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REPORT ON A COLLECTION OF EAST AFRICAN SLUGS (UROCYCLIDAE)

By

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INTRODUCTION

Since the publication of my synopsis of East African slugs* further material has been collected by myself or handed to me for naming. Further collections are needed from all areas; even in Nairobi itself there is an elusive new species which has been collected only twice, neither specimen being in a state suitable to decide even the correct genus.

Since the appearance of the last part of the synopsis a most important paper has appeared; on the first page of my paper I mentioned that Dr. Sigrid Urban had written an exhaustive thesis on the anatomy and histology of Trichotoxon. This she found difficult to publish in East Germany but it has now been possible to publish it** in Belgium by the kind cooperation of Prof. Benoit of the Musee de L'Afrique Centrale, Tervuren. I have always advocated that the larger Urocyclid slugs would be ideal for teaching purposes in East Africa. The importation of snails from biological supply houses in Europe is absurd when local material is on the doorstep. Slugs are easier to prepare and dissect than snails. The publication of Miss Urban's detailed work renders it much easier to use the slugs for very advanced studies***. The following notes follow the order used in the synopsis and references are omitted. All the material is deposited in the Coryndon Museum, Nairobi.

ATOXON

One specimen, unfortunately badly preserved and accompanied by no colour notes was present in a collection of molluscs handed over to me for study by the Second Oxford University Tanganyika Expedition. As has been mentioned, the confusion in this genus is so great that the description of singletons is not advisable. Until large collections from type localities are available nothing

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* Vide this journal 23, 200-209 (1960), 23, 233-240 (1960) and suppl. 7, 1-36 (1961)

** 'Anatomie und Histologie von Trichotoxon thikensis Verdcourt, Ann. Musee Royal de L Afrique Centrale Sci. Zool. No.97, 114 pp. including 36 plates (1961) (note my original spelling thikensis is inaccurate - Trichotoxon is neuter and the specific epithet should be thikense. Miss Urban uses the correct spelling in her text but not on the cover of which she probably did not see proofs).

*** At the coast the large species of Achatina are ideal for dissection in schools. Anatomical studies have been carried out by Dr. Mead of several of our species (vide Mead, A.R. Comparative Genital Anatomy of some African Achatinidae. Bull. Mus. Comp. Zoo. 105, No.2 (1950)).

can be made of most of Simroth's species.

Atoxon ? sp. nov. (Figs.1,2,3)

Body "tadpole-shaped", forebody very swollen due to the extreme maturity of the genitalia, tail very slender and narrowed to the tip. The body is blackish-brown in colour, the mantle darker, with a few large spots; there are minute specks of white particularly below the mantle where the body is stretched and there is also an irregular pattern of larger, darker, brown marks. The foot is 18.5 mm. long and the body 7 mm. wide. The mantle is 10 mm. long, the prominent pulmonary aperture 4 mm. from the anterior margin; the pallial hole is stretched wide open, 1.5 mm. long, showing the white shell nucleus beneath. The hind body is not keeled and is 9.5 mm. long measured along the dorsal surface.

The shell is oblong-oval and quite thick for such a small species, 4.5 mm. long and 2.75 mm. wide, greenish-white with a greenish-brown hyaline margin, the nucleus situated right on the posterior margin, striate very finely concentrically and extremely finely radially; the crystalline structure of the shell is irregular.

The genitalia are mature and are figured in fig.2, the elongate spermatheca passes very gradually into the shorter duct. The liver extends backwards to a fine point about 3 mm. from the tail end of the body.

TANGANYIKA. Western Province, Mahari Mountains, Kasangazi, in the axils of old outer leaf bases of wild banana by streams, 4500 ft. alt., 29 Sept. 1959, leg. D.H. Eccles. Although the combination of small size and very pointed tail probably indicate specific distinction, the shape may be partly due to bad preservation. The position of this form is left until more material is available; it is considered, however, useful to put the details on record since spirit material is always in danger of being spoiled. Atoxon brunneum Simroth would appear to be the nearest affinity.

Atoxon flavum Simroth

The single specimen is rather damaged, the shell being missing, but the characters fit well with Simroth's species. The body is pale brownish-ochre with dark grey-brown spots; the spots are arranged in irregular bands on either side of the mantle and the hind body (Fig. 4). The mantle is 1.2 cm. long and the back 2 cm. long; the sole is 3 cm. long and 4 mm. wide (1.3:1.3:1.3). The tail is slender but the gut area very swollen. The spermatheca is sausage-shaped, 4.5-5 mm. long, with a globular central swelling due to a spermatophore and the duct is 5 mm. long.

UGANDA. Kigezi District, Kisizi Falls, 30 miles from Lake Bunyoni, 1960, leg. J.D. Goodman.
Two lots of this genus, collected outside of East Africa have also been examined.

Atoxon sp. nov. (Figs. 5,6)

Body 2.4 cm. long, grey-buff without any marks; mantle 10.5 mm. long, grey-buff with irregular black markings. The whole slug is granular. Hind body slightly keeled towards the tail. Pulmonary aperture about 4 mm. from the posterior mantle margin. Sole 2.2 cm.

long, the areas 1.3,1.3, and 1.3 mm. wide respectively. The genital anatomy is that of Atoxon; there is no trace of a dart sac, nor does it seem likely that one would develop later. The hermaphrodite gland is placed at the extreme end of the viscera behind the liver and was the only part of the genital system which was found to be fully developed.

In the area from which this slug was collected only Urocyclus species have been previously recorded. Some of these have not been dissected and may be generically wrongly placed. However, the present slug does not match any of the descriptions of Urocyclus available to me. Although it seems unwise to describe it without more mature material, it is worth a full mention since it represents the most southerly occurrence of a species of Atoxon.

PORTUGUESE EAST AFRICA. Gorongoza Mountain, 4000 ft., Sept. 1957, 1 small specimen and 2 very small specimens, leg. E. Pinhey.

Atoxon hildebrandti Simroth

This species is the genotype of the genus Atoxon and recently Mr. C.F. Hemming has presented to me several specimens collected near to the type locality, presumably the first obtained for about 75 years.

The largest specimen in lot M 166 has the body 5.1 cm. long, the sole 4.5 cm. long and 7.5 mm. wide and the mantle 2.6 cm. long. Apart from the general colours mentioned below, the whole of the mantle and hind body are strongly reticulate, the paler brown areas filled with white pigment specks and the grooves forming the reticulation dark brown. The mantle is brown with an obscure dark stripe on either side; to the outside of these stripes the mantle is paler. The flanks are pale grey-brown but the back is darker, with a line of dark spots on either side and a few scattered spots above and below the line. The pulmonary aperture is 12.5 mm. from the posterior margin of the mantle, which is strongly sinuate. The shell is oval, callus-filled, but with a very hyaline margin, pale horn-coloured, with a white raised nucleus, well overhanging the posterior margin, glossy, with concentric and radial striae, 8.5 mm. long and 5.5 mm. wide. This specimen was dissected and the genitalia are figured in Fig. 7a. The hermaphrodite gland is 8 mm. long and 4 mm. wide, buried just in front of the last lobe of the liver; the duct is 38 mm. long. The spermatheca was swollen with a large smooth spermatophore and measured 16 mm. in length and 5 mm. in width, with duct about 5 mm. long. The flagellum is minute but the lime gland is 33 mm. long outstretched. Another specimen from lot M 166 had a very leathery integument; the body was 4.4 cm. long and the mantle 1.95 cm. long. The whole body is very reticulate, a dark blackish reticulation marking off paler brownish areas. The general colour of the mantle is dark grey with black side bands, the marginal areas to the outside of the bands pale with black spots. The sole and the flanks below the mantle are pale, unspotted, head blackish-grey above. Hind body grey-brown above, paler beneath, the median line obscure, brownish and not raised in a keel; the sides are densely spotted with fairly large, dark blackish spots. In a smaller specimen from the same lot, the spots on the hind body are reduced to a single narrow, somewhat interrupted band on each side. Neither of these two further specimens was dissected.

The single specimen forming lot M 167 had a total length of 3.7 cm. and a breadth of 1.1 cm.; the sole is 7 mm. wide, each area about 2.3 mm. wide. The mantle is broad, 1.7 cm. long, markedly sinuate along the posterior margin, grey-brown with an obscure blackish interrupted line on either side. The back is grey-brown above with a brownish, unraised median line, and paler ochraceous below, with some black spots. The pulmonary aperture is 8.5 mm. from the posterior margin of the mantle. In this specimen the hermaphrodite gland and duct are exactly as in M 166 but other organs are rather smaller, particularly the spermatheca (containing no spermatophore) which measures 8.25 mm. long and 3 mm. wide with a duct about 4 mm. long (fig. 7b). The lime gland is 27 mm. long. The overall reticulation of the body is just as noticeable as in M 166.

The two baby slugs comprising lot M 172 are believed to be this species but the genitalia are completely lacking. The body is 2.2 cm. long and the mantle 9.5 mm. long, the general colour brownish with a dark line on either side of the mantle and a few obscure dark marks on the hind body.

SOMALI REPUBLIC, N.REGION. Upper Sheik, under a stone in shade of Acacia, 4650 ft., 17 September 1960 (one) and 19 September 1960, leg. C.F. Hemming M 166. Ala'ouleh, 9 miles W. of Sheik, in gardens watered by a spring up a narrow side valley; the spring is within a few feet of the lowest Juniper and the area is really in Buxus hildebrandtii, 5600 ft., 18 September 1960 (one), leg. C.F. Hemming M 167. Wagger Mts., under stone in shaded site in grassy high valley between ridges, 5000 ft., leg. 19 September 1960 (two small slugs).

TRICHOTOXON

Trichotoxon heynemanni Simroth

A greenish-white slug with black grooves on some parts of the hind body.

TANGANYIKA. East Usambaras, Kwamkoro, on leaves of undergrowth in rain forest, 16 May 1961, leg. W. Wilkinson.

Trichotoxon thikense Verdcourt

A cream coloured slug with purple fringe, about 7 cm. long. In the Kimakia specimens the dart sac is 2.2 cm. long.

KENYA. Naivasha District, Bamboo Forest, Sasumua pipe line road, 11 Dec. 1960, Polhill, Verdcourt and Lucas 208 (two specimens). Naivasha District, Bamboo Forest, near Kimakia, 11 Dec. 1960, Polhill, Verdcourt and Lucas 205 (four specimens).

Trichotoxon bambuseti Verdcourt & Polhill

A speckled white and grey slug, the oblique grooves on the back white, the zones between brown, marbled with dendritic white markings. The dart sac is 17 mm. long and 6 mm. wide, it is bifid slightly at the apex but the emargination is filled up with the lower parts of the oviduct and spermathecal duct.

KENYA. Naivasha District, Bamboo Forest, on Sasumua pipe line road, 11 Dec. 1960, Polhill, Verdcourt and Lucas 206.

Trichotoxon copleyi Verdcourt subsp. copleyi

A small specimen, deep rich brownish-ochre coloured with grooves of hind body a much darker brown.

KENYA. Machakos District, Uuni, in hollowed tree branch, in Acacia-Combretum scrub with scanty grass and herbs on hillside, low (c. 20 inches?) rainfall, 4500 ft., 23 Nov. 1960, leg. W.Wilkinson.

Trichotoxon copleyi Verdcourt ? var.

The following slug may be only a colour variant of T.copleyi. It was brought to me alive and the colours were taken from life. Outstretched it measured 12 cm. long; unstretched it measured only 6 cm. long, and after drowning and preserving in spirit, 6.5 cm. The head is blackish-grey; mantle and body dark brown, strongly shagreened, the small raised areas convex; mantle and fringe slightly darker than the hind body, sole grey-brown with middle area pale bistre. In spirit the general colouration is purple-brown, the sole dull purple-brown with middle area pale grey-white. The dart sac is 8-9 mm. long, slightly curved and very obtuse at the apex. More adult material is required of this form. It may well be a local colour variant. The Mua Hills have been separated from other areas by seasonally dry plains for a very long time although they are only a short distance from Nairobi.

KENYA. Machakos District, Mua Hills, 17 May 1961, leg. J.G. Williams and B. Parsons.

Trichotoxon copleyi Verdcourt var.

This is adult material of the Kitale form mentioned on p. 29 of my synopsis.

Body (contracted in spirit) about 6-8 cm. long. Sole with mid-area about 4 mm. wide and outer areas 4.5-5 mm. wide. Mantle 3.2-3.7 cm. long and back 3.7-4 cm. long. Back dark grey-brown, paler below the mantle but darker than in the Nairobi form. Shell greenish-horn coloured, 10-11 mm. long and 8-9 mm. wide. The dart sac is 2.2-2.8 cm. long and contains about 17 very slender darts 20-25 mm. long The spermatheca is 8-9 mm. long and 3.5-5 mm. wide and the duct 1.5-2.5 cm. long (Figs. 8, 9).

KENYA. Kitale, April 1961, leg. A.V. Bogdan (12 specimens).

Also in this area is a spotted slug which probably belongs to the same species. The body is grey-brown with brown spots; the fringe is more or less white with dark lines; mantle granular. This was seen between Hoeys Bridge and Kitale but not collected.

Trichotoxon copleyi Verdcourt var.

The following also appears to be a dark form of copleyi. It is much contorted due to the method of preservation. The dart sac is 2.6 cm. long, truncate at the apex; the spermatheca is sausage-shaped 1.3 cm. long and 2-3 mm. wide, the duct 2.4 cm. long.

KENYA. Masai District: Olosendo, N.E. of Lolgorien, GZM 603723, 19 June 1961, leg. M.D. Gwynne.

Trichotoxon (Atrichotoxon) usambarense Verdcourt

In spirit the hind body of this slug is pale purplish-brown and

the mantle is a little darker. The mantle is 2.9 cm. long and very granular with slightly raised, round protuberances, 0.5-1 mm. across, which in life may have been more elevated. The hind body is 4.7 cm. long. The genitalia are shown in fig. 10.

TANGANYIKA. East Usambaras, Kwamkoro, on leaves of undergrowth in rain forest, 15 May 1961, leg. W.Wilkinson.

Unidentified species

The following six species could not be referred to their genera since the genitalia were undeveloped. More adult material is needed of all of them; at least some are new species.

1) A slightly granular slug, whitish in colour, speckled with liver-red-purplish specks; a lateral band on each side of the mantle composed of many blackish dots. Mantle 8.5 mm. long, hind body 8 mm. long, very slightly keeled throughout.

KENYA. Meru, in litter of upland rain forest, 5500 ft., Oct. 1960, leg. Verdcourt & Polhill 184.

2) A pale bistre slug with pale brown spots on the hind body and about ten darker brown spots scattered near the keel, which is not raised, save at the extreme end. There is a pale brown band on either side of the mantle made up of coalescent spots and the area between is speckled with minute brown spots. The mantle is 10.5 mm. long and the hind body 13.5 mm. long.

KENYA. Nairobi, found on a banana, probably introduced on it from elsewhere in the territory, leg. B. Verdcourt.

3) A white slug with a slight greyish tinge. The mantle bears some characteristic grey marks made up of minute grey dots (Fig.11) The sole measures 3.7 cm. long and its areas 1.5, 1.0 and 1.5 mm. in breadth respectively; the hind body is 1.7 cm. long, scarcely keeled and the mantle is 1.8 cm. long. The shell is thick, oblong-ovate, of a very pale yellow-brown horn colour with a prominent white nucleus. It measures 5.3 mm. in length and 3.5 mm. in breadth and has concentric striae with some prominent radial wrinkles between some of the outer striae. The genitalia were completely immature. It may be a species of Atoxon.

KENYA. Nairobi, in banana plant, leg. Alexander.

This is undoubtedly the same species as the slug collected in Nairobi by J.G. Williams mentioned on page 32 of my synopsis. It should not be long before some adult material is collected and the species can be described.

4) An almost transparent slug with the dark gut showing through the body wall, mantle a very pale olive green; in spirit the body appears cream all over. The hind body has a very strong keel. Possibly a very juvenile Trichotoxon.

KENYA. Nyambeni Hills, Kirima Peak, in upland rain forest, 6500 ft. leg. Hemming, Howland & Verdcourt.

5) A pale cream slug with one faint band on either side of the mantle. Total length 2.2 cm., mantle 0.85 cm. long and hind body

1.3 cm. long.

TANGANYIKA. East Usambaras, Kwamkoro, on leaf of undergrowth, in rain forest, 17 May 1961, leg. W.Wilkinson.

6) A greyish-white slug with sole pure white, mantle and hind body characteristically speckled with numerous minute black specks, a band on either side of mantle and body made up of larger black spots. A pale line along the back, which is not raised in a keel, is devoid of spots. The head and neck have a pavement effect of grey areas with white grooves between (Fig. 12).

The genitalia of this specimen were vestigial but suggestive of Trichotoxon sensu stricto. Further material should be looked for of this almost certainly undescribed species.

TANGANYIKA. East Usambaras, Kwamkoro, under bark of log in rain forest, 18 May 1961, leg. W. Wilkinson.

Geographical Distribution of the Urocyclidae

From the point of view of distribution, so far as present knowledge is concerned, the family can be divided into two groups

A. Small genera confined to limited areas
Leptichnus (Tanganyika)
Phaneroporus (Tanganyika)
Estria (Guinea)
Aspidelus (Cameroons)
Buettnerella (Angola)
Kirkia (Portuguese East Africa, a doubtful genus)
Microcyclus (Togo)
Urocyclus subg. Mesocyclus (Uganda, Toro)
Urocyclus subg. Comorina (Comoro Islands)
Varania (Cameroons, a dubius genus described from a badly preserved specimen obtained from the stomach of a monitor)

B. Widespread genera. Only these are marked on the accompanying maps (Figs. 13 and 14)

1) Atoxon. This genus extends from the Al Mountains in N. Somalia, Ethiopia (Arussi-Galla), Kenya, Uganda, E. Congo, Tanganyika to Portuguese East Africa and Lower Congo (Kuako). It is found in forest areas of limited extent on mountains surrounded by very arid country, as well as in extensive rain forest, mostly 4000-7000 feet.

2) Dendrolimax. This extends from Princes Island, S. Tome and W. Africa across to Thika in Kenya. Lower altitudinal limits not known but certainly extends up to 5000 ft. The presence of this genus at Thika is remarkable but the affinities of the organisms in the gorges are diverse. Many of the molluscs have "north-south affinities", one of the plants (Heywoodia lucens) has a peculiar disjunct distribution including Natal and Bukoba; the Nandi Flame trees (Spathodea campanulata) in the gorges certainly appear to be native, indicating another Western affinity.

Bukobia. Mostly in W. Uganda and near Lake Victoria with one species near Nairobi in Kenya. Mostly about 4000-7000 ft.

Urocyclus sensu stricto. There is an error in my synopsis part 2, p. 237. The genus does not occur in the Mascarene Islands proper (i.e. Mauritius and Réunion) but in the Comoro Islands and Madagascar, Natal, Portuguese East Africa, Tanganyika coast, Pemba Island and Kenya coast, at just above sea level to about 4300 ft. A species described from Cape Town has dubiously been ascribed to this genus but needs recollecting. It may not even have been a Urocyclid.

Trichotoxon. The typical subgenus extends from the coast to Kenya, N. Tanganyika, Uganda and to the eastern Congo. Subgenus Polytoxon has a similar distribution but is rarer towards the coast and extends further north to Kulal and the S.E. Sudan. The two small subgenera Atrichotoxon and Spirotoxon are complicated since two of Simroth's species are devoid of proper localities and one Ethiopian locality has not been traced. Other species come from East Usambaras, Kingani River and Teita Hills.

In a study of the Miocene Molluscs of Kenya (in the press) I have shown that Urocyclid slugs, probably species of Trichotoxon and Atoxon, were abundant at Rusinga and Mfwangano, now islands in E. Lake Victoria. Similar fossils possibly of Miocene age have been picked up at Mara Bridge. Slug shells fossilise easily. In the Chania Gorge at Thika, Mr. Polhill has found old callus-filled shells in the soil (Polhill 116), presumably those of fairly recent Trichotoxon thikense.

C. Piersanti (Miss.Biol.Sagan-Omo, Zool. 6, 263-5 figs. 1 & 1A (1941) has described a Urocyclus (Parmarionopsis) elbannoensis from El Banno, but without further material (the original three examples were destroyed during the war), it is not possible to decide what genus the species belongs to, since none of the internal anatomy is described, save for three photographs of the radula. Topotypic material will be easily recognised since he describes the external characters and the shell in some detail. His reason for the new subgenus is not clear but he says it is intermediate between Urocyclus and Parmarion (an oriental genus). From the radula alone I am not able to identify the genus. Only topotypic material will solve the problem. El Banno is in the Tertale province of Ethiopia, to the east of Lake Stefanie.

(Received 21st. November 1961)

Fig. 1

Fig. 10

East African Slugs

Fig. 2

Fig. 3

Fig. 4

Fig. 12

Fig. 11

Fig. 5

Fig. 8

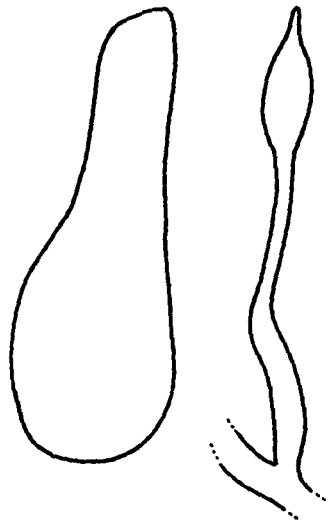
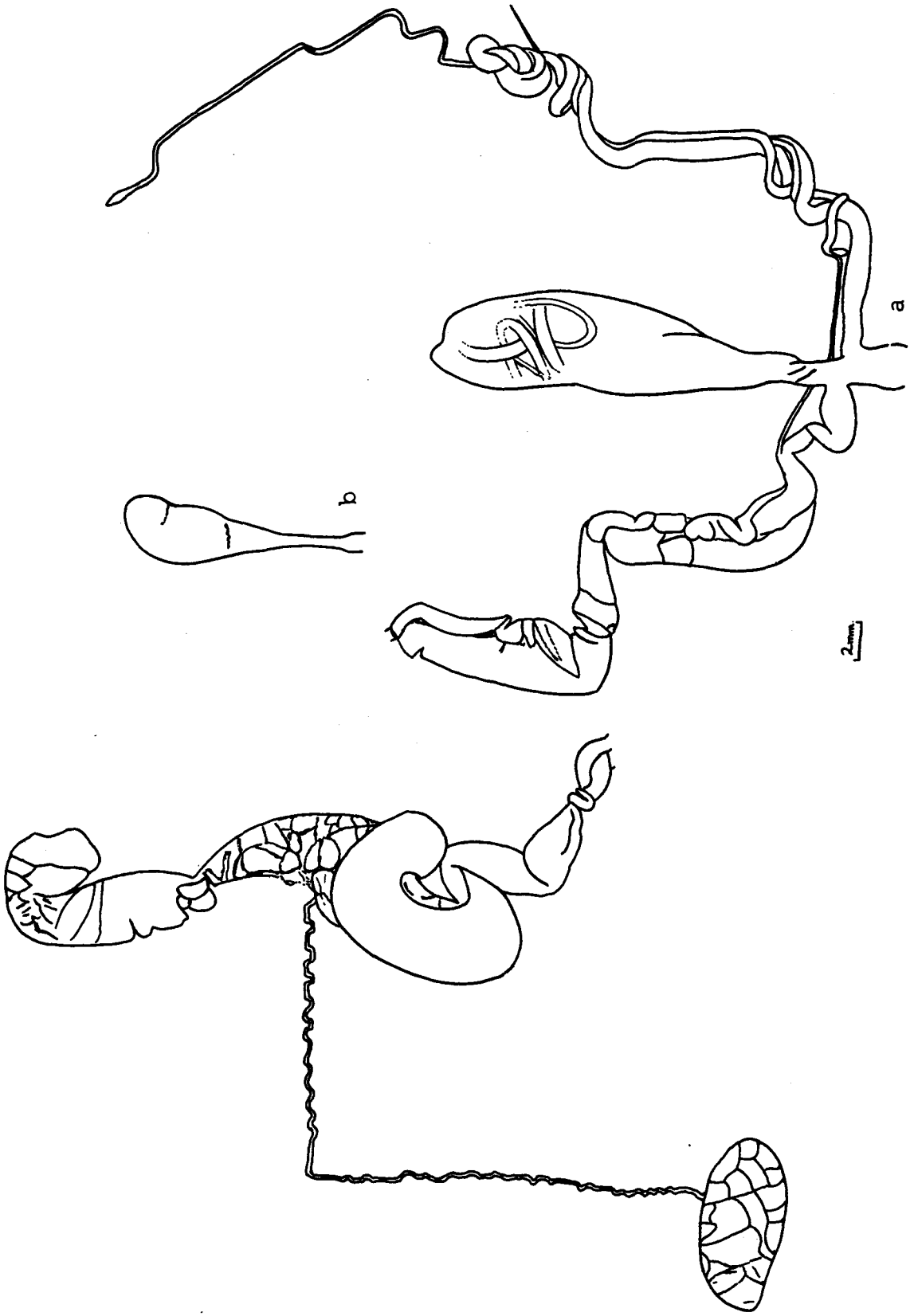


Fig. 9

East African Slugs



East African Slugs

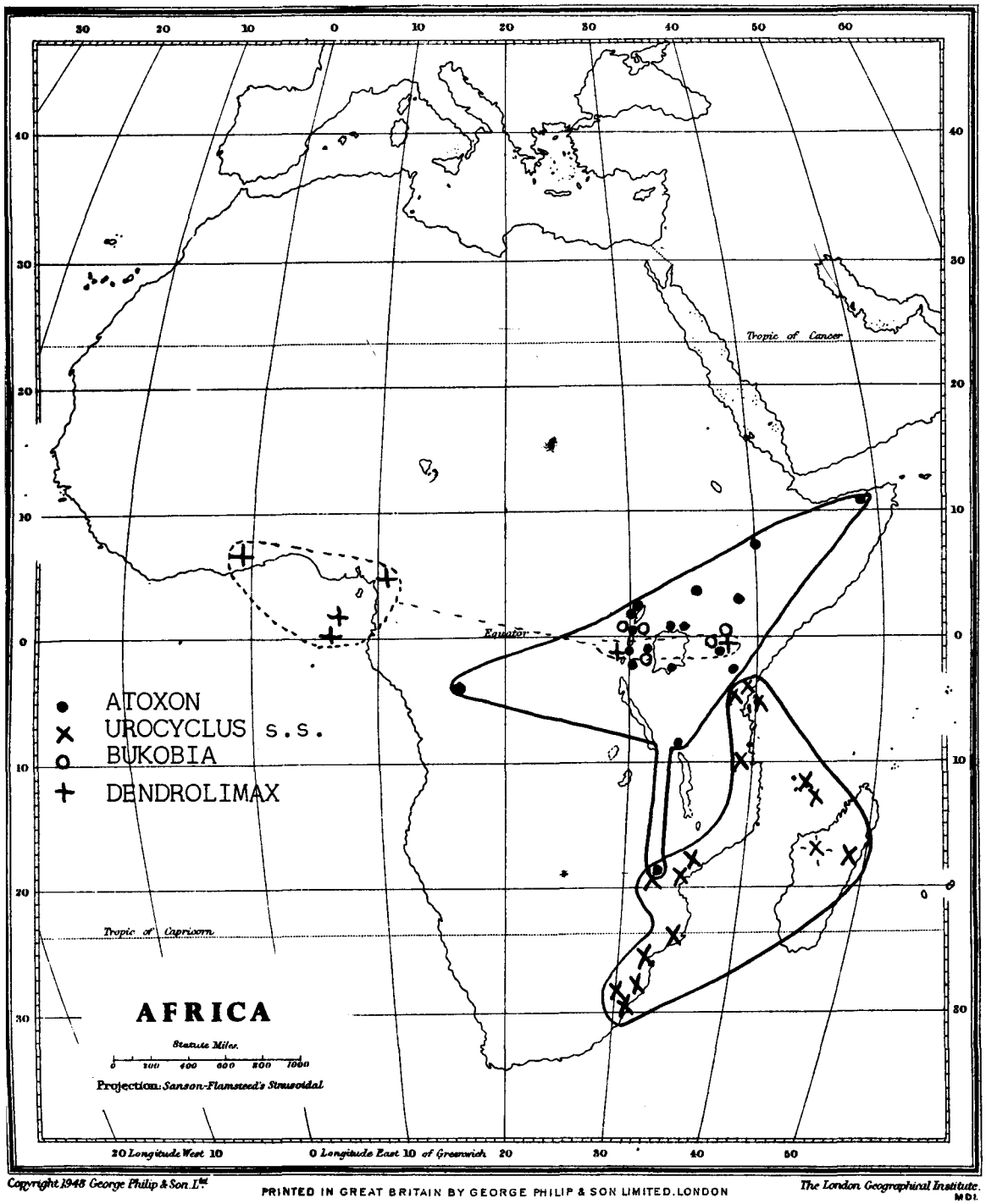


Fig. 13 Slug distribution

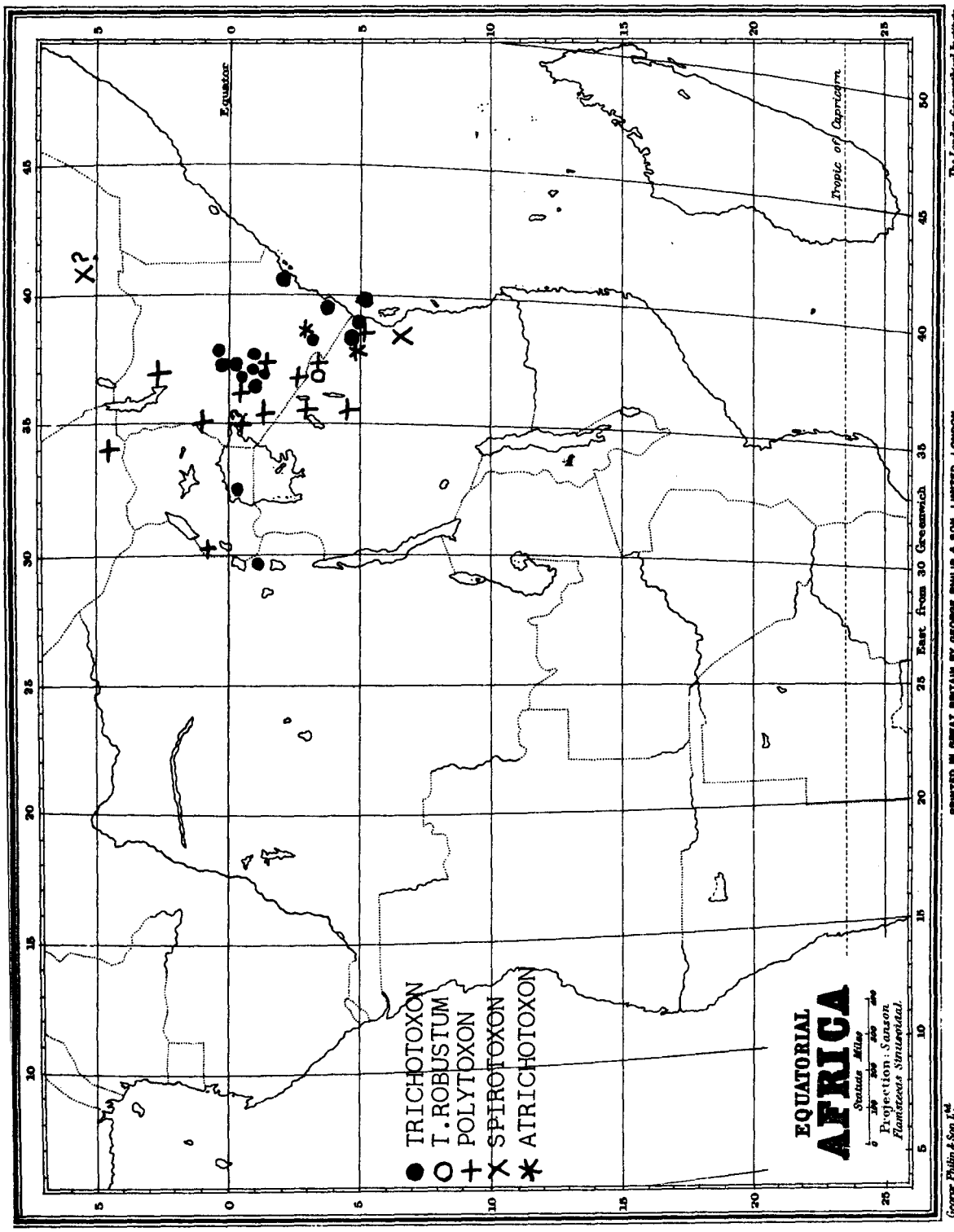


Fig. 14 Slug distribution