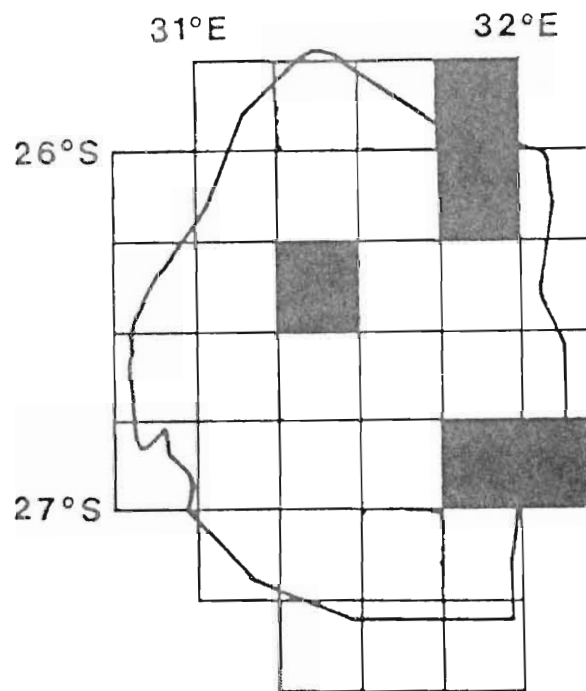
(27a) Typhlops bibronii with fornasinii characteristics



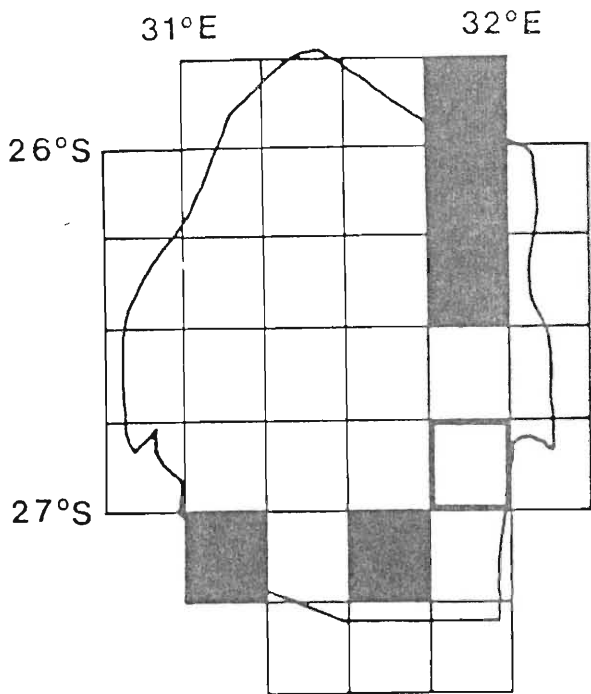
(27b) Leptotyphlops longicaudus



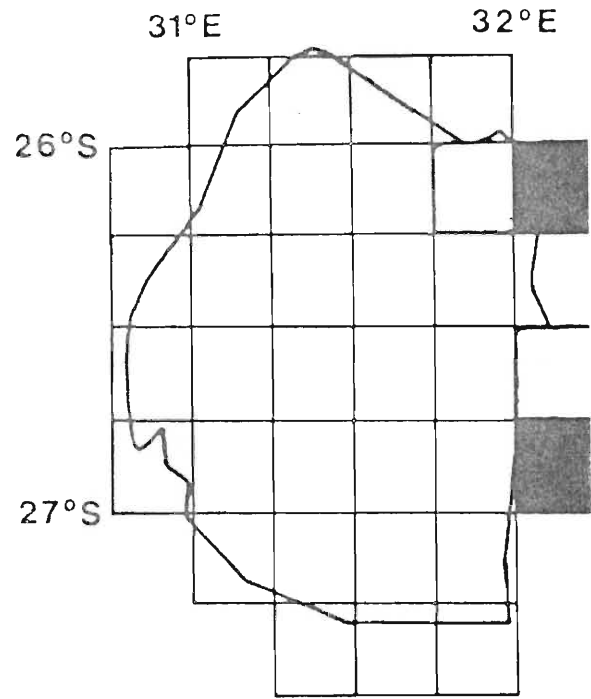
(27c) Leptotyphlops conjunctus conjunctus



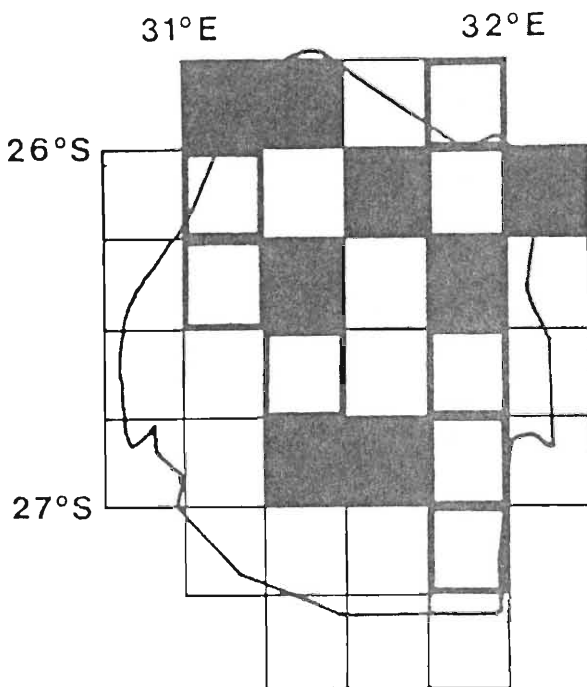
(27d) Leptotyphlops conjunctus incognitus



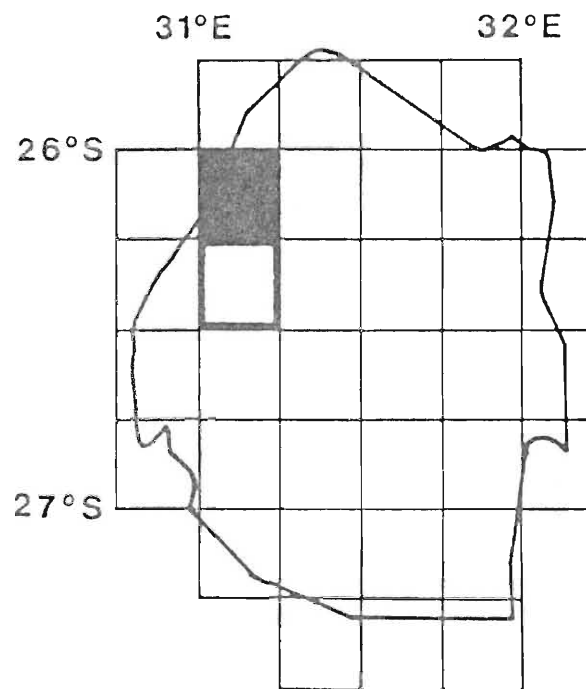
(28a) *Leptotyphlops scutifrons scutifrons*



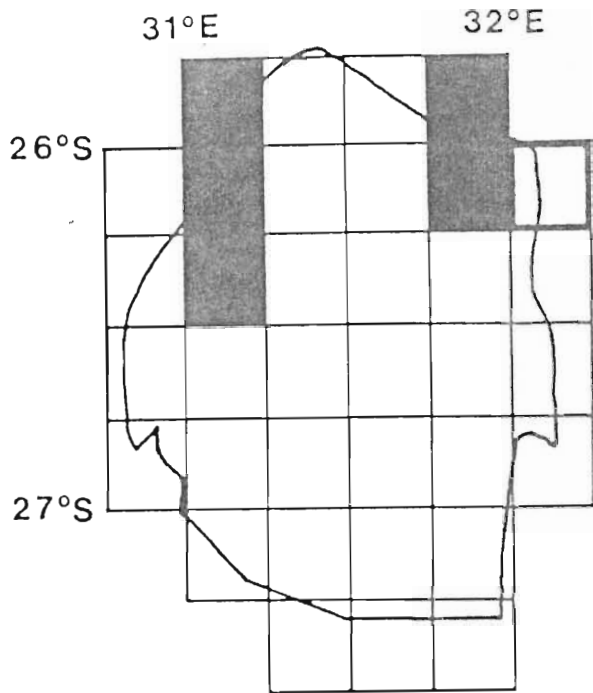
(28b) *Leptotyphlops telloi*



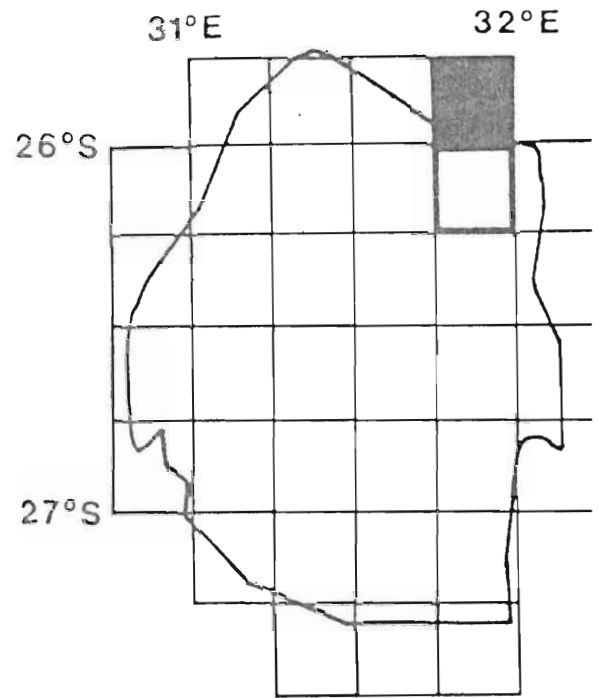
(28c) *Python sebae natalensis*



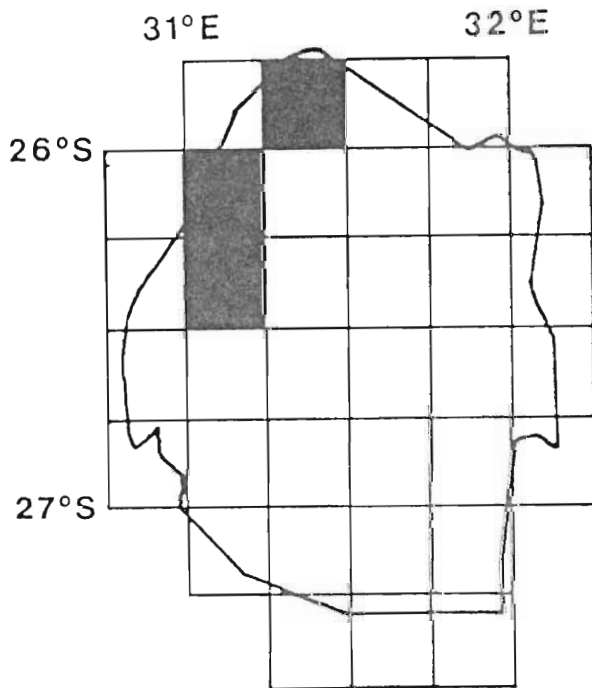
(28d) *Lycodonomorphus laevisissimus fitzsimonsi*



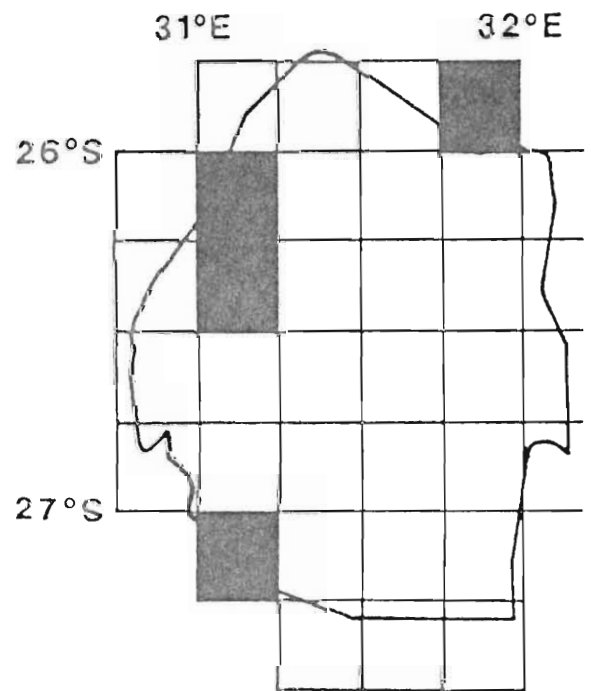
(29a) Lycodonomorphus rufulus



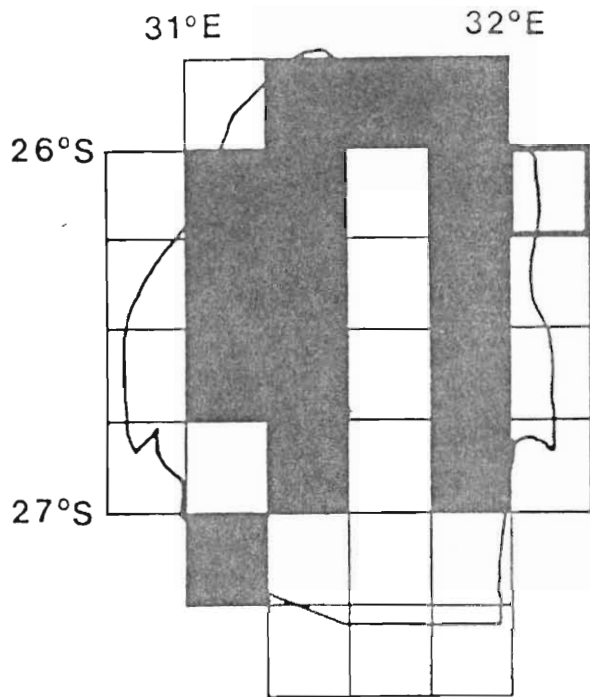
(29b) Lycodonomorphus whytii obscuriventris



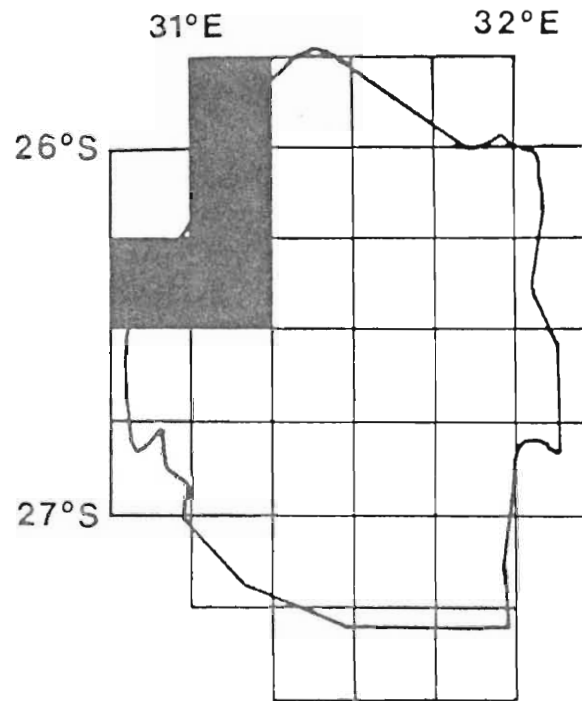
(29c) Lamprophis inornatus



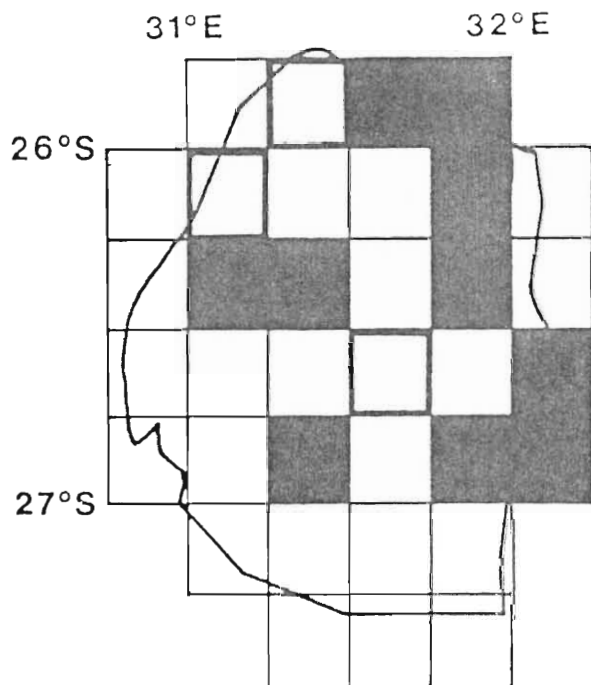
(29d) Lamprophis guttatus



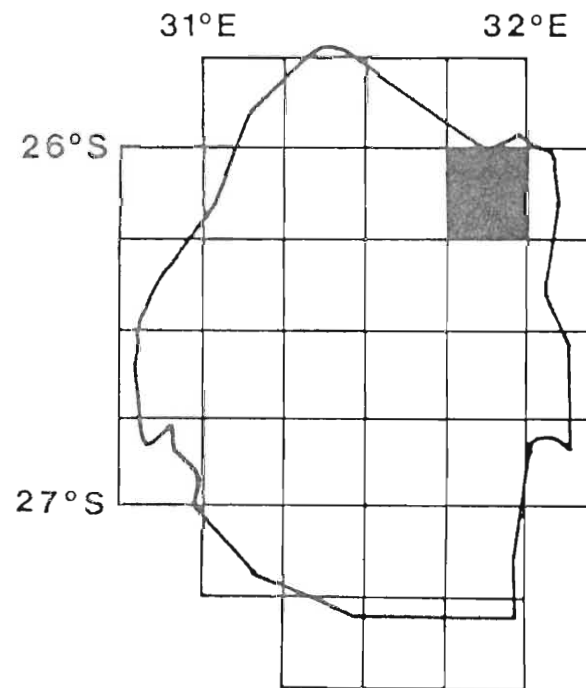
(30a) Lamprophis fuliginosus



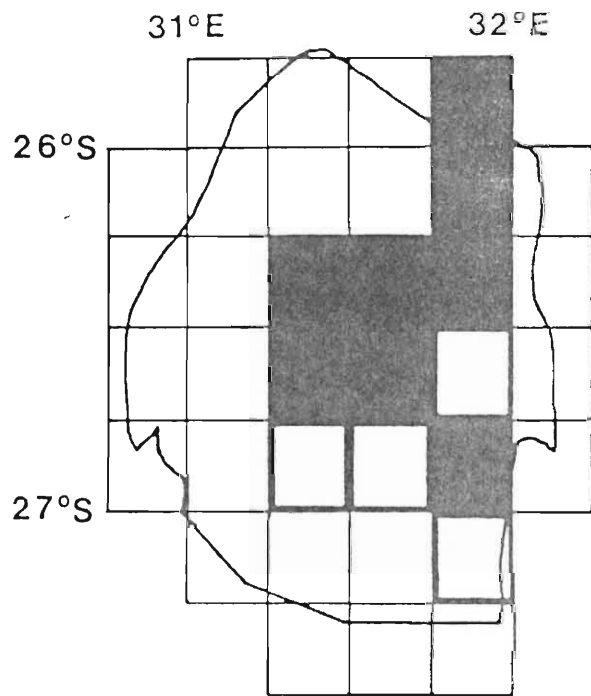
(30b) Lamprophis swazicus



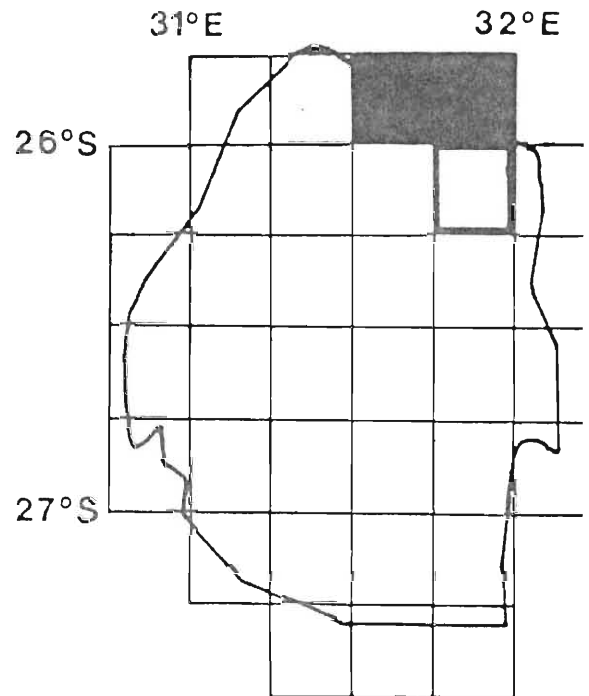
(30c) Lycophidion capense capense



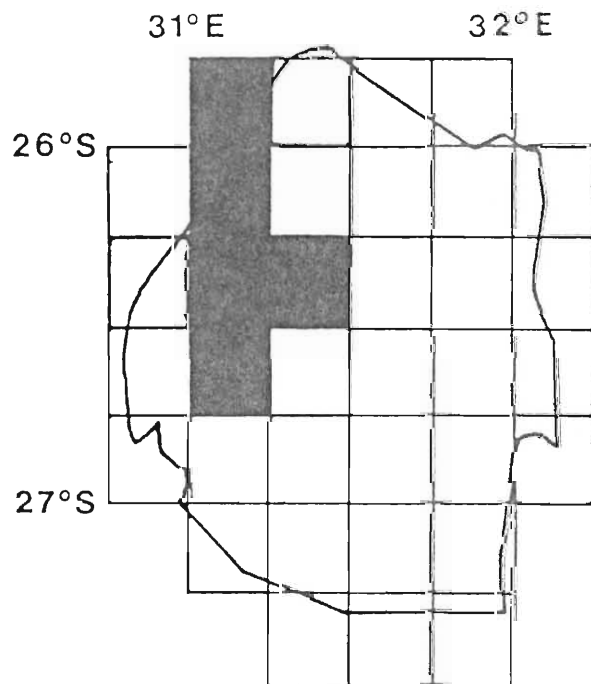
(30d) Lycophidion variegatum



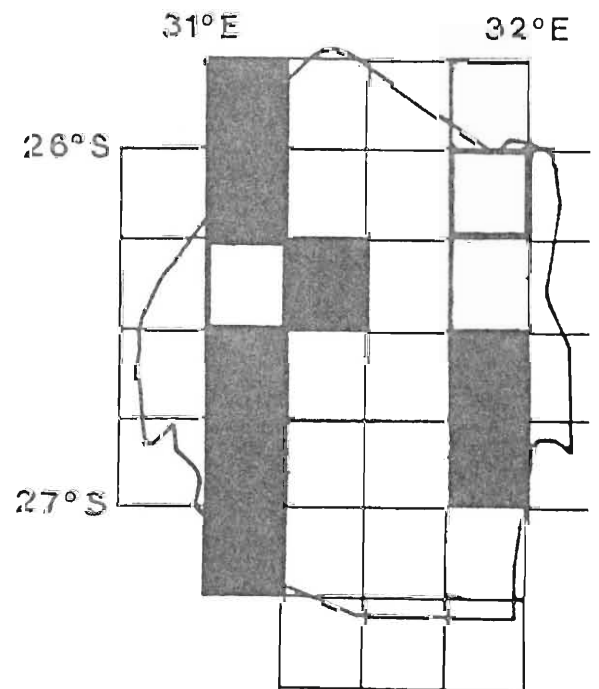
(31a) Mehelya capensis capensis



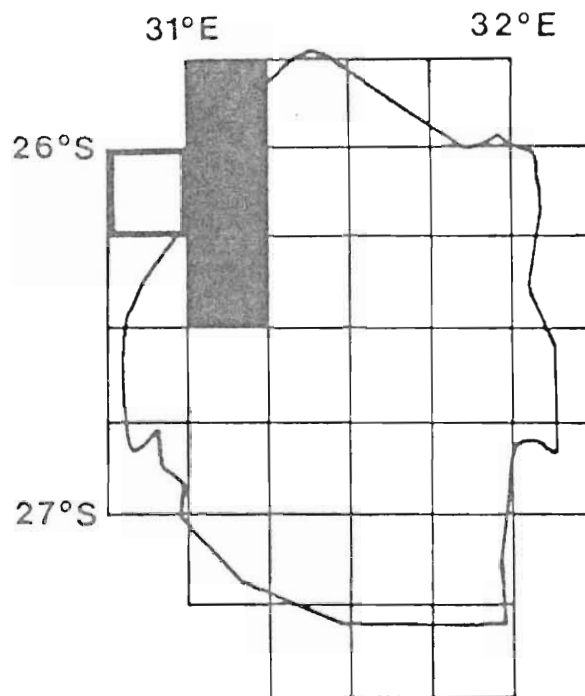
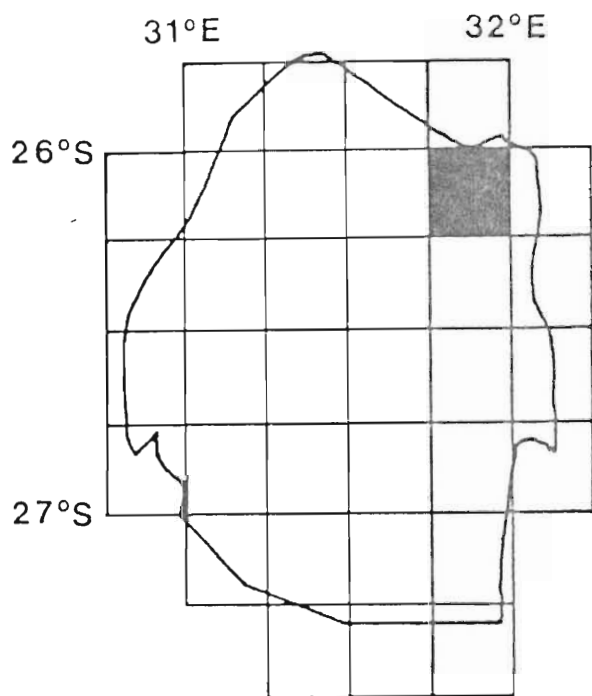
(31b) Mehelya nyassae



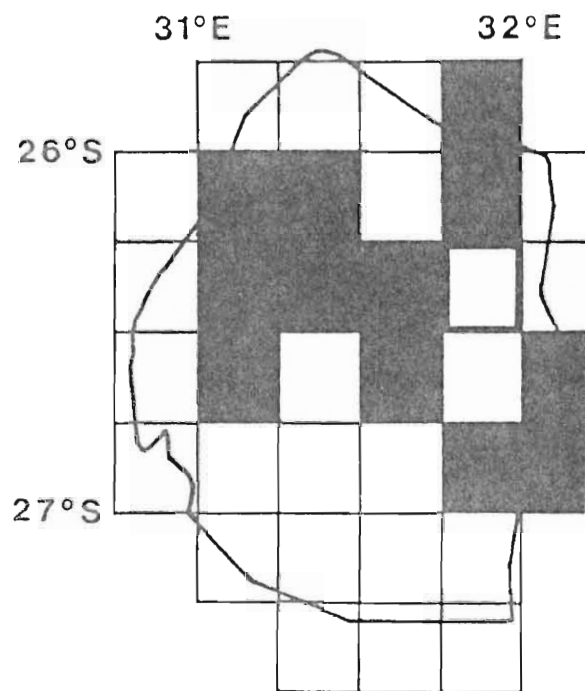
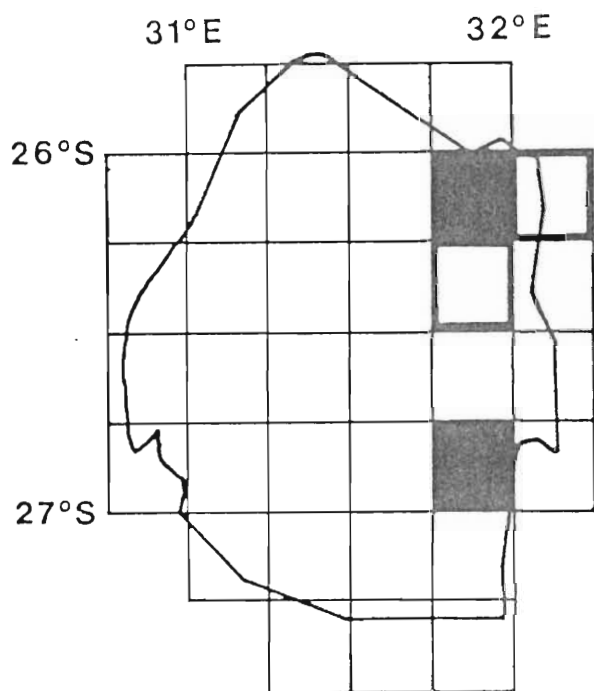
(31c) Duberria lutrix lutrix



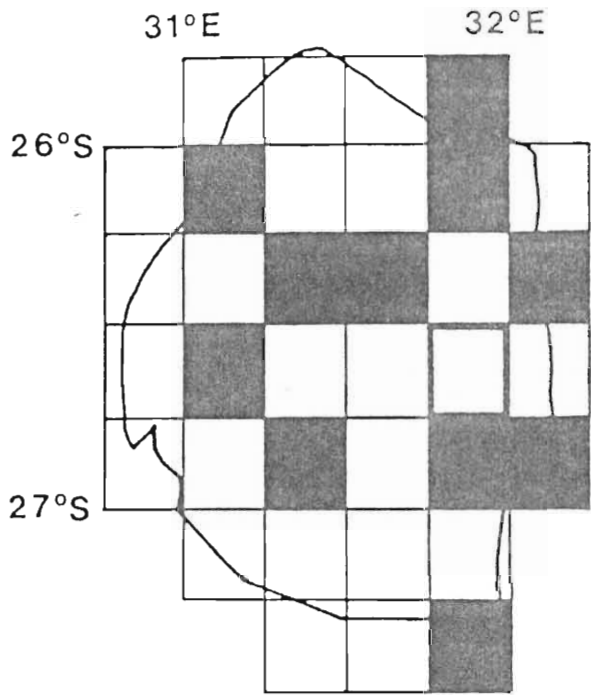
(31d) Pseudaspis cana



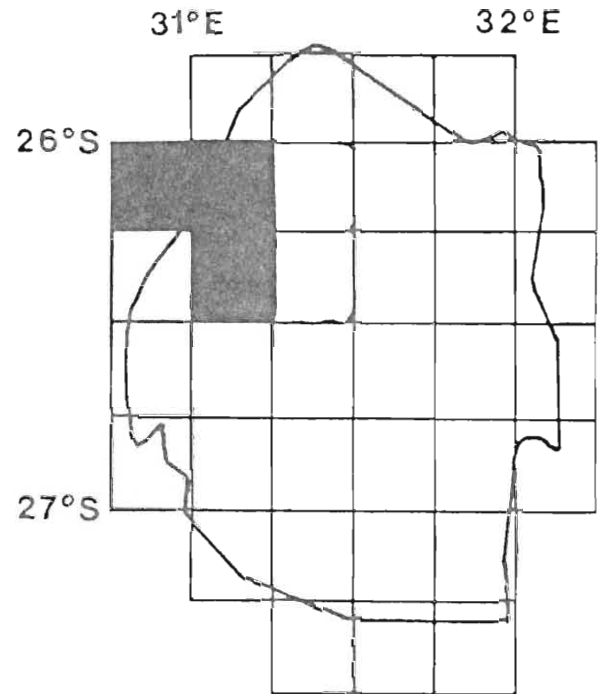
(32a) Hemirhagerrhis nototaenia nototaenia (32b) Psammophylax rhombeatus rhombeatus



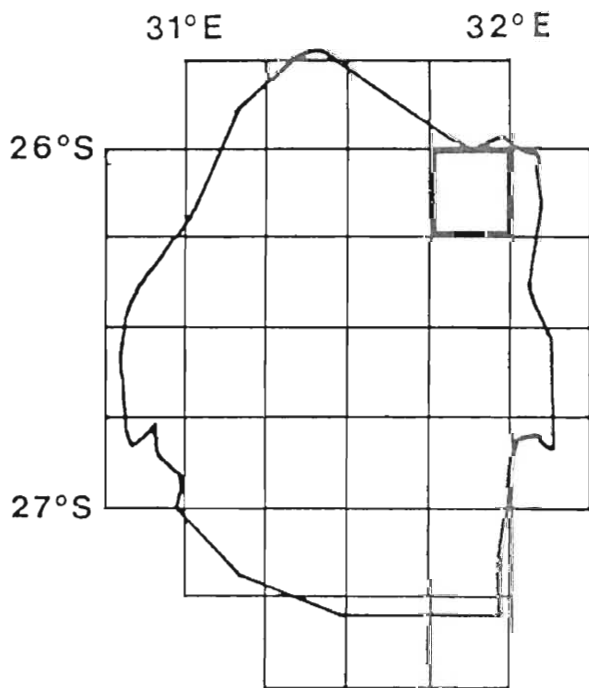
(32c) Psammophis subtaeniatus subtaeniatus (32d) Psammophis sibilans brevirostris



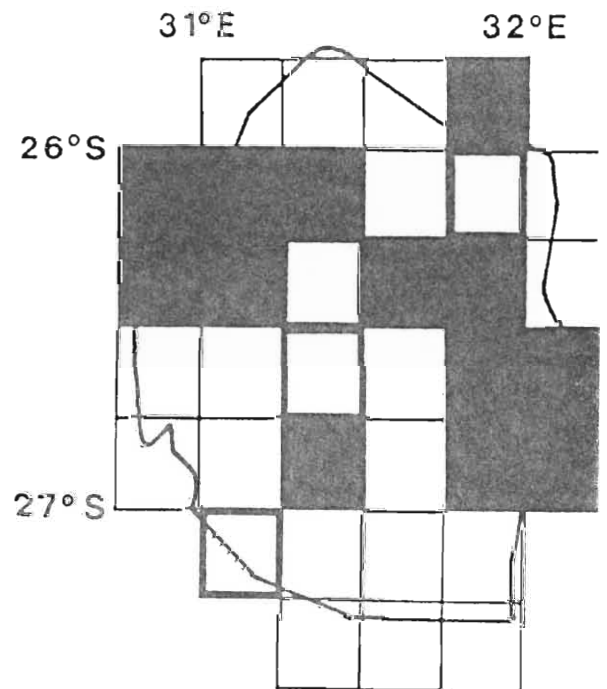
(33a) Psammophis phillipsii



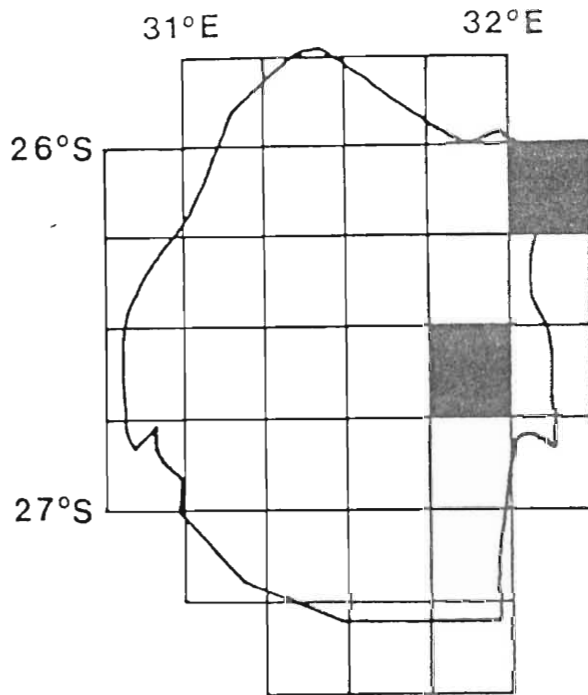
(33b) Psammophis crucifer



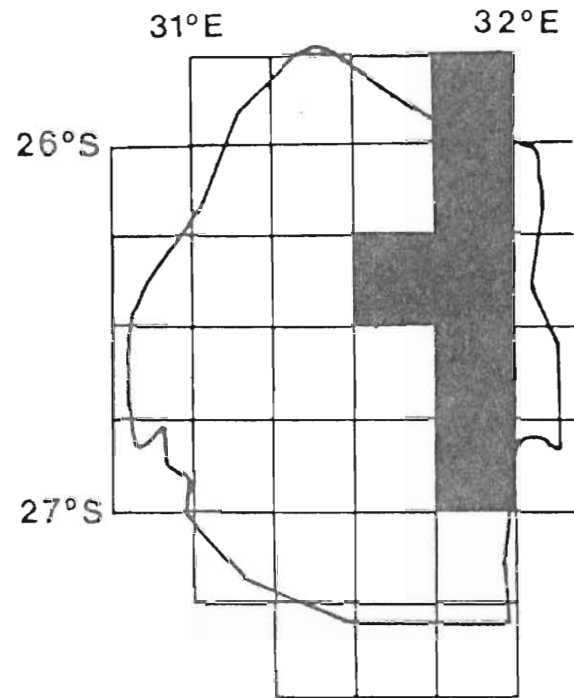
(33c) Aparallactus lunulatus lunulatus



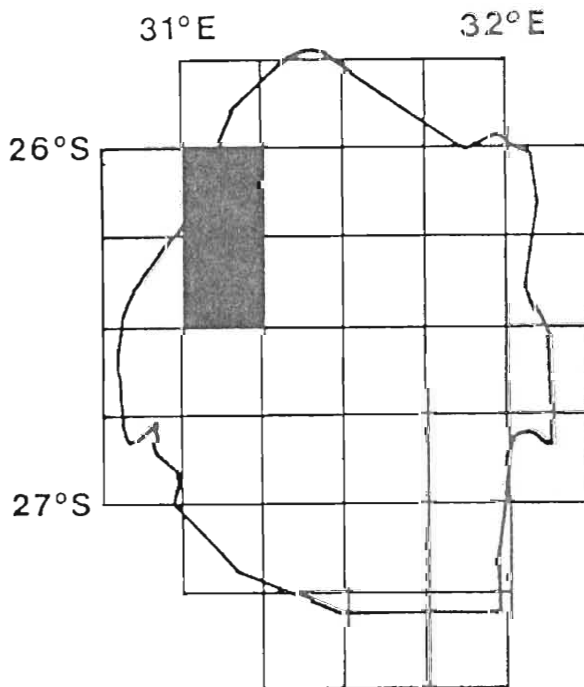
(33d) Aparallactus capensis



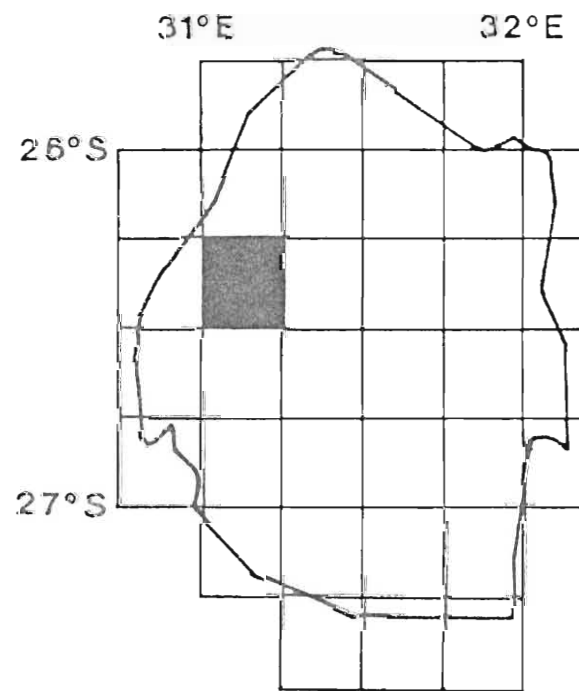
(34a) Amblyodipsas concolor



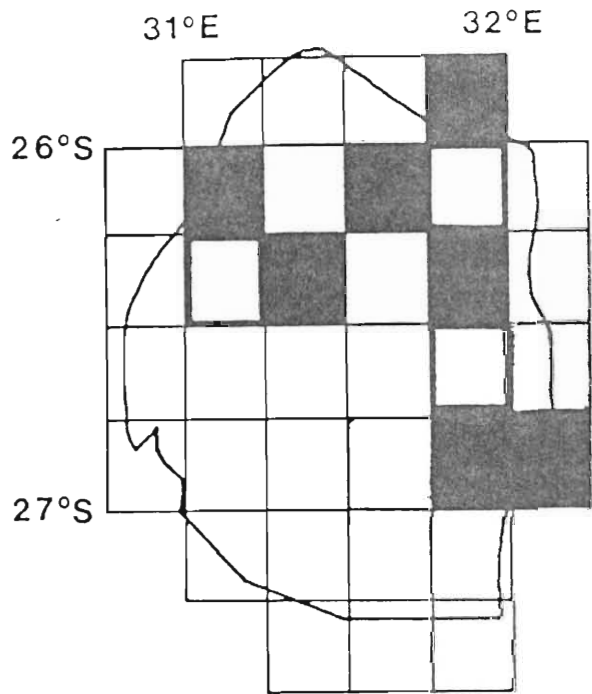
(34b) Amblyodipsas polylepis polylepis



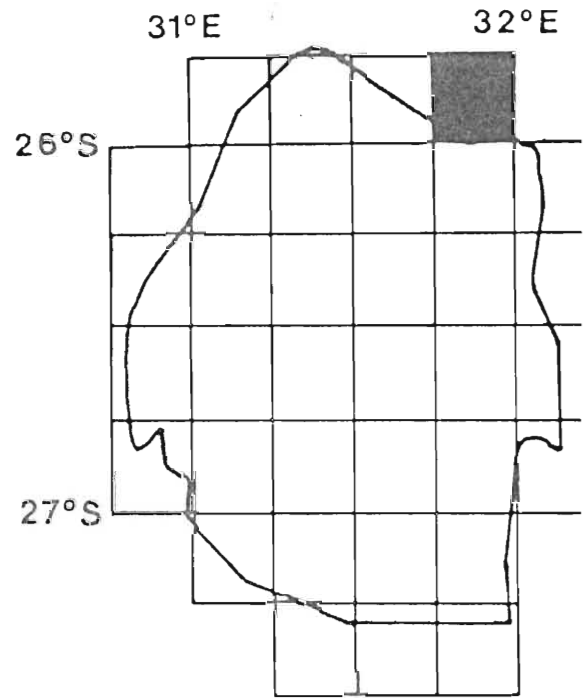
(34c) Homoroselaps lacteus



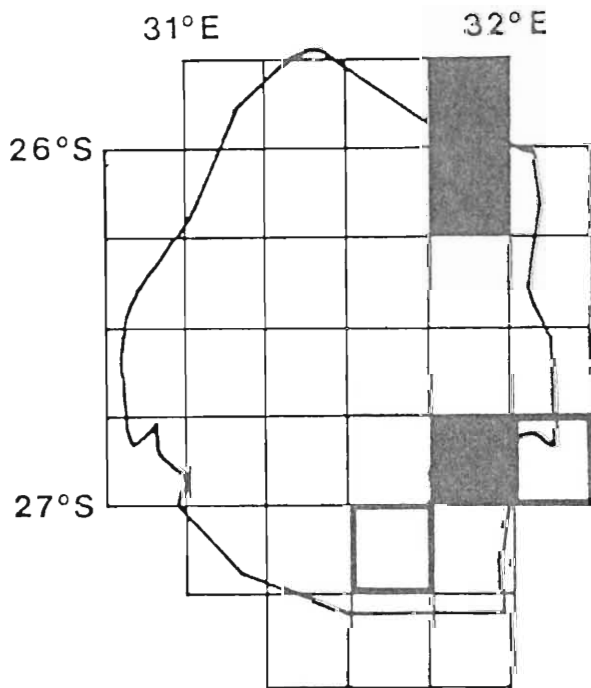
(34d) Homoroselaps dorsalis



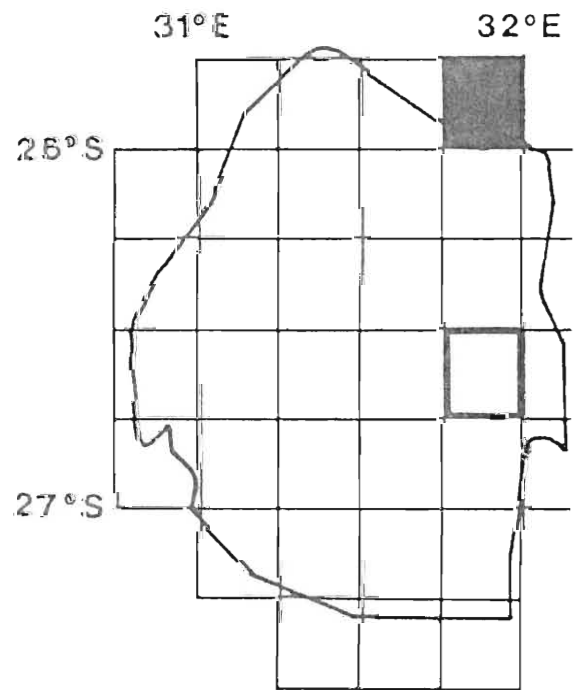
(35a) Atractaspis bibronii



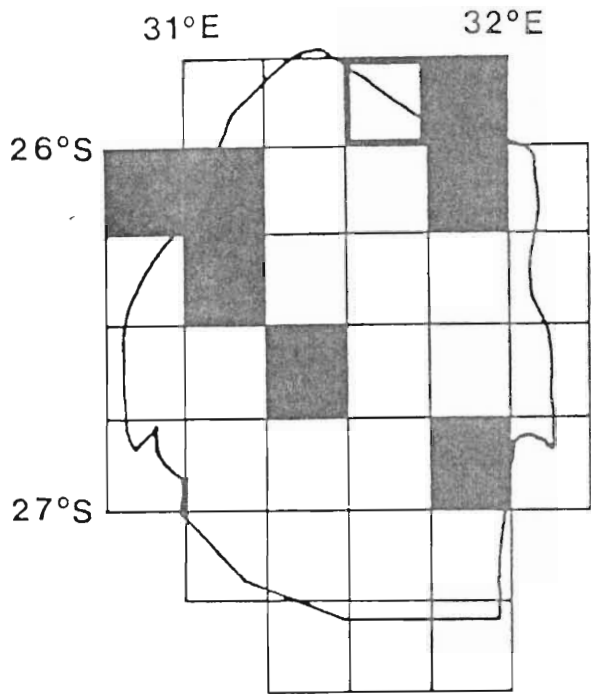
(35b) Prosymna sundevallii lineata



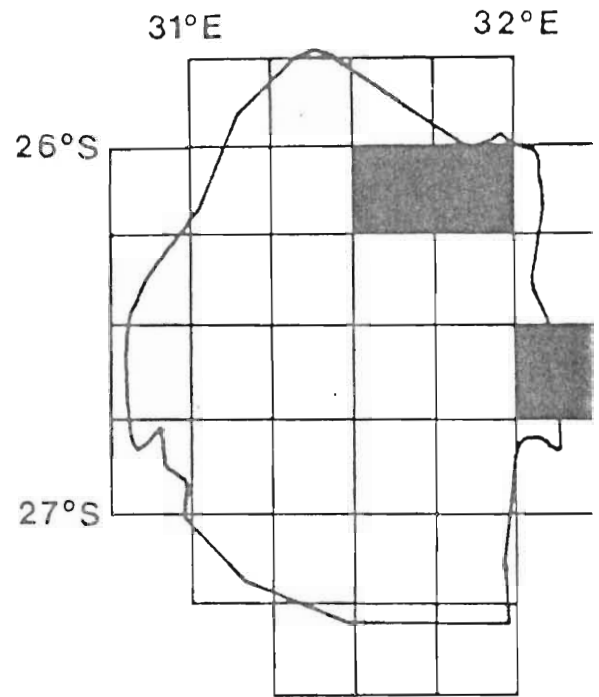
(35c) Prosymna ambigua stuhlmannii



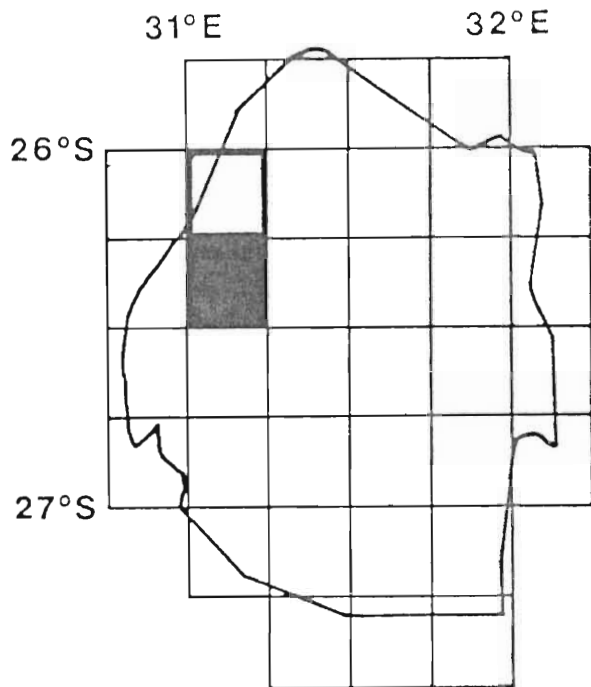
(35d) Meizodon semiornatus



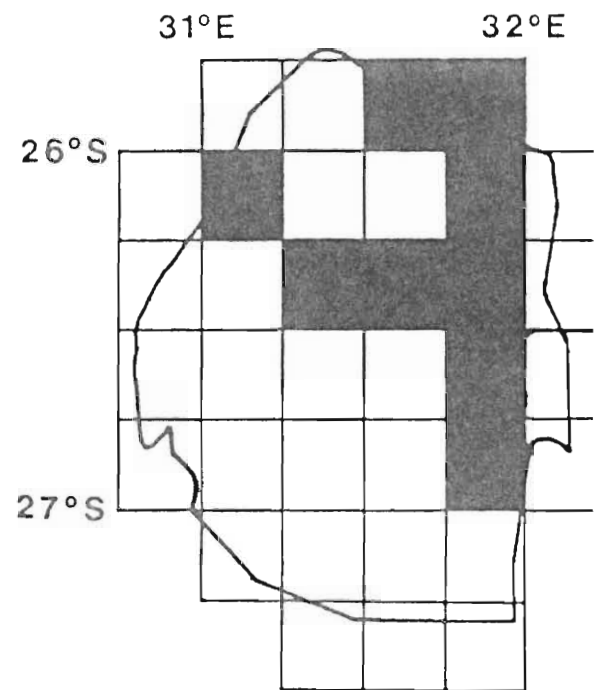
(36a) Philothamnus hoplogaster



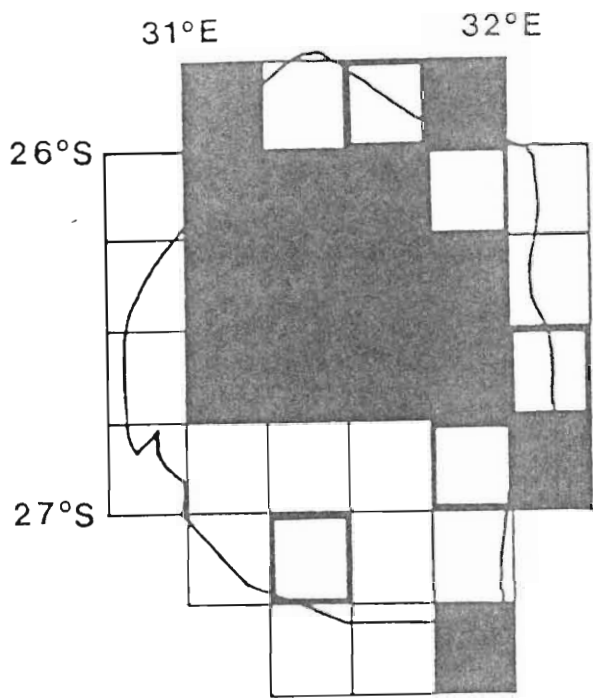
(36b) Philothamnus natalensis natalensis



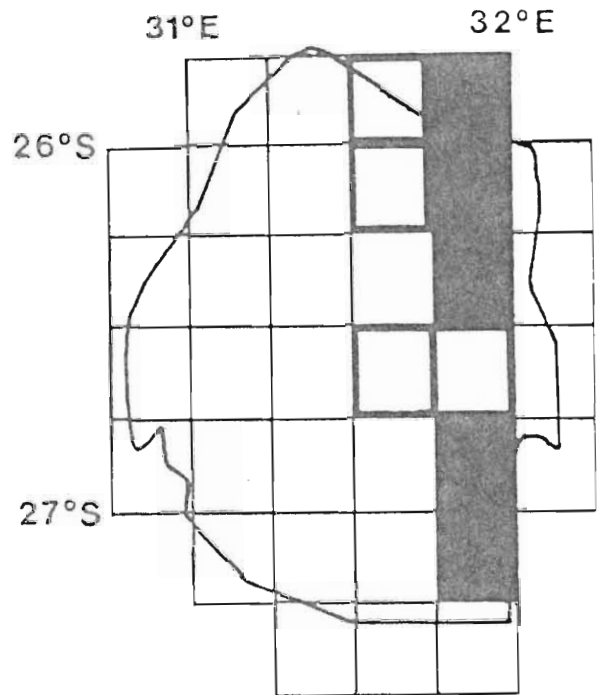
(36c) Philothamnus natalensis occidentalis



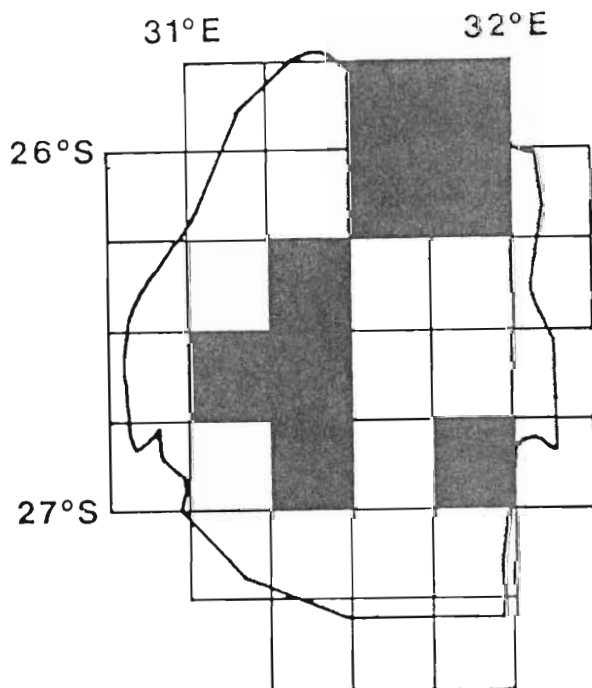
(36d) Philothamnus semivariiegat semivariiegatus



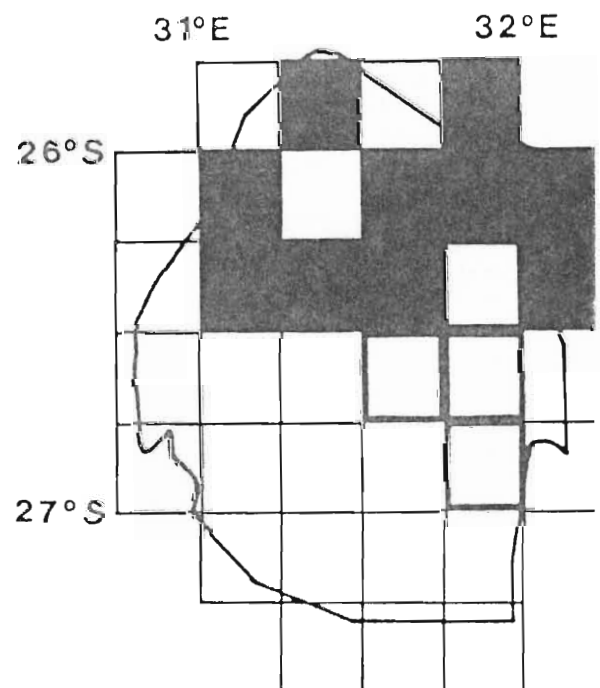
(37a) Crotaphopeltis notamboeia



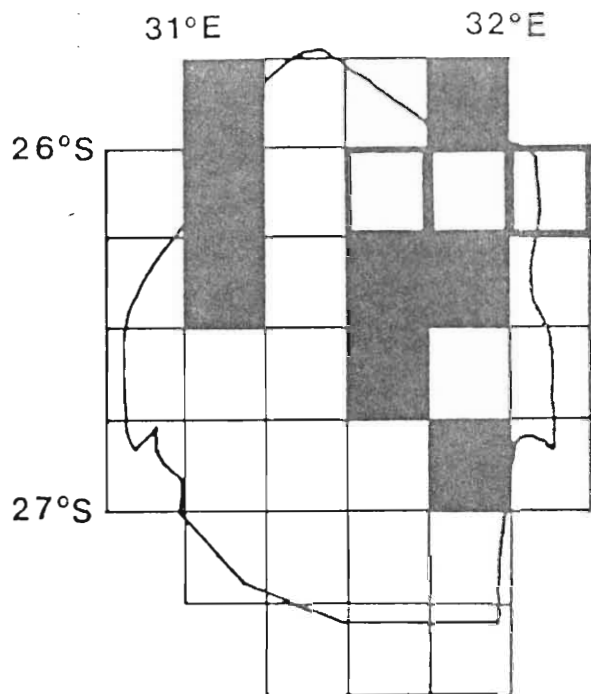
(37b) Dipsadoboa aulica aulica



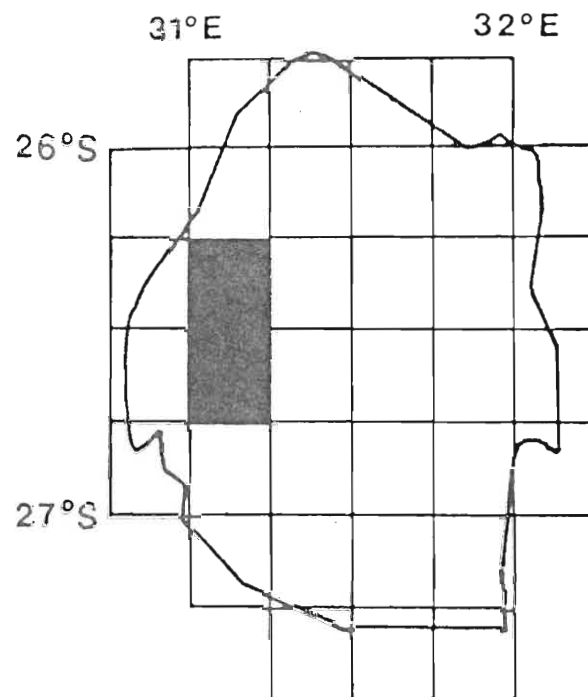
(37c) Telescopus semiannulatus semiannulatus



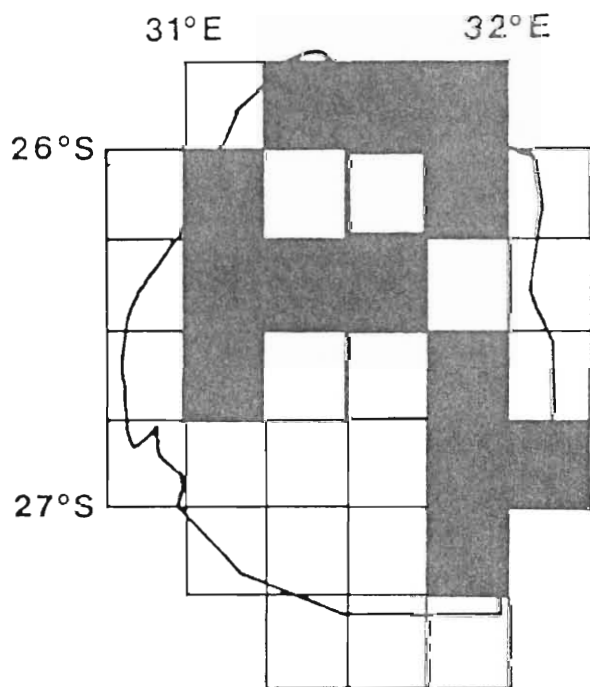
(37d) Dispholidus typus typus



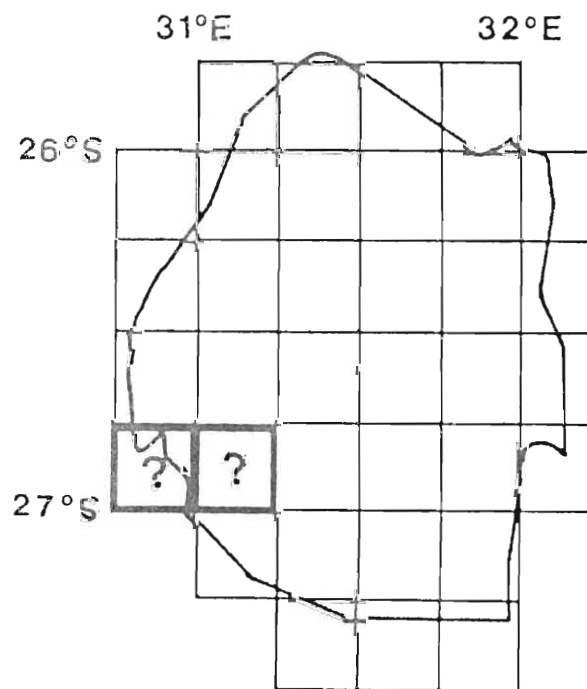
(38a) Thelotornis capensis capensis



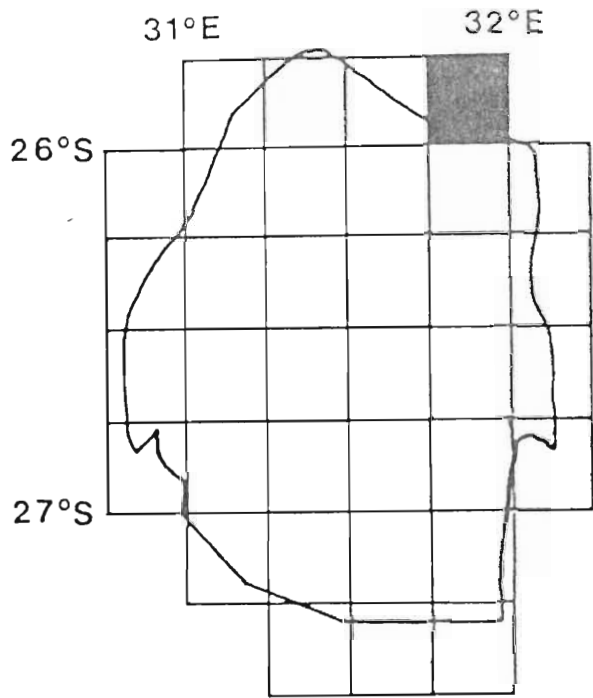
(38b) Dasypeltis inornata



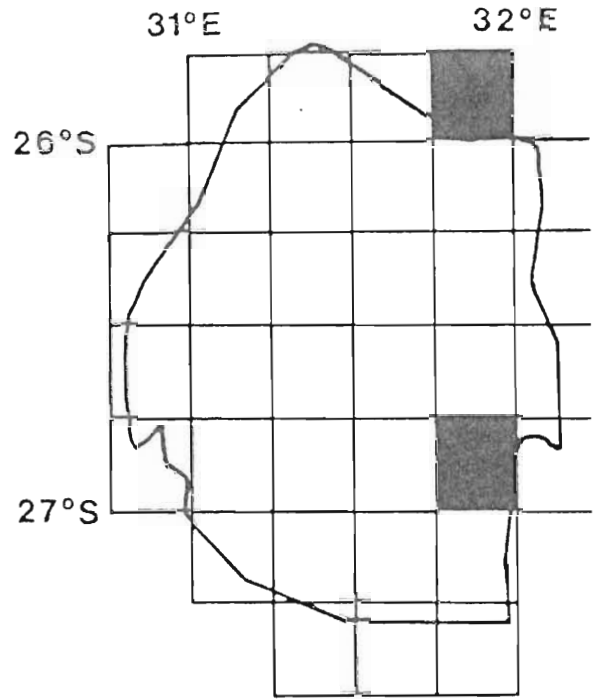
(38c) Dasypeltis scabra



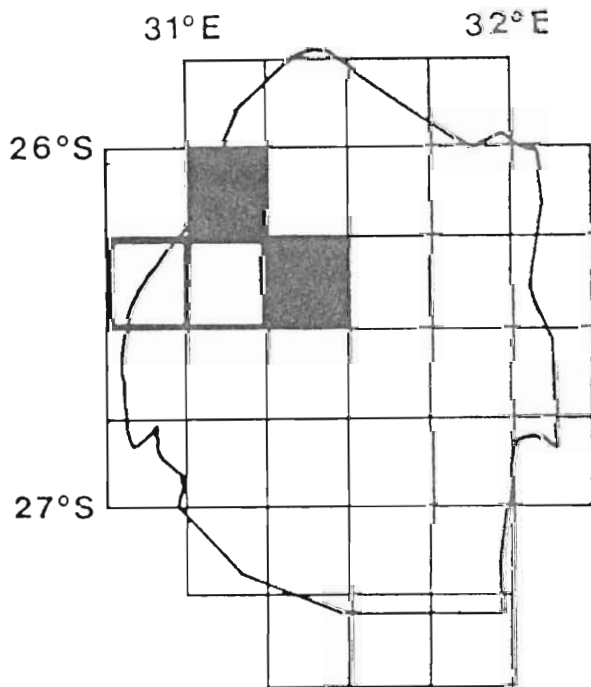
(38d) Elapsoidea sundevallii sundevallii



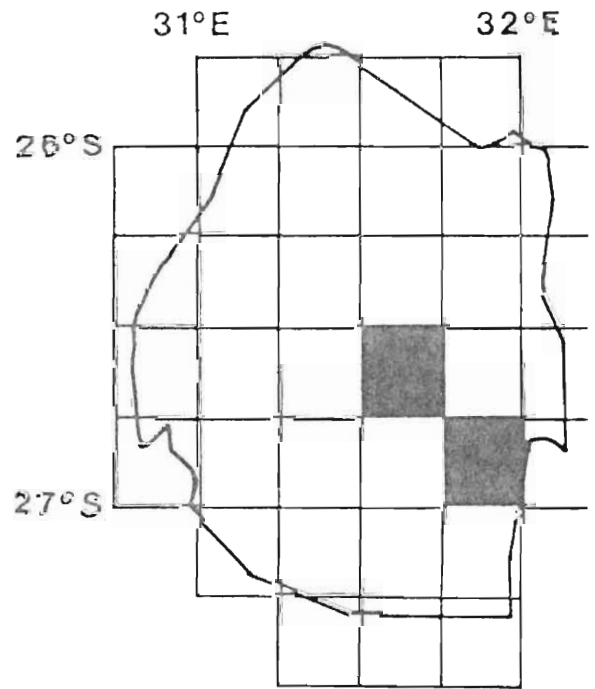
(39a) Elapsoidea sundevallii decosteri



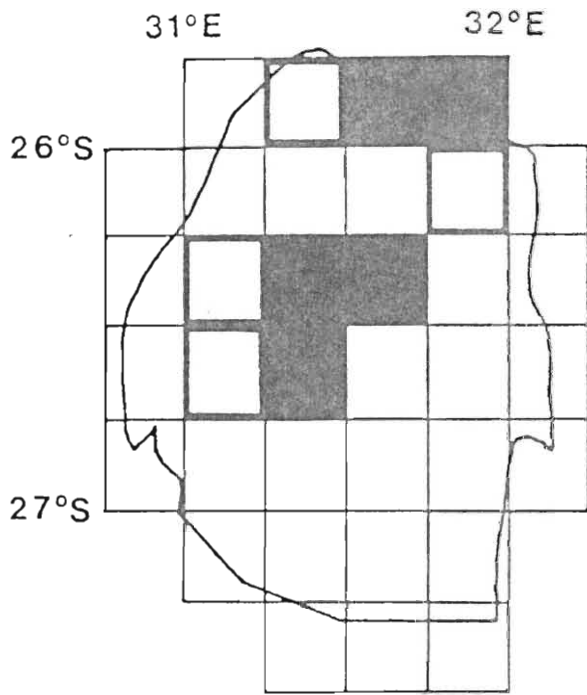
(39b) Elapsoidea semiannulata boulengeri



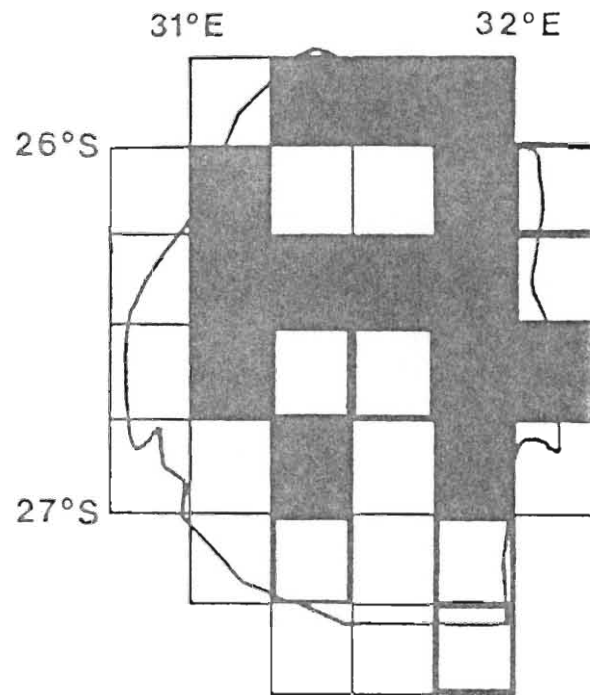
(39c) Hemachatus haemachatus



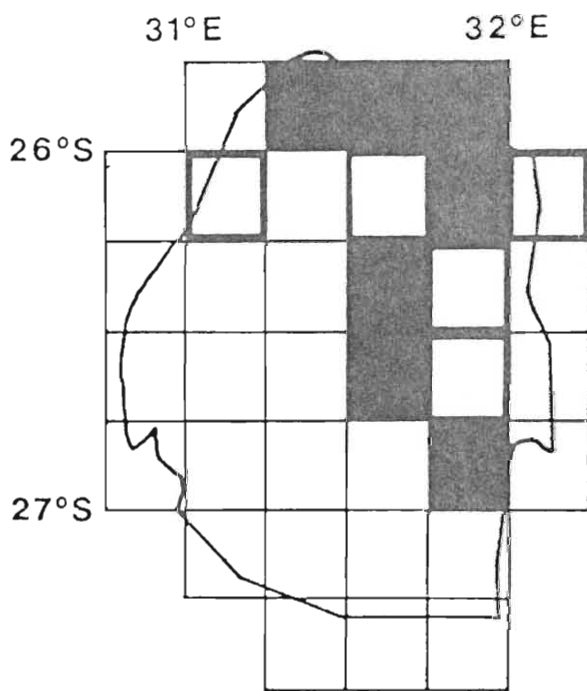
(39d) Aspidelaps scutatus intermedius



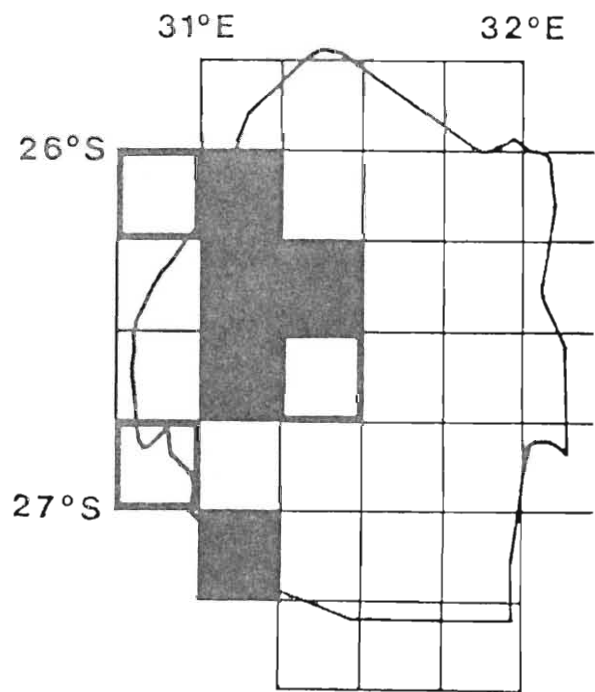
(40a) Naja haje annulifera



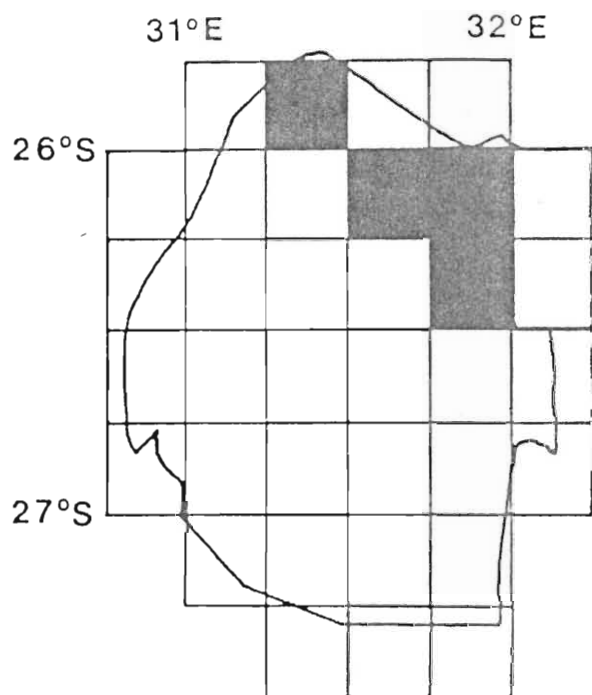
(40b) Naja mossambica



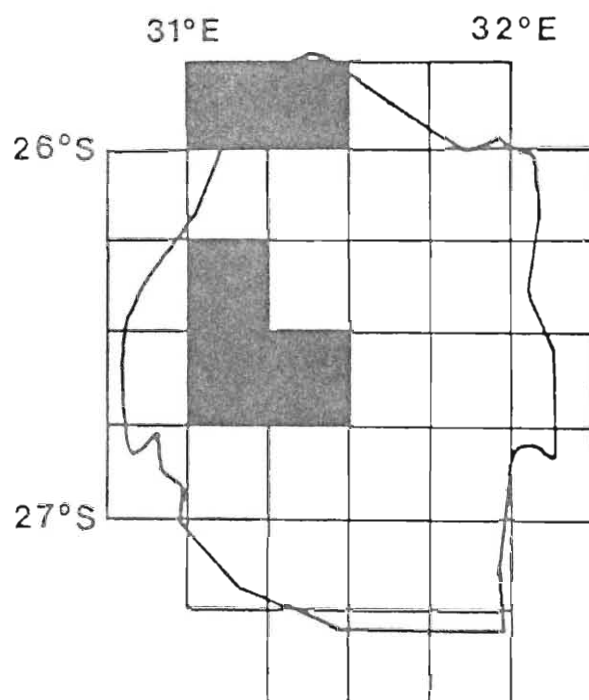
(40c) Dendroaspis polylepis



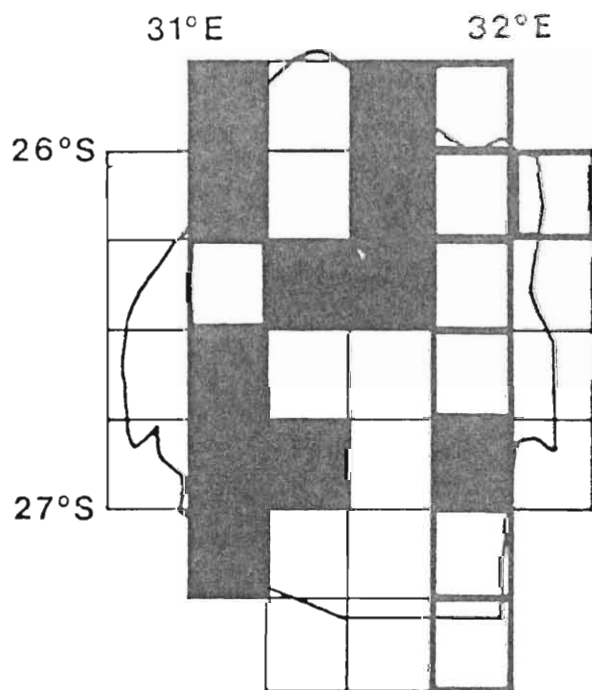
(40d) Causus rhombeatus



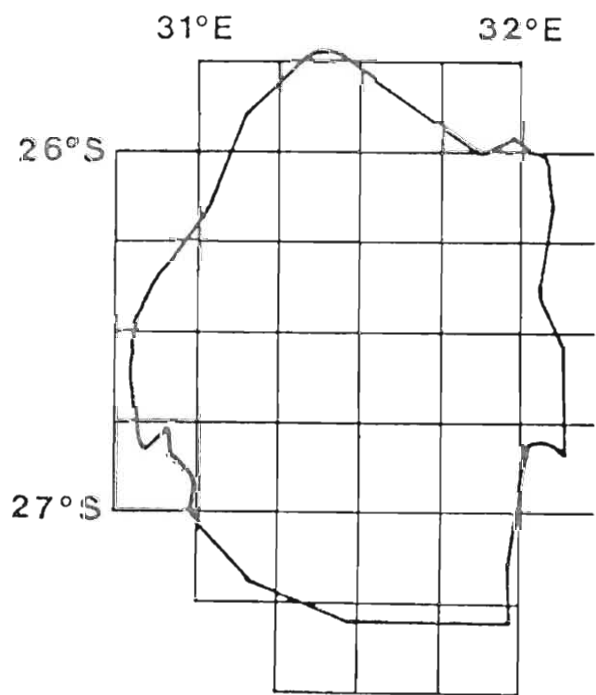
(41a) Causus defilippii



(41b) Bitis atropos



(41c) Bitis arietans arietans



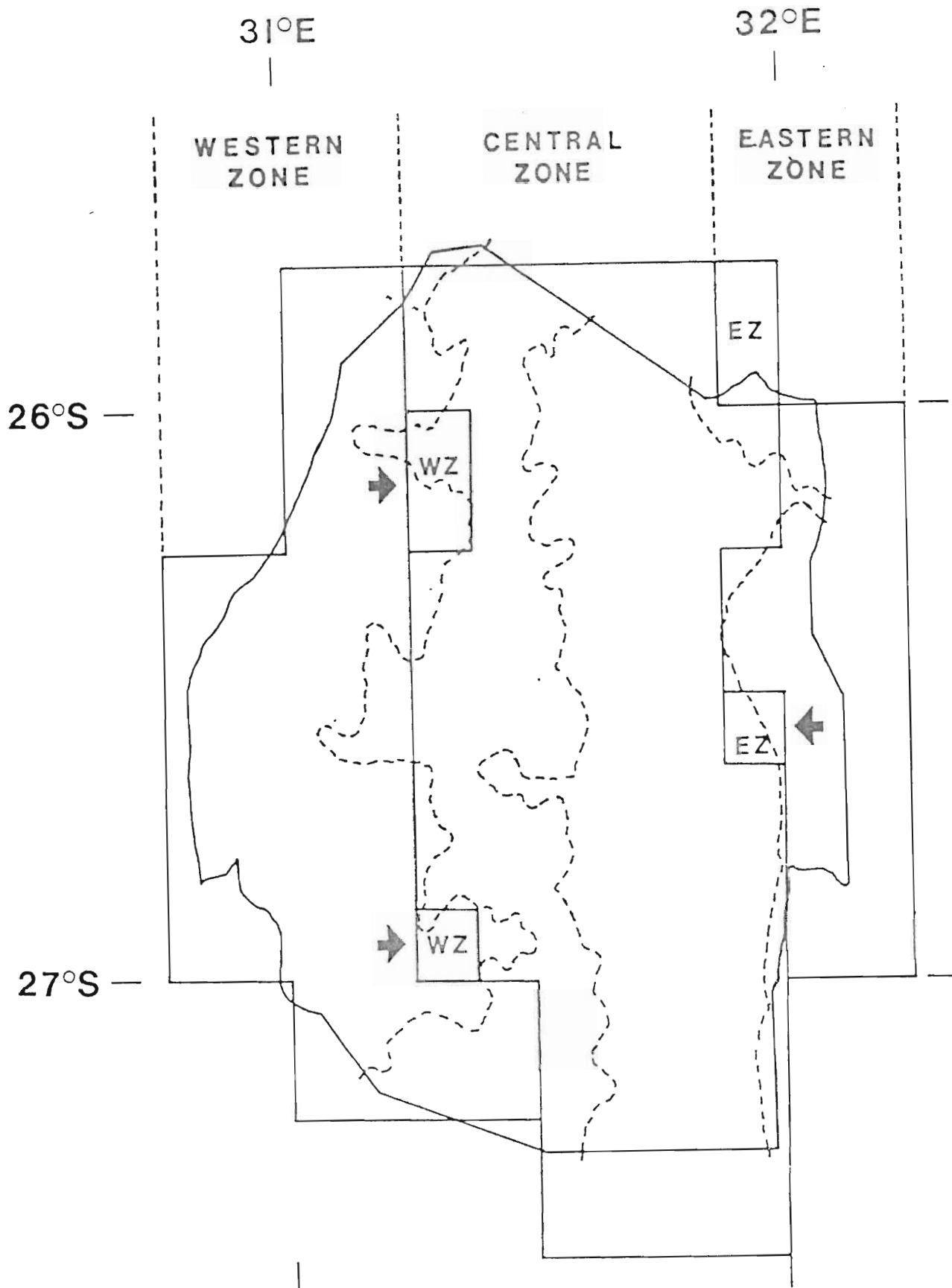


FIGURE 42. Regions defined by amphibian and reptile distributions (map shows quarter degree square overlay on the major topographical regions of Swaziland - eighth degree square adjustments have been made where necessary).

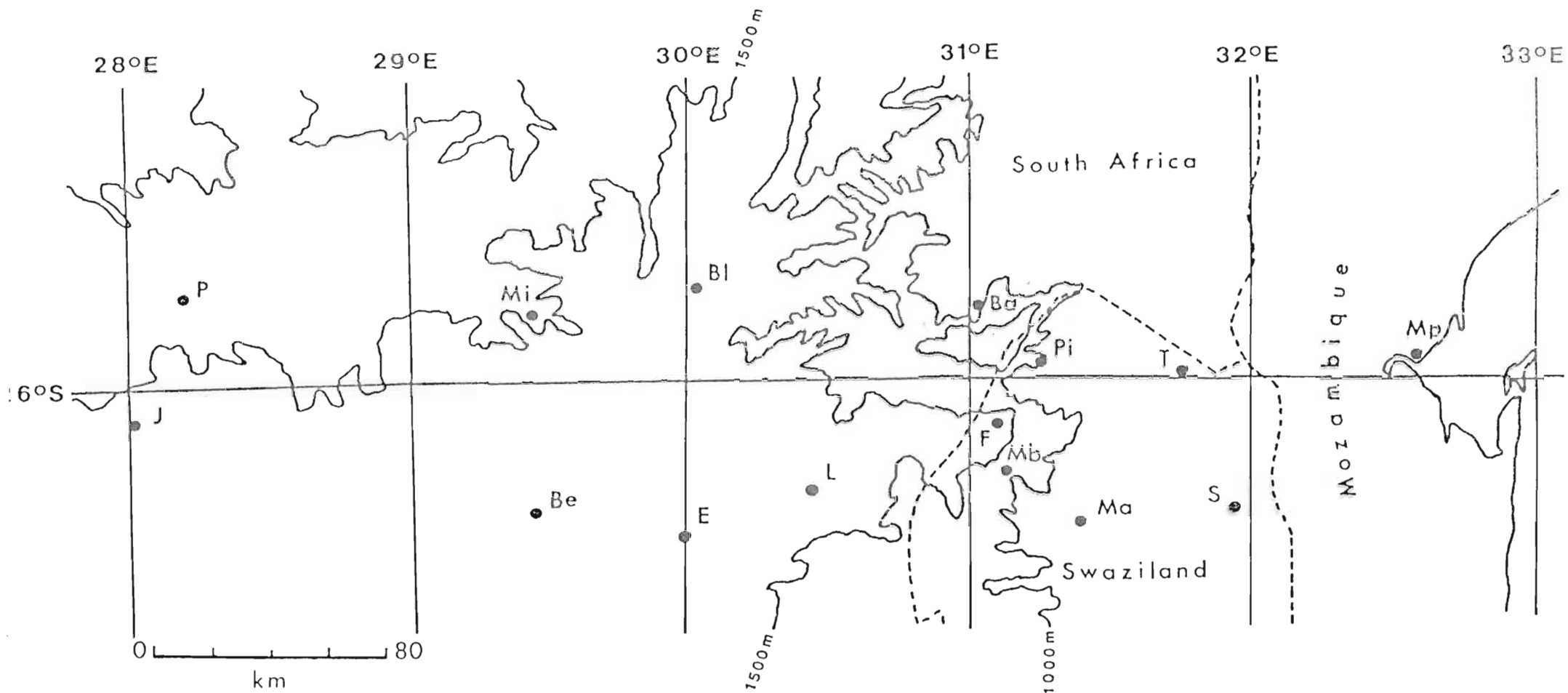


FIGURE 43. Map showing location of Maputo to Johannesburg transect. P= Pretoria, J= Johannesburg, Mi= Middelburg, Be= Bethal, E= Ermelo, Bl= Belfast, L= Lothair, Ba= Barberton, F= Forbes Reef, Mb= Mbabane, Pi= Pigg's Peak, Ma= Manzini, T= Tshaneni, S= Siteki, Mp= Maputo. The 1 000m and 1 500m contours are shown.