

NOTES ON SOME REPTILES COLLECTED IN THE RUKWA
VALLEY, S.W. TANGANYIKA.

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DURING 1955 and 1956 a collection of reptiles was made in the central area of the Rukwa Valley, Tanganyika Territory (fig. 1). In the present paper only 27 of the 29 species collected are dealt with as the data obtained on the two very common species *Agama cyanogaster* (Rüppell) and *Mabuja striata striata* (Peters) justify separate and more detailed treatment.

The Rukwa Valley has an altitude of 2,600 feet and is fully enclosed by escarpments and hilly country varying in height from 300 to 3,000 feet above the valley floor. The wet season lasts from November to April and the average annual rainfall is about 32 inches. The dry season is very severe and the temperature reaches 105°F. in October and November. Collecting was centred round Kafukola (fig. 1) where the three main habitats are open grassland, the woodland fringing the grassland and the wooded side of the escarpment to a point about 600 feet above the valley floor. Details of the vegetation and the characteristics of the different habitats are given by Pielou (1952) and Vesey-FitzGerald (1955).

All the specimens were dissected to determine the state of development of the gonads and in some cases the information obtained may be used as an indication of breeding. Juveniles were taken to be specimens which showed no visible sign of development of the gonads. The stomach contents were also examined and identified wherever possible. In all cases numbers in parenthesis show the numbers of specimens examined. In the following list of species the order is taken from Loveridge (1953).

CHELONIA.

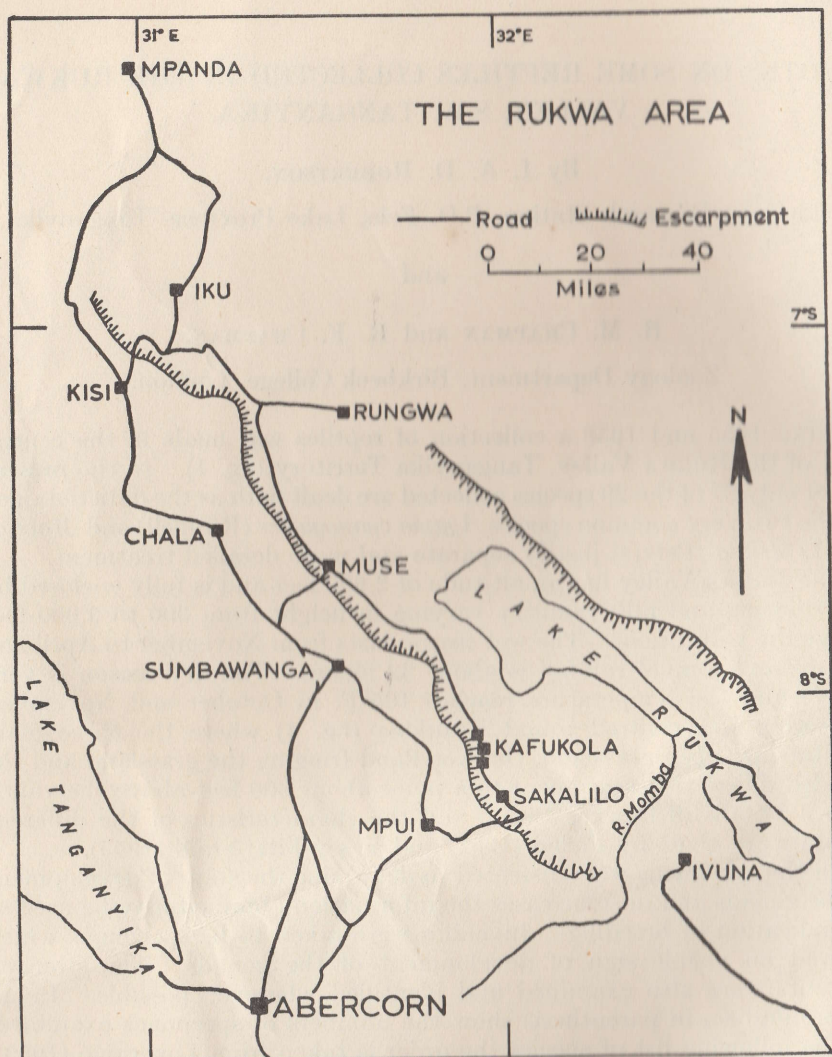
Testudinidae.

Kinixys belliana belliana (Gray).

A single specimen of this tortoise was taken on the side of the escarpment in January.

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Fig. 1



Map showing the position of the collecting area, centred round Kafukola.

LACERTILIA.

Agamidae.*Agama agama dodomae* (Loveridge).

One female and ten males were taken, all on the side of the escarpment. These lizards with their bright red heads and blue bodies were often seen basking on rocks, but they were alert and active and very difficult to catch.

The one female taken in October had ova of 2.5 mm. diameter in the ovaries. The smallest male, taken in July, had testes 2 mm. long, but others taken in September (1), October (5) and November (1) had testes ranging in length from 7 to 11 mm.

The stomachs of nine specimens were examined and contained Coleoptera (8), Hymenoptera (8), Lepidoptera larvæ (2), Heteroptera (1). Nematode parasites were found in the stomach of one specimen.

Agama mossambica mossambica (Peters).

A single female was taken in May within the forest edge. The stomach contained ants and a small Heteropteran.

Chamaeleonidae.*Chamaeleo dilepis dilepis* (Leach).

A total of 52 specimens was taken, all within the woodland. Twenty-eight were females, 22 males and two juveniles.

The gonads of 13 females were examined but in only one, a large specimen (301 mm.) caught in February, were the ova in the ovaries greater than 1 mm. in diameter. In this specimen the ova measured 5.5 mm. and there were 49 in the left ovary and 46 in the right. The other specimens examined were caught in April (2), May (1), June (4), July (2), August (2) and September (1). In two large specimens taken in April and May the oviducts were well developed.

The testes were measured in the 22 males and their average length, expressed as a percentage of head plus body length, gave the following results: February 7.3 (1), April 4.1 (2), May 4.5 (7), June 4.9 (6), July 5.2 (2), August 3.9 (2), September 4.1 (1), December 7.1 (1). The data are few but indicate greatest testis length in December and February. This corresponds with the single observation of developing eggs in a female in February. It is possible that mating takes place during the wet season, the two females found with well developed oviducts in April and May having already laid their eggs.

The stomachs of 52 specimens were examined and the contents are shown in Table I which shows that this species had a wide range of insect prey without any obvious preference.

Specimens of *Chamaeleo* were found in stomachs of the snake *Telescopus semiannulatus semiannulatus* (Smith).

Scincidae.*Mabuya maculilabris maculilabris* (Gray).

A total of 31 specimens were taken within the forest edge, 17 being males and 14 females. Most of the specimens were taken on or close to buildings.

The species is oviparous, large shelled eggs measuring approximately 14 × 9 mm. being laid. The gonads of 14 females were examined and

shelled eggs were found in the oviducts of the two specimens examined in July, the number of eggs present being 15 and 14 respectively. Specimens in June (2), September (1), and October (1) had large ova 8 mm. to 10 mm. in diameter in the ovaries and specimens in May (2) and November (2) had empty but well developed oviducts, suggesting that they might have already laid their eggs.

TABLE I.—The stomach contents of 52 specimens of *Chamaeleo dilepis*.

Contents	Number of stomachs	Contents	Number of stomachs
Empty	4	Insecta:	10
Unidentified	3	Odonata	32
Isopoda	1	Orthoptera	1
Feathers	1	Dictyoptera	14
Vegetable matter	1	Hemiptera Homoptera	4
Wood	1	Lepidoptera (adults)	9
Stones	1	Lepidoptera (larvæ)	11
		Diptera	6
		Hymenoptera	11
		Coleoptera	

The gonads of 17 males were examined and the average length of the testes expressed as a percentage of head plus body length. The results are inconclusive with the few specimens but suggest a steady percentage from March to September, with a definite drop in October and November.

TABLE II.—The stomach contents of 28 specimens of *Mabuya maculilabris*.

Contents	Number of stomachs
Empty	4
Unidentified	3
Insecta:	10
Orthoptera	1
Dictyoptera	2
Isoptera	2
Hemiptera Heteroptera	4
Lepidoptera (larvæ)	10
Coleoptera	1
Araneae	1
Solifugae	1
Diplopoda	3
Reptile skin	1
Bone	1
Vegetable matter	

The stomach contents of 28 specimens (Table II) indicated that the diet consisted largely of arthropods without any apparent preferences. The reptile skins were of *Mabuya* type and were very likely cast skins which had been afterwards sloughed. The pieces of bone could not be identified.

Mabuya planifrons (Peters).

A single male was taken in October on the side of the escarpment. The testes were 10 mm. long. The stomach was empty, but the tail and hindquarters of a small skink of the genus *Mabuya* were sticking out of its mouth.

Ablepharus wahlbergii (Smith).

A single male was taken in July in the fringing woodland. The testes measured 5.5 mm. and the stomach contained a small beetle.

Lacertidae.

Lacerta sp.

A single juvenile was taken in September on the side of the escarpment.

Latastia johnstoni (Boulenger).

Seven specimens were taken, five males and two females, five coming from the fringing woodland and two from the side of the escarpment.

The two females taken in April and May showed no development of the gonads.

The average testis length of the males was about three per cent of the total body length from April to November.

Three of the stomachs examined were empty and the others contained Coleoptera (3), Coleoptera larva (1) and Araneae (1).

Ichnotropis capensis bivittata (Bocage).

Seven specimens were taken within the woodland habitats, two males, two females and three juveniles.

The female taken in July had ova in the ovaries 2 mm. in diameter and shelled eggs in the oviducts measuring 13.5 mm × 6.5 mm., one only in each oviduct. The one taken in August had ova in the ovaries 5.5 mm. in diameter and containing yolk.

Two males were examined and the average testis length, expressed as a percentage of the total length, was 2.8 in May and 3.7 in June.

The stomach contents of five specimens were examined, one was empty and the others contained Acrididae (3), Mantidae (1), Isoptera (1) and Araneae (1).

Varanidae.

Varanus niloticus niloticus (Linnaeus).

Sixteen specimens were taken in all habitats and all near rivers. They were three females, six males and five juveniles. Two specimens were so badly damaged that their sex could not be determined.

In the three females one in May showed no signs of development of the ovaries, but the other two, taken in November and December, had ova in the ovaries of 4 mm. diameter.

In the six males, collected in March, May, June and December, the average length of the testes was 1.7 per cent of the total body length, and did not show any marked seasonal variation. The data are too few to allow any conclusions about the breeding season to be reached.

The stomachs of 13 specimens were examined, two were empty and three held material which could not be identified. The contents of the remainder were Muridae (3), Amphibia (1), Acrididae (2), Coleoptera (5) and Diplopoda (1). This is the only lizard taken in which the vertebrates form an appreciable part of the diet. In observations on a nesting colony of the white pelican (*Pelecanus onocrotalus*) on the shore of Lake Rukwa it was noted that *Varanus niloticus* was one of the major predators of pelican eggs.

OPHIDIA.

Typhlopidae.

Typhlops punctatus punctatus (Leach).

Two males were taken in April, both within the forest edge.

The testes were 5.4 and 6.0 per cent of the total length respectively. The stomachs of both specimens were empty.

Boidae.

Python sebae (Gmelin).

Six specimens were taken, four males, one female and one of undetermined sex. Two were taken within the forest edge, two on the side of the escarpment and two in the grassland, where they were taken in association with the scattered trees which follow the natural drainage lines on the plains. One within the forest edge was taken on a river bank.

The female taken in June had ova of 4.5 mm. diameter in the ovaries.

The average length of the testes of the males expressed as a percentage of total length was: June 7.9 (1), October 7.4 (1), November 1.1 (1), and December 1.4 (1).

The stomachs of two were empty and the other four contained the remains of rats, probably *Arvicanthus* sp.

Colubridae.

Boaedon fuliginosus fuliginosus (Boie).

Thirty-two specimens were taken, four females, eight males and twenty juveniles; they all came from the fringing woodland. The species was common and often found in and around buildings.

The females had developing ova in the ovaries in February, May and August, the specimen in May having 10 ova of 32 × 12 mm. in the ovaries. The specimen in September had ova in the ovaries of 6 mm. diameter and also seven eggs measuring 35 × 15 mm. in the oviducts.

The average testis length of the males expressed as a percentage of total length was: February 3.7 (1), April 2.7 (1), May 2.1 (3), June 2.8 (2) and November 3.1 (1).

Juveniles were taken in most months.

The stomach contents of 30 specimens were examined and 24 were empty. Four specimens had eaten rats, one being taken in the act of swallowing a Pygmy Mouse (*Mus minutoides*). One specimen contained a frog and one juvenile contained what was believed to be the contents of an egg.

Philothamnus semivariiegatus semivariiegatus (Smith).

Four specimens, one female and three males, were taken within the forest edge.

The female taken in January had ova of 2 mm. diameter in the ovary. The stomachs of all four specimens were empty.

Dasypeltis scabra (Linnaeus).

Two specimens, one male and one female, were taken, one being within the forest edge and one in the grassland.

The female, taken in December, had ova of 3 mm. diameter in the ovaries. The male, taken in October, had testes the average length of which, expressed as a percentage of total body length, was 5.7.

The stomachs of both specimens were empty.

Telescopus semiannulatus semiannulatus (Smith).

Fifteen specimens were taken, eleven from the fringing woodland and four from the side of the escarpment. One was taken in a sandpit, but several were taken in trees and two in the thatched roofs of houses. Five were males, six females, one juvenile and three were unsexed due to damage.

One female in July had large eggs of 24 × 11 mm. in the oviducts, there being five in one oviduct and four in the other. The specimen in May had nine ova of 9 × 4 mm. in the left-hand ovary and eight in the right-hand ovary.

The testes of the five males had a length of about 3 per cent of the total body length without any marked variation from April to August. The data are too few to allow any conclusions to be drawn.

The stomachs of twelve specimens were examined, six were empty and the others contained *Chamaeleo dilepis dilepis* (4), *Mabuya striata striata* (1), and reptile remains (1). It therefore seems that reptiles form the major diet of this snake, chamaeleons being important.

Crotaphopeltis hotamboeia hotamboeia (Laurenti).

Six specimens were taken, three within the forest edge and three in the grassland. Three were males, two females and one was unsexed due to damage.

The two females taken in December (1) and February (1) had ova in the ovaries of diameter 3 mm. and 2 mm. respectively.

In the two males examined in May and June the lengths of the testes were respectively 3.4 and 2.4 per cent of the total body lengths.

The stomachs were empty in all the specimens.

Hemirhagerrhis nototaenia nototaenia (Gunther).

Three specimens, one female and two males were taken, all within the forest edge.

The female, taken in November, had ova 2 mm. in diameter in the ovaries and in the two males, both taken in April, the average testis length expressed as a percentage of total length was 2.0 and 3.7.

The stomachs of the three specimens were empty.

Psammophis sibilans sibilans (Linnaeus).

Eleven specimens were taken, six males, three females and two which were damaged and could not be sexed. Eight of them came from the forest edge, one being taken up a tree, and three from the side of the escarpment.

Loveridge (1953) remarks that the anal scale is rarely entire and also that he found the tails of some of his larger specimens truncate. In our collection the anal scale was divided in nine specimens and entire in two, while two males of body length 1,064 mm. and 1,054 mm. had short tails of 146 mm. and 213 mm. respectively, the number of sub-caudals being 27 and 43.

In the three females examined, two, taken in November and December, had ova of diameter 2 mm. in the ovaries; the third, taken in July, had ova in the ovaries measuring 21 × 7 mm., 12 in the left ovary and 14 in the right.

The average length of the testes in the males, expressed as a percentage of total body length, was 2.7 in one specimen in February, but about 5.0 in five specimens collected from June to October. The data suggest that the testes are enlarged from June onwards.

The stomachs of nine specimens were examined, seven of them were empty and two contained the remains of rats. In one specimen Cestodes were found in the mesentery and body cavity.

Psammophis subtaeniatus sudanensis (Werner).

Seventy-eight specimens were taken, four from the grassland, 66 from the fringing woodland and eight from the side of the escarpment. Thirty-one were males, 28 females and 16 were juveniles, three being unsexed due to damage.

The gonads of 22 females were examined (Table III) and the results indicate that egg laying takes place in September and October. Two specimens in November and one in October had large oviducts and were

presumed to have laid their eggs already. The number of eggs in the oviducts of three specimens was 9, 20 and 20, the eggs being about 25 to 30 mm. long and 10 to 15 mm. broad.

The gonads of 27 males were examined and the average testis length expressed as a percentage of the total body length was: March 2.8 (1), May 2.8 (3), July 5.5 (3), August 5.0 (2), September 4.8 (6), October 3.8 (3), November 1.7 (2) and December 2.9 (7). The data suggest that the testes are largest from July to September, which is just before the females show eggs ready to lay.

The stomach contents of 76 specimens were examined. Fifty-seven were empty, 14 contained rats, one a juvenile *Varanus niloticus*, one the remains of a *Mabuya striata*, one a frog, and one the remains of an unidentified lizard. One specimen carried ticks, two had Cestodes in the gut and three had Nematodes in the wall of the body cavity.

TABLE III.—The development of the ovaries in female *Psammophis subtaeniatus*.

Month	No. of specimens with max. diameter (mm.) of eggs in ovary			No. of specimens with eggs in oviduct
	1-5	6-10	16-20	
March	1			
May	2			
June	2			
July	1			
August		1	1	
September	1			2
October	1	1		1
November	4			
December	4			

Psammophis angolensis (Bocage).

A single female was taken within the forest edge during May. There were ova of 2.5 mm. diameter in the ovaries. The stomach was empty.

Scaphiophis albopunctatus albopunctatus (Peters).

Thirty-two specimens of this beaked snake were taken, four on the side of the escarpment, 27 in the fringing woodland and one in the grassland. There were 11 males, nine females, ten juveniles and two which were not sexed because of damage.

Of the nine females, specimens in January (1), March (1) and April (1) had ova of 2 mm. in diameter in the ovaries, while in May two had ova of 9 mm. in the ovaries and in July four had ova in the ovaries ranging from 20 mm. to 41 mm. in diameter. These data suggest that egg development begins about May and continues at least until July, when, in some specimens, the eggs are ready to lay.

The average testis length when expressed as a percentage of total length was: February 2.2 (4), May 2.5 (2), June 4.4 (4) and July 3.6 (1). This suggests that there is a considerable increase in testis length in June and July, which agrees with the fact that egg development in the female begins in May.

The stomachs of 32 specimens were examined: 30 were empty, one contained an adult rat and the other four newly born rats.

Dispholidus typus (Smith).

A single female was taken within the forest edge in May.

There were 17 well developed ova in the ovaries, their average measurement being 25 × 15 mm. The stomach contained the remains of a lizard and a grasshopper.

Elapidae.

Naja nigricollis (Reinhardt).

Thirteen specimens were taken, one female, ten males and one juvenile; one was not sexed because of damage. Four were taken on the side of the escarpment and the rest in the forest edge.

The single female, taken in June, had large ova 10 × 5 mm. in the ovaries. The left ovary contained 22 ova and the right ovary 28. There were also many small ova visible ranging from 1 to 3 mm. in diameter.

The average length of the testes in nine males, expressed as a percentage of total length, was: June 2.8 (1), July 4.1 (1), August 4.1 (4), October 2.5 (1) and November 3.9 (1). The data are few but suggest an increase in testis size in July onwards. This agrees with the fact that the female had developing ova in June.

The stomachs of all 13 specimens were examined. Nine were empty, two contained rats, one a specimen of *Bufo regularis regularis* and the other had swallowed two bull frogs (*Rana adspersa*). This specimen also contained beetles, but they may have come from the stomachs of the partly digested bull frogs. Three specimens were carrying ticks.

Dendroaspis polylepis polylepis (Gunther).

Six specimens of the black mamba were taken, four in the forest edge and two on the side of the escarpment. Four were males, one female, and one was not sexed because of damage.

The female, taken in October, had ova measuring 8 mm. in the ovaries. In June a pair was seen copulating on the side of the escarpment.

The average length of the testes of the males, expressed as a percentage of total length was: January 2.3 (1), April 2.0 (1), June 1.5 (1) and November 1.7 (1).

The stomachs of five specimens were empty and that of the sixth contained the well-digested remains of a rat.

Viperidae.

Bitis arietans arietans (Merrem).

The puff adder was a common snake, 91 specimens being taken, 30 in the grassland, 56 in the fringing woodland and five on the side of the escarpment. Fifty-three were males, 24 females and 15 juveniles.

When the length of the tail was expressed as a percentage of total length it was found that in the 51 males the range was 8.9 to 16.5, with an average of 12.9 per cent, while in the 24 females the range was 6.1 to 8.9, the average being 7.4 per cent. In the ten juveniles the range was 6.2 to 8.1 with an average of 7.2 per cent which suggests that they were all females.

The gonads of the 24 females were examined and the results are shown in Table IV. The data show that egg development takes place from May to August, the largest eggs in the ovary being 24 mm. long by 16 mm. broad. In all ten specimens with large eggs in the ovaries there were more eggs in the right ovary (average 28) than in the left (average 15) while the number of eggs produced by a single female varied from 23 to 56 (average 42).

TABLE IV.—The development of the ovaries in female *Bitis arietans*.

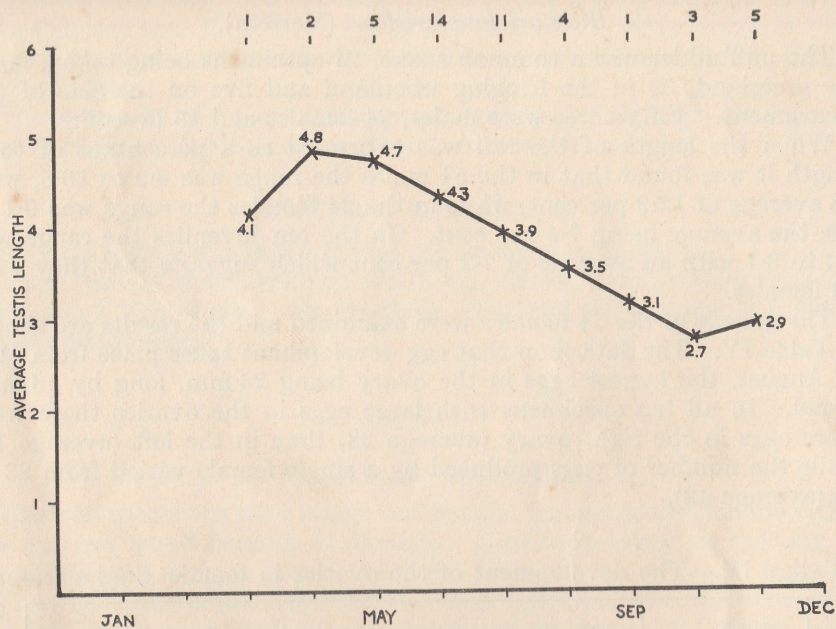
Month	Number of specimens with maximum diameter (mm.) of eggs in ovary				
	1-5	6-10	11-15	16-20	21-25
May					
June		1			
July	1		3	1	
August			4	4	2
October	1			1	
November	3	1		1	1

The gonads of the 46 males were examined and the average testis length expressed as a percentage of total length (fig. 2). The data suggest that sexual activity takes place from March to July and this agrees with the information of the development on the ovaries.

The stomachs of 89 specimens were examined and 66 were empty. Twenty-one contained rats and the other two contained the remains of small mice, one of which could be identified as belonging to the genus *Mus*.

SUMMARY.

Notes are given on the reproduction and stomach contents of twenty-seven species of reptiles comprising Testudinidae 1, Agamidae 2, Chamaeleonidae 1, Scincidae 3, Lacertilidae 3, Varanidae 1, Typhlopidae 1, Boidae 1, Colubridae 11, Elapidae 2 and Viperidae 1, collected in the Rukwa Valley, South-west Tanganyika during 1955 and 1956.



The seasonal change in the average testis length, expressed as a percentage of the total body length, of male *Bitis arietans*. Figures along the top show the number of specimens examined.

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