

Zoology. — *The occurrence of eggs in one of the testes of a Rhizocephalan.*
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(Communicated at the meeting of November 26, 1949.)

In a specimen of a Rhizocephalan parasite of the crab *Paraxanthus barbiger* (Poëppig), collected at Talcahuano at the coast of Chile, the left testis contains a large number of eggs that in every respect correspond with those found in the ovary. As the specimen belongs to a hitherto undescribed species a description of its characters is given here.

***Loxothylacus armatus* nov. spec.**

Talcahuano, Hassler Expedition, 1 specimen (holotype) detached from *Paraxanthus barbiger* (Poëppig), collection Museum of Comparative Zoölogy, Cambridge, Mass., no. 1245.

Specific characters. Male genital organs in the posterior half of the visceral mass. Testes completely separated, the left much larger than the right. Right testis curved in anterior direction, left testis enlarged into a voluminous pouch extending in anterior direction. Colleteric glands slightly before the centre of the visceral mass, with more than 100 canals in their most strongly branched region. External cuticle of the mantle with hairs which have a length of 15 to 25 μ , and which bear minute lateral hairs. Internal cuticle of the mantle with retinacula consisting of a flat basal part and 20 to 35 spindles. The latter are not barbed, they vary in length from 9 to 18 μ .

The specimen (fig. 1) has a greater (dorso-ventral) diameter of 16½ mm, an antero-posterior diameter of 14 mm, and a smaller diameter ("thickness") of 5½ mm. It has a roundish pentagonal shape. The mantle opening, surrounded by a strongly developed sphincter, is found at the left side of the anterior margin. With the exception of a broad groove in the centre of the posterior half of the right side (caused by pressure of the median ridge of the abdomen of the host) the mantle does not show any pronounced grooves or wrinkles.

Longitudinal sections show that the male genital organs are contained in the posterior half of the visceral mass. Parts of five sections are drawn, one (fig. 3 a) showing the ventral parts of the vasa deferentia, the next (fig. 4 a) is at a distance of 900 μ farther dorsally, whilst the distance from 4a to 4b is 30 μ , that from 4b to 4c 75 μ , that from 4c to 4d 225 μ . The ventral part of the two vasa deferentia is narrow (fig. 3 a); the right does not become perceptibly wider (fig. 4 a—c), and gradually passes into the right testis which extends for some distance in an anterior direction (fig. 4 d). The left vas deferens towards the dorsal region

gradually increases in size (fig. 4 *a*), towards its dorsal extremity it passes into a voluminous oval shaped pouch extending in an anterior direction.

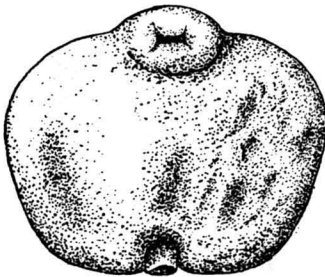


Fig. 1. *Loxothylacus armatus* nov. spec.
Left side. $\times 2\frac{1}{2}$.

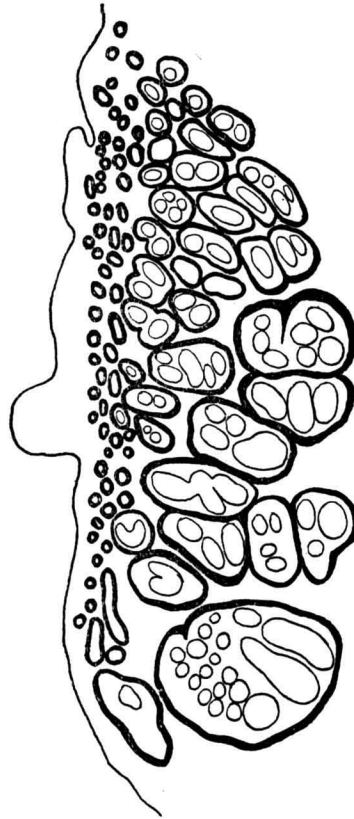


Fig. 2. *Loxothylacus armatus* nov. spec.
Section of the right colleteric gland.
Posterior region in the upper part of
the figure. $\times 60$.

The antero-posterior dimension of this pouch is about twice its ventro-dorsal dimension. Its ventral part is visible in fig. 3 *a*, its dorsal part in fig. 4 *d*.

The colleteric glands lie slightly before the middle region of the visceral mass. In their most strongly divided region a longitudinal section shows at least 100 canals (fig. 2). The figure shows, drawn with thick lines, sections of 102 canals with the epithelium that secretes the chitinous matter of the colleteric gland. In many of these canals there are one or more, sometimes a great number of tubes drawn with thin lines, representing the chitinous matter secreted by the epithelium. Apparently in the present specimen the chitinous canal system was already partly withdrawn from the tubes in which it was secreted, so that the narrower canals do no more contain any chitinous matter, and in many of the larger canals there are

a great number of these chitinous tubes. Altogether the figure shows 91 of these thin-walled chitinous tubes. The condition of the colleteric glands in the present specimen strongly reminds of that found in *Heterosaccus setoensis* Shiino (cf. SHIINO, 1943, p. 31, fig. 22 G).

The external cuticle of the mantle has a thickness which in different parts varies from 50 to 125 μ . Its surface is covered with hairs of the same structure as the main layers of this cuticle (fig. 5 a, b). The hairs have a length of 15 to 25 μ , their basal part has a thickness of 2 to 5 μ , at their surface they possess minute lateral hairs.

Retinacula occur in large numbers and in regular distribution on the surface of the internal cuticle of the mantle (fig. 5 c). They consist of a flat basal part, which is nothing else but a more or less circular area of the

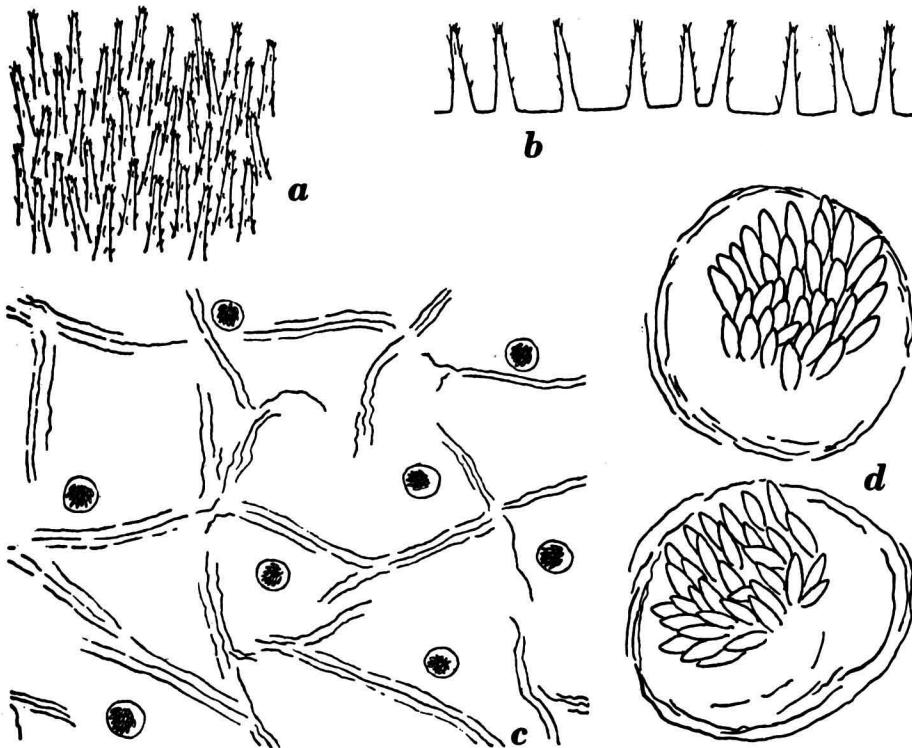
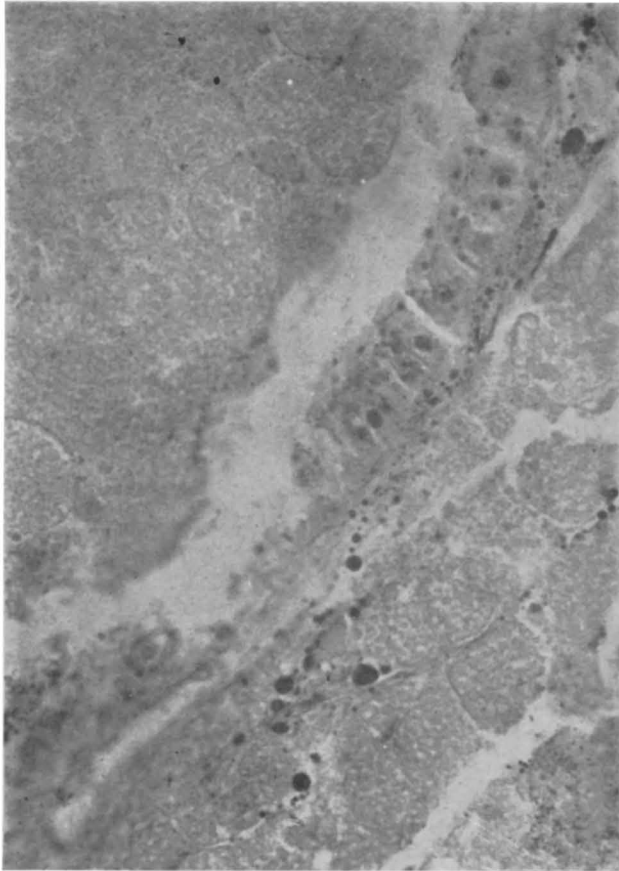


Fig. 5. *Loxothylacus armatus* nov. spec. a, excrescences on the external cuticle; b, section of the upper part of the external cuticle; c, retinacula on the internal cuticle; d, retinacula. a, b, d, $\times 530$; c, $\times 72$.

internal cuticle, and numerous spindles (fig. 5 d). Usually each retinaculum bears from 30 to 35 spindles, occasionally the number of spindles of a retinaculum is 20 to 25. The spindles are not barbed, they vary in length from 9 to 18 μ .

Besides *Loxothylacus armatus* there is but one species of the genus, *L. sclerothrix*, that has retinacula of a similar shape (cf. BOSCHMA, 1940,

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Loxothylacus armatus nov. spec. Part of a longitudinal section showing the wall of the testis and eggs in the testis and in the ovary. $\times 102$.

p. 370 and fig. 65). In *L. sclerothrix* the retinacula have 15 to 30 spindles, which, however, are considerably smaller (4 to 8 μ) than those of *L. armatus*. Moreover the two species have entirely different excrescences of the external cuticle. The trivial name *armatus* was chosen to emphasize the peculiarities of the retinacula.

In many parts of the pouch-like extension of the left testis the wall is composed of rather high cells of various thickness. In the centre of most of these cells a nucleus is found surrounded by a varying amount of yolk, the largest of these have the size of normal eggs in the ovary. A part of the testis showing this formation of eggs is reproduced in the photograph on the plate accompanying the present paper; in a more diagrammatic manner the same part is represented in fig. 3 *b*. Both figures show that inside the testis there is a large mass of closely packed eggs, most of which clearly show a round contour, and many of which have a distinct nucleus. In their structure and affinity to stains these eggs in the testis do not present any differences from the normal eggs in the surrounding ovary. In the preserved specimen the mass of eggs, obviously on account of shrinkage, has detached itself from the wall of the testis, so that an open space occurs which undoubtedly is abnormal.

It is difficult to find an explanation of the occurrence of eggs in the testis of a Sacculinid. It seems to serve no purpose that, next to the ovary fully packed with eggs, there are developing eggs of normal appearance within the larger of the two testes. No similar phenomena in invertebrates that are normally hermaphroditic in so far that male and female organs are functioning at the same time seem to have been observed. Prof. G. J. VAN OORDT, Utrecht, kindly drew my attention to a phenomenon resulting into a corresponding state of reversal of sexual functions in molluscs, where eggs and sperm are produced in the same follicle of the ovotestis. A striking example is that of *Arianta arbustorum* (L.), as studied by BURESCH, and referred to in the handbook by SIMROTH and HOFFMANN (1908—1928, pp. 644 et seq., figs. 205 A and B). In these protandric snails as a normal phenomenon eggs and sperm are produced in the same follicle. At first the eggs are found in the wall of the follicle only (loc. cit., fig. 205 A); in later stages, when the male cells are degenerating, the eggs are found in the cavities of the follicles (loc. cit., fig. 205 B). But here it is of normal occurrence that in the same organ the production of male cells is followed by the production of female cells, whilst in Sacculinidae the testes, even in old specimens, never are seen to produce eggs.

Unfortunately but one specimen of *Loxothylacus armatus* is available, so that there is no occasion to study the male glands of other specimens. Owing to its large size it may be safely assumed that the specimen is comparatively old, but this does not explain the aberrant phenomenon in its male organs.

I am indebted to Prof. S. T. BOK for the photograph on the plate.

LITERATURE.

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