DEROCERAS LOMBRICOIDES (MORELET, 1845) (GASTROPODA, PULMUNATA, AGROLOMACIDAE) IN THE BRAGA MOUNTAINS AND THE SERRA DA ESTRELA (PORTUGAL)

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ABSTRACT

This is an anatomical study of D. lombricoides (Morelet, 1845), based upon specimens gathered in the Braga mountains and the Serra da Estrela (Portugal). It is shown that the characteristics attributed to this species by SIMROTH (1891) - are valid, and it can be differentiated from D. agrestis (Linneo, 1758), D. reticulatum (Muller, 1774) and D. laeve (Muller, 1774) by its genital system.

RÉSUMÉ

Avec le matériel recueilli sur les montagnes de Braga et Serra da Estrela (Portugal), on fait un étude anatomique de D. lombricoides (Morelet, 1845). On observe que les caractères assignés à cette espèce sont valides, et on peut la différencier de D. agrestis (Linneo, 1758), D. reticulatum (Muller, 1774) et D. laeve (Muller, 1774) par l'appareil génital.

INTRODUCTION

In his study of the terrestrial and fluvial molluscs of Portugal, MORELET (1845) described the characteristics of a species of Limax, L. lombricoides, collected in the Braga mountains and the territory around Monchique: "Limax gracilis, car nicolor, atomis nigris notatus; corpore subcarinato; posticè a cuminato, nigrosisculo; clyper strii advernis sulcato; anterius libero, valde contractili".

SIMROTH (1891) used specimens gathered in Coimbra, Praya d'Espelho, Oboro, Mattosinhos and Serra do Gerez to study its anatomy and compare it with that of D. reticulatum (Muller). He concluded that "the penis had a well-branched glandular appendage, as in agrestis". He added that the two species could be distinguished, since the stimulating organ of D. agrestis was
replaced by a fold. We have shown that *D. reticulatum* has a conical stimulating organ whose pointed tip is folded over itself. Today, the most widely-held opinion is that the species with branched penis glands is not *D. agrestes*, but in fact *D. reticulatum*. Therefore, it should not be surprising that the two species have been confused and that *D. reticulatum* was considered a variety of *D. agrestes*.

LUTHER (1915) kept the true species and the supposed variety in captivity, and showed that they were different species, distinguishable by their genital systems.

NOBRE (1930, 1941), in this study of the terrestrial molluscs of Portugal, ignored SIMROTH's comparative study (1891), and included *D. reticulatum* among the synonyms of *D. laeve* (MÜLLER, 1774), because "according to some naturalists, there are no notable differences in their anatomy".

Thus, it can be concluded that *D. lombricoides* has not been collected since it was re-described by SIMROTH (1891), and the only available information on its anatomy is that which he published.

MATERIAL

Sameiro (29TNG50, Braga mountains, Portugal). Altitude: 560 m; 17-IV-83. 3 specimens (1 deposited in the collection of the Istituto di Zoologia, Università di Siena, Italia; 2 in the collection of the Department of Zoology, University of Santiago de Compostela, Spain).

Sabugueiro (29TPE17, Serra da Estrela, Portugal). Altitude: 1050 m; 28-III-83. 7 specimens (3 in the Istituto di Zoologia, Università di Siena, Italia; 4 in the Department of Zoology, University of Santiago de Compostela, Spain).

Folgosinho (29TPE28, NW slopes of the Serra da Estrela, Portugal). Altitude: 650 m; 28-III-83. 2 specimens (1 in the Istituto di Zoologia, Università di Siena, Italia; 1 in the collection of the Department of Zoology, University of Santiago de Compostela, Spain).

RESULTS

The specimens of *D. lombricoides* gathered in northern Portugal have the external characteristics of the Genus *Dicroceras*. Alive, their color varies from light or dark chestnut brown to almost black. The darkest ones (fig. 2) have no blotches of dark pigment on their body, while, on the lighter ones (fig. 3), these blotches appear and have an irregular shape and distribution. The mucus is colorless and turns somewhat white in alcohol. Those found in dry places (pine woods, walls) are larger than those found in wet zones (among the plants at the edge of springs), the former often reach 40 mm, while the latter do not exceed 30 mm.

With the organs "in situ" (fig. 4), the ovotestis appears in the last third of the visceral sac. The rectum has no caecum.
The genital system (figs. 8 a 14) have the same shape and profile as those described by SIMROTH (1891; taf. 3, figs. 15, 16a, 16b). In the observed examples, the swelling of the distal wall of the penis is not as marked as that illustrated by SIMROTH (1891; taf. 3, fig. 16b) nor does it take form of a short caecum sac. The proximal part of the penis has an accessory gland, inside of which is set the sarcobelem (figs. 9, 11) in the form of a fold which, when unsheathed, takes the form noted by SIMROTH (1891; taf. 3, fig. 14). The number of branches of the penis gland varies from 3 to 5, and the branches are deeply cut and scalloped. The vas deferens leads to the base of the penis glands, near the insertion of the retractor muscle of the penis.

The kidney (fig. 5) partially covers the end of the rectum. The branches of the aorta is long and it bifurcates where it touches the intestinal convolution. The limacella (fig. 6) is characteristic of the genus.

Formula of radula: $\frac{C}{1} \frac{3}{15-17} \frac{1}{28-30} \times 97$

DISCUSSION

There are several characteristics which MORELET (1845) viewed as typical of the species. He said, for example, "Looking closely at the shield, one sees that its grooves go in two different directions, depending on whether one is examining the anterior or posterior part, and that the anterior lobe of the shield is free and extraordinarily mobile". The fingerprint-like grooves on the shields of the species of the genus Deroceras are fixed in a preserving solution. They emerge like waves from the upper convex part of the shield and completely cover it; sometimes, the grooves on the posterior third are parallel to the longitudinal axis of the animal. The same thing happens on the Galician specimens of D. agreste and D. laeve, and on specimens of D. reticulatum and D. panormitanum from northern Portugal. In these species, one also observed that the free anterior part of the shield shifts to the right and left when they move.

If we compare the genital systems of D. Lombricoides with those of D. agreste, D. reticulatum and D. laeve, we see that they are differences typical of the species. D. agreste and D. reticulatum are distinguished from D. lombricoides by the caecum of the rectum, the position of the ovotestis, the accessory gland of the penis and the form of the stimulating organ. The specimens of D. laeve are characterized by their aphasis, semiphallus or phallic genital systems. In the last case, the penis is long and cylindrical, with no penis glands. These characteristics are sufficient to distinguish the two species.

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ABBREVIATIONS USED IN THE ILLUSTRATIONS:

ag: genital atrium
ao: aorta
au: auricle
bc: genital pouch
cd: vas deferens
cp: paleal complex
es: stomach
ga: accessory gland
gc: genital
gp: penis gland
gs: salivary gland
hp: digestive gland
i: intestine
m: muscle
mp: retractor muscle of the penis
ov: ovotestis
p: penis
r: rectum
ri: kidney
s: sarcobellum (stimulating organ)
ve: ventricle
Figures 1, 2 - Deroceras lombricoides (Morelet, 1845). Scale: 1 mm.
1 - Dark chestnut brown specimen, with the anterior part of the penis unheated. Spring. Sabugueiro.
2 - Specimen with black back and sides. Pine woods, Sabugueiro.
Figure 3 - *Deroceras lombricoides* (Morelet, 1845). Scale 1 mm
Light chestnut-brown specimen. Spring, Sameiro.
Figure 4 - Deroceras lombricoides (Morelet, 1845). Scale: 1 mm Organos "in situ". Spring, Sameiro.
Figures 5, 6, 7 - *Deroceras lombricoides* (Morelet, 1845). Scale: 1 mm
5 - Paleal complex. Sameiro.
6 - Limacella. Spring, Sameiro
7 - Retractor muscles of the ocular tentacles. Sameiro.
Figure 8 - Deroceras lombricoides (Morelet, 1845). Scale: 1 mm
Rear view of genital system. Sabugueiro.
Figure 9 - Deroceras lombricoides (Morelet, 1845). Scale: 1 mm Genital system and stimulating organ. Sameiro.
Figure 10 - *Derozeras lombricoides* (Morelet, 1845). Scale: 1 mm
Rear view of genital system. Sabugueiro.
Figures 11, 12 – *Dero ceras lombricoides* (Morelet, 1845). Scale: 1 mm.

11 - Stimulating organ. Sabuqueiro
12 - Ventral view of anterior part of genital system. Sabuqueiro.
Figures 13, 14 - *Deroceras lombricoides* (Morelet, 1845). Scale: 1 mm.
13 - Ventral view of anterior part of genital system. Sabugueiro.
14 - Dorsal view of anterior part of genital system. Sabugueiro.