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*Distoma opisthotrias*: a new parasite of the opossum

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The Trematodes observed in Brazil have been relatively few until now, and this may be due less to the lack of helminthological studies than to the sparse land and fresh-water mollusks that serve as intermediate hosts. The description of a new species may thus be of interest, especially as the present one has a rather aberrant organization.

The name *Distoma opisthotrias* was chosen because the three genital glands are located at the posterior end of the body. As yet, it has only been found in São Paulo, in the intestine of two old males determined as *Didelphis aurita*, according to Burmeister. The specimens present were very numerous and living in the lower part of the small intestine, the mucous membrane of which was very congested and covered with thick, somewhat bloody mucus. In the large intestine, there were a few specimens that may have been emigrating. Besides these, both hosts contained *Oxysoma tentaculatum* Schneider in rather large numbers; one of the hosts also had a small *Trichocephalus*, probably *T. minutus* Rud. The two last species are mentioned in the Catalogue of v. Linstow, whereas no species similar to the one now described was found there.

*Distoma opisthotrias* is an elongated oval, approaching the cylindrical shape often seen in small species. Its dimensions vary a good deal, according to the degree of contraction, but display an average of 4 mm in length by 1.1 mm in width and 0.9 mm in depth.

The oral sucker, visible to the naked eye, at the cephalic end, seems somewhat inclined ventrally. It is followed by a rounded pharynx, giving rise to the two limbs of the intestine. These are first directed forwards and toward the dorsal surface, then bend backwards, travel along the sides and end almost in contact with each other, near the end of the body. They are not ramified and are straight only when they are distended to the utmost; otherwise, they form more or less pronounced bends and even loops, easily seen in sections; the typical ciliates epithelium is also evident.

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The ventral sucker is well developed and occupies the space between the pharynx and the limbs of the intestine, in the anterior third of the body. The posterior third is occupied by three rounded glandular bodies, which, when viewed from the side, appear to be near the dorsal surface.

The median one is much smaller than the other two; this is the ovary; the others, which are about equal in size, are evidently the testes. When strong contractions are made, they move out of the middle towards one side, while the often sharply compressed ovary moves to the other side.

Between the ovary and the ventral surface there is a much smaller, rounded organ with three conic processes; two of them are lateral and directed forwards and outwards; the third lies in the midline, is more posterior, and approaches the dorsal surface. I take this organ to be the ootype, as it contains masses of yolk conducted to it by the lateral processes, which correspond to the openings of the yolk-ducts. The median one communicates with the uterus. I believe that there is another communication with the ovary, through a very narrow and coiled tube, and there must be yet another communication with the canal of Laurer. The latter is indistinct and hardly visible in the entire animal, but, in serial sections, it can be seen to turn almost vertically towards the dorsal surface, where it opens, after having crossed the mid-line, between the ovary and the posterior testis.

The rest of the area in the middle is almost entirely occupied by the numerous coils of the uterus, the first part of which spreads especially on the ventral and the second half on the dorsal aspect and forms many almost horizontal coils. The point of reversion occurs near the ventral sucker, and single coils may be seen in front of this. The terminal part of the uterus is directed somewhat obliquely forwards and downwards towards the genital atrium.

In full-grown specimens, the coils of the uterus are crammed full of eggs with a yellowish-brown covering that is lighter in the ascending portion of the uterus than in the terminal part. The lateral spaces of the middle third of the body to the outside of the intestine are occupied by the vitellaria, composed of a great many vesicles arranged like bunches of grapes, found only in the outer third alongside the gut but outwards from it along an excretory passage. The latter is often distended with yolk and can be followed until its opening into the ootype.

The secretion is granular and very rich in fat, as shown by the intense black staining acquired in osmic acid. It also shows great affinity for several dyes, so it can be easily followed from the vitellaria, through the passage and the ootype with its processes and even to the recently formed eggs in which the membrane is still thin and allows the penetration of the dyes. In older specimens, the vitellaria are exhausted and very little yolk is found outside the eggs.

The genital atrium lies ventrally, in the middle line, at the level of the fore edge of the anterior testis. It is thus nearer to the center than the ootype but still distant from the ventral sucker. It contains a large cirrus, either entirely within its sheath or somewhat protruding, and the vulva, which lies more caudad. The terminal part of the vas deferens is often distended by sperm and then has the aspect of a thick winding canal lying between the cirrus and the dorsal surface. I have always found the passages of the testes empty and have thus been unable to observe them carefully; I believe, however, that they run along the dorsal plane.
The eggs are small, operculate, oval, and flattened to one side. Although they are extremely numerous in the coils of the uterus, they are rare in the excrements of the hosts. This seems to indicate that as a rule, the worm emigrates with its full complement of eggs, as soon as the vitellaria and the seminal glands are exhausted. The testes seem to stop functioning rather early, after they have furnished the necessary quantity of sperm, but they retain their original shape, whereas the vitellaria become noticeably atrophied. Specimens in this condition were found in the rectum, the mucous membrane of which did not seem irritated by their presence. This suggests emigration but it is not certain because the opossums were examined some time after death, when all the *Distoma* had loosened their hold.

The formation of the embryos seems to occur outside the intestine of the host. They were observed five days after the death of the parent organisms, kept in a moist chamber, and whose bodies had almost disintegrated by then. The intermediate host should be a land-mollusk, perhaps a bare *Limacid*, but I have not been able to ascertain this.

A short excretory pore lies somewhat ventral at the caudad end. It bifurcates immediately into lateral limbs that subdivide almost at once. Further ramifications were not determined as they are not perceptible in the collapsed condition and the excretory system is generally found either empty or only partly filled. The caliber of the canal seems rather wide but the contents are hardly recognizable and only seldom does it contain a few granulations and droplets which can be stained black with osmic acid.

Two longitudinal vessels, one dorsal and one ventral, accompanying the intestine to the outside, were more easily discernible and anastomosed through a tortuous coil to the outside of the pharynx. This disposition is bilateral but no connection was observed between the two sides. The canals always appear tortuous, evidently because they are adapted to the greatest distension of the body.

The parenchyma of the body is rather firm and in appearance is reminiscent of reticulated connective tissue; in the adult, it becomes much reduced by the development of the coils of the uterus. The cuticle is transparent and when the body is contracted, it forms transversal folds. It is covered with pointed spinescent scales over a great extent of its surface, especially on the ventral aspect and on the dorsal surface of the cephalic end. In the lateral fields of the anterior end, some large cells are perceptible beneath the cuticle. The ganglia and nervous system are very difficult to perceive in this small form and were not investigated. The structure of the sucker and bulbus pharynges offers nothing special; there is no crop-like diverticulum like that seen in *Distoma hepaticum*. The oral sucker is somewhat unsymmetrical because of its inclined position, so that the ventral caudad half seems somewhat smaller than the other.

While drawing up this description, I was under the impression that the anatomic structure of this *Distoma* was rather unique. Since then I have found in Loos’ paper “Ueber die Distomen unserer Froesche und Fische” a figure of *Distomum leptostomum*, discovered by Oellson in the badger (*Melestaxus*) and seen again by Loos in the porcupine (*Erinaceus europaeus*), which displays great similarity to the present form, including in size. Consequently, one might feel inclined to consider them as identical, despite the different place of origin. The following differences
were noticed: First, there is no trace of spines in Loos’ picture, though he could not have missed them in fresh specimens and, if seen, they ought to have been indicated, the more so as his figures are generally excellent. Secondly, the forward direction of the initial part of the gut, which is constant in my species, seems lacking in his, nor is the bulbus pharynges immediately adjacent to the sucker. Lastly, the disposition of the excretory vessels also seems different, despite the fact that I was unable to observe mine completely. The last point, however, needs to be re-examined.

A species similar to mine was also found in the European porcupine by v. Linstow, who called it *Distoma caudatum*. This differs from the other two, mainly because the tip of the tail is retractile.

If in fact there are three species, they certainly constitute a closely related group and probably also have analogous life histories. It is equally likely that the young *Distoma* reach the intestinal tube of the definitive host, together with the intermediate one, and in agreement with the feeding habits, of the former. Opossums are completely omnivorous. They eat fruit, birds, and eggs and have a well-known predilection for spirits made from sugar-cane, which are often used as a lure for catching them. I once found a *Caecilian* in the stomach of an opossum, and in the intestinal tubes of five specimens from Santos there were numerous specimens of *Echinorhynchus*, which must be transmitted by insects. They were very similar to *E. gigas*, which occurs in pigs here and, on closer comparison, may prove to be identical. *Melolonthus vulgaris* is the known intermediate host and it should be substituted by other *Lamellicornia* in Brazil. It seems likely that opossums occasionally devour insects and all sorts of other small invertebrates.

**Figures (after Portuguese version, ahead).**

2. Sagittal cut of adult worm, a bit contracted, 25x (idem).
3. Transversal cut by central part of adult worm, 25x (idem).
4. Egg, 500x (idem).

Abbreviations: v.c. – cephalic sucker; b.ph. – bulb of pharynx; v.a. – abdominal sucker; t.u. – uterine tube; c.v. – vitelline body; t.a., t.p. – anterior and posterior testis; o.v. – ovary; oo. ootype; ci. – cirrus, cl. – sexual cloaca; v.s. – vas deferens forming a seminal vesicle; v.e. – excretory ducts.