

Emphysetes udzungwensis, a most remarkable new genus and species of slug from the Udzungwa Mountains in southern Tanzania (Gastropoda, Pulmonata, Urocyliidae)

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Emphysetes udzungwensis is described as a new genus and species of urocyliid slug from the Udzungwa Mountains (Eastern Arc mountains) in southern Tanzania. The head and anterior part of the mantle in the living animal is inflatable and the hind body bears a keel. The anatomy resembles that of *Atoxon* in general particulars.

Key words: Gastropoda, Pulmonata, Urocyliidae, slugs, *Emphysetes*, taxonomy, Udzungwa Mts., Tanzania, East Africa.

INTRODUCTION

In September 1985 I was sent two slugs for examination which had been collected on grasses on 16 August 1985 in *Ocotea-Hagenia* forest at 1900–2300 m in the Udzungwa (Uzungwa) Mts. in the Iringa District of Tanzania by J.B. Hale and W.A. Rodgers. The slugs were said to be yellow and 10 cm long. In spirit the body was buff with a dull purple fringe; the back is strongly keeled from mantle to caudal gland. Dissection revealed



Fig. 1. Group of *Emphysetes udzungwensis* spec. nov. (arranged on leaf by collector), Tanzania, Udzungwa Mts Mt. Luhomero, 2200 m, Quentin Luke photo, October 2000.

an *Atoxon*-like anatomy with no accessory organs. There is a strong thick-walled muscular vagina not containing darts but with a pilaster divided at both ends into close folds; the flagellum is long and the lime-gland small but distinct. The material was sent to Dr J.L. Van Goethem in Brussels who could not identify it (see also Van Goethem, 1977) and nothing further was done.

In October 2000 Quentin Luke sent me a photograph (fig. 1) of a group of slugs he had encountered on Mt. Luhomero in the Udzungwa National Park on 5 October 2000 at 2200 m in bamboo-*Ocotea-Hagenia* forest. The photograph depicts slugs showing characters I have never noticed myself in living Urocyclidae nor seen reported in the literature. The head and anterior part of the mantle is inflated and the hind body bears a broad elevated keel developed to a varying extent up to 1 cm tall, occupying a short distance or the entire distance from the posterior edge of the mantle to the keel. This photograph was also sent to Dr. Van Goethem. I wrote to the collector that I thought his slugs must belong to an undescribed species but nothing could be done without preserved material. He finally obtained some in October 2002, one of three specimens being more or less adult. At this stage I had entirely forgotten the material collected by Hale and Rodgers. I found later that I had filed a copy of Luke's photograph with my account of this earlier collection. Hale and Rodgers had not commented on any inflation of the body but a dissection of Luke's specimens revealed that the two collections made in much the same place in the same type of forest are undoubtedly conspecific. Preserved material shows no obvious trace of the inflated head or keel.

Abbreviations for museum collections are IRSNB for Institut Royal des Sciences Naturelles de Belgique (Brussels) and RMNH for National Museum of Natural History (Leiden).

DESCRIPTIONS

Emphysetes gen. nov.

Emphysetes is closest to *Atoxon* Simroth, 1888, which it resembles in the genitalia without accessory organs but differs in being strongly keeled for the whole length of the hind body, in its curious powers of inflation and in detailed structure of the penis. In immature specimens the atrium is distinct but when mature the male and female ducts are almost or quite separate at base. Vagina muscular and oviduct oblong-ellipsoid, roughly equal in length; spermatheca exceeding the duct in length. Penis slender, tubular, sinuous; outer integument thin, covering the thick muscular wall about as thick as the lumen which ends in a thick white conical hollow organ containing a conical papilla; the thick tissue above this contains transverse ridges; penial retractor weak and accessory muscles lacking; lime gland adnate to vas deferens; hermaphrodite gland not at extreme end of body cavity; flagellum long; tentacular retractor passing to right of penis between it and female ducts. Jaw typically oxygnathous but central lobe reduced and rounded. *Pseudatoxon* Van Goethem, 1975, differs in the hind body not being keeled, the atrium very well developed and radular teeth with very long mesocones. *Atoxonoides* Van Goethem, 1973, also differs in not being keeled and in the aorta.

Type species. — *Emphysetes udzungwensis* spec. nov.

Derivation. — From Greek 'εμφωνητής' 'one who inflates'; gender masculine.

Emphysetes udzungwensis spec. nov. (figs 1-7)

Material examined. — Tanzania, Iringa District, Udzungwa (Uzungwa) Mts., in *Ocotea-Hagenia* forest, 7°45'S, 36°35'E, 1900-2300 m, J.B. Hale & W.A. Rogers leg., 16 August 1985 (IRSNB, 2 paratypes); Udzungwa Mts., Udzungwa Mountain National Park, Mt. Luhomero, in bamboo-*Ocotea-Hagenia* forest, 2200 m, Quentin Luke leg., October 2000 (photograph: fig. 1); same locality, Quentin Luke leg., October 2002 (RMNH 96325/holotype; RMNH 96326/2 paratypes).

Diagnosis. — A large urocyclid slug capable of inflating its head and all or parts of its well marked keel; anatomy resembling that of *Atoxon* in general particulars.

Description. — Body (in spirit) ochre-coloured with fringe of chocolate-brown or sometimes blackish, expanding over the caudal pore. Outer areas of foot sole pale brownish, inner ochraceous, all pustulate; tentacles grey, contrasting clearly with the body. In life the animals are creamy-buff to yellow or buff, sometimes marked with orange-brown blotching behind the mantle and fringe orange-brown; tentacles black. Animal capable of inflating head and keel.

Shell oblong-elliptic, quite strongly calcified, 8 mm long, 5 mm wide; posterior margin quite near the nucleus, faintly emarginate; no obvious pore above shell.

Genitalia (fig. 2). Vagina 3.5 mm long; spermatheca sausage-shaped, once or twice constricted at the apex, 7 mm long, 2 mm wide, the duct somewhat shorter, 5 mm long. Oviduct oblong-ellipsoid, 5 mm long, 2.5 mm wide. Albumen gland 11.5 mm long, 4 mm wide; duct of hermaphrodite gland slender, 19 mm long, somewhat convoluted near the albumen gland. Penis sinuous, tubular but narrowing towards epiphallus, 12 mm long, 1.5 mm wide near base; penial papilla 0.8 mm long; penial retractor not strongly developed; flagellum about 18 mm long.

Jaw (fig. 3) 4.2 mm wide with thickened part 0.8 mm long. Radula (figs 4-7) about 2.9-3.3 mm wide with formula 35 : 30 : c : 30 : 35; marginals unicuspid.

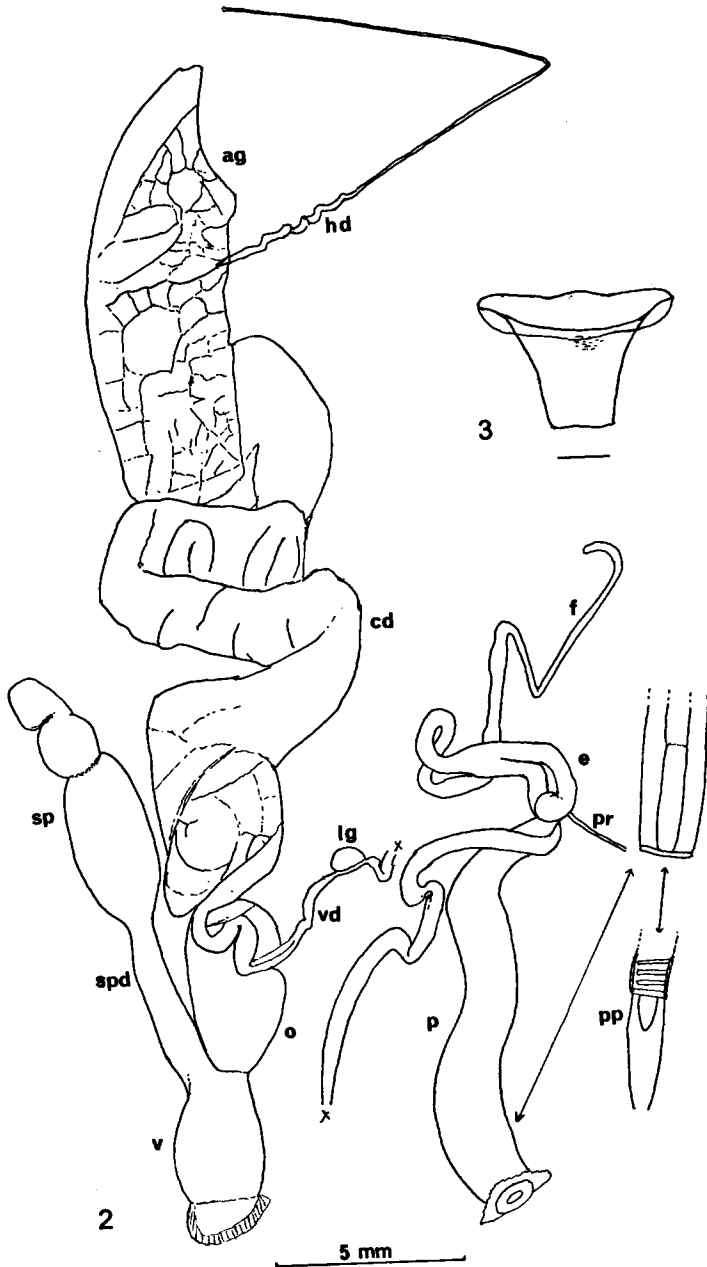
Dimensions. — Animal 5.5-7 cm long in spirit, but 10 cm or more in life (fide collectors).

DISCUSSION

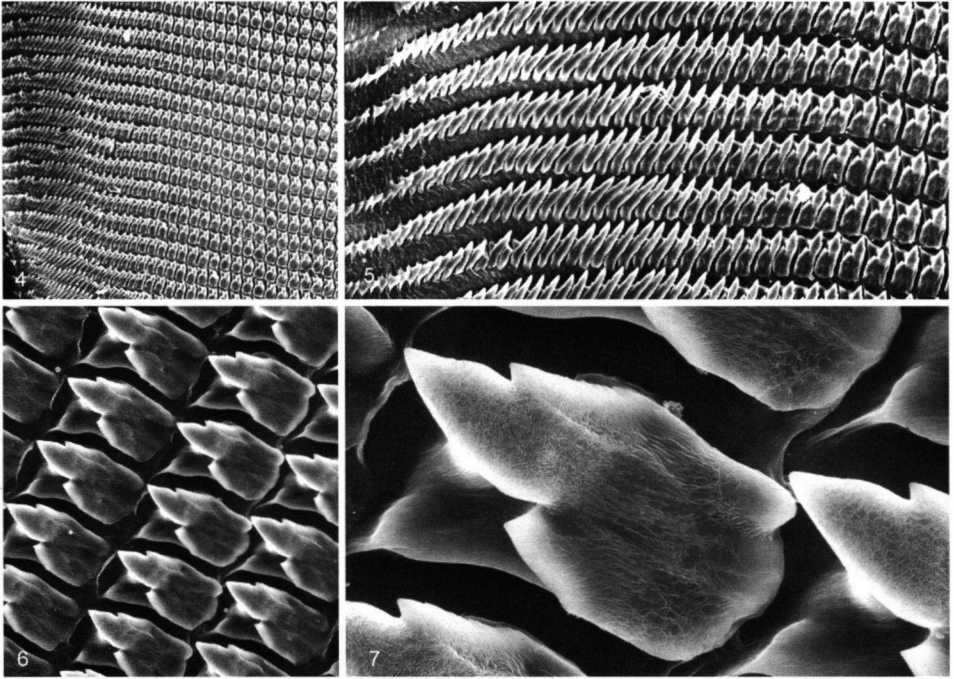
I have found no references to inflation of the body in slugs neither during some 15 years in East Africa, in the course of which I saw many thousands of urocyclid slugs, did I ever notice such a phenomenon. Binder (1977 etc.) has written several papers on the frontal organ in the genus *Gymnarion* Pilsbry, 1919. In this genus the erection of the organ is accomplished by communication with the haemocoel of areas with numerous lacunae in the tissue. Without suggesting any close relationship between *Emphysetes* and *Gymnarion* (the latter is now generally considered to belong to a separate family, the Gymnarionidae) the mode of inflation is doubtless similar. In addition, Van Bruggen & De Winter (1990) described an undoubted urocyclid snail with an erectile (?) frontal organ more or less similar to what is found in *Gymnarion*.

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Figs 2-3. *Emphysetes udzungwensis* spec. nov., Tanzania, Udzungwa Mts., Mt. Luhomero, 2200 m, Quentin Luke leg., October 2002. 2, holotype (RMNH 96325), general view of genitalia; 3, jaw of paratype (RMNH 96326). Abbreviations: ag, albumen gland; cd, common duct; e, epiphallus; f, flagellum; hd, hermaphrodite duct; lg, lime gland; o, oviduct; p, penis; pp, penial papilla; pr, penial retractor; sp, spermatheca; spd, spermathecal duct; v, vagina; vd, vas deferens.



Figs. 4-7. *Emphysetes udzungwensis* spec. nov., radula of paratype (RMNH 96326). Locality data as for figs 2-3.

Resources of the Royal Botanic Gardens Kew for prints from these and from the colour transparency.

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