

## NOTES ON AUSTRALIAN CESTODES

BY

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*(Received for publication 10 February, 1922)*III. *COTUGNIA OLIGORCHIS*, n. sp.

On four occasions specimens of the cestode about to be described were found in the intestine of the Whistling Duck (*Dendrocygna arcuata*, Cuvier), shot a few miles from Townsville, North Queensland.

## EXTERNAL ANATOMY.

The largest specimen measured 80 mm. long and 8 mm. broad at its widest part; these dimensions were taken from fixed material.

The scolex is relatively small and there is no neck. In well fixed specimens the worm is of almost uniform breadth for the greater part of its length, but tapers fairly rapidly and evenly both anteriorly and posteriorly. The posterior end is not unlike the anterior, except that it is not so finely pointed, owing to the absence of a scolex.

*Head.* The scolices were not well fixed, being in all cases more or less shrunken, so the detailed characters of this structure cannot be accurately given. However, it is seen to bear a very small retractile rostellum armed with a single row of minute hooks measuring about  $10\mu$  long, but unfortunately their exact number could not be determined, because all available specimens were imperfect. The four small suckers are situated quite near the anterior extremity, and measure about  $0.65\mu$  in diameter (fig. 1).

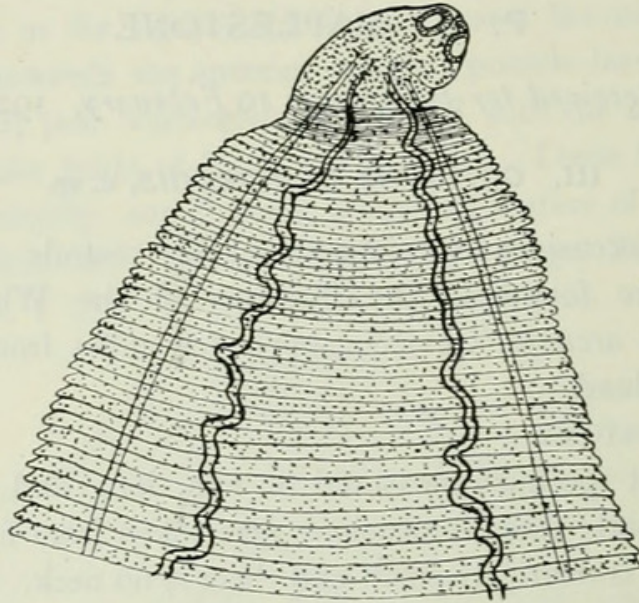
*Segments.* The proglottides are from first to last much broader than long.

## INTERNAL ANATOMY.

*Muscular system.* On examining transverse sections it is seen that the muscle layers are disposed in the same way as in *Diploposthe laevis* (Bloch, 1872); Jacobi, 1896. That is, there are a few diagonal fibres externally, with a layer of transverse fibres internal to them. Next in order from without inwards is the main longitudinal layer, which consists of a large number of closely set



bundles oval in cross section, with their long diameters running dorso-ventrally, and about  $0.50\mu$  in thickness. This layer is evenly developed and encircles the segment, except where it is pierced by



A.M.B. del.

FIG. 1. *C. oligorcbis*, n. sp. Scolex and anterior portion of strobila.  $\times 35$ .

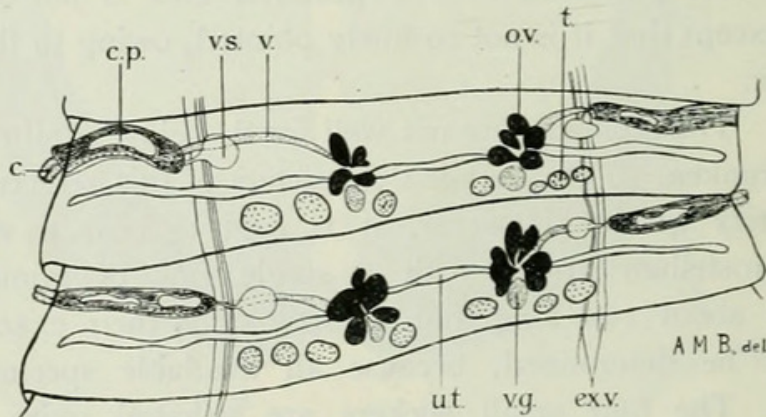


FIG. 2. *C. oligorcbis*, n. sp. Mature segments. *c.*, cirrus; *c.p.*, cirrus pouch; *ex.v.*, excretory vessels; *ov.*, ovary; *t.*, testes; *ut.*, uterus; *v.*, vagina; *vg.*, vitelline gland; *v.s.*, vesicula seminalis.  $\times 20$ .

a cirrus pouch. Internal to this is another thinner layer of transverse muscle with a few scattered bundles of longitudinal muscle irregularly placed on the dorsal and ventral surfaces respectively, and about fifteen to twenty in number on each surface. Internal to these bundles are a few fibres of transverse muscle. It should be noted that the transverse muscle layers consist of hoop-like strands of fibres discontinuous with each other antero-posteriorly, so that in transverse sections they are only seen here and there. (Figs. 3



and 4 do not show the transverse fibres for this reason.) The dorso-ventral fibres are most marked in sections through the anterior and posterior of a segment.

*Nervous system.* The nervous system is poorly developed and consists of a small main nerve lying well to the outer side of the excretory canals, and ventral to the cirrus pouch and vagina.

*Excretory system.* The two lateral excretory canals on each side lie in the anterior portion at some distance from each other; the smaller dorsal vessel lies to the inner side of and dorsal to the ventral vessel. In this part of the worm the dorsal canal pursues a

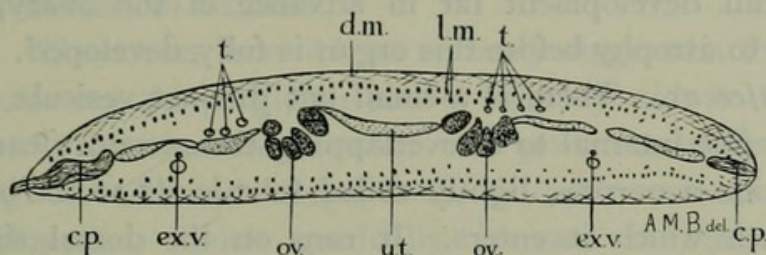


FIG. 3. *C. oligorbis*, n. sp. Transverse section through a mature segment. *c.p.*, cirrus pouch; *d.m.*, diagonal muscle; *ex.v.*, excretory vessels; *l.m.*, longitudinal muscle; *ov.*, ovary; *t.*, testes; *ut.*, uterus.  $\times 20$ .

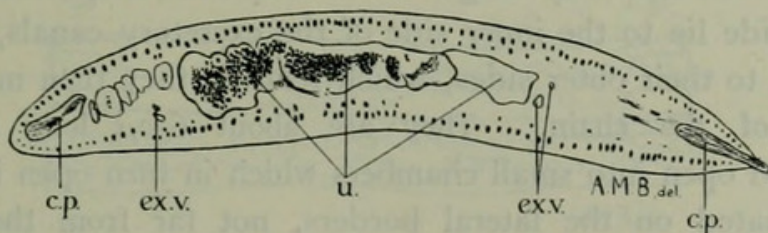


FIG. 4. *C. oligorbis*, n. sp. Transverse section through a gravid segment. *c.p.*, cirrus pouch; *ex.v.*, excretory vessels; *u.*, uterus.  $\times 20$ .

wavy course, each wave extending over two or three segments, so that the width of the medulla varies slightly in different segments (fig. 1). More posteriorly it straightens out like the ventral vessel and pursues a direct antero-posterior course, and at the same time comes to lie close to the inner side of the latter. Throughout their whole length the canals are a considerable distance from the lateral borders of the worm.

*Genitalia.* The male and female organs lie in the medulla in two separate groups, one on each side of the mid-line.

*Testes.* The testes vary from three to five in number on each side and are situated posterior to the ovary, close to the posterior border of the segment in a transverse line. They measure about



80 $\mu$  in diameter, but this dimension is only approximate, for when five are present they are smaller than when only three are present on each side. Their number and position in relation to the ovary (whether lateral or mesial to it) vary in different proglottides of the same chain, or even on the two sides of the same segment. Thus when there are three testes they may all lie external to the ovary, or there may be one internal and two external; if four in number they may lie, two internal and two external, or three external and one internal; and lastly, if five in number they may lie three external and two internal, or four external and one internal (fig. 2). They come to full development far in advance of the ovary, and are beginning to atrophy before this organ is fully developed.

*Vas deferens.* There is a small but distinct vesicula seminalis, which lies just internal to or overlapping the excretory canals; from its outer side a narrow, lightly coiled tube leads to the base of the cirrus pouch which it enters. It runs on the dorsal side of the excretory canals. The cirrus pouches are long and relatively thick saccular organs lying transversely near the anterior margins of the segments. In the early stages of development, the cirrus pouches on each side lie to the inner side of the excretory canals, but they soon pass to their outer sides, which relation they then maintain to the end of the chain. They are about 630 $\mu$  long and 110 $\mu$  broad, and open into small chambers which in turn open in distinct pores situated on the lateral borders, not far from the anterior lateral angles. The cirri are often seen partly extruded through these pores, and they are relatively thick and straight, being of the same diameter for their whole length, with slightly rounded tips. They are about 460 $\mu$  long and 45 $\mu$  in cross section, and their outer surfaces are thickly covered from base to tip with small straight spines set perpendicular to the surface and about 7 $\mu$  long. These organs are the same in appearance and have the same relations with the other organs on both sides of each segment (fig. 2).

*Ovary.* The paired ovaries are large and are situated one on each side of the mid-line, about mid-way between the anterior and posterior borders of the segments. Each consists of four or five lobes, which radiate forwards and laterally from a central point; the small compact vitellarium lies close behind them. The distances of the ovaries from one another, and consequently from the lateral



borders on the corresponding sides, vary slightly in different segments. The shell gland, as a rule, is not clear; but in some segments it can be seen lying between the ovary and vitelline glands (fig. 2).

*Receptaculum and vagina.* The vagina is a relatively wide tube; running from the ovary it first curves forwards and outwards, then turns and runs directly outwards, and crossing ventral to the seminal vesicle, but dorsal to the nerve and excretory canals, it finally runs ventral to the cirrus pouch to open at the genital pore on the ventral side of this organ. The final part of its course can only be determined in sections.

*Uterus.* The uterus is visible at an early stage as a thin transverse tube crossing the proglottis almost from one side to the other, about mid-way between the anterior and posterior borders of the segment (fig. 2). As it develops, it throws out numerous branches in every direction, which gradually increase in size, so that eventually the uterus appears as a broad saccular organ occupying nearly the whole of the segment, with a few trabeculae representing

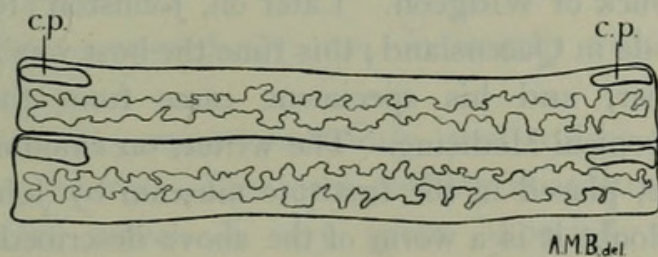


FIG. 5. *C. oligorcbis*, n. sp. Uterus in intermediate stage of development. c.p., cirrus pouch.  $\times 20$ .

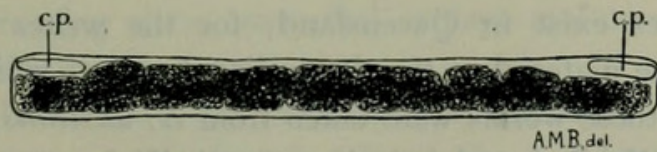


FIG. 6. *C. oligorcbis*, n. sp. Fully developed uterus. c.p., cirrus pouch.  $\times 17.5$ .

the remains of the original branches (figs. 5 and 6). When the uterus is fully developed, the eggs lie singly in capsules.

In sections showing the early stages of the uterus, it is seen to pass between the testes (dorsal) and the ovaries (ventral), and at the sides it crosses the excretory canals dorsally and runs almost to the edge of the segments (fig. 3). Later, it pushes the canals ventrally, and tends somewhat to disturb the contour of the muscle layers



(fig. 4). No fully developed eggs were seen, the most mature ones measured about  $43\mu$  and the oncosphere  $26\mu$  in diameter.

#### DIAGNOSIS.

Up to the present, ten species of the genus *Cotugnia* have been recorded (Meggitt, 1920). All except *C. browni*, Smith, possess numerous testes. *C. browni* has six to seven testes, but these lie anterior to the female glands. The present species possesses only from three to five testes on each side, and these lie posterior to the female glands; it is thus obviously new, and is accordingly named *Cotugnia oligorchis* on account of the few testes.

The type specimens are in the museum of the Liverpool School of Tropical Medicine.

NOTE.—*Diploposthe laevis*, Bloch, was first recorded in Australia by Krefft under the name *Taenia tuberculata*; this material was re-examined by Johnston (1912), who assigned it to the above species. The host, in this case, was *Aythya australis*, Gould, the White-eyed Duck or Widgeon. Later on, Johnston (1913) recorded the same cestode in Queensland; this time the host was *Dendrocygna arcuata*, Cuvier, and his specimens came from the Australian Institute of Tropical Medicine. The writer, on examining the slide of this cestode, placed in the Institute museum by Johnston, found that beyond doubt it is a worm of the above described species with two ovaries, and is not *D. laevis*. Therefore the record by Johnston of *D. laevis* in the host *D. arcuata* is not correct. However, *D. laevis* does exist in Queensland, for the writer has recently examined some material at the Australian Institute which proved to be *D. laevis*; these worms were taken from *A. australis*, the original host in which Krefft found it in New South Wales.

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