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A Revised Description of *Dolichopera macalpini* Nicoll, 1914

(PLAGIORCHIIDAE-TREMATODA)

By

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(WITH ONE PLATE)

In March, 1948, Mr. J. de Bavay collected two tiger snakes (*Notechus scutatus* Peters) in the vicinity of the Arthur Lakes. The alimentary and respiratory systems were fixed in Bouin's fluid. Upon opening the lungs Mr. de Bavay observed the presence of numerous trematodes and handed all the fixed material over to me in order that I might identify them.

Dolichopera macalpini Nicoll, 1914, appears to be the only fluke reported from the tiger snake. It is briefly described, but not named by D. McAlpine (1891), whose material came from the gullet, the anterior part of the stomach, the trachea, and the lung of a copper-head snake (*Denisonia superba* Günther). Nicoll (1918) notes than in 1911 Dr. Georgina Sweet of Melbourne University sent him specimens of this trematode said to have come from the intestine of the tiger snake and the lung of the copper-head snake. He also mentions the collection in 1910 by Dr. Burton Cleland of an apparently similar form from the peritoneum of an unidentified snake on Flinders Island. In the two tiger snakes from the Arthur Lakes in Tasmania the parasites are confined to the respiratory system.

McAlpine's observations are clear, but inadequate by present-day standards. Nicoll's attempt to redescribe the species he had previously named from McAlpine's description, adds very little information. Neither author provides an illustration of the species. I think there is no doubt that the Tasmanian specimens should be assigned to *Dolichopera macalpini*, but several differences, probably due to omissions from the earlier descriptions, may indicate variation between the Tasmanian and mainland forms.

Whole mounts used in compiling the following description were stained with alum carmine. Longitudinal and transverse sections were stained with Ehlich's haematoxylin and eosin. The work was commenced in the Zoology Department of the University of Tasmania during the tenure of a Commonwealth research grant, and completed at the Bureau of Animal Population, Oxford University.

Family PLAGIORCHIIDAE Lühe, 1901

(syn. LEPODERMATIDAE Looss, 1901)

Dolichopera macalpini Nicoll, 1914

EXTERNAL FEATURES

These trematodes are fairly large, measuring up to 4·0 mm. long and 1·6 mm. broad. The smallest (non-gravid) specimen found measured 0·8 mm. x 0·5 mm. Three progressively larger individuals are illustrated (Figs 1-3). In section the body is concave ventrally and convex dorsally. The anterior end bears a prominent

pre-oral lip, while the posterior extremity is produced into a small protruding fleshy knob. The pre-oral lip is not mentioned in the accounts of McAlpine and Nicoll. The posterior protuberance is not retractile and does not resemble the ecsoma of the *Heminurinae*. In strongly flexed specimens it is directed forwards and is not visible from the dorsal aspect. The oral sucker measures up to 0·6 mm. x 0·49 mm. The mouth is directed forwards and downwards and the anterior rim of the sucker protrudes from the pre-oral lip (Fig. 4). The acetabulum is situated just behind the middle length. It is slightly smaller than the oral sucker, measuring up to 0·47 mm. in diameter. In form it is a simple cup, the gape of which may be elongated transversely or longitudinally. The rim of the acetabulum projects slightly from the ventral surface. A simple pore, at the level of the posterior border of the oral sucker, and about half-way between the mid-line and the lateral body margin of either the left or the right side, leads into a short genital atrium. This appears to be merely an invagination of the ventral surface caused by the retraction of the cirrus sac. When the sac is thrust forward, the male and female apertures lie side by side at the end of a stout papilla. The relative prominence of the genital atrium appears to depend on the degree of contraction of the specimen. The excretory pore is situated at the extremity of the knob-like 'appendage' which projects from the hind margin. A further small pore, leading to Laurer's canal, occurs in a medial dorsal position approximately 0·6 mm. from the excretory pore. The cuticle is thick and spinous. Ventrally the spines, measuring 0·018 mm. extend almost to the posterior extremity. Dorsally they are weaker and do not extend beyond the middle length.

Alimentary System

According to Nicoll (1918), the pharynx is contiguous with the oral sucker, and the oesophagus 'is extremely short and divides almost immediately into the diverticula'. McAlpine (1891) states that the mouth ' leads into a pharynx, which very soon enlarges into a thickened muscular body, succeeded by a comparatively short gullet, which is thin-walled'. My sections reveal the presence of a well developed prepharynx followed by a muscular pharynx which measures approximately 0·18 mm. both in length and diameter. The pharynx leads into a weakly muscular oesophagus of similar length (Fig. 4). This corresponds to McAlpine's description, when the different terminology is taken into account. In whole mounts and contracted specimens the oral sucker and the pharynx appear contiguous due to the dorsad displacement of the latter (Fig. 4). The two gut rami diverge from the oesophagus and run backwards, close to the dorsal surface, at some distance from the lateral body margins. Near the posterior extremity they descend and lie adjacent to the outer margins of the testes. They may terminate in this position, or they may pass beyond the testes and curve slightly inwards behind them. The termination is commonly slightly expanded. The rami are comparatively narrow tubes bounded by a deeply staining layer containing large nuclei. No muscle fibres or continuous membranous walls appear to be present.

Reproductive System

Male: The testes are two irregularly lobed but entire bodies, lying side by side near the posterior end of the body. They measure up to approximately 0·45 mm. x 0·23 mm., being elongated in the direction of the animal's length, and are bounded laterally by the gut rami. Nicoll (1918), describes the testes similarly but states that the left is in advance of the right. This is not consistently so in my material although in whole mounts either testis may appear slightly in advance of the other. A vas deferens leaves the antero-dorsal surface of each

testis and the two ducts converge to meet, but not fuse, above the acetabulum. Together they run obliquely forward suspended within the spacious uterus by a 'mesentery' formed by a folding of its dorsal wall, and enter the posterior tip of the cirrus sac. The cirrus sac is comparately large measuring up to 1·0 mm. long and 0·3 mm. in diameter. It has the form of a slightly sinuous or simply curved cylinder with rounded ends. There is no doubt that this is the organ McAlpine (1891) refers to as the vesicula seminalis. Nicoll (1918) states of the sac's contents: 'It contains a large vesicula seminalis, a short pars prostatica and a moderately long ductus ejaculatorius' but records no actual dimensions. In similar terms I should describe the Tasmanian specimens as possessing a *small* seminal vesicle and a *long* pars prostatica. The seminal vesicle is a weakly muscular bipartite sac situated centrally within the posterior end of the cirrus sac. Its two approximately equal compartments communicate through a narrow aperture in a muscular partition (Fig. 4). Overall the vesicle measures approximately 0·29 mm. long and 0·14 mm. in diameter. The anterior compartment narrows into a slender tube which expands abruptly into the cylindrical pars prostatica. This measures 0·8 mm. long and 0·16 mm. in diameter. Its wall contains weak longitudinal muscles and it is almost filled by the lining of tall empty-looking 'cells'. At its anterior end the pars prostatica leads into the muscular ejaculatory duct which traverses the remaining length of the cirrus sac to open into the genital atrium, immediately adjacent to the female opening. No cirrus is differentiated, the protruded end of the cirrus sac forming a genital papilla. The peripheral spaces within the cirrus sac are occupied by the tightly-packed cells constituting the prostate gland (Fig. 4).

Female: In whole mounts the ovary lies on or slightly to the right of the mid-line, near the dorsal surface, and immediately behind the level of the acetabulum. In unflattened specimens however, it may lie mid-way between that organ and the posterior extremity of the body. It is an irregularly ovoid body measuring 0·25 mm. in greatest diameter. Ventrally the ovary leads into an oviduct which is proximally expanded to form a ciliated ovicapt. The oviduct turns posteriad and connects laterally with the large thin-walled receptaculum seminis (Fig. 5). Shortly after, Laurer's canal is given off ventrally. This winds a sinuous course backwards through the dense tissue above the excretory vesicle. Beyond the testes it turns abruptly dorsad and communicates with the exterior by a median dorsal pore. The circular muscles of the canal are very strongly developed, and it is lined by cuticle for at least a considerable distance from the pore. After giving off Laurer's canal the oviduct receives a short duct from the median yolk reservoir. It then turns dorsad and expands into the ootype. Large gland cells are loosely packed about this region and constitute the 'shell' gland. Beyond the ootype the female duct continues as the uterus, which gradually expands into the relatively enormous tube whose convolutions occupy the greater part of the animal's bulk. Nicoll (1918) describes the uterus as a narrow highly convoluted tube. While this is true of the proximal convolutions behind the ovary, in front of that organ the diameter of the uterus is relatively enormous and its convolutions relatively few. The uterus extends forwards beneath the cirrus sac and almost at the level of the genital pore, terminates in a very short broad metraterm which runs directly forwards into the genital atrium. The innumerable eggs are elongate-oval in form and measure 0·036 mm. long and 0·02 mm. in diameter. The shell is yellowish brown in colour but in the mass the eggs appear dark brown to almost black. The shell has a circular operculum at one end. The yolk follicles lie in two lateral groups extending from the level of the acetabulum almost to the posterior end of the body. In flattened whole mounts

they are, as Nicoll describes them, confined to the outer side of the intestinal diverticula, but sections show that they lie dorsal to the rami and may extend over them into the intercaecal region. The follicles measure approximately 0·05 mm. x 0·1 mm. and discharge into main longitudinal collecting ducts lying between the gut rami and the lateral body margins. At the level of the ovary transverse ducts pass over the gut and meet behind the ovary. The expanded junction of the pair of transverse ducts with the central duct leading to the oviduct forms a T-shaped yolk reservoir.

Excretory System

The median excretory vesicle extends directly forwards from the pore, separates the testes, and bifurcates immediately behind the ovary. In large specimens the vesicle may be displaced to one side by the uterus. A further development, or a possible artifact caused by contraction during fixation, is the prolapsus of the uterus into the excretory vesicle.

References

McAlpine, D., 1891.—Remarks on a Fluke Parasitic in the Copper-head Snake. *Proc. Roy. Soc. Vic. III* (New Series), 1889 (1891), pp. 40-43.

Nicoll, W., 1914.—The Trematode Parasites of North Queensland. I. *Parasitology 6*, pp. 333-350.

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PLATE I

Fig. 1.—*Dolichopera macalpini* Nicoll, whole mount approximately 4 mm. long, from the ventral aspect. Contents of the uterus omitted.

Fig. 2.—*D. macalpini* Nicoll, whole mounts approximately 2·6 mm. long, from the ventral aspect. Contents of the uterus omitted.

Fig. 3.—*D. macalpini* Nicoll, whole mount of non-gravid individual approximately 1 mm. long, from the ventral aspect.

Fig. 4.—*D. macalpini* Nicoll, vertical longitudinal section of the forebody. Contents of the uterus omitted.

Fig. 5.—*D. macalpini* Nicoll, diagram of female complex reconstructed from serial sections. Drawn from the posterior aspect.

ac, acetabulum; *cs*, cirrus sac; *cut*, cuticle; *gap*, common genital aperture; *int*, intestine; *lc*, Laurer's canal; *oes*, oesophagus; *os*, oral sucker; *ov*, ovary; *ovc*, ovicapt; *ovd*, oviduct; *pg*, prostate gland; *ph*, pharynx; *pl*, preoral lip; *pp*, pars prostatica; *res*, yolk reservoir; *rs*, receptaculum seminis; *sh*, cells of the 'shell' gland; *sv*, seminal vesicle; *tes*, testis; *ut*, uterus; *vd*, vas deferens.

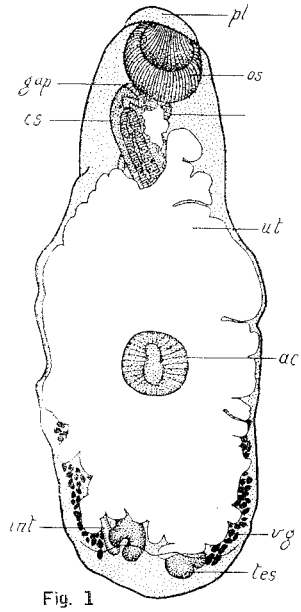

Fig. 1

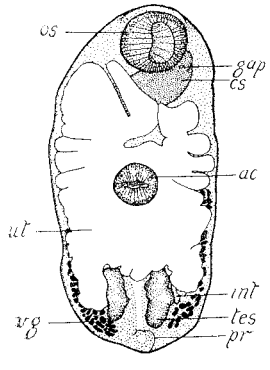

Fig. 2

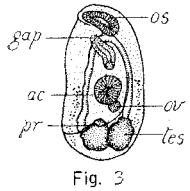

Fig. 3

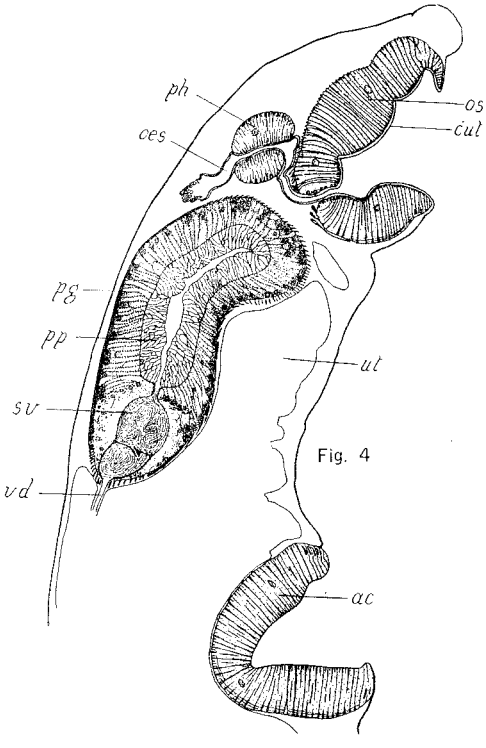

Fig. 4

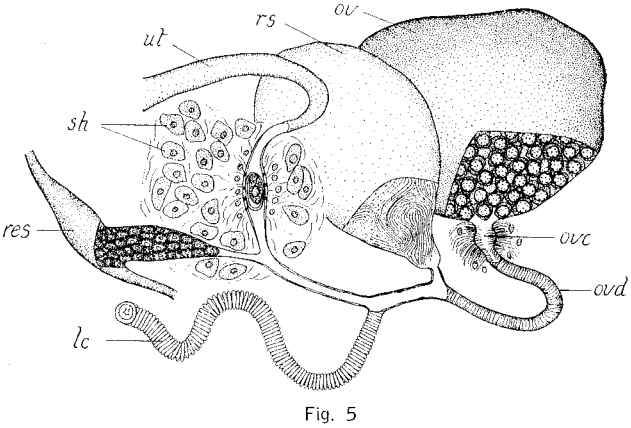

Fig. 5