

**Three new *Deroceras* species from Greece
(Gastropoda, Pulmonata, Agriolimacidae)**

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INTRODUCTION

In recent years the number of species known in the genus *Deroceras* has increased considerably. Since 1981 about 15 new species have been described from Greece, and it seems likely that many more are to follow. In the present paper three more species from different parts of Greece will be added.

The material was partly collected by the following persons, to whom we are most indebted: Mr. J.W. Biekart (Utrecht), Mr. R. Leys (De Bilt) and Mr. G.J.M. Visser (Midsland, Terschelling).

Measurements are taken from specimens preserved in 70% ethanol. Abbreviations used: a, atrium; am, atrial muscles; ap, penial appendage; b, bursa copulatrix; bd, duct of bursa copulatrix; fo, free oviduct; i, intestine; l, liver; o, ovotestis; rc, rectal caecum; rm, penial retractor muscle; sa, sarcobelum; vd, vas deferens; MNHW, Museum of Natural History, Wroclaw, Poland; RMNH, Rijksmuseum van Natuurlijke Historie, Leiden; WW, colln. A.J. de Winter, Wageningen; ZMA, Zoologisch Museum, Amsterdam.

***Deroceras halieos* nov. spec. (figs. 1-6)**

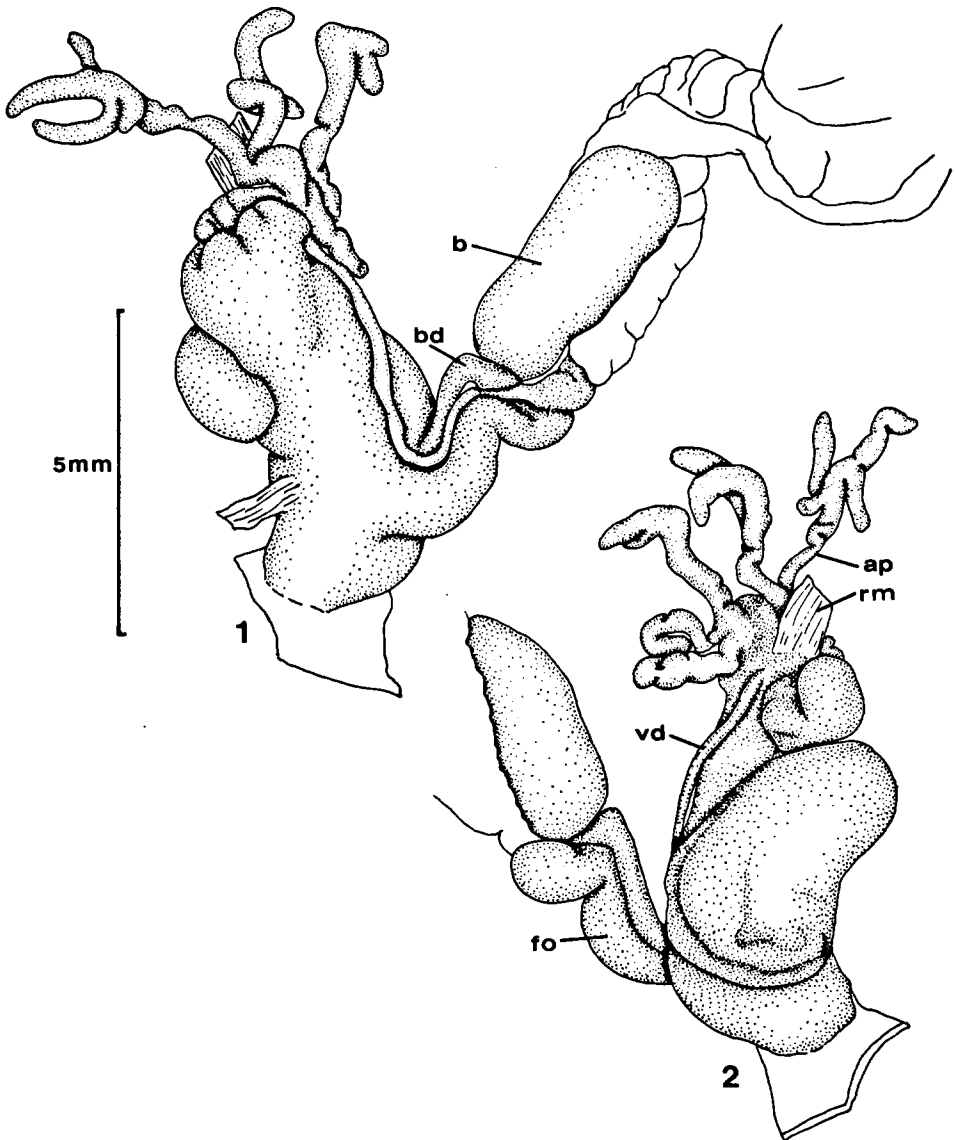
Diagnostic features. — A unicolourous blackish slug of the genus *Deroceras* Rafinesque. Rectal caecum very long. Penis with long, smooth appendages, some of them dichotomously branched. Sarcobelum large, tongue-shaped.

External appearance. — All specimens are unicolourous dark grey to nearly black; the swollen ring around the pneumostome is not or only a trifle paler in colour. The sole is tripartite; the central part is dirty cream, the lateral parts are greyish. The dorsum is conspicuously keeled only at its posterior fifth part. Part of the material has been relaxed prior to fixation; some paratypes are strongly contracted. The length of the relaxed specimens varies between 30 and 42 mm. The holotype is 30 mm long; its mantle length is about 10 mm.

Shell. — The shell of a paratype of 30 mm measures 4.4 × 3.1 mm.

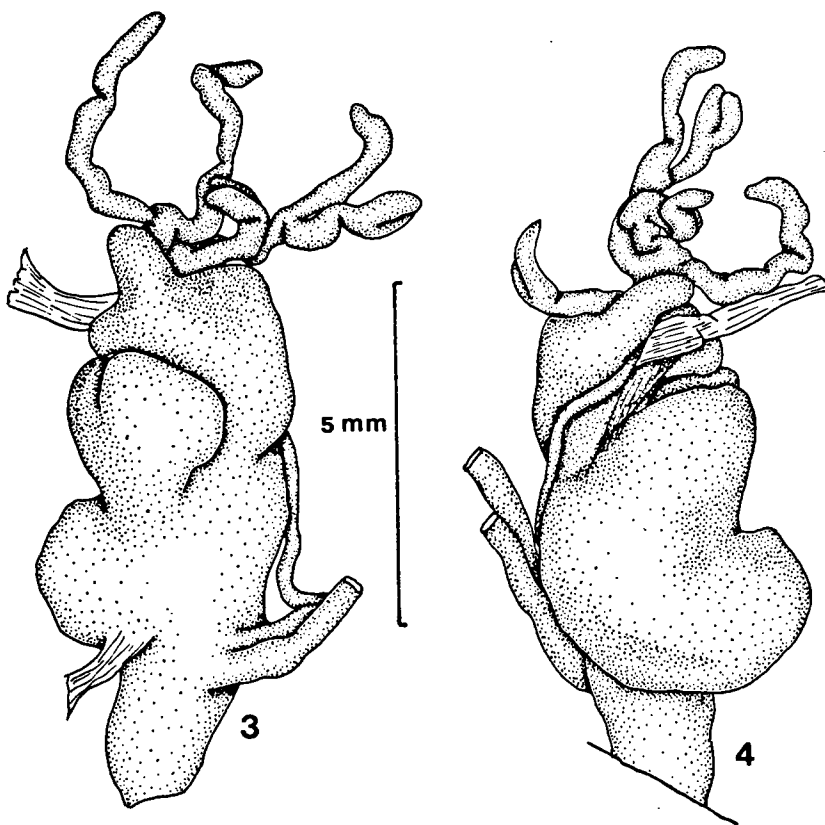
Intestine (fig. 6). — All specimens examined possess a very long rectal caecum. The mesenteria covering the viscera are unpigmented.

Genital system (figs. 1-5). — The ovotestis consists of very large, greyish-pale acini, situated anterior to the last intestinal loop, thus not reaching the rear of the visceral mass. The hermaphrodite duct is short and not convoluted. The albumen gland is



Figs. 1-2. *Deroceras halieos* nov. spec., anterior genitalia of holotype (ZMA 386003).

cream coloured. The spermooviduct is greyish, becoming paler anteriorly. The prostate is dirty white over its whole length. The bursa copulatrix is an oblong bag with a long, slender duct. The free oviduct varies in width, but is usually over twice as wide as the bursal duct. The lower part of the penis is largely surrounded by a very large diver-



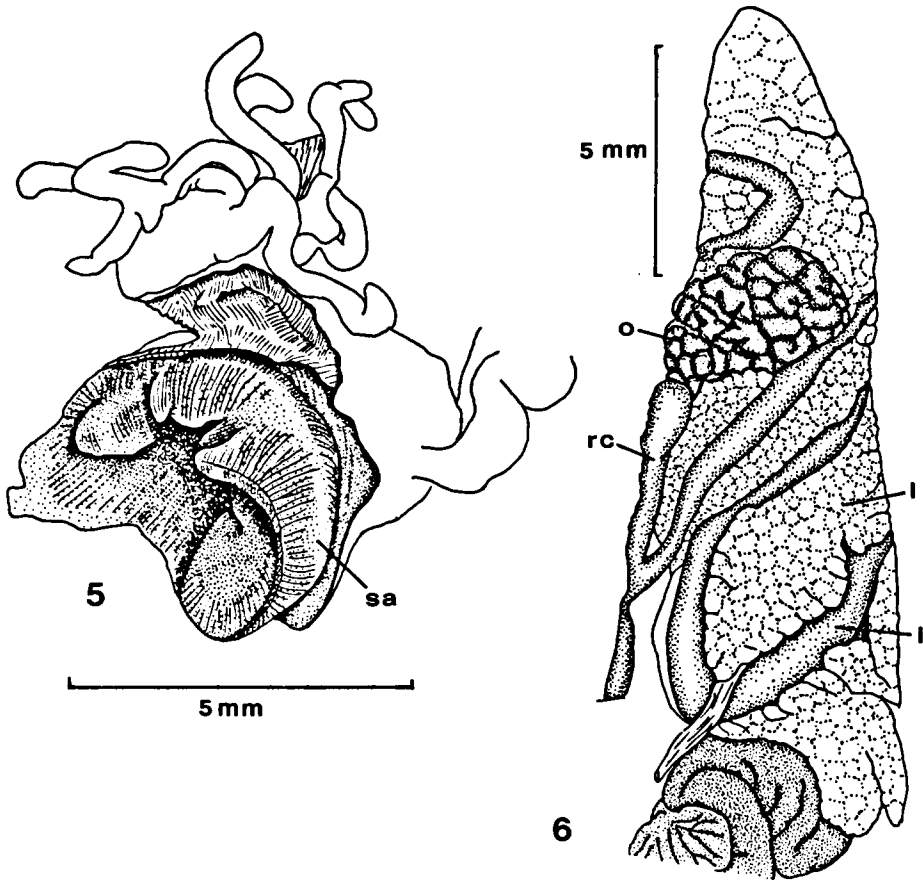
Figs. 3-4. *D. halieos* nov. spec., penis of paratype (ZMA 386004), viewed from different sides.

ticulum, which contains the sarcobelum. The upper part of the penis consists of two curved caeca. One of these bears at its apex one or two groups of long and smooth (i.e. not crenulated) appendages, some of which branch in a dichotomous manner; the other caecum always divides into two blunt processes, which rest on the lower diverticulum. The penial retractor muscle inserts between the two caeca. The entry of the vas deferens is situated next to or slightly lower than the insertion of the penial retractor. The large sarcobelum is elongate tongue-shaped in the holotype as well as in a paratype; in another, contracted, paratype it is nearly semi-circular.

Material. — Holotype and four paratypes in ZMA (Moll. 386003 and 386004 respectively); three paratypes in RMNH (alc. 9184).

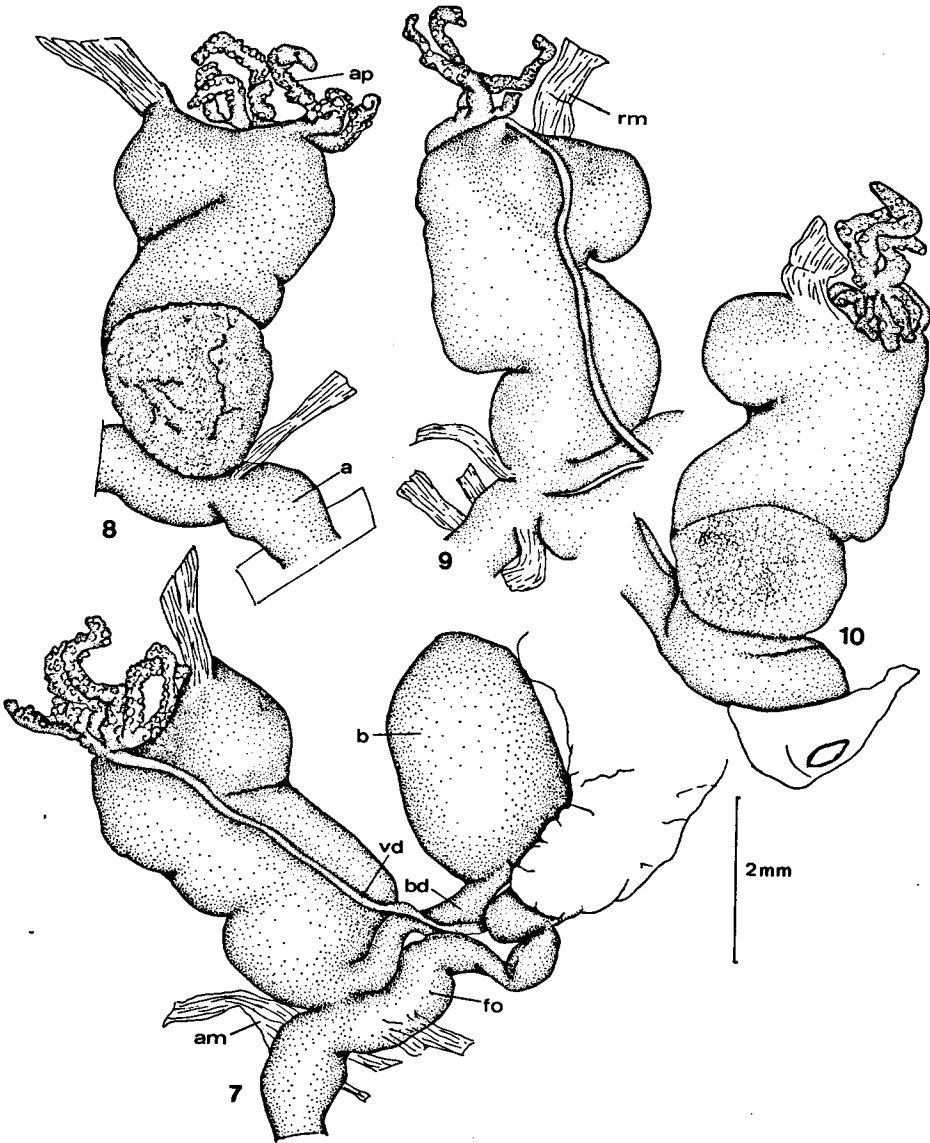
Type locality. — Greece, Chalkidiki, Athos, *Fagus* forest near Simonos Petras monastery, UTM KE65, 200 m alt., G.J.M. Visser leg., 9-IV-1981.

Derivatio nominis. — Derived from the ancient Greek word for visser (Dutch = fisherman), ἄλιευς, genitive ἄλιεως, in honour of its collector, Mr. George Visser, to acknowledge his long-lasting friendship with both of us.

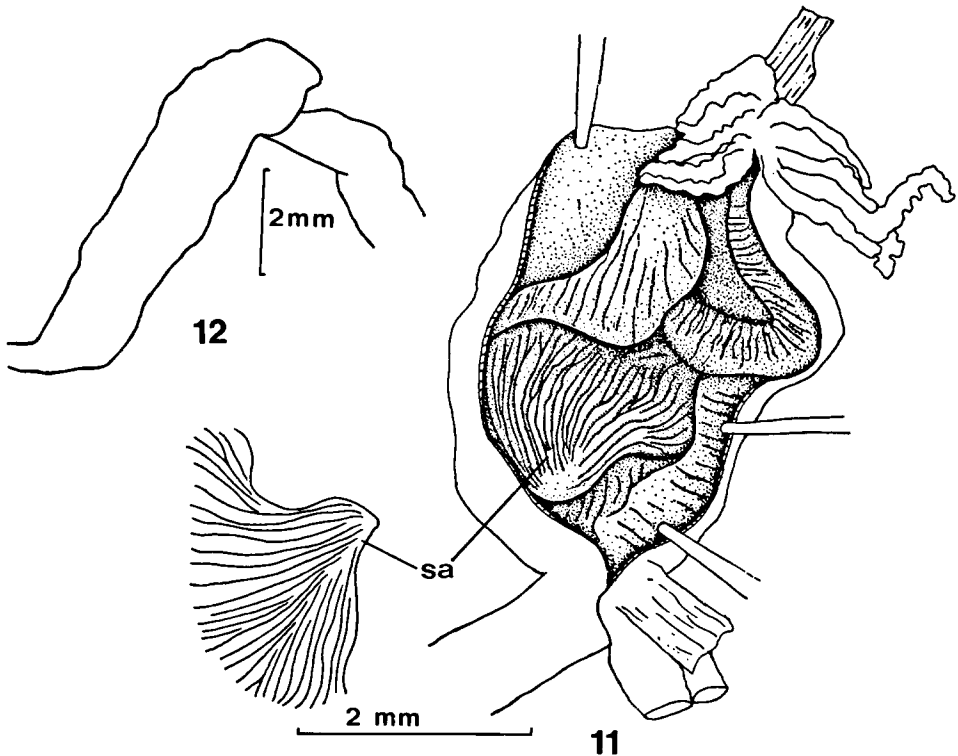


Figs. 5-6. *D. halieos* nov. spec., holotype; 6, penis opened, showing sarcobelum; 7, posterior part of visceral mass.

Remarks. — *D. halieos* may be related to a number of similarly coloured species described from Greece, viz., *D. keaensis* Altena, 1969, *D. samium* Rähle, 1983, *D. johannae* de Winter & Butot, 1985, and perhaps *D. rhodensis* Forcart, 1972. These species resemble each other in the possession of two caeca at the penial apex and a very large, elongate sarcobelum. *D. halieos* resembles *D. keaensis* in its well-developed rectal caecum and in having smooth penial appendages. It differs most conspicuously in the lack of a glandular outer wall of the penis, and in its longer, wider and branched penial appendages (cf. Altena, 1969). The sarcobelum of the new species resembles that of *D. samium*. It differs from this species, however, in its long rectal caecum and in its smooth and less numerous penial appendages (cf. Rähle, 1983). *D. johannae* has a shorter, but also well-developed rectal caecum, a usually folded sarcobelum, and longer, strait caeca at the penial apex with more slender, crenulated appendages (De Winter & Butot, 1985).



Figs. 7-10. *Deroceras nyphoni* nov. spec.; 7, anterior genitalia of holotype (ZMA 386005); 8, penis of holotype, viewed from an other side; 9-10, penis of paratype from N. of Achladias Bay, isle of Skiathos (ZMA 386007).



Figs. 11-12. *D. nyphoni* nov. spec., paratypes from N. of Achladias Bay, Isle of Skiathos (ZMA 386007); 11, penis opened; 12, rectum.

***Deroceras nyphoni* nov. spec. (figs. 7-12)**

Diagnostic features. — A pale brown *Deroceras* species with diffuse spots on the mantle and dorsum. Penis apically with a lateral pouch and a knot of thin, crenulated appendages; basally the penial wall is partly glandular. Sarcobelum very broad and flat, with a blunt apex.

External appearance. — Adult specimens measure between 19 and 31 mm. The holotype is 25 mm long; its mantle length is 10 mm. The animals are pale brown with diffuse brown spots, which are most conspicuous on the mantle. The swollen area around the pneumostome is clearly paler than the rest of the mantle. The skin is thin, partly transparent. The sole is cream coloured. The posterior quarter of the dorsum is keeled.

Shell. — A shell taken from a paratype of 26 mm long measures 4.7×2.8 mm.

Intestine (fig. 12). — The rectum has a short, but distinct caecum. The mesenteria covering the viscera are not pigmented.

Genital system (figs. 7-12). — In most animals the ovotestis is not exposed when the body is opened dorsally, but is covered by the rectum and by liver tissue. It consists of

three lobes, each consisting of small brown acini. It does not reach the rear of the visceral mass. The albumen gland is dirty white. The spermoviduct is pale greyish brown and contrasts with the whitish prostate. The anterior genitalia are cream coloured. The free oviduct is about twice as broad as the bursal duct. The bursa is oval, more or less elongate; its transition into the bursal duct is rather abrupt. The penis is irregularly cylindrical. Apically it has a large lateral pouch. On top of this pouch a broad, unbranched retractor muscle is inserted. A knot of crenulated, thin appendages is present on the penial apex, but never on the pouch. The vas deferens enters the penis apically, always close to the penial appendages. At one side the basal wall of the penis is glandular. Inside the penis a very broad, flat sarcobelum is present, which has a more or less blunt apex.

Material. — Holotype: Greece, Nomos Magnesia, Sporades, Isle of Skiathos, S. of Moni Evangelistria, under stones, UTM GJ13, L.J.M. Butot & J.E. Okkersen leg., 20-IV-1979 (ZMA 386005). Paratypes: together with the holotype (ZMA 386006/1). Isle of Skiathos, hills N. of Achladias Bay, 2.5 km SW. of Skiathos, under stones in olive-yard, UTM GJ14, L.J.M. Butot & J.E. Okkersen leg., 15-19-IV-1979 (ZMA 386007/12; RMNH alc. 9185/7; MNHW/3; WW/3).

Derivatio nominis. — We wish to dedicate this species to abbot Nyphon, who had the present Greek flag hoisted for the first time at the Evangelistria monastery, the type locality of *D. nyphoni*.

Remarks. — A number of Greek *Deroceras* species have lateral outgrowths at the upper part of the penis: *D. melinum* Wiktor & Mylonas, 1981, differs in having only one broad penial appendix, and in the possession of a long, slender sarcobelum. In *D. seriphium* Wiktor & Mylonas, 1981, the lateral pouch is smaller; in addition, its retractor muscle is branched and its sarcobelum is much larger and differently shaped (cf. Wiktor & Mylonas, 1981). *D. parnasium* Wiktor, 1984, particularly seems to resemble *D. nyphoni* in genital morphology. However, *D. nyphoni* differs in the somewhat higher place of entry of the vas deferens into the penis, in its pale brown instead of black body colour, and in the presence of a fold inside the penis, which runs from the sarcobelum to the upper part of the penis; this fold characteristically is absent in *D. parnasium* (see Wiktor, 1984: 159).

Deroceras rethimnonensis nov. spec. (figs. 13-16)

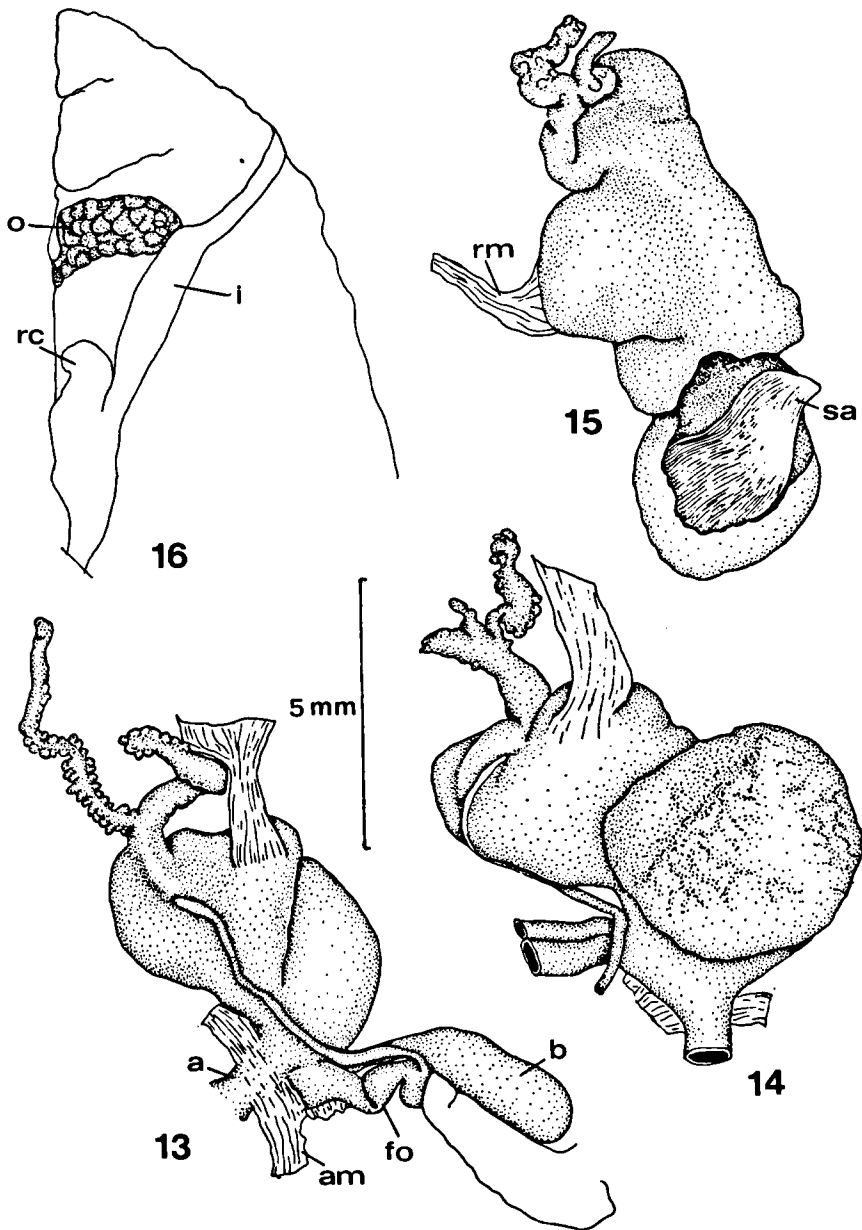
Diagnostic features. — A large pale brown to dark grey *Deroceras* species. Rectal caecum well-developed. Penis with conspicuous dark pigmentation; two or three glandular appendages arise from a common branch on the penial apex. Sarcobelum long and flat, lined with very delicate furrows.

External appearance. — Most specimens are pale brown, one paratype (from Apostoli) is dark grey; all have diffuse dark brown spots, especially on the mantle. The sole is unicolourous pale brown. The last third of the dorsum is keeled. The length of the relaxed specimens varies between 29 and 36 mm. The holotype is 29 mm long; its mantle length is about 11 mm.

Shell. — Not examined.

Intestine (fig. 16). — A well developed rectal caecum is present. The mesenteria covering the visceral mass are conspicuously stained by blackish pigment.

Genital system (figs. 13-15). — The ovotestis is dirty yellow or black; it is relatively small, partly exposed and situated just posterior of the rectum, never at the rear of the



Figs. 13-16. *Derocheras rethimnonensis* nov. spec.; 13, anterior genitalia of holotype (ZMA 386008); 14, penis of paratype from type locality (ZMA 386009); 15, penis of paratype from type locality, opened, showing sarcoelium; 16, paratype, 2 km N. of Livadia, Kriti (RMNH alc. 9187), posterior part of visceral mass.

visceral mass. The upper part of the sperмовiduct is grey, becoming cream anteriorly; the prostate is dirty white. The bursa copulatrix is more or less oval; its duct is about half as wide as the free oviduct. The large penis consists of two parts. The wall of the lower part is on one side covered by a glandular stratum. The lower part contains an elongated, flat sarcobelum, which is extremely delicately lined; in some specimens it is somewhat curved. Unlike the surrounding tissue, the sarcobelum is dark grey in all specimens examined. The upper part of the penis is quite variable in shape; it often has a large outgrowth behind the main stem of the penial appendage. Both the entry of the vas deferens and the insertion of the genital retractor are situated somewhat laterally. The retractor muscle is relatively broad and undivided. The penial appendage consists of a very strong main stem with two or three glandular branches, which may be rather long. There is much blackish pigment on the upper part of the penis, especially around the entry of the vas deferens.

Material. — Holotype: Greece, Kriti (Crete), Nomos Rethimno, Margarites, UTM KV81, J.W. Biekart leg., 28-III-1981 (ZMA 386008). Paratypes: together with the holotype (ZMA 386009/1; RMNH alc. 9186/1). Kriti, Nomos Rethimno, Apostoli, table mountain, UTM KV80, J.W. Biekart leg., 27-III-1981 (ZMA 386010/1); Kriti, Nomos Rethimno, 2 km N. of Livadia, near Moni Dioskouron, UTM LV00, R. Leys leg., 27-IV-1985 (RMNH alc. 9187/1).

Derivatio nominis. — The species has been named after the province (Nomos) of Rethimno, central Crete, where all the available material originates from.

Remarks. — The newly described species is in many respects quite similar to *D. thersites* (Simroth, 1886), viz., range of external colouration, size, presence of a rectal caecum, pigmentation of the mesenteria covering the visceral mass, and the overall shape of the penis and sarcobelum (Urbański & Wiktor, 1968; Wiktor, 1983; our own observations on specimens from the isle of Chios, Greece). It differs (1) in the penial appendage, which is much more branched in *D. thersites*, (2) in the duct of the bursa copulatrix, which is clearly separated from the bursa itself, whereas in *D. thersites* the bursa changes indistinctly into the bursal duct, (3) in the grey colour of the sarcobelum and in its lining, which is coarser in *D. thersites*, and (4) in the position and size of the ovotestis, which is much larger in *D. thersites* and reaches the apex of the visceral mass.

D. rethimnonensis may represent a local subspecies of *D. thersites*, of which no records have been published from Crete, but until intermediates have been found we prefer to consider them two separate species.

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