

A new family of Monostome flukes
(Platyhelminths, Digenea)
from the Dugong, *Dugong dugon* (Müller)

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Résumé.

Une nouvelle famille de Monostomes (Plathelminthes-Digenea) du dugong, *Dugong dugon* (Müller).

La famille Labicolidae est créée pour une espèce nouvelle de Monostome, présente dans des abcès de la lèvre supérieure du dugong d'Australie septentrionale, *Labicola elongata*. Cette espèce est décrite et figurée dans le présent travail.

Summary.

The family Labicolidae is erected to contain a new species of Monostome fluke occurring in abscesses in the upper lip of the dugong from northern Australia. *Labicola elongata* is described as a new species and figured.

During histological examination of the upper lip of a dugong from north Queensland, Dr. M. Bryden of the Anatomy Department, University of Queensland, observed what he thought was a parasitic worm in his sections. Dr. L. Cannon of the Queensland Museum agreed with this view and advised the author. Subsequently the author was able to recover intact worms from abscesses in the upper lip of dugongs. The abscesses can easily be felt as a series of lumps, generally five or six, along the lip on each side. None were present towards the midline. They communicate with the outside by pores arranged in a line just inside the upper lip and below the line of the

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vibrissae (*fig. 1*). The abscesses are about 1 cm in diameter, but several may run together in heavy infections. They contain pus and variable numbers of worms. Exact counts of worms were not made. All dugongs which were examined for this parasite by the dugong research group at James Cook University were found to be infected (see list following Description). The worm cannot be placed in any of the existing families of monostome flukes, and a new family is erected here to contain it.

Materials and methods

When dugong material became available, worms were dissected out of their abscesses in the lip. As worms tended to coil themselves tightly, they were killed with hot water, uncoiled carefully on a piece of moist filter paper, and held flat with strips of moist filter paper. A small quantity of formalin was then added to the filter paper and the worms left until sufficiently fixed to be removed to a tube of formalin without their coiling again. Whole mounts were stained in Gower's carmine, and mounted in balsam. Serial sections were cut at 6 microns and stained with haematoxylin and eosin, dehydrated in an alcohol series and mounted in D.P.X. A critical point drying apparatus was not available for processing specimens to be examined in the scanning electron microscope. The best alternative was to use camphene (manufactured by Hopkin and Williams) for drying. Specimens were dehydrated through an alcohol series, cleared and hardened in methyl benzoate, brought to 60 °C and put through several changes of camphene which is liquid at this temperature. After three hours at 60 °C the container of camphene and specimens was removed to room temperature. When the camphene had solidified, the container was placed in an oven at 40 °C and the camphene allowed to sublime away over the next 24 hours. Dried specimens were coated with gold-palladium.

In the list of host specimen given after the description, the code number, prefixed by the letters MM, refers to the number given to each animal by the dugong research group at James Cook University. Age determination of dugongs was carried out by Marsh and was based on dentinal growth layers in the tusks, assuming that the layers are laid down annually (Marsh, 1978, in press). Where the age is followed by a plus (+) sign, this indicates that the age given is a minimum, as some dentinal layers had been lost by abrasion of the erupted tusks. Measurements of the worms are as seen in ventral view, and are given in millimeters.

Description

Labicolidae, new family.

Diagnosis: Monostomatous Digenea with greatly elongate cylindrical body bearing tiny spines. Oral sucker small, terminal, its inner surface ridged; pharynx absent;

oesophagus short; caeca lateral, simple, terminating close to posterior of body. No acetabulum. Testes large, ovoid, tandem in posterior fifth of body. Cirrus sac long, containing internal seminal vesicle, prostatic region and unarmed cirrus; male opening ventral, median, just behind intestinal bifurcation. Ovary large, rounded or angular in shape, pretesticular. Shell gland immediately posterior to ovary; Laurer's canal present; seminal receptacle absent. Uterus forming tight intercaecal coils; eggs small, operculate, with long polar filaments; female opening ventral, immediately posterior to male opening. Vitelline follicles ventral, pre- and post-ovarian. Excretory opening posterior, terminal; a longitudinal excretory duct runs ventral to each caecum. Parasites of Sirenia.

Genus *Labicola*, new genus.

Diagnosis: Labicolidae. Body cylindrical, greatly elongated; tegument densely covered with tiny spines and occasional papillae. Oral sucker small, terminal, its inner surface consisting of nine longitudinal ridges; oesophagus very short; caeca lateral, simple, but may be periodically constricted along their length, terminating close to posterior of body. Testes large, ovoid, tandem in posterior fifth of body and occupying most of cross-sectional area of body. Convoluted external seminal vesicle present; cirrus sac long, tapering proximally, containing convoluted internal seminal vesicle, prostatic region and unarmed cirrus. Male opening ventral, median, just behind intestinal bifurcation. Ovary large, rounded or angular in shape, pretesticular, about three-quarters from anterior end of body. Shell gland immediately posterior to ovary; Laurer's canal present; seminal receptacle absent. Uterus forming tight intercaecal coils; egg reservoir occasionally present; eggs small, operculate, with long polar filaments; female opening ventral, median or slightly to left of median line, immediately posterior to male pore. Vitellaria consisting of large follicles extending anteriorly from ovary and posteriorly from shell gland almost to first testis; pre-ovarian vitellaria consisting of a row on each side ventral to caecum, post-ovarian vitellaria in two irregular median ventral rows. Excretory opening posterior, terminal; a longitudinal excretory duct runs ventral to each caecum. Parasitic in lip of *Dugong* (Sirenia).

Type (and only) species *Labicola elongata* new species

The generic name is derived from *labia-ae* f. (Latin; lip) and *-cola* (Latin; suffix meaning « dweller »).

Labicola elongata, new species (fig. 2-4)

Description: With the characters of the family and genus. A medium to large-sized worm with an extremely elongate body of approximately uniform diameter throughout, but may be slightly increased by the massive testes. Thirteen worms measured 19.1-31.1 (mean 25.4) in length and 0.41-0.78 (mean 0.59) in diameter just anterior to the ovary. The tegument is densely covered with tiny spines and bears occasional papillae. The most conspicuous feature of the tegumental musculature is

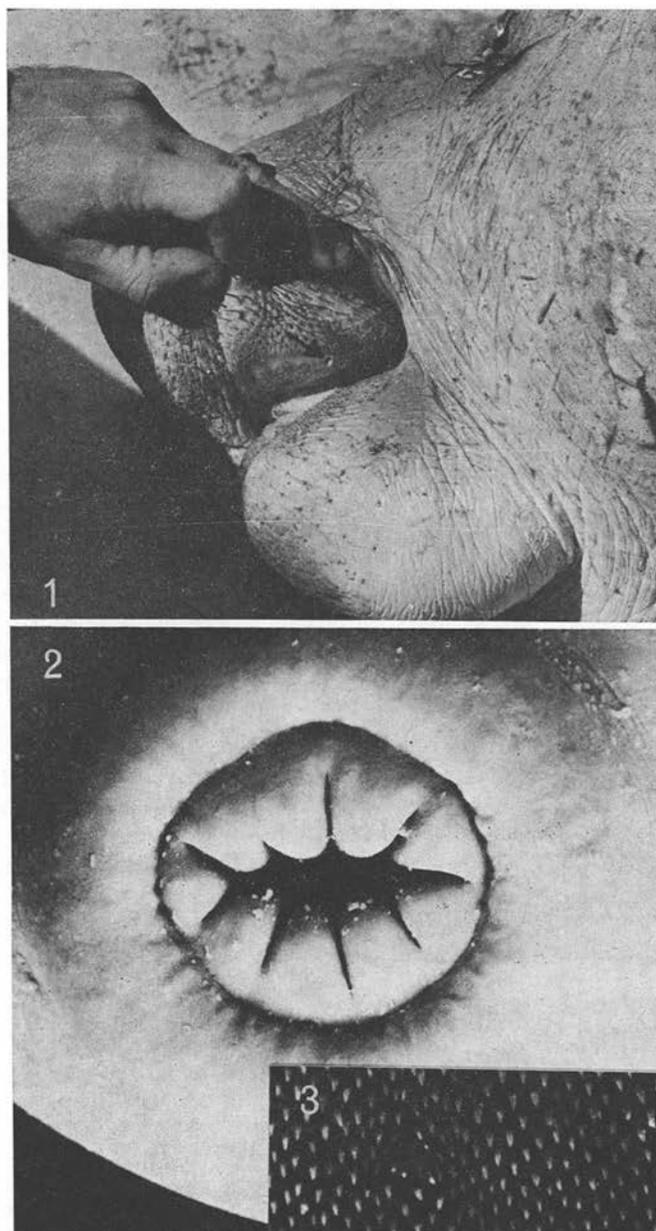


Fig. 1. Head of a dugong with upper lip raised to show the line of pores leading to abscesses containing *Labicola elongata*. One pore is anowed, others are visible to its left.

Fig. 2. Scanning electron micrograph of oral sucker of *L. elongata* ($\times 308$).

Fig. 3. Body surface of *L. elongata* to genital openings. The posterior of the worm is towards the bottom of the page. Note tiny spines and a papilla ($\times 2763$)

the strongly developed longitudinal fibres which are especially well developed on the dorsal side. The small oral sucker measures 0.16-0.24 (mean 0.2; 14 observations) in length and 0.15-0.24 (mean 0.2; 14 observations) in maximum diameter. The oesophagus is very narrow and short, being 0.17-0.36 (mean 0.24; 11 observations) in length.

The first testis is situated about four-fifths of the body length from the anterior and measures 0.97-1.92 (mean 1.43; 13 observations) in length and 0.32-0.62 (mean 0.48; 11 observations) in width. The second testis is close to the posterior extremity of the body and measures 1.15-1.92 (mean 1.45; 12 observations) in length by 0.53-0.8 (mean 0.67; 10 observations) in width. A sperm duct passes forwards on each side just ventral to the caecum. Immediately anterior to the ovary, the two ducts pass dorsally, medial to the caeca, and unite in the dorsal midline to form the common sperm duct. This runs forward, and for some distance prior to entering the cirrus sac is convoluted and greatly distended to form an external seminal vesicle. The large cirrus sac is 2.77-5.0 (mean 3.51; 14 observations) in length. Immediately posterior to the male opening it is 0.24-0.48 (mean 0.36; 14 observations) in diameter and tapers posteriorly to be 0.12-0.3 (mean 0.21; 14 observations) in diameter close to its proximal end. Within the proximal region of the cirrus sac the ejaculatory duct is convoluted and dilated to form an internal seminal vesicle. Distal to this comes a short prostatic region followed by a convoluted unarmed cirrus. When fully protruded, the cirrus may reach 10% of the body length.

The ovary is located three-quarters along the length of the body from the anterior end. It measures 0.22-0.45 (mean 0.32; 13 observations) in length by 0.36-0.56 (mean 0.48; 10 observations) in width. The shell gland is larger than the ovary and is separated from it by a narrow parenchymatous partition. The opening of Laurer's canal is dorsal, median, and level with the posterior edge of the shell gland. From there it runs to the partition between the ovary and the shell gland where it joins the oviduct. This runs into the shell gland where it receives material from the yolk reservoir on its dorsal side before entering the ootype. The uterus exits from the ventral side of the shell gland and is looped several times between the shell gland and the ovary before passing anteriorly ventral to the ovary. In the pre-ovarian vitelline region, the uterine coils are often narrow and irregular. Anterior to this the uterus may be packed with eggs and tightly and regularly coiled until reaching the metraterm which is 1.5-2.0 times as long as the cirrus sac and lies ventral to it. In a minority of specimens the end of the uterus is dilated as an egg reservoir. Ten eggs dissected from the distal uterus, measured 0.021-0.023 in length and 0.012-0.013 in diameter. The egg bears 1-2 long filaments at the opercular end and 2-4 at the other. The filaments are up to 0.4 in length. The eggs do not appear to be embryonated. The pre- and post-ovarian vitelline fields each extend for up to 10% of the body length. The pre-ovarian vitellaria often extend further anteriorly on the left side than on the right. Vitelline follicles measure 0.06-0.14 (mean 0.1; 11 observations) in length by 0.14-0.18 (mean 0.16; 9 observations) in width. The follicles drain dorsally into a lateral duct ventral to the caecum on each side. The pre- and post-ovarian ducts on each side unite laterally at the anterior edge of the shell gland to produce a duct which

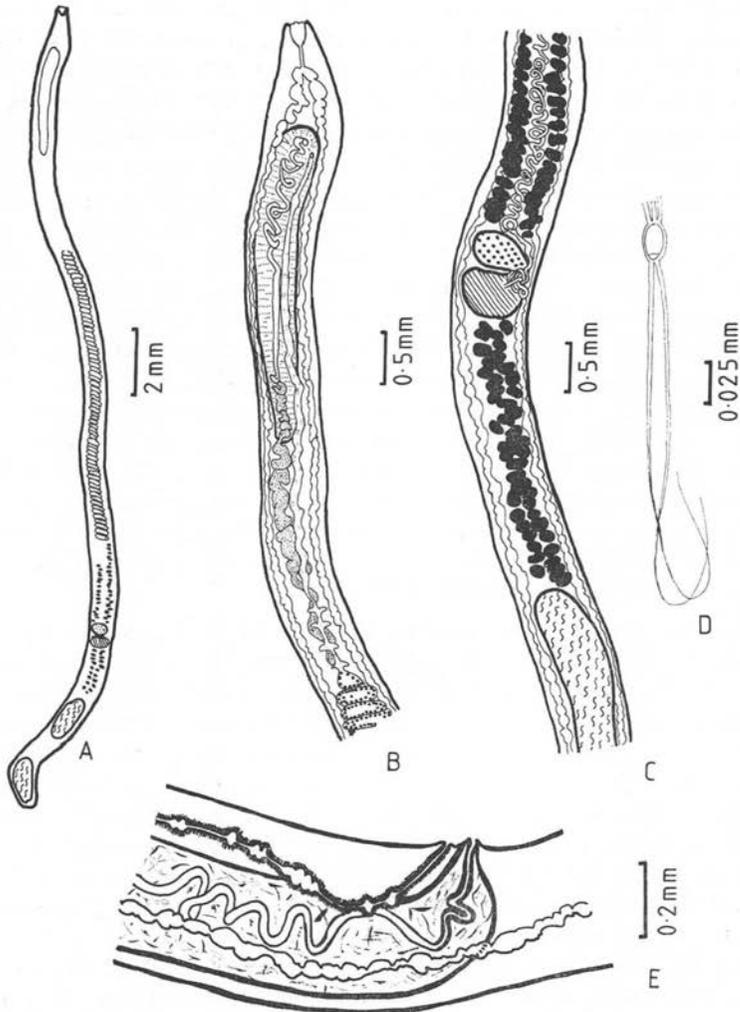


Fig. 4. A. Whole worm in ventral view showing cirrus sac, coils of uterus, vitellaria, ovary, shell gland and testes. — B. Anterior end of *L. elongata* in ventral view. — C. Ovarian region of *L. elongata* in ventral view showing vitellaria, ovary, shell gland and first testis. — D. Egg of *L. elongata* showing polar filaments (drawn fully on one end only). — E. Region of genital pores viewed from left hand side and showing metraterm, cirrus sac and caecum on one side.

passes dorsally and medially into the partition between the ovary and the shell gland. Here, at a point dorsal to the oviduct, it joins its partner from the opposite side, and the common duct runs into the yolk reservoir which lies dorsally within the shell gland.

The longitudinal excretory duct ventral to each caecum is narrow and often inconspicuous. At regular intervals each gives off a blind-ending branch which passes anteriorly and dorsally, lateral to the caecum, and runs anteriorly for a short distance dorsal to the caecum. These branches are generally much broader than the longitudinal excretory ducts.

Host: *Dugong dugon* (Müller).

Location in host: Abscesses in upper lip.

Location of types: Holotype (V 1679) and two paratypes (V. 1680-1681) from dugong MM 131 (male, 9.5 years, Townsville, North Queensland, 11th March, 1977) and one paratype (V. 1682) from MM 129 (female, 28.5 years, Mornington Island, Gulf of Carpentaria, 11th November, 1977), all deposited in the South Australian Museum. Sectioned material has also been deposited in the South Australian Museum and has been given the accession numbers V 1683-1684.

Two paratypes (U.S.N.M. Helm. Coll. No. 75110) from MM 131, in the United States National Museum.

Two paratypes (1979.1.31 1-2) from MM 131, in the British Museum (Natural History).

Other animals from which *Labicola elongata* was collected:

- MM 133, male, 34+ years, Mornington Island, 21st April, 1977
- MM 136, male 21.5 years, Mornington Island, 5th July, 1977
- MM 138, male, 28+ years, Mornington Island, 11th July, 1977
- MM 139, male, 28+ years, Mornington Island, 20th July, 1977
- MM 140, male, 23.5 years, Mornington Island, 21st July, 1977
- MM 146, male, 10.5 years, Townsville, 13th August, 1977
- MM 154, male, 15 years, Mornington Island, 16th November, 1977
- MM 200, female, 17.5 years, Mornington Island, 26th July, 1978
- MM 202, male, 34+ years, Mornington Island, 31st July, 1978
- MM 204, female, 46.5 years, Mornington Island, 3rd August, 1978

Animals observed in the field to have abscesses in the lip, but which were not dissected:

- MM 132, male, 12.5 years, Mornington Island, 5th April, 1977
- MM 143, female ? years, Mornington Island, 1st August, 1977
- MM 149, female, 22 years Townsville, 27th August, 1978
- MM 152, male, 33+ years, Thursday Island, (Torres Straits), 27th September, 1977
- MM 201, female, 15.5 years, Mornington Island, 30th July, 1978
- MM 203, female, 17.5 years, Mornington Island, 2nd August, 1978
- MM 205, female, 40.5 years, Mornington Island, 3rd August, 1978
- MM 206, female, 17.5 years, Mornington Island, 4th August, 1978
- MM 207, male, ? years, Mornington Island, 7th August, 1978.

Discussion

The affinities of the Labicolidae are clearly with those monostome families associated with the alimentary tract of the host and possessing eggs with long polar filaments. Yamaguti (1971) recognises five such families, Notocotylidae Lühe, 1909; Nudacotylidae Barker, 1916; Rhabdiopoeidae Poche, 1926; Opisthotrematidae Poche, 1926 and Pronocephalidae Looss, 1902. By virtue of its body form, testes in tandem, distribution of vitellaria and oral sucker shape, *Labicola elongata* cannot be placed in the first four of these families. A more detailed comparison is therefore necessary only with the Pronocephalidae, a family containing a great variety of forms divided among 11 subfamilies (Yamaguti, 1971). The majority of pronocephalids have their testes opposite or diagonal, and possess a distinctive unarmed head collar. This latter feature is frequently considered diagnostic of the group, although it is lacking in a few genera. *Labicola* cannot be placed in any of the existing subfamilies and differs from all pronocephalids by its extreme elongation and by its ridged oral sucker. It also lacks a head collar. It is therefore considered best to erect a separate family to contain it.

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