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ON A TREMATODE (DIGENEA : CAMPULIDAE) OF A MARINE MAMMAL FROM ARABIAN SEA

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(With 3 Text-figures)

INTRODUCTION

A female cetacean, *Neophocaena phocaenoides* (Cuvier), was collected by some fishermen on the beach of Vasco-do-Gama, Goa, adjacent to the mouth of Zoari river on 20th February, 1980 ; its viscera and the uterus containing a foetus were collected for the present study by the author. While the studies on the foetus are being published elsewhere, the flukes recovered from the intestine of this cetacean are being reported here as *Synthesium tursionis* (Marchi, 1873) Stunkard and Alvey, 1930. This may well be the first report of this trematode from the mammal *N. phocaenoides* from the seas surrounding the Indian Peninsula.

Hafeezullah (1982) presented this study in the Fourth National Congress of Parasitology held at Aligarh Muslim University, Aligarh. The abstract of the study appeared in the Proceedings of the Congress. The present full paper has since then been greatly modified.

The material was stained with borax carmine and mounted in Canada balsam. The drawings were made with aid of a camera lucida. All measurements are in microns unless otherwise stated.

SYSTEMATIC ACCOUNT

Family Campulidae Odhner, 1926

Syn. Brachycladiidae Faust, 1926

Subfamily Synthesiinae Yamaguti, 1958

Synthesium Stunkard and Alvey, 1930

Synthesium tursionis (Marchi) Stunkard and Alvey

(Text-figs. 1-3)

1873. *Distomum tursionis* Marchi, *Atti Soc. ital. Sci. nat.*, Milano, 15 (4) : p. 104.

1886. *Distomum longissimum* of Poirier, *Bull. Soc. philomath. Paris*, 10 (7) : p. 29.

1896. *Distomum* (*Dicrocoelium*) *tursionis* : Parona, *Atti Soc. Lingust. Sci. nat. geogr.*, 7 (3) : p. 162.

1926. *Orthosplanchnus tursionis* : Odhner, *Ark. Zool.*, 18 : p. 4.

1930. *Synthesium tursionis* : Stunkard and Alvey, *Parasitology*, 22 (3) : p. 332.

1932. *Synthesium tursionis* : Price, *Proc. U. S. natn Mus.*, 18 (13) : p. 16.

1935. *Orthosplanchnus elongatus* Ozaki, *J. Sci. Hiroshima Univ.*, (Zool.), 3 : p. 116 (n. syn.)

1946. *Synthesium tursionis* : Ben Dawes, *The Trematoda*, Cambridge University Press, 644 pp., p. 393.

1966. *Synthesium tursionis* : Delamure and Serdyukov, *Mater. nauch. Konf. vses. Obshch. Gel'mint.*, Part 3 : p. 105.

1977. *Odhneriella elongata* : Yamaguti, *Synopsis of Digenetic Trematodes of Vertebrates*, Vol. I : p. 726.

Material Examined : 7 ex., 4 mature and 3 immature, on 4 slides ; host—**Neophocaena phocaenoides* (Cuvier), the Little Indian Porpoise or Finless Black Porpoise, (Mammalia : Cetacea : Phocaenidae) ; location—Intestine ; locality—Vasco-da-Gama (Goa, Arabian Sea) ; specimens deposited—Z.S.I. Reg. Nos. W 7472/1 to W 7475/1.

Description : Body 6.398-14.094 mm long by 0.633-1.787 mm wide, elongate. Eye-spot pigment absent. Tegument armed with spines. Acetabulum 372-825 in diameter, spherical, situated at 2.200-3.025 mm from anterior end of body. Oral sucker 440-756 in diameter, funnel-shaped, terminal, almost equal in size to acetabulum. Mouth ventro-terminal ; prepharynx 275-592 long ; pharynx 229-550 long by 124-275 wide, elongated pear-shaped, oesophagus short, 68-75 long ; caecal bifurcation anteriorly removed from anterior margin of acetabulum, nearer to pharynx than to acetabulum ; caeca H-shaped, anterior diverticula reaching almost level of anterior margin of pharynx or beyond, posteriorly ending blindly near posterior end of body (this is discernible only in immature specimens ; in mature specimens this is not seen due to heavy distribution of vitellaria).

Testes two, 862-1375 in diameter, tandem, asteroid, deeply lobed or indented even in immature specimens, anterior one with five lobes, posterior with six, separated by intruding vitelline follicles, situated in middle of posterior half of body. Cirrus sac elongate, saccular with a long neck, containing undivided seminal vesicle (in some specimens twisted seminal vesicle looks partite), long pars prostatica surrounded by prostatic gland cells and a well developed muscular invaginated cirrus armed with spines, opening independently into genital atrium at level of posterior margin of acetabulum without uniting with the female duct. Cirral spines seen in immature specimens. Genital atrium

**Neomeris* Gray, 1846 is junior homonym being preoccupied by *Neomeris* Lamouroux, 1816. *Neophocaena* Palmer, 1899 is its changed generic name.

(functioning as hermaphroditic duct) long, tubular, extending from posterior margin of acetabulum dorsally to its anterior margin. Genital pore median, immediately preacetabular.

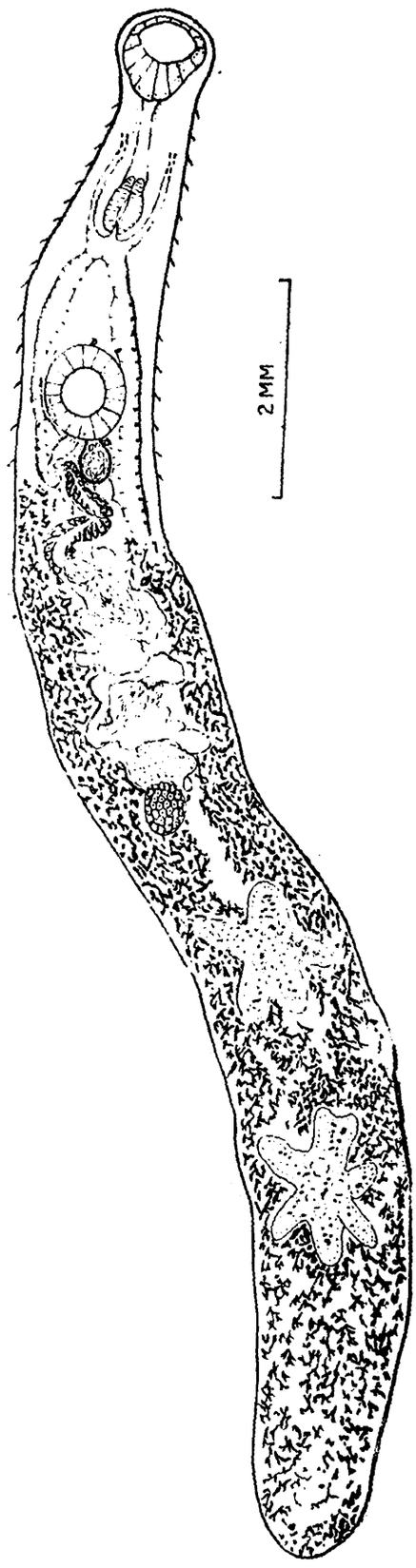

Fig. 1. *Synthesium tursionis* (Marchi, 1873), entire worm, ventral view.

Ovary globular, 371-461 in diameter, median, situated almost in middle of body, preacetabular, removed from anterior testis with few follicles of vitellarium tending to intrude between them. Vitelline reservoir near ovary ; lateral vitelline ducts running anteriorly and

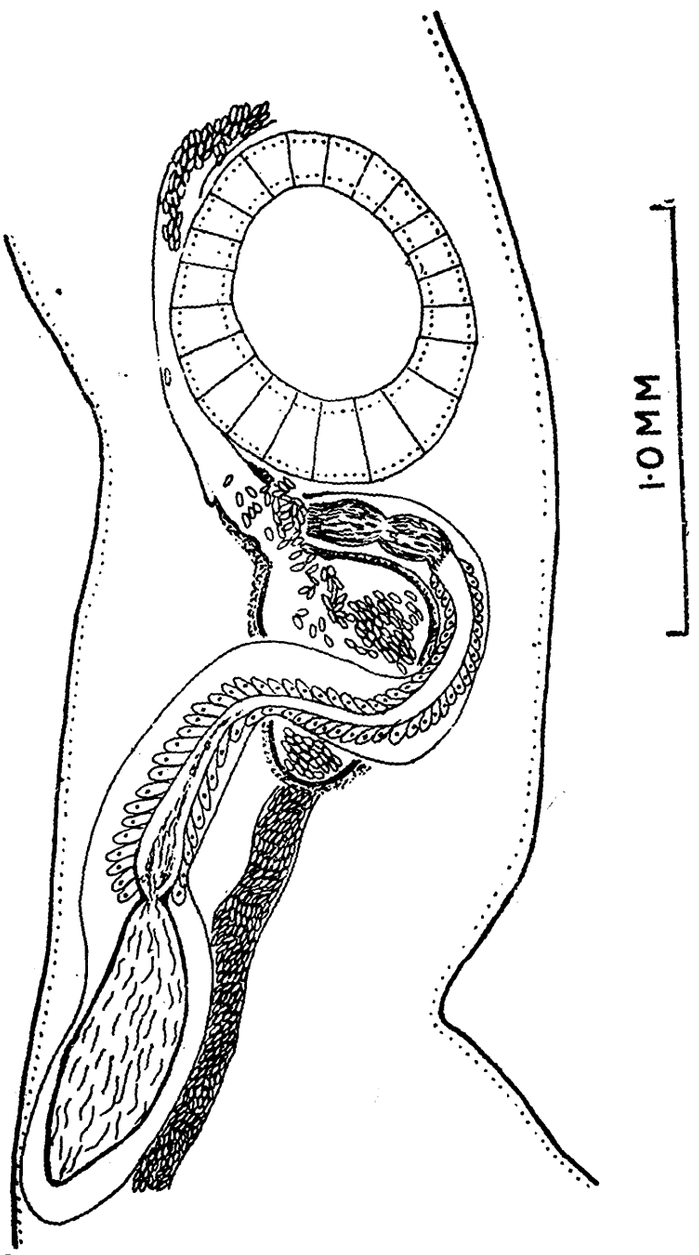

Fig. 2. *Synthesium tursionis*, acetabular region of another mature specimen showing terminal male and female ducts.

posteriorly ; vitelline follicles distributed from behind acetabulum to posterior end of body, anterior extent on both sides unequal, tending to intrude between anterior testis and ovary, coalescing between testes. True seminal receptacle absent. Uterine seminal receptacle formed. Laurer's canal not seen. Mehlis' gland anterodorsal to ovary. Close coils of uterus preovarian, median ; anterior terminal part differentiated into metraterm, slightly widened in immature specimens · deve-

loping into bulb-like swollen muscular structure in gravid ones densely surrounded by glandular cells, opening by a narrow anterior most part into genital atrium near posterior margin of acetabulum, unarmed. Normal eggs 38-49×28-34, collapsed eggs 51-60×24, thick-shelled, thickening or projection at anopercular pole discernible with difficulty in high power, and easily in oil immersion, triangular in cross-section.

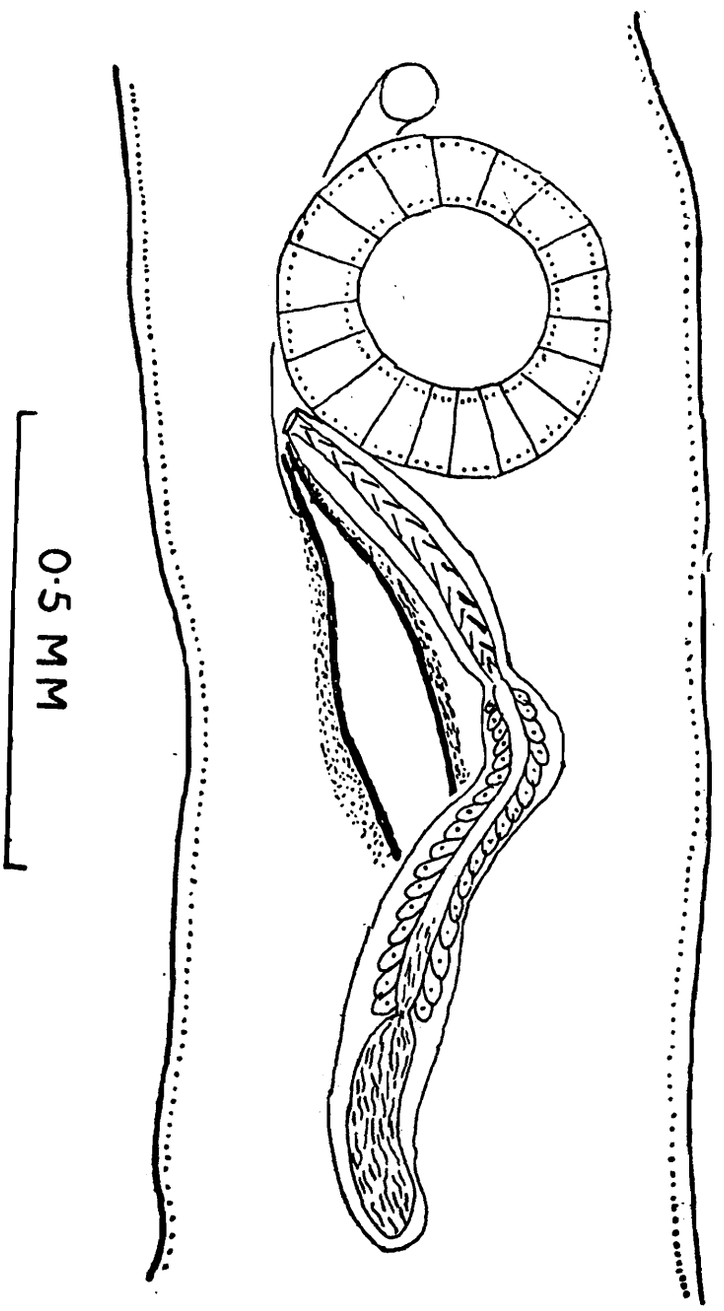

Fig. 3. *Synthesium tursionis*, acetabular region of an immature specimen showing terminal male and female ducts.

Excretory pore terminal ; excretory vesicle I-shaped.

Remarks : The history of the fluke *Synthesium tursionis* dates back to 1873 when Marchi described it as *Distomum tursionis* from the intestine of *Delphinus tursio* from Europe, but this description is inadequate and does not provide complete information about the species.

Poirier (1886) described *Distomum longissimum* from the same host from Europe. The description gives a fair picture of the species but nevertheless is not complete. Parona (1896) had an opportunity to restudy Marchi's original material of *D. tursionis* and compared with *D. longissimum*, concluding that the latter was identical to the former. Odhner (1910) predicted that *D. tursionis* represented a new genus of the subfamily Fasciolopsinae but he did not name a new genus. Later on, he (1926) revised his opinion and tentatively referred Marchi's species to the genus *Orthosplanchnus* Odhner, 1905 on the basis of the similarity of the coupulatory organs. Stunkard and Alvey (1930) did not think it proper to include this species in *Orthosplanchnus*, *Lecithodesmus* Braun, or *Campula* Cobbold, 1858 (Syn. *Brachycladium* Looss, 1899) with which it resembles in one character or other, but proposed the genus *Synthesium* to accommodate it.

In earlier descriptions the terminal part of the uterus in *Synthesium tursionis* (Marchi, 1873) has been shown only slightly enlarged (as is the case in the immature specimens of the present material), and the cirrus and the vagina (metraterm) have both been described to be armed with spines. H-shaped gut had not been indicated. No mention of a muscular bulb-like metraterm had been made. In addition, the long genital atrium had not beeu described. Delamure and Serdyukov (1966) reported *Synthesium tursionis* (Marchi, 1973) in *Tursiops truncatus* from the Black Sea with H-shaped gut.

The fully mature specimens of the present material show that an H-shaped gut is present and a well developed metraterm is differentiated in the form of muscular bulb-like structure before entering the genital atrium immediately posterior to the acetabulum. This bulb-like metraterm is lined internally with muscles, surrounded externally by gland cells and filled with eggs. The metraterm is without spines. The cirrus is muscular and is lined with spines. The male and female ducts independently open into the genital atrium.

In these characters, the present material seems to deviate from Marchi's species, but the author is inclined to attribute this dissimilarity to the inadequacies of earlier studies. Thus, judging from the general shape of the body, slightly widened metraterm in immature specimens, unequal anterior extent of vitellarium on both sides of the body, and the asteroid testes, he feels that the present material belongs to *Synthesium tursionis* (Marchi, 1973) Stunkard and Alvey, 1930.

Ozaki (1935) described *Orthosplanchnus elongatus* from the intestine of the same species of marine mammal from Japan. This species appears basically indentical to the present material differing only in the

extent of the tubular genital atrium or genital sinus (at the base of which cirrus and metraterm open). The enlarged and widened metraterm invested externally with gland cells in *O. elongatus* is comparable to the bulb-like swollen metraterm densely surrounded with gland cells in the present material, the latter probably representing more advanced stage of maturity.

Yamaguti (1971) kept *O. elongatus* in the genus *Odhneriella* Skrjabin, 1915 probably because of the H-shaped gut, armed cirrus only (no spines in the metraterm) and postacetabular anterior extent of vitellaria, but it is a genus with entire or slightly indented testes (Delamure, 1955). It cannot also be placed under *Orthosplanchnus* Odhner, 1905 because in this genus the vitelline follicles extend up to anterior margin of acetabulum, the caecal bifurcation takes place near anterior margin of acetabulum, the testes are only slightly indented and seminal receptacle is present. Moreover, the species of *Orthosplanchnus* (*O. arcticus* and *O. fraterculus*) were reported from the gall-bladder of seal and walrus, whereas *O. elongatus* is the intestinal parasite of porpoise. It seems to the author that Ozaki's species is identical to *Synthesium tursionis*, which has asteroid type of deeply lobed testes, with caecal bifurcation anteriorly removed from the anterior margin of the acetabulum andH-shaped caeca, and the anterior extent of vitellaria remaining a little behind the acetabulum.

In view of the discovery of H-shaped gut and presence of spines on the cirrus only (not on the metraterm) in *Synthesium tursionis*, the gulf of difference between *Orthosplanchnus* Odhner, 1905, *Odhneriella* Skrjabin, 1915 and *Synthesium* Stunkard and Alvey, 1930 narrow down considerably.

SUMMARY

Since the original description of and subsequent information on *Synthesium tursionis* (Marci, 1873) Stunkard and Alvey, 1930 is inadequate with respect to many characters, a fuller account of the worm is furnished on the basis of mature and immature specimens recovered from a marine mammal *Neophocaena phocaenoides* (Cuvier) at Vasco-da-Gama, Goa. This form is the first record of this trematode from the Indian seas. *Orthosplanchnus elongatus* Ozaki, 1935 recorded from the same host from Japan, appears identical to the present material except in some variations. It has also been indicated that the discovery of of the presence of H-shaped gut and spines in the cirrus only (not in the metraterm) in *Synthesium tursionis* has considerably reduced the distinctness between *Orthosplanchnus* Odhner, 1905, *Odhneriella* Skrjabin, 1915 and *Synthesium* Stunkard and Alvey, 1930.

ACKNOWLEDGEMENTS

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