



TERRESTRIAL GASTROPODS OF THE PROVINCE
OF MADANG IN PAPUA-NEW GUINEA. PART II.
TWO SPECIES OF *CRYPTAUSTENIA* COCKERELL, 1898
(PULMONATA: HELICARIONIDAE)
NEW TO THE SCIENCE

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ABSTRACT: A description of two species new to science, namely *Cryptaustenia saltatoria* n. sp. and *Cryptaustenia mirabilis* n. sp., both from the Ramu River valley in Papua, including figures and information on anatomical characters of the reproductive system and shell, as well as on the external appearance.

KEY WORDS: terrestrial Gastropoda, Pulmonata, Helicarionidae, Papua-New Guinea, new species

INTRODUCTION

The present paper is the second part of the publication based on material collected by the author in Papua-New Guinea during his visit there at the end of 1990. The first part devoted to the Papuan material was published in 1998 (WIKTOR 1998). Further papers on Pulmonata to be subsequently published are in preparation.

The author's field study in New Guinea was possible owing to the fellowship of the Christensen Re-

search Institute (Madang, Papua-New Guinea). The first paper published provides slightly more information about the investigations themselves, including a map of localities where the material was collected. Herein, on the same schematic map, only those localities are marked from which the presently described species came, the numbers of localities corresponding with the ones in part I (WIKTOR 1998).

DESCRIPTIONS

According to the systematics of Helicarionidae proposed by SOLEM (1966: 22), the species described should be ranked with:

Superfamily: Limacoidea

Family: Helicarionidae

Subfamily: Ariophantinae

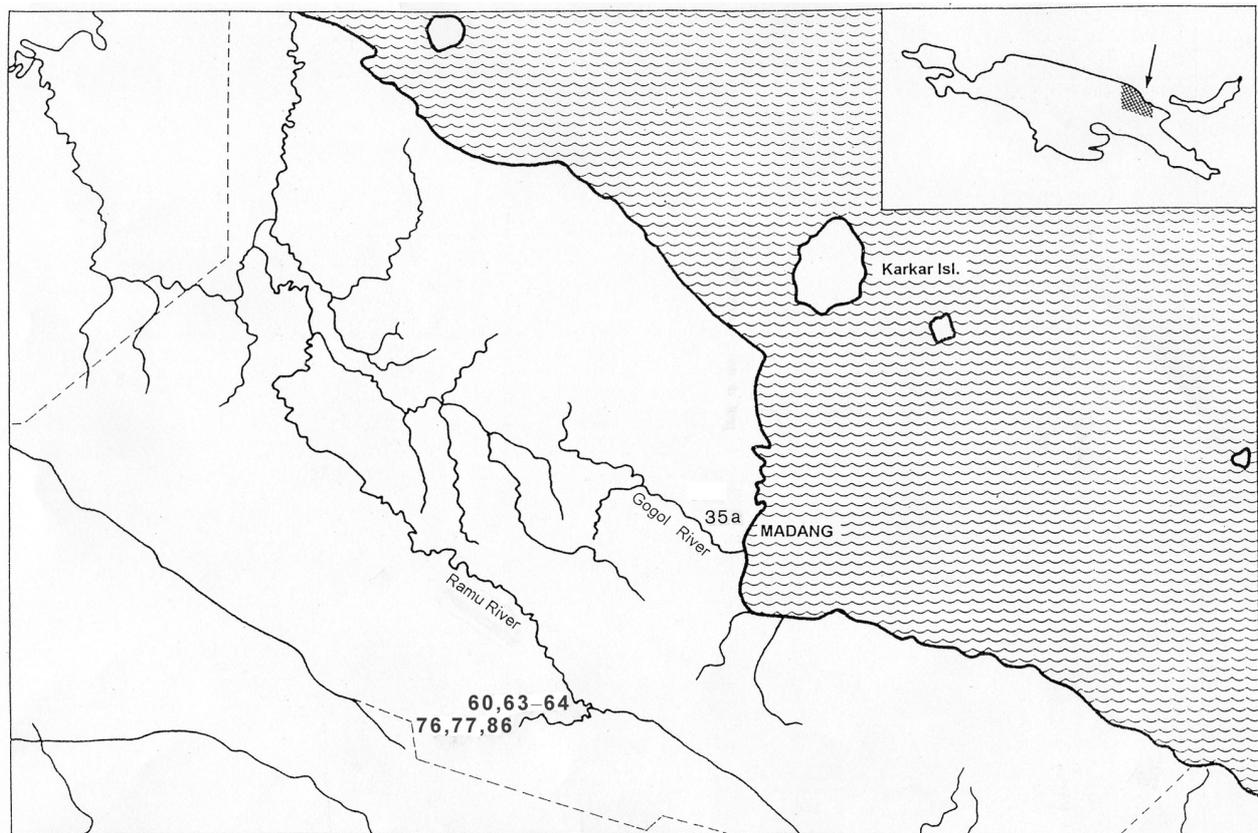
Tribe: Durgelli

Genus: *Cryptaustenia* Cockerell, 1898

Cryptaustenia saltatoria n. sp.

Holotypus: Papua-New Guinea, Province Madang, S of village Brahmin (=Braham), the Ramu River valley, natural forest and old gardens, volcanic rocks, ca. 400 m a.s.l., leg. A. WIKTOR 18.11.1990 (locality no. 60). Museum of Natural History, Wrocław University, no. MP 840.

Paratypi: all in the Museum of Natural History, no. MP 840: 30 specimens of various size – collected with the holotype; 2 specimens – Povice Madang, SE of



Map 1. Distribution of the localities

the Brahmin (=Braham) Mission, N of village Tauya, left of the Tauya River, primeval forest, ca. 500 m a.s.l., leg. A. WIKTOR 16.11.1990 (locality no. 63); 1 specimen – Province Madang, SE of village Touya and SE of the Brahmin (=Braham) Mission, primeval rain forest, volcanic rocks, ca. 200–600 m a.s.l., leg. A. WIKTOR 17.11.1990 (locality no. 64); 7 specimens – Province Madang, near village Korog, ca. 200 m a.s.l., leg. A. WIKTOR 26.11.1990 (locality no. 35a).

Diagnosis. A snail similar to *Cryptaustenia gadinodromica* Solem, 1966 (known from N Thailand) but slightly smaller. With respect to genitalia, it differs from the species compared in the shape of penis, appearance of epiphallus, presence of an oval container at the vas deferens outlet into penis and in the shape of spermatheca, especially its duct.

Etymology. The name *saltatoria* has been derived from Latin *saltus* = a jump, to describe a leaping snail (see below).

Description. Body length of the holotype (preserved in alcohol after drowning in water) – 15 mm, shell width – ca. 5.5 mm; the largest specimen (from locality no. 60) attained 16 mm in length and ca. 5.5 mm in shell width. Inside the shell only the visceral hump is hidden. After preservation, three large mantle lobes, the head and the whole foot (Figs 1–3) remain outside the shell.

Shell (Figs 4–6) roundish with a clearly raised spire. Suture very shallow. Umbilicus closed. Lip lack-

ing. Shell golden-hued, thin, transparent, strongly glittering. Under a high magnification a very delicate, irregular sculpture as poorly distinguishable radial and spiral lines, which do not produce a regular reticulum, is visible.

Body (Figs 1–3). The head section short and entirely compact. Tentacles thick. The whole visceral hump inside shell, outside which there are three large mantle lobes, head and entire foot. Mantle lobes: the left one (“left shell lap” according to SOLEM 1966) is nearly triangular, the right (according to SOLEM 1966, “right shell lap”) considerably larger, with three fragments of varied shape and size distinguishable within, and the most posterior is bay-like incised at its free end. Foot very long, about 3 times longer than the shell width. It is cylindrical in shape, but centrally on its dorsal side there is a groove starting from shell and

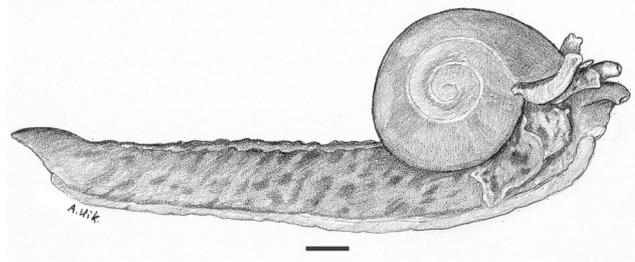
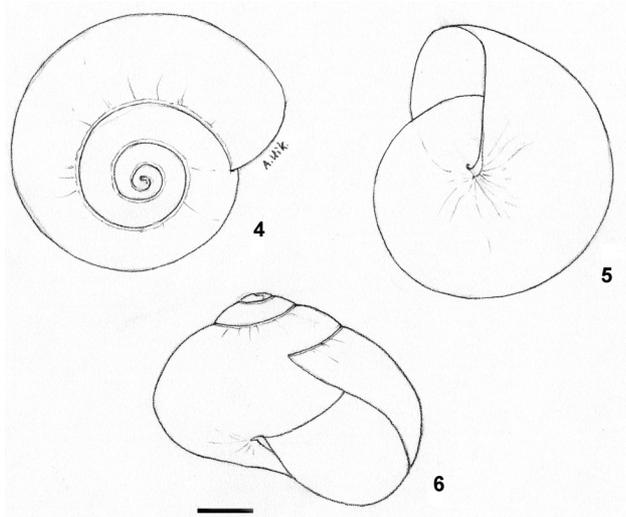


Fig. 1. *Cryptaustenia saltatoria* n. sp – lateral view of the holotype. Scale bar 1 mm

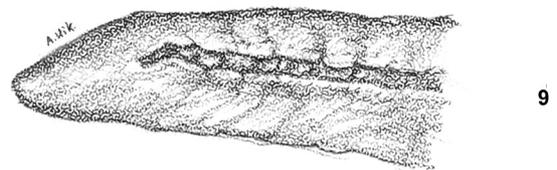
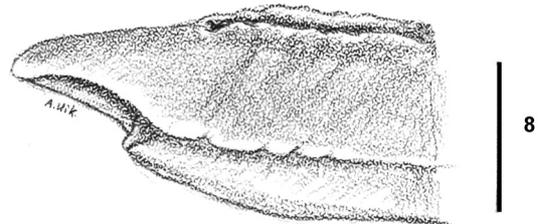
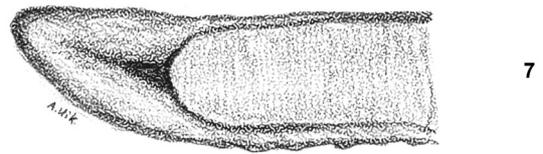


Figs 2–3. *Cryptaustenia saltatoria* n. sp. – photograph of a paratype collected with the holotype; views from three different sides (photo Dr. IMAHARA YUKIMITSU)

terminating near the very posterior end (Figs 7–9). The posterior foot margin is somewhat raised upward, making an impression of being a caudal spine (Figs 7–9). Actually, it is sunk inside like the vaulting of a roof. Skin sculpture barely marked, slanting furrows discernible dorsally on foot. Sole undivided: no clear division into longitudinal zones. Body coloration whitish with irregularly scattered black spots. The darkest, usually completely black, are the spots on the mantle folds. Foot spotting lighter, blackish or grey, or even vestigial. The arrangement of the indistinct spots on foot agrees with the slanting skin furrows.



Figs 4–6. *Cryptaustenia saltatoria* n. sp. – shell of a paratype collected with the holotype. Scale bar 1 mm



Figs 7–9. *Cryptaustenia saltatoria* n. sp. – posterior end of foot viewed: – ventrally, – laterally, and – dorsally. Scale bar 1 mm

The dark pigment yields also spots on head. The intensity of the dark pigment and the density of spots differ from individual to individual.

Reproductive system (Figs 10–13). Glandula hermaphroditica undivided into clear lobes. Glandula

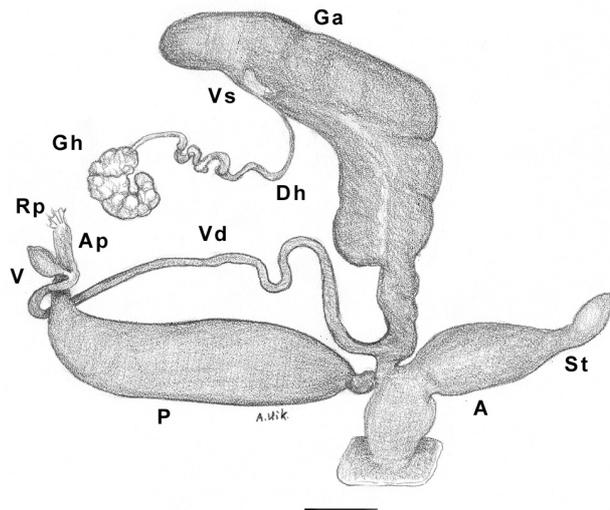


Fig. 10. *Cryptaustenia saltatoria* n. sp. – reproductive system of a paratype collected with the holotype. A – atrium genitale; Ap – appendix; Dh – ductus hermaphroditicus; Ga – glandula albuminalis; Gh – glandula hermaphroditica; P – penis; Rp – musculus retractor penis; St – spermatheca; V – container of unknown function; Vd – vas deferens; Vs – vesicula seminalis. Scale bar 1 mm

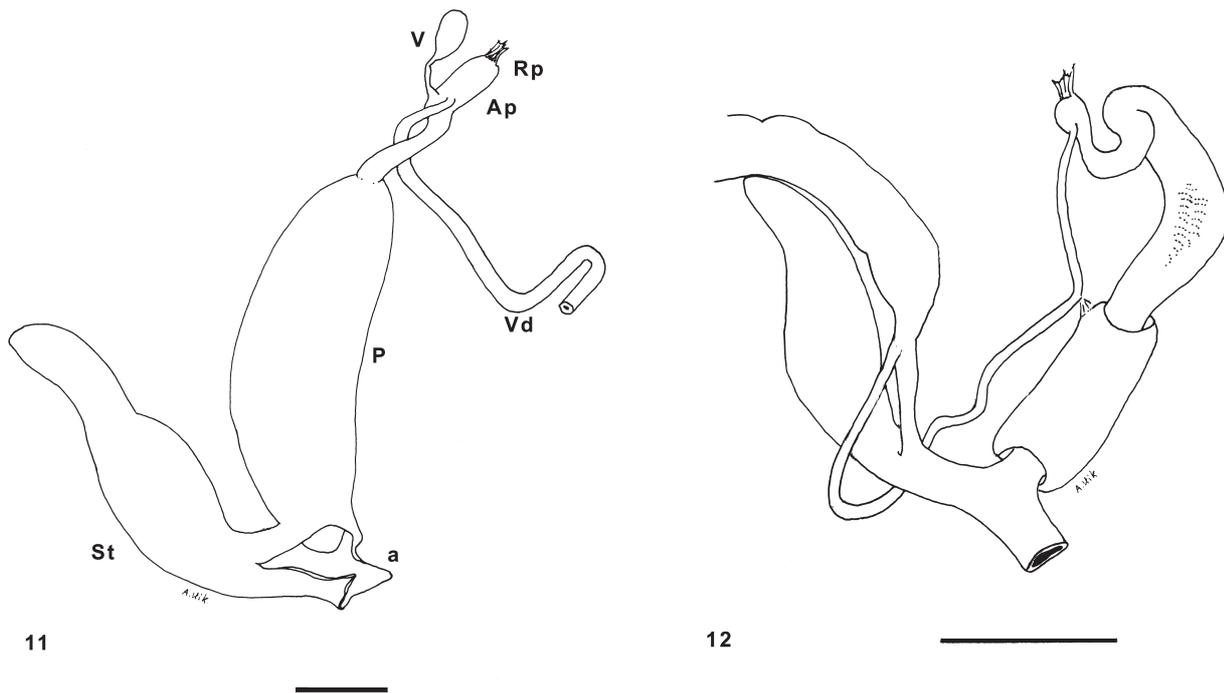


Fig. 11–12. *Cryptaustenia saltatoria* n. sp. – fragment of copulatory organs of paratypes from the locality no. 63; papilla's end seen inside the penis. For lettering see Fig. 10. Scale bar 1 mm

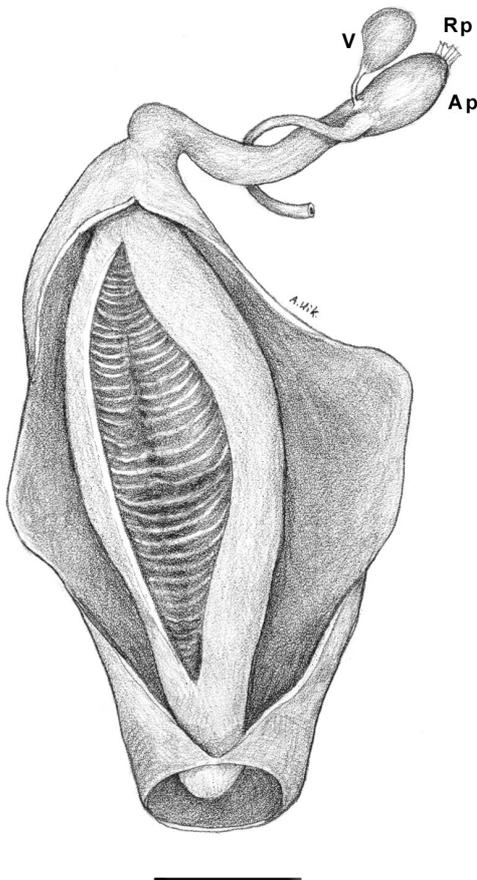


Fig. 13. *Cryptaustenia saltatoria* n. sp. – dissected penis of a paratype from the locality no. 63; inside also a dissected papilla with its structures visible inside. Scale bar 1 mm

dula albuminea large, broad and elongated. Spermoviductus with a broad prostate. The anterior spermoviduct section considerably narrowed and divided into a thick vas deferens and a very short tubular oviductus. Vas deferens comparatively thick and, before its opening to penis, connected with a small oval container set on a short duct (Figs 10–11). The container is whiter than the rest of genitalia, but perceivable only in some of the largest individuals (!) (Fig. 11), probably when filled. Its function is unknown to me. Vas deferens opens to penis slightly laterally, and hence the short blind section of penis can be referred to as an appendix or epiphallus. To this part, a very short retractor penis is apically attached. Penis resembles a club as it has a narrow posterior section and broadens more anterad to abruptly narrow again into a thin tube before opening to atrium. Inside penis (Figs 11–13) a long papilla, nearly equaling the length of the whole penis. Its interior is covered by transverse laminar structures (Fig. 13). Oviductus very short. I have failed to find distinct glands on its external walls.

Ecology. After rain these snails actively crawl about large leaves of plants of the forest floor. I do not know where they hide, certainly somewhere on the ground or in leaf litter. When irritated by a touch, sudden light, or when a shade is cast on them, they react with an immediate hitting of their narrow and long foot, dashing like a fish taken out of water. Such a spring is uncontrolled and very quick, and the snail turns a somersault. The shell and the body inside it act like a sweeping weight. The movement is so fast that it is

difficult to follow; the animal leaps even 3–4 cm upward and makes a turn resembling the gymnastic leap “salto mortale”. Undoubtedly, it is a form of escape from a predator.

Comments. The snail displays a marked similarity to *Cryptaustenia gadinodromica* Solem, 1966. When describing *C. gadinodromica*, SOLEM (1966) defines the posterior blind section of its penis as an epiphallus. It seems, however, that this is rather a mere blind section of penis, the more so that we do not know whether these snails produce spermatophores. Also, the organ the author mentioned refers to as a stimulator seems to be a huge papilla. In *C. saltatoria*, I have not found any glands on the terminal section of the oviduct.

Cryptaustenia mirabilis n. sp.

Holotypus: Papua-New Guinea, Province Madang, the region of Iwan Pass, the Bismarck Range, primeval rain forest, granite, 2,600–3,000 m a.s.l., leg. A. WIKTOR 7.11.1990 (locality no. 88). Museum of Natural History, Wrocław University, no. MP 841.

Paratypi: all in the Museum of Natural History, Wrocław University, no. MP 841: 2 specimens – collected with the holotype; 2 specimens – Province Madang, village Pandambai in the Bismarck Range (on the road Bundi–Yandera), primeval rain forest, granite, ca. 2,000 m a.s.l., leg. A. WIKTOR 1.11.1990 (locality no. 76); 1 specimen – Province Madang, village Pandambi in the Bismarck Range (on the road Bundi–Yandera), primeval rain forest, ca. 2,000 m a.s.l., leg. A. WIKTOR 6.11.1990 (locality no. 77).

Diagnosis. The species is similar to *Cryptaustenia gadinodromica* Solem, 1966 (known from N Thailand) but differs in the body being smaller, the foot shorter relative to the shell size, in black stripes on the body, different shape of the male copulatory organ posterior section, especially the part SOLEM (1966) calls epiphallus. From *Cryptaustenia mirabilis* it differs also in a smaller body size, more spherical shell, different body pigmentation, shorter foot, different shape of penis and different irregular structure of wrinkles inside the penial papilla.

Etymology. Latin *mirabilis* means strange or odd. In this case a strange defensive behaviour of this snail, involving its jumping ability, is concerned (see below).

Description. Body length of the holotype after preservation in alcohol 7.9 mm, shell width ca. 4 mm. Paratypes are of similar size or smaller. Only one specimen, collected with the holotype, is slightly larger, i.e. 10 mm in length. This specimen, however, is of somewhat different coloration, resembling *C. saltatoria*. It has not been examined anatomically, and its foot being short in comparison with the shell width indicates that in all likelihood the specimen does not represent *C. mirabilis*.

Inside the shell only the visceral hump is contained, not the entire animal (Figs 14–16).

Shell (Figs 17–19) roundish with a fairly low spire. Suture very shallow. Umbiliculus narrow. No lip. The whole shell is transparent, very thin, fragile, glassy and a little yellowish. Under a high magnification irregular radial striation is seen on the surface.

Body (Figs 14–16). The head section very short, tentacles thick. Foot about twice longer than the shell width. Head and mantle lobes – see the description of *G. saltatoria* above. The right lobe divaricated at the end, all entirely deep black. Along the whole foot, laterally on each side there is a wide completely black band. Below it, along the sole margin another, nar-

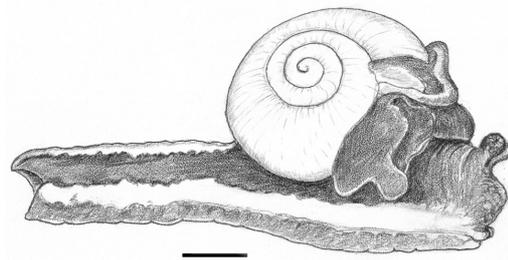
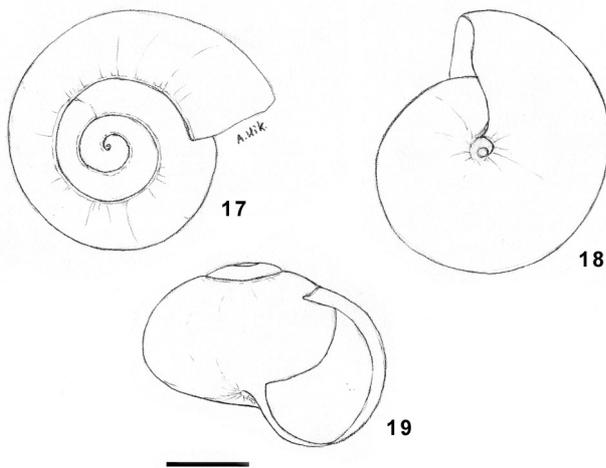


Fig. 14. *Cryptaustenia mirabilis* n. sp. – lateral view of the holotype. Scale bar 1 mm



Fig. 15–16. *Cryptaustenia mirabilis* n. sp. – a paratype (locality no. 76); lateral view – an everted penis (?papilla) visible inside (photo Dr. IMAHARA YUKIMITSU)



Figs 17–19. *Cryptaustenia mirabilis* n. sp. – shell of a paratype collected with the holotype; different views. Scale bar 1 mm

rower, dark belt occurs. Between the two the body is whitish (without spots). Sole also whitish, divided into three zones, but the dividing grooves are hardly perceivable. Skin sculpture delicate and barely distinguishable, in the form of slanting furrows.

Reproductive system (Fig. 20). Glandula albuminalis of a shape difficult to define, its structure composed of spherical vesicles. Spermoviductus short and broad. Prostate externally similar to glandula albuminalis but its vesicles are larger. Vas deferens long and thick when compared with the rest of copulatory organs. Just before opening into penis it fun-

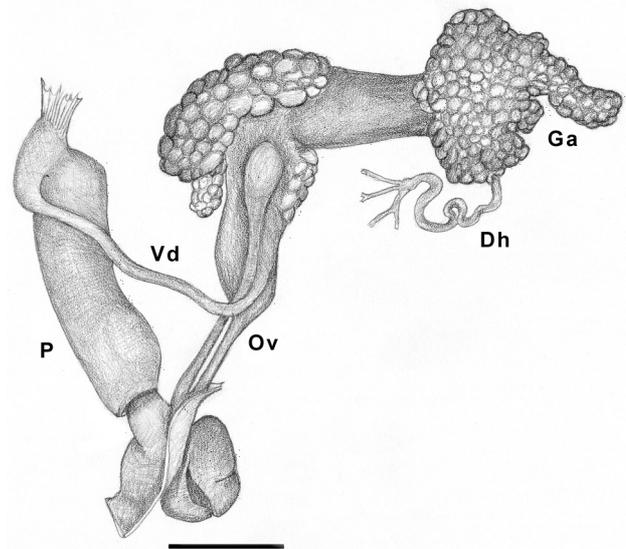
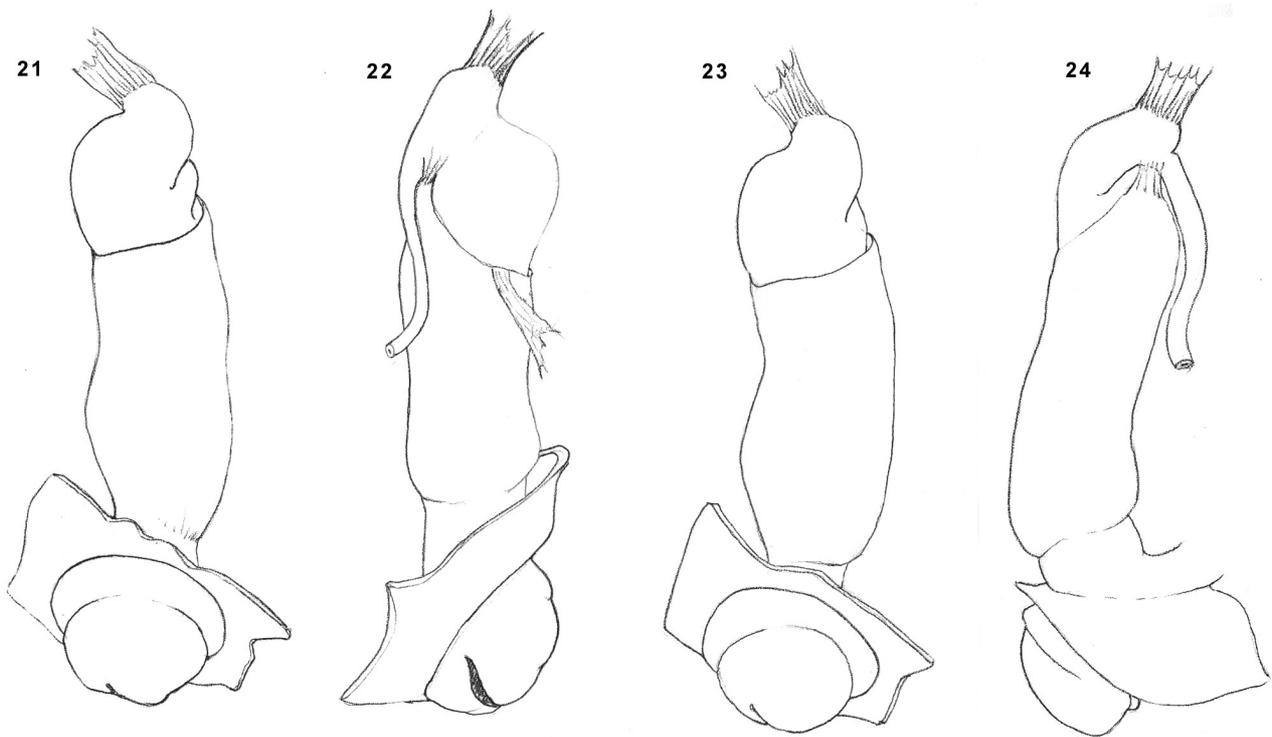


Fig. 20. *Cryptaustenia mirabilis* n. sp. – reproductive system of the holotype. Ov – oviductus (for the remaining lettering see Fig. 10)

nel-like, gradually widens. Although in the holotype, whose anatomy has been studied, the anterior part of penial papilla is partly everted, penis itself does not seem to have undergone eversion as all its external structures remain in their natural position. Both appendix and the container joining vas deferens are lacking (cf. the above description of *C. saltatoria* and Figs 1–11, 13). Musculus retractor penis attached to the terminal, broadened, section of vas deferens. Penis cylindrical (Figs 20–24). Its folds suggest that it is



Figs 21–24. *Cryptaustenia mirabilis* n. sp. – penis of the holotype; different views. Scale bar 1 mm

slightly contracted, still not everted. Like in the above described species, the anterior penis section is significantly narrower than the rest of this organ. Inside penis, or rather its papilla, a well developed structure of irregular folds is visible (Fig. 24). In one specimen, the whole of penis (? papilla) is everted. The organ is cylindrical, too (Fig. 15), its surface smooth, and on its free end there is an opening in the shape of a slit, as if a cutting, which is seen in the holotype as well (Fig. 20). Having separated from vas deferens, oviductus is first thick, afterwards narrowing to become a straight tube. Atrium genitale very short. Both the female duct and atrium are devoid of accessory glands visible from the outside.

Ecology. The species seems to live like *C. saltatoria*; at least I collected this snail from leaves of the ground flora. Yet, I never found these two species in the same habitat.

When irritated, *C. mirabilis* behaves like *C. saltatoria*, i.e. jumps swinging its foot, but it does it less skilfully, probably because its foot is shorter than that of *C. saltatoria*.

Comments. *C. mirabilis* differs from *C. saltatoria* in numerous characters: it is smaller; its body more intensely pigmented and the pigment differently distributed; the shell has a lower spire; the penis, posteriorly lacking an appendix and container, looks different; oviductus proportionately longer.

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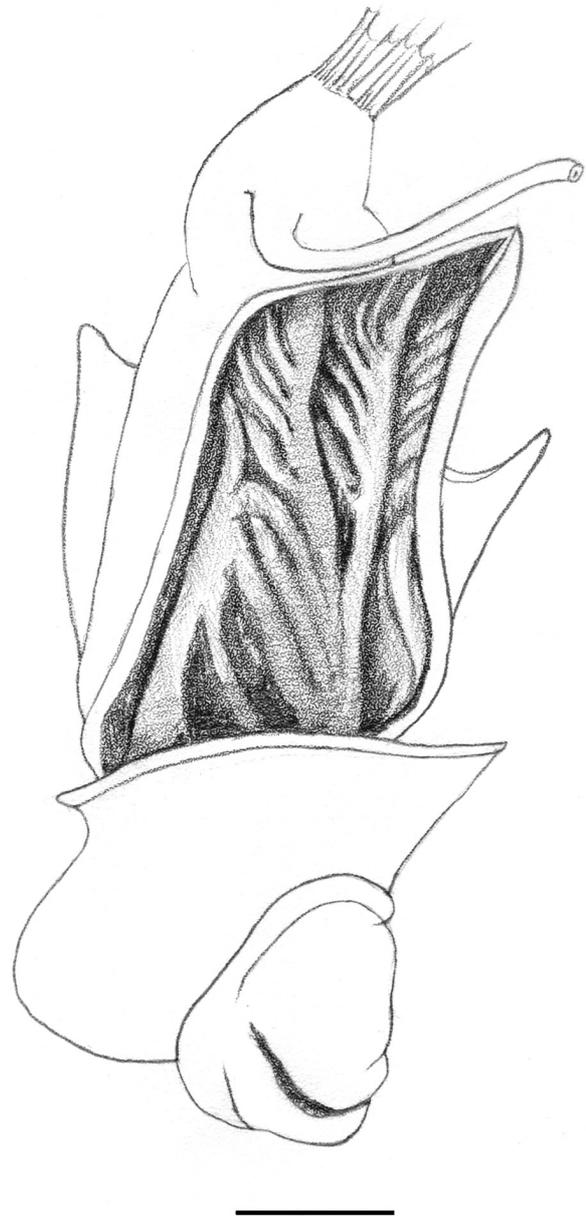


Fig. 25. *Cryptaustenia mirabilis* n. sp. – open penis and papilla with their characteristic structures visible inside. Scale bar 1 mm (Holotype)

sary literature; and to Dr. IMAHARA YUKIMITSU (Funao Kainan-shi, Japan) for the photographs.



