STUDIES ON THE FAMILY CYATHOCOTYLIDAE POCHE. PART 3. SUBFAMILY MUHLINGININAE MEHRA, 1950, WITH DESCRIPTION OF *MUHLINGINA LUTRAI* MEHRA, 1950

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(With 1 Table and 6 Text-figures)

CONTENTS

I—INTRODUCTION

In 1950 (Mehra, 1950) I created the genus *Muhlingina,* with *Muhlingina lutrai* sp. nov. as the generic type for a number of specimens collected from the intestine of the common Indian otter, *Lutra vulgaris,* in June, 1913, and placed at my disposal by the Zoological Survey of India in 1948 for description. A full account of the species was, however, delayed till now.

The genus *Muhlingina* is remarkable in having a small anterior part of the body modified into the form of a beaker surrounding a cavity of the ventral surface around the characteristic sucker-like anterior part of the holdfast organ opening to the exterior by an anteriorly directed ventral funnel-shaped opening, whereas the much larger hind-body has remained a solid, compact part with the narrow chink-like cavity of the glandular parenchymatous holdfast organ penetrating through it almost to a little in front of the hinder end.

In the family Cyathocotylidae is included another remarkable genus, *Braunina* Heider, 1900, for which Wolf (1903) created the subfamily Braunininae and for which Bosma (1931) created the family Brauninidae, in which cup-shaped fore-body is of much larger size and is also formed by a great development and subsequent fusion of the margins of the ventral folds surrounding the deep ventral concavity with the anteriorly directed opening and enormously developed, ventrally projecting holdfast organ in it. The hind-body in *Braunina* is reduced to a short terminal cylindrical or truncated appendix. The holdfast organ in this genus is altogether of a different shape and structure from that of *Mu-*

hlingina. It is solid, massive, without a cavity and protrudes as a large heart-shaped structure in the cavity of the fore-body which is consequently narrowed. The two genera, namely, *Muhlingina* and *Braunina;* though they have a cup-shaped fore-body, thus differ much in the shape of the entire body, size and shape of the fore-body and the hind-body and in the structure of the holdfast organ. It is obvious that their common resemblance in having a cup-shaped fore-body has been brought about by convergent evolution along two different lines of ancestory possibly on account of similar habitat in aquatic mammalian hosts for effective attachment and functioning of the secretions of the glandular holdfast organ. A fundamental similarity in the totality of their organisation, all the same, signifies their close relationship as being members of the same family Cyathocotylidae.

II—Morphology of *Muhlingina lutrai* Mehra

Muhlingina lutrai Mehra, 1950

Host : *Lutra vulgaris* (the common otter, Indian race).

Location : Intestines.

Locality : ?

Donor : Zoological Gardens, Calcutta.

Zoological Survey of India Registered No. ZEV 5970/7.

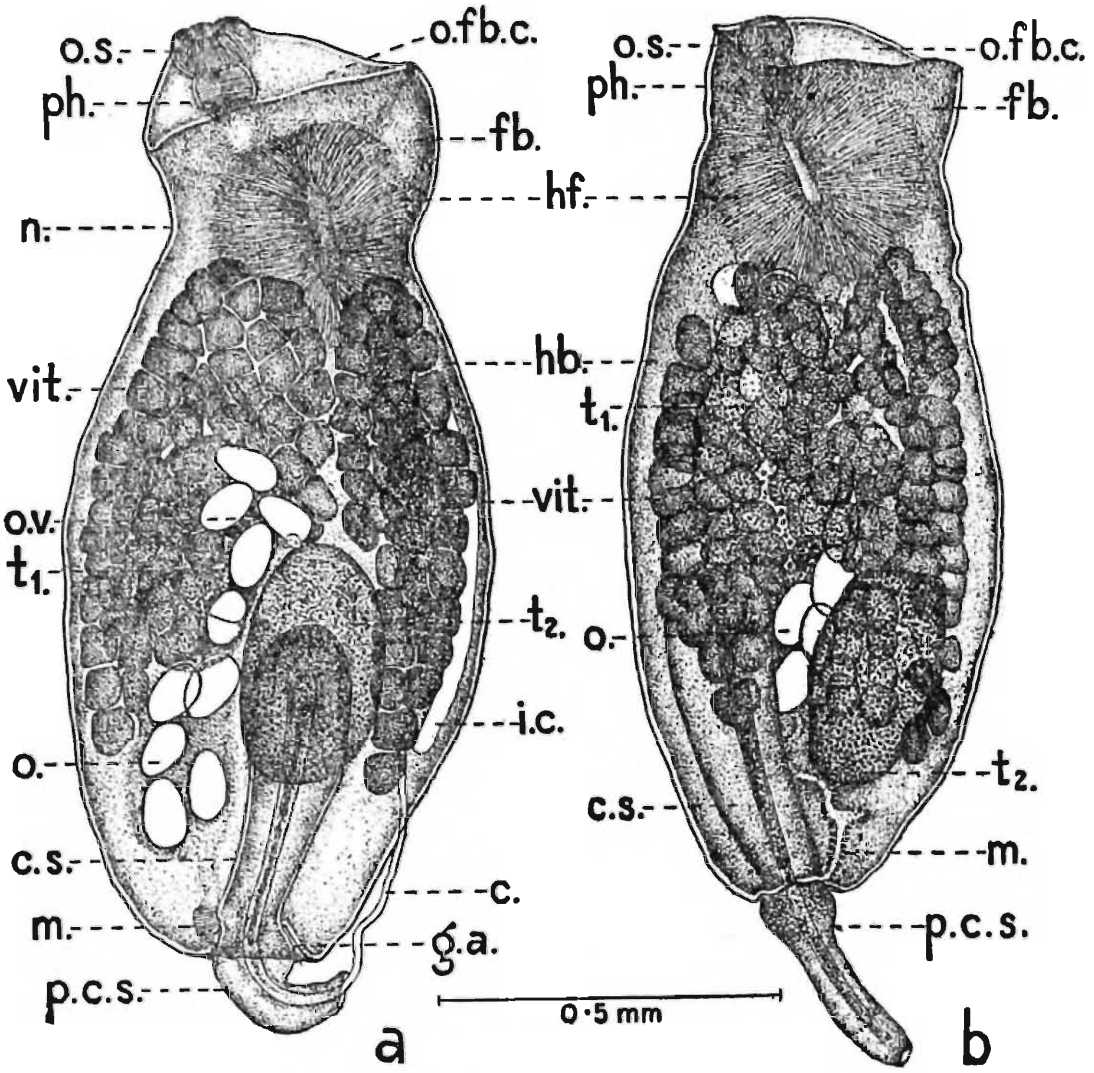
Number of specimens : Reported many, about 2 dozen.

A large number of specimens, about two dozen, were collected from the intestines of the common Indian otter *Lutra vulgaris* in June, 1913, which had died in the Zoological Gardens, Calcutta. A preliminary account of these specimens was given by me in 1950.

Muhlingina lutrai is a small cyathocotylid measuring 1·13-1·57 mm. in length and 0·51-0·72 mm. in maximum breadth, which lies a little behind the middle, with an average measurement of 1·36 by 0·58 mm. with broad anterior and narrow posterior ends of 0·144-0·399 and 0·136-0·187 mm. breadth. The body is somewhat vase-shaped, wide-mouthed, bottle-shaped or jar-shaped, with a more or less distinct neck region (Text-figs. 1-3) dividing it into a small cup or beaker-shaped anterior region or fore-body of 0·28-0·47 mm. length (average 0·37) and 0.32-0·476 mm. breadth, and a large posterior compact region,the hind-body of 0·86-1·156 mm. length (average 0·99). The neck region of 0·32-0.416 mm. breadth is separated usually from the hind-body by a constriction. The fore-body has a large cavity with a broad funnel-shaped opening of 0·187-0·27 mm. breadth situated ventrally a little behind the dorsally projecting anterior end containing the oral sucker and pharynx.

The almost spherical cup-shaped holdfast organ, with a fairly wide cavity, situated on the ventral surface of the fore-body opens into the cavity of the latter by a fairly large opening. The holdfast organ is enormously developed, extending almost in the entire hind-body except the posterior end. Its cavity in the hind-body is mostly reduced to a narrow chink or slit, while in the fore-body, where it opens to the exterior

into the form of a fairly large outer suctorial cup-like structure with a wide cavity having disc-shaped margin usually projecting in the form of two eversible flaps or lobes (Text-figs.1, 2, 4 & 5), it lies on the ventral surface enclosed in the cavity of the fore-body formed by extensions of the ventral margins of the bodywall and their subsequent fusion around the ventral concavity of the ancestor. Its sucker-like part opening in the fore-body measures 0·27-0·3 mm. in diameter (Table 1). Its secretion formed and accumulated in the large glandular parenchymatous vacuoles

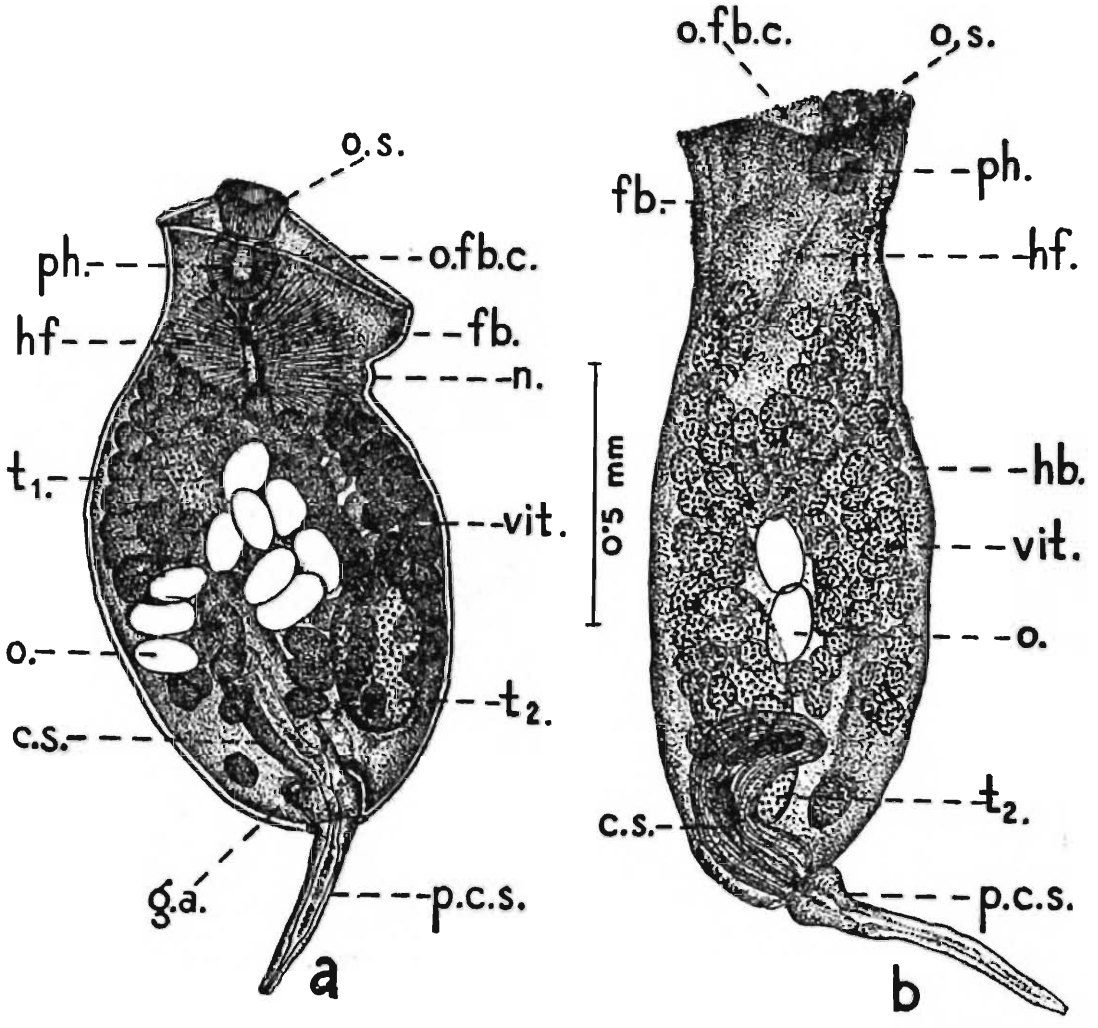


TEXT-FIG. 1.—*Muhlingina lutrai* Mehra. (*a*) and (*b*). Ventral views.

c., cirrus ; *c.s.*, cirrus sac ; *fb.*, fore-body ; *g.a.*, genital atrium ; *hb.*, hind-body ; *hf.*, holdfast organ ; *i.c.*, intestinal caecum ; *m.*, metraterm ; *n.*, neck region ; *o.*, ovum ; *o. fb. c.*, opening of fore-body cavity ; *o.s.*, oral sucker ; *ov.*, ovary ; *p. c. s.*, protrusible part of cirrus sac ; *ph.*, pharynx ; t_1., anterior testis ; t_2., posterior testis ; *vit.*, vitelline follicles.

flows into the cavity of the holdfast organ, and from there it is finally discharged through the sucker-shaped outlet into the cavity of the fore-body. The fibrous walls of concentrically arranged fibres around the sucker-shaped part are mostly parenchymatous, simulating muscular appearance. A thin cuticle lines the cavity of the holdfast organ. It is in continuation of the cuticle lining the cavity of the fore-body and the bodywall outside. It is the parenchymatous fibrous wall formed as the result of aggregation and concentration of concentrically arranged fibres separating the large vacuoles of the glandular parenchyma outside

the thin longitudinal layer and cuticle lining the cavity of the holdfast organ that forms the wall of the suctorial cup of the latter on the ventral surface of the fore-body. This fibrillar parenchymatous wall in and near the disc-shaped margin surrounding the opening gives the appearance of a musculature, and is produced into two folds, one dorsal and the other ventral, the former being anterior. The ventral fold is larger and may be subdivided into two small lobes. The opening of the holdfast organ surrounded by these flaps, which form the disc-shaped margin of the cup, is funnel-shaped, measuring 0·0093-0·013 mm. in diameter, and gradually narrows posteriorly till it becomes a narrow chink-like canal



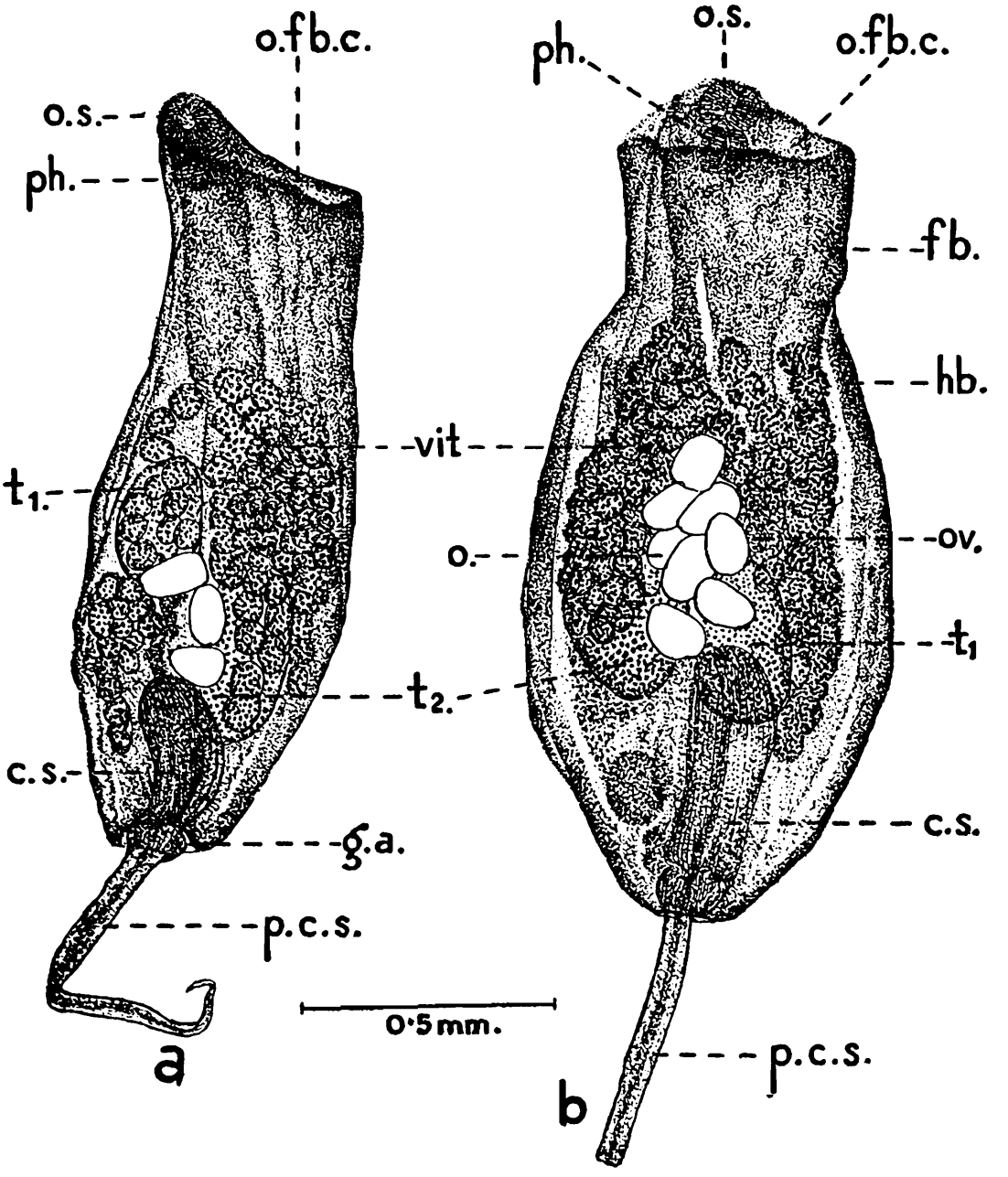
Text-fig. 2.—*Muhlingina lutrai* Mehra. (*a*). Ventral view. (*b*). Dorsal view. *c.s.*, cirrus sac; *fb.*, fore-body; *g.a.*, genital atrium; *hb.*, hind-body; *hf.*, holdfast organ; *n.*, neck region; *o.*, ovum; *o.fb.c.*, opening of fore-body cavity; *o.s.*, oral sucker; *p.c.s.*, protrusible part of cirrus sac; *ph.*, pharynx; t_1., anterior testis; t_2., posterior testis; *vit.*, vitelline follicles.

of 0·0056-0·0037 mm. diameter running through the length of the hind-body much nearer the ventral surface in its middle and posterior part, with the uterus and gonads lying above it. In the anterior part of the hind-body behind the intestinal bifurcation it lies more dorsally.

The holdfast or adhesive organ thus conforms to the description given by me in the diagnosis of the family Cyathocotylidae in 1947. It is "simple in structure, mostly glandular and parenchymatous, and slightly muscular with a central cavity".

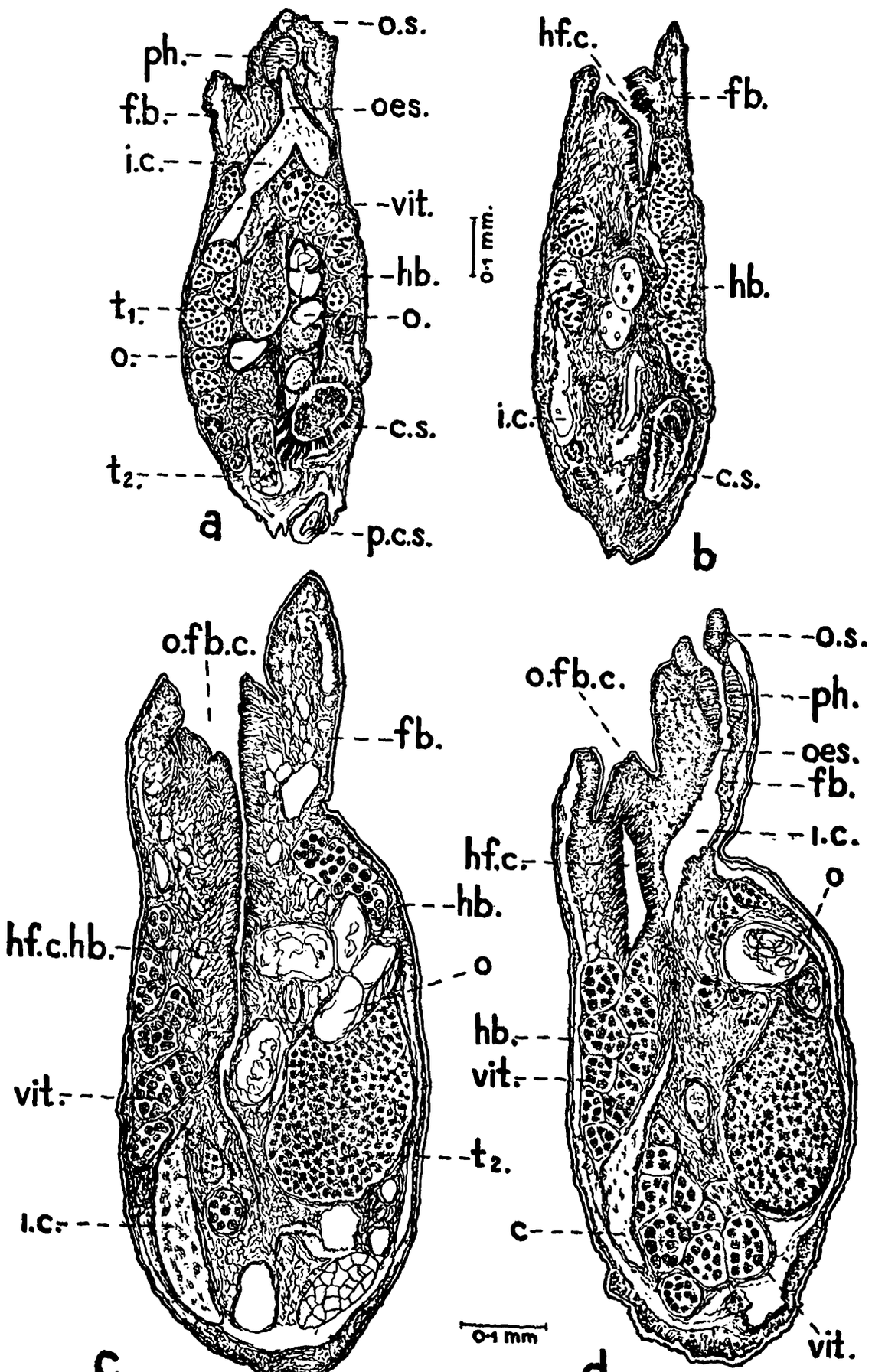
The thin body wall is without spines, and covered with a thin cuticle. The ventral sucker is absent.

The oral sucker and pharynx are well developed. They lie at the anterior end of the dorsally projecting anterior part of the body in front of the ventrally situated opening of the cavity of the fore-body. The oral sucker with its opening is terminal, measuring 0·093× 0·093-0·17 mm. in size. A short prepharynx though not visible in entire mounts is present. The spherical pharynx has thick muscular walls and is almost equal to the oral sucker, measuring 0·09-0·115 mm. in diameter. Its lumen, 0·02 mm. in diameter, is a little broader in the less muscular



TEXT-FIG. 3.—*Muhlingina lutrai* Mehra. (*a*). Lateral view. (*b*). Dorsal view. c.s., cirrus sac; *fb.*, fore-body; *g.a.*, genital atrium; *hb.*, hind-body; *o.*, ovum; *o.fb.c.*, opening of fore-body cavity; *o.s.*, oral sucker; *ov.*, ovary; *p. c. s.*, protrusible part of cirrus sac; *ph.*, pharynx; t_1., anterior testis; t_2., posterior testis; *vit.*, vitelline follicles.

posterior one-fourth part, whereas anteriorly it is narrower, measuring 0·0075 mm. in diameter. A short oesophagus of 0·084 mm. length, usually not seen in entire mounts, is present. It gradually increases in breadth towards the intestinal bifurcation, measuring 0·0476 mm. near the latter and 0·02 mm. near the pharynx in breadth. The intestinal bifurcation is 0·112 mm. broad. The intestinal caeca, which are



Text-fig. 4.—*Muhlingina lutrai* Mehra.

(*a*) and (*b*). Horizonto-longitudinal sections. (*c*) and (*d*). Horizonto-longitudinal sections of another specimen.

c., cirrus; *c.s.*, cirrus sac; *fb.*, fore-body; *hb.*, hind-body; *hf. c.*, holdfast organ cavity in fore-body; *hf. c. hb.*, holdfast organ cavity in hind-body; *i. c.*, intestinal caecum; *o.*, ovum; *o. fb. c.*, opening of fore-body cavity; *o. s.*, oral sucker; *oes.*, oesophagus; *p. c. s.*, protrusible part of cirrus sac; *ph.*, pharynx; t_1., anterior testis; t_2., posterior testis; *vit.*, vitelline follicles.

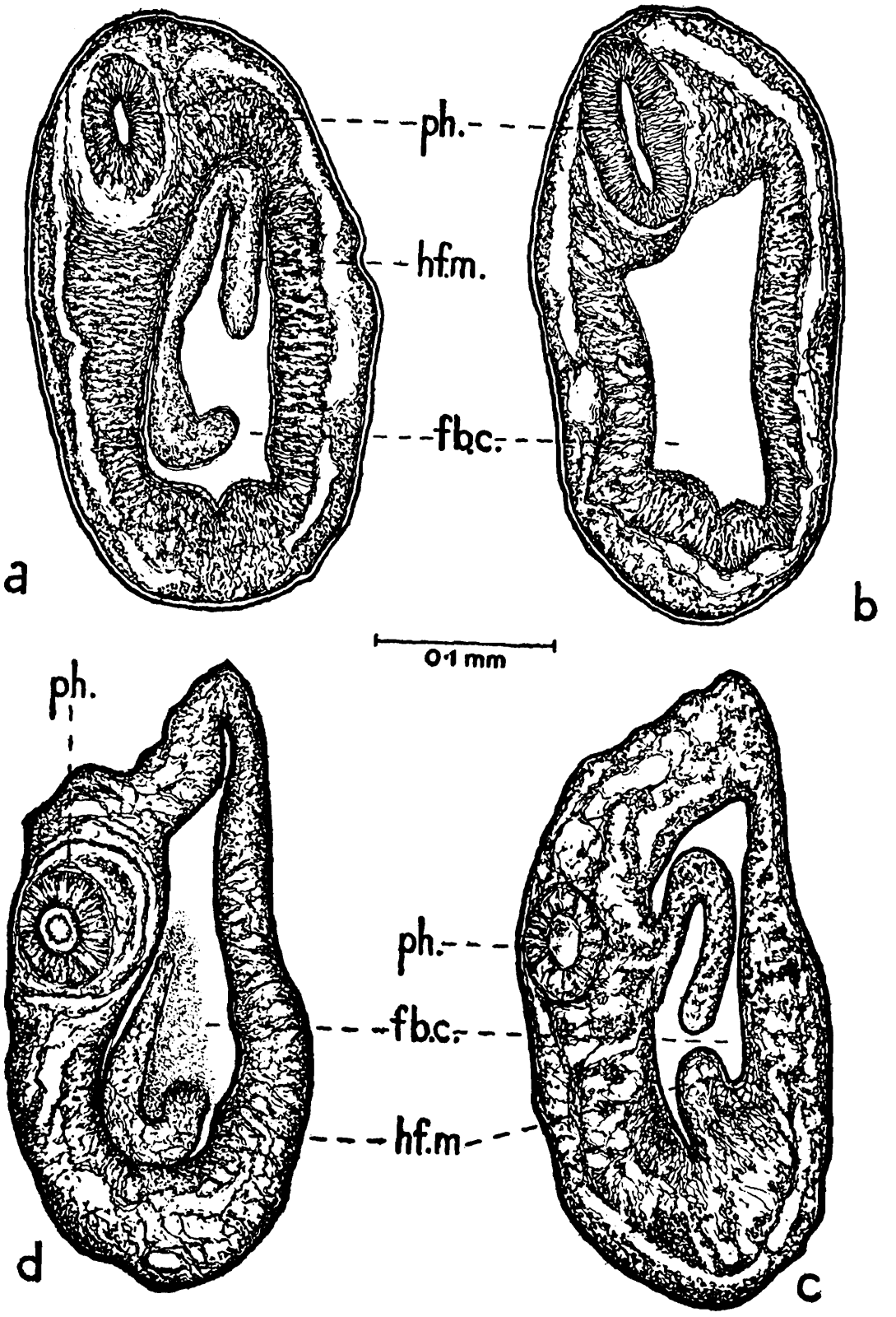
broader near the intestinal bifurcation, terminate a little distance in front of the hinder end of the body at about the level of the posterior end of the posterior testis.

TABLE 1.—*Dimensions in mm. of specimens of* Muhlingina lutrai *Mehra.*

Specimen	Length of body	Length of fore-body	Length of hind-body	Breadth near ant. end	Maximum breadth of body just behind middle	Breadth in neck region
(1)	1·19	0·29	0·9	0·144	0·55	0·32
(2)	1·23	0·297	0·935	0·39	0·578	0·357 Neck indistinct.
(3)	1·4	0·467	0·935	0·399	0·51	0·357
(4)	1·58	0·425	1·156	0·416	0·7225	0·416
(5)	1·53	0·3825	1·1475	0·399	0·535	0·357
(6)	1·57	0·442	1·1305	0·255	0·578	0·382
(7)	1·317	0·382	0·935	Anterior part with o. s. and pharynx separated.	0·535	0·38
(8)	1·394	0·34	1·054	0·34	0·569	0·38
(9)	1·13	0·28	0·85	0·33	0·595	0·323
(10)	1·28	0·425	0·857	0·39	0·646	0·38

Specimen	Max. Breadth of fore-body	Breadth of opening of fore-body cavity	Breadth at hinder end	Size of oral sucker	Size of pharynx	Approximate diameter of holdfast organ
(1)	0·32	0·289	0·144	0·065×0·1028	0·09×0·09	0·27
(2)	0·4	0·26	0·1589	0·0748×0·1028	0·0935×0·097	0·28
(3)	0·38	0·255	0·187	0·066×0·1028	0·1028×0·1028	0·272
(4)	0·476	0·255	0·1496	0·0748×0·0748	0·0935×0·0935	0·297
(5)	0·3825	0·2125	0·136	0·093×0·17	0·1×0·1	0·2975
(6)	0·425	0·215	0·144	0·084×0·13	0·0935×0·0935	0·2975
(7)	0·425	0·215	0·17	0·0673×0·0935	0·112×0·099	0·29
(8)	0·391	0·255	0·175	0·0748×0·0935	0·1028×0·1028	0·297
(9)	0·33	0·187	0·17	0·065×0·075	0·11×0·11	0·299
(10)	0·467	0·27	0·144	0·076×0·102	0·11×0·11	0·297

All the genital organs lie in the hind-body. The two testes are obliquely situated closely in front of one another, the posterior part of anterior testis being opposite and overlapping the anterior part of



Text-fig. 5.—*Muhlingina lutrai* Mehra.

(*a*) and (*b*). Transverse sections of forebody, showing fore-body cavity and sucker-like margin of the opening of holdfast organ. (*c*) and (*d*). Transverse sections of fore-body of another specimen, showing fore-body cavity and sucker-like margin of the opening of holdfast organ.

fb.c., fore-body cavity; *hf.m.*, holdfast organ margin ; *ph.*, pharynx.

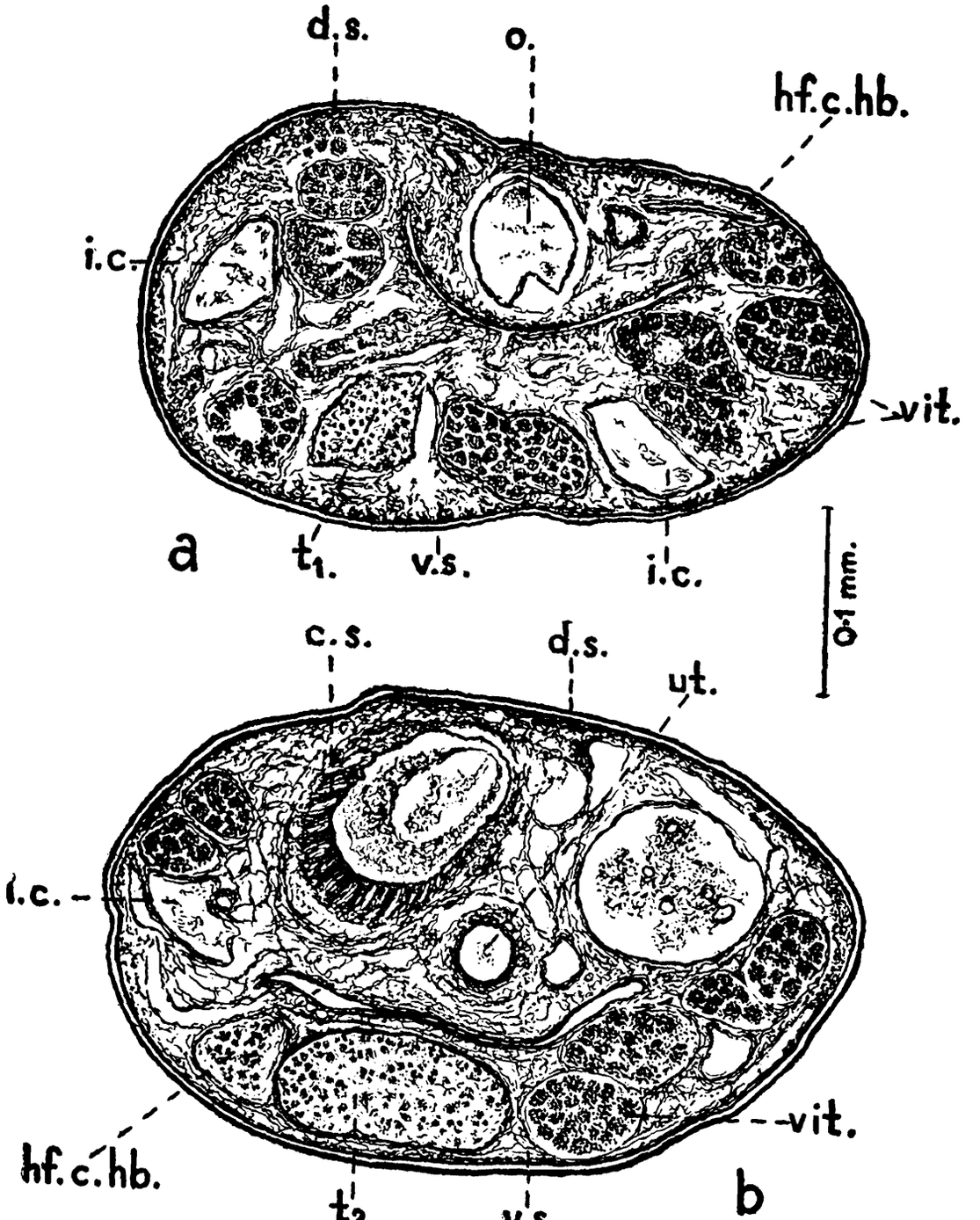
posterior testis. They are oval or somewhat spherical and entire. The anterior testis lies in the anterior part of the hind-body just behind the neck region, a little behind the intestinal bifurcation, about 0·187 mm.

distance behind it, mostly covered by vitelline follicles and ova, closely in front of and in the same line with the posteriorly situated cirrus sac, sometimes overlapping dorsally its basal part, measuring 0·187-0·34× 0·21 mm. in size. It covers the ovary ventrally in its anterior part and extends posteriorly into the region of the posterior testis and basal part of the cirrus sac. The posterior testis lies in the posterior part of the hind-body a little in front of the hinder end, 0·17 mm. distance in front of it opposite to the cirrus sac, covered dorsally in its anterior half by the dorsally situated basal or proximal part of the latter. It is larger than the anterior testis and measures 0·255-0·31×0·12-0·187 mm. in size. The cirrus sac is large with thick muscular walls composed of an outer prominent thick layer of longitudinal muscle fibres and an inner thin layer of circular muscle fibres. It lies dorsally, usually obliquely, with its basal end approaching the dorsal surface closely behind or overlapping the posterior end of anterior testis and the terminal end median and ventral. It sometimes occupies almost a median position throughout its length, usually occupying a great part of hind-body; in a few specimens it extends as far forwards as the anterior end of the latter much in front of the middle of the entire body; in some specimens it is confined only to the posterior half of hind-body. Its size and shape vary much due to the state of its contraction. It measures 0·39-0·85 mm. in length, with a maximum breadth of 0·127-0·168 mm. near the basal end. It may be slightly or very deeply curved on its inner side, assuming a semilunar or rarely an alomst semicircular shape. In a few specimens it is slightly concave dorsally and convex ventrally, or almost straight. The terminal or distal part of the cirrus sac which is usually found protruded out of the genital opening consists of a small proximal bulb of 0·112×0·116 mm. size and a much longer narrower tubular part of 0·22-0·3 mm. length and 0·042 mm. breadth at its proximal end. In one specimen a long very narrow cirrus was found everted out of the narrow distal protruded part of the cirrus sac (Text-fig. 1*a*). In some specimens the proximal bulb of the protrusible part of the cirrus sac is not found protruded, but it lies within the genital atrium or even further inside the body. It appears that this part marks the limit for protrusion of the length of the terminal region of the cirrus sac. The vesicula seminalis filled with sperms is fairly large and lies somewhat coiled in the basal part of the cirrus sac. The long narrower pars prostatica surrounded by prostate gland cells, and the long narrow cirrus occupy the greater part of its length. A great part of the latter lies usually enclosed in the protruded part of the cirrus sac.

The ovary is almost spherical and measures 0·08-0·14 mm. in diameter. It lies in the anterior part of the hind-body near the dorsal surface, above the anterior testis closely in front of the proximal end of the cirrus sac, with its posterior end sometimes overlapped by the latter dorsally. It was not possible to see the ovary in entire mounts as it is covered ventrally and laterally by the anterior testis, the large vitelline follicles and the uterine ova. Its correct position has been determined by study of serial transverse sections. While the testes of *Braunina* differ from those of *Muhlingina* in shape and position, in being strongly lobed and lying parallel opposite to one another, the ovary is similar in shape and lies

dorsal to the anterior testis. In *Braunina* the ovary lies dorsally to the right testis, as both the testes lie opposite to each other at the same level, in the large voluminous compact holdfast organ along with uterine convolutions, vitelline follicles and intestinal caeca.

The oviduct arises from the inner margin of the ovary at about the middle of its length. Soon after its origin it forms a short loop and continues its course forward to pass into the ootype which is surrounded by the inconspicuous shell-gland mass and lies median between the



Text-fig. 6.—*Muhlingina lutrai* Mehra

(*a*) and (*b*). Transverse sections of hindbody.

c. s., cirrus sac; *d. s.*, dorsal surface; *hf. c. hb.*, holdfast organ cavity in hindbody; *i. c.*, intestinal caecum; *o.*, ovum; t_1., anterior testis; t_2., posterior testis; *ut.*, uterus; *vit.*, vitelline follicles; *v. s.*, ventral surface.

inner margin of the ovary and that of the anterior testis at about the level of one-third length of the latter, a little above the narrow cavity of the holdfast organ. It is there joined by the rather inconspicuous

vitelline reservoir. A short narrow Laurer's canal arises from the ootype and opens to the exterior on the dorsal surface in the median line in a slight depression of the bodywall just in front of the ovary. The receptaculum seminis is absent. The uterus arising from the ootype passes a little forward and makes a loop to take a downward course. It lies dorsally in front of the middle of the posterior testis, mostly almost median in the hind-body in between the vitelline follicles which contain a few large, yellow, thick-shelled operculated ova, 1-15 in number and of 0·1234-0·1533 × 0·0748-0·0972 mm. size. The initial part of the uterus is filled with sperms and forms the receptaculum seminis uterinum. The metraterm is well developed and has strongly muscular walls composed of a fairly thick layer of circular muscle fibres. It lies at the hinder end of the body ventrally to the cirrus sac and dorsally to the hinder part of the posterior testis curving strongly and forming one or two coils and becoming wider near its terminal end before it opens ventrally in the genital atrium near the genital opening. The genital atrium is a large deep terminal chamber of 0·112-0·12 mm. breadth and 0·06-0·1028 mm. depth at the hinder end. In some specimens the proximal bulbed, protrusible part of the cirrus sac fills it completely with the distal narrow part protruding outside. The terminal genital opening measures 0·056-0·17 mm. in diameter.

The vitellaria are composed of large vitelline follicles and are mostly situated ventrally in the hind-body. They commence a little behind the intestinal bifurcation, about 0·028 mm. distance behind it, from just behind the opening of the holdfast organ in the neck region and extend to about the level of posterior end of the posterior testis, *i.e.*, a little distance (0·09-0·17 mm.) in front of the hinder end of the body. They are united mesially from their commencement and broadened in a fan-shaped manner on the ventral surface of the hind-body for a little more than half of their length to a little in front of the posterior testis, where they are separated to occupy a lateral position for about 0·3 mm. of their posterior length. The transverse vitelline ducts arise at about the middle of their length in the region of the ovary between the latter and the anterior testis, and unite in the median plane to form the vitelline reservoir.

The excretory system could not be studied in entire mounts. The study of sections, however, revealed the presence of a subcutaneous excretory capillary system underneath the bodywall and extending anteriorly to the pharynx. The minute excretory opening is situated postero-subterminally on the dorsal side a little in front of the hinder end behind the posterior testis. It leads into a short, somewhat globular or V-shaped excretory vesicle, from which a pair of main excretory canals arise, one on each side from each corner, and probably extend anteriorly as far as the pharynx.

III—SYSTEMATIC POSITION AND PHYLOGENY OF GENUS *Muhlingina* MEHRA

The systematic position and relationships of *Muhlingina* Mehra with *Braunina* Heider, 1900, were discussed briefly by me in 1950. *Muhlingina* belongs, without any doubt, to the family Cyathocotylidae

Poche, 1925, according to the diagnosis of the family given by me in 1947. This genus has the body indistinctly divided into a small fore-body and a large hind-body. The fore-body has been modified into a cup-shaped or beaker-shaped form on account of the fusion of the ventral folds in the median line surrounding the deep ventral concavity around the externally opening anterior part of the holdfast organ. The somewhat funnel-shaped opening of the cavity of the fore-body lies a little behind the anterior end just behind or at about the level of the dorsally situated pharynx. The presence and structure of the large cirrus sac which extends anteriorly to the middle or even further forwards, the oblique position of the testes behind and near one another, the vitellaria composed of large follicles situated laterally to the holdfast organ and united anteriorly in the hind-body, the presence of a muscular metraterm, the absence of receptaculum seminis and the presence of receptaculum seminis uterinum, the well developed genital atrium with a terminal genital opening at the posterior end, justify the inclusion of this genus definitely in the family Cyathocotylidae. The holdfast organ is simple, mostly parenchymatous and slightly muscular with a central cavity which is large anteriorly in the fore-body and gradually narrows into a chink-like, tubular cavity extending posteriorly to a little in front of the hinder end. It has, however, undergone some modification in structure as compared with the members of the subfamily Cyathocotylinae, though it retains essentially the same morphological features. The extensive massive holdfast organ of the subfamily Braunininae Wolf, 1903, is a solid compact mass without a cavity. It also projects out in the cavity of the cup-shaped fore-body which is consequently considerably narrowed. It contains all the vitelline follicles, ovary, both testes, uterine convolutions and intestinal caeca throughout their length. In the subfamily Muhlingininae though it is extensive and occupies almost the whole body behind the pharynx, it is characterised by having a cavity throughout its length, which opens to the exterior in the cavity of the fore-body as mentioned already by its sucker-like anterior part. The genital organs, *i.e.*, testes, ovary, cirrus sac and vitelline follicles, as well as the intestinal caeca lie outside its cavity and also its glandular parenchymatous walls. So its extensive development and growth have taken place differently in the two subfamilies. It appears that the Cyathocotylid ancestor of the Muhlingininae belonged to the subfamily Cyathocotylinae in which only the small anterior part of the body became modified into the cup-shaped form enclosing the deep concavity of the ventral surface of that region surrounding the externally opening part of the holdfast organ, whereas the remaining part remained as such and the posterior part of the holdfast organ continuing in this region—the hind-body became narrowed with its cavity reduced to a narrow chink. I am in favour of the view expressed by Szidat (1936) about the evolution of the subfamily Braunininae from an ancestor which resembled and was closely related to the genus *Prosostephanus* Lutz, 1935.

The striking features of resemblance between the Muhlingininae and Braunininae besides the similarity of the cup-shaped body are : (1) Complete disappearance of ventral sucker; (2) large size of the pharynx; (3) great size of the cirrus sac ; (4) large size of the ova, 0·16-0·17 mm. in

length and 0·1 mm. in breadth in *Braunina*, 0·1234-0·1533 mm. in length and 0·07-0·0972 mm. in breadth in *Muhlingina*; and (5) hosts being aquatic mammals. The two subfamilies, however, differ remarkably in the following respects:—(*a*) the structure and form of holdfast organ; (*b*) shape of the entire body, and relative size and shape of the fore-body and hind-body; (*c*) absence of oral sucker in Braunininae; (*d*) position of the testes parallel to each other and their strongly lobed form in Braunininae; (*e*) ovary situated dorsally to right testis in Braunininae and dorsally to anterior testis in Muhlingininae; (*f*) uterus much convoluted containing numerous ova in Braunininae in contrast to small uterus containing a few ova (1-15 in Muhlingininae); and (*g*) hosts marine Dephnidae of the Adriatic Sea for Braunininae and the freshwater Indian Carnivora (Mustelidae, the otter, *Lutra vulgaris*) for Muhlingininae.

As discussed previously by me (1950), I have followed Szidat (1936) in dropping the family Brauninidae Bosma, 1931 and maintaining the subfamily Braunininae Wolf, 1903, under the family Cyathocotylidae. The family diagnosis of the Braunimdae as given by me in 1947 should be considered to apply to it as the subfamily.

Subfamily *MUHLINGININAE* Mehra, 1950

Subfamily diagnosis.—Body indistinctly divided into small cup-shaped fore-body and a large compact hind-body. Opening of the fore-body cavity large, anterior, ventral, close to or just behind pharynx. Holdfast organ with fairly large cavity with externally opening sucker-like part in fore-body and extending through hind-body to a little distance in front of hinder end with narrow chink-like tubular cavity, mostly parenchymatous and glandular, slightly muscular. Ventral sucker absent. Oral sucker and pharynx present; intestinal caeca outside holdfast organ ending a little distance in front of hinder end. Genital organs in hind-body. Testes entire, oblique, close behind one another, outside holdfast organ. Ovary dorsal to anterior testis, outside holdfast organ; receptaculum seminis absent; receptaculum seminis uterinum present. Cirrus sac large, thick and muscular. Uterus small, outside holdfast organ; muscular metraterm well developed. Ova a few, large, oval, 1-15 in number. Habitat in intestines of freshwater Mustelidae (the otter, *Lutra vulgaris*).

Type genus.—*Muhlingina* Mehra, 1950, with a single species, *Muhlingina lutrai* Mehra, 1950.

Generic diagnosis of the genus Muhlingina *Mehra.*—The same as for the subfamily.

IV—SUMMARY

1. A detailed account of the morphology of *Muhlingina lutrai* Mehra, 1950 is given.

2. The systematic position and phylogeny of the genus *Muhlingina* Mehra, 1950 are discussed, and a fuller diagnosis of the subfamily Muhlingininae Mehra, 1950 is provided.

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