Rec. zool. Surv. India, 93(1-2) : 65-75, 1993

ON THE TREMATODE GENUS *ORIENTODIPLOPROCTODAEUM* BHUTTA AND KHAN, 1970

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Introduction

A number of contemporary investigators of the Indian subcontinent are engaged in studying digenetic trematodes collected from the coastal fishes to the Arabian Sea and the Bay of Bengal. Consequently, overlappings in the reporting of these flukes have occurred and the literature on them is not scanty. This has happened as a result of inadequate literature consultation leading to erraneous taxonomic judgements. What is more alarming and distressing is that some such inferences are marked mainly by faulty processing of material and interpretations. The present study deals with some such glaring examples, with the attempt to straighten the literature on the group.

The drawings have been made with the aid of a camera lucida. The material will be deposited with the National Helminthological Collection of Zoological Survey of India, Calcutta.

Bhutta and Khan (1970) proposed the genus *Orientodiploproctodaeum* (type species : *O. diacanthi*) on the basis of fifty flukes recovered from the marine fish *Pseudosciaena diacanthus* (Sciaenidae) from the Arabian Sea caught off Karachi coast. They diagnosed their genus and described the species with the help of an illustration of entire fluke showing some details of anatomy. They accommodated the genus in a new subfamily Orientodiploproctodaeinae under the family Diploproctodaeidae Ozaki, 1928. Madhavi (August, 1974) presented a paper on three new cryptogonimid trematodes in the Third International Congress of Parasitology held at Munchen, West Germany, one of them being *Cryptocollaritrema provesiculatum* n. gen., n. sp. The abstract of the paper was published in the Proceedings of the Congress with the salient features of the new genus *Cryptocollaritrema* which was found distinct from all other cryptogonimid genera. The material of the genus was recovered from the marine fish *Lutjanus* sp. (Lutjanidae) from the Bay of Bengal off Waltair coast. Later on, she (1976) published it in full paper with the help of a series of diagrams. Madhavi (August, 1974 ; 1976) did not compare her genus *Cryptocollaritrema* with *Orientodiploproctodaeum* Bhutta and Khan, 1970, while placing it in the family Cryptogonimidae

Ciurea, 1933. Further, she did not name any cryptogonimid subfamily for her genus. Bilqees (December, 1974) proposed two new genera, *Multiovarium* (type species : *M. heteroformis* ; other species : *M. interruptum*) and *Anterodiscus* (type species : *A. biseminalis* ; other species : *A. triuteri*) as against *Orientodiploproctodaeum* on the basis of several specimens recovered from the type host *Pseudosciaena diacanthus* and type locality (Karachi) of the latter genus. Further, she revised the diagnosis of the subfamily Orientodiploprocdaeinae Bhutta and Khan, 1970 on the basis of her two genera without naming any family for it but obviously considering it under the family Diploproctodaeidae Ozaki, 1928. It is obvious that Madhavi's (August, 1974) abstract and Bilqees' (December, 1974) full paper were simultaneously in press, and therefore they were unaware of each other's work. As a matter of fact, Madhavi (1974, 1976) was unaware of the work of Bhutta and Khan (1970) too. Srivastava, C. B. (1982) also, while including *Cryptocollaritrema* Madhavi, 1974 in his compilation work on Indian fauna did not take into account the genera *Orientodiploproctodaeum, Multiovarium* and *Anterodiscus*. Further, he (1982) proposed a new subfamily Cryptocollaritrematinae for the genus *Cryptocollaritrema* in the family Cryptogonimidae.

SYSTEMATIC CONSIDERATIONS

Family Cryptogonimidae Ciurea, 1933

Subfamily Orientodiploproctodaeinae Bhutta and Khan, 1970

Syn. Cryptocollaritrematinae Srivastave, C.B. 1982 (n. syn.)

Genus **Orientodiploproctodaeum** Bhutta and Khan

1970. *Orientodiploproctodaeum* Bhutta and Khan, *Pakistan J. Zool.*, 2 (2) : 163.

1974. *Cryptocollaritrema* Madhavi, *Proc. 3rd. Internat. Congr. Parasit.*, München, Section G2 (12) 1616. (Abstract) (n. syn.)

1974. *Multiovarium* Bilqees, *Sind Univ. Res. J. (Sci. Ser.)*, 8 (1/2) : 33. (n. syn.)

1974. *Anterodiscus* Bilqees, *Sind Univ. Res. J. (Sci. Ser.)*. 8 (1/2) : 7 (n. syn.)

1976. *Cryptocollaritrema* : Madhavi, *Riv. Parassit.*, 37 (2/3) : 313.

1982. *Cryptocollaritrema* : Srivastava, C. B., *The Fauna of India and the Adjacent Countries, Platyhelminthes Vol. I (Supplement), Trematoda—Digenea. Additiuns to Prof. H. R. Mehra's Volume on Trematoda—Digenea* : 139.

Orientodiploproctodaeum diacanthi Bhutta and Khan

(Figs. 1-6)

1970. *Orientodiploproctodaeum diacanthi* Bhutta and Khan, *Pakistan J. Zool.*, 2 (2) : 163.

1974. *Cryptocollaritrema provesiculatum* Madhavi, *Proc. 3rd. Internat, Congr. Parasit.*, München, Section G2 (12) : 1616. (n. syn.)

1974. *Multiovarium heteroformis* Bilqees, *Sind Univ. Res. J. (Sci. Ser.)*, 8 (1/2) : 34. (n. syn.)

1974. *M. interruptum* Bilqees, *Ibid*, 8 (1/2) 36. (n. syn.)

1974. *Anterodiscus biseminalis* Bilqees, *Ibid*, 8 (1/2) : 38. (n. syn.)

1974. *A. triuteri* Bilqees, *Ibid*, 8 (1/2) : 40. (n. syn.)

1976. *Cryptocollaritrema provesiculatum* : Madhavi, *Riv. Parassit.*, 37 (2/3) : 313.

1982. *C. provesiculatum* : Srivastava, C. B., *The Fauna of India and the Adjacent Countries, Platyhelminthes Vol. I (Supplement), Trematoda—Digenea. Additions to Prof. H, R. Mehra's Volume on Trematoda—Digenea* : 140.

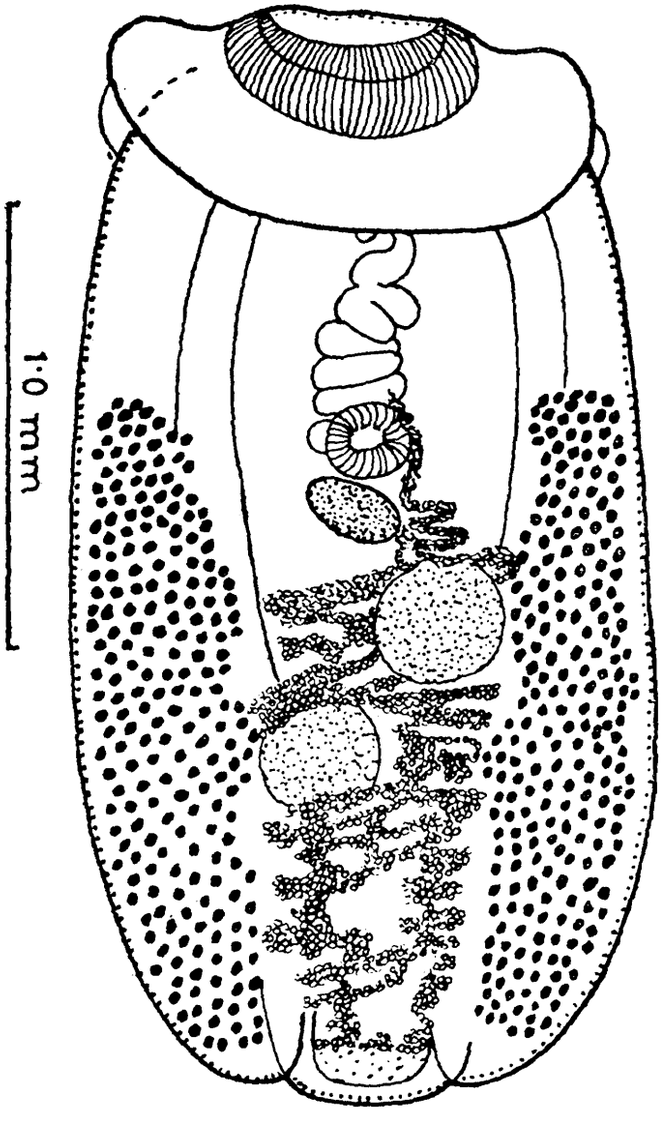

Fig. 1. *Orientodiploproctodaum diacanthi* Bhutta and Khan, 1970 (After Bhutta and Khan, 1970).

Material examined : Host—*Protonibea diacanthus* (Lacépède)

[Syn. ***Pseudosciaena diacanthus***], Spotted croaker, (Family Sciaenidae) ; location-intestine, localities – Pondicherry (Bay of Bengal), Trivandrum and Margao (Arabian Sea) ; no. of specimens – 7 + 2 + 4 respectively, on 3 + 1 + 2 slides ; dates of collection – 5.12. 75, 6.8.76 and 24.2.80 respectively.

Remarks : The preliminary study of this material showed that it comes close to four genera, *viz.*, *Orientodiploproctodaeum*, *Cryptocollaritrema*, *Multiovarium* and *Anterodiscus*. Confronted with this difficulty, its detailed study was made which revealed that they all may be one and the same. A scrutiny of the results of the study further disclosed that *Orientodiploproctodaeum* was inadequately and incorrectly described, *Multiovarium* and *Anterodiscus* were based on erroneous study of material and only *Cryptocollaritrema* was correctly and adequately described and correctly placed in the family Cryptogonimidae ; otherwise the four genera seem to be identical. Thus,

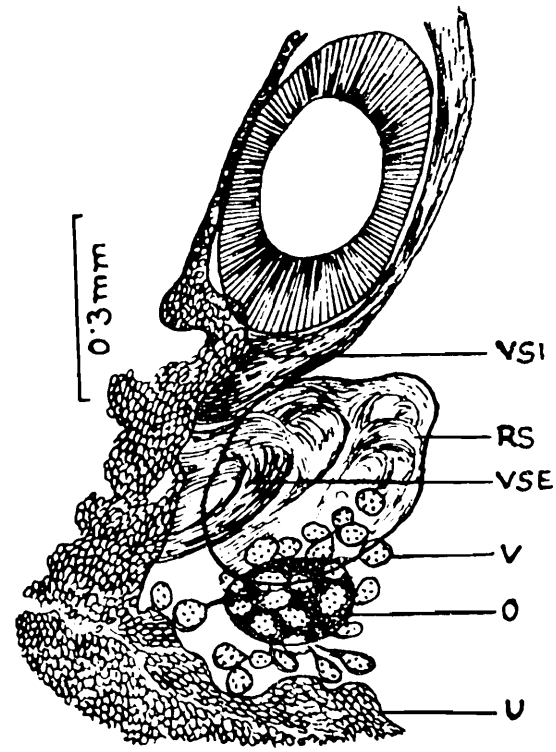

Fig. 2. *Anterodiscus biseminalis* Bilqees, 1974 showing postacetabular region (After Bilqees, 1974).

only *Orientodiploproctodaeum* with correct and detailed account as given by Madhavi (1976) in the form of *Cryptocollaritrema* may be held valid on priority basis and the remaining three genera should fall into its synoymy. The accounts of *Orientodiploproctodaeum* and *O. diacanthi* Bhutta and Khan, 1970 are inadequate in the sense that a ventrogenital pit, a gonotyl in its posterior part and the gland cells in the forebody including the anterior disc or collar have altogether been missed to be mentioned ; the ascending and descending coils of the long and tubular seminal vesicle have been correctly shown in the figure but this character has not been described in the textat all ; and the real bilobed follicular ovary immediately in the pretesticular region has not been shown. It is inaccurate because the large and prominent seminal receptacle behind the acetabulum has been mistaken as unlobed ovary, and the follicles of bilobed

ovary behind the seminal receptacle in the intercaecal field have been misinterpreted as those of extracaecal follicles of vitellarium intruding into the intercaecal

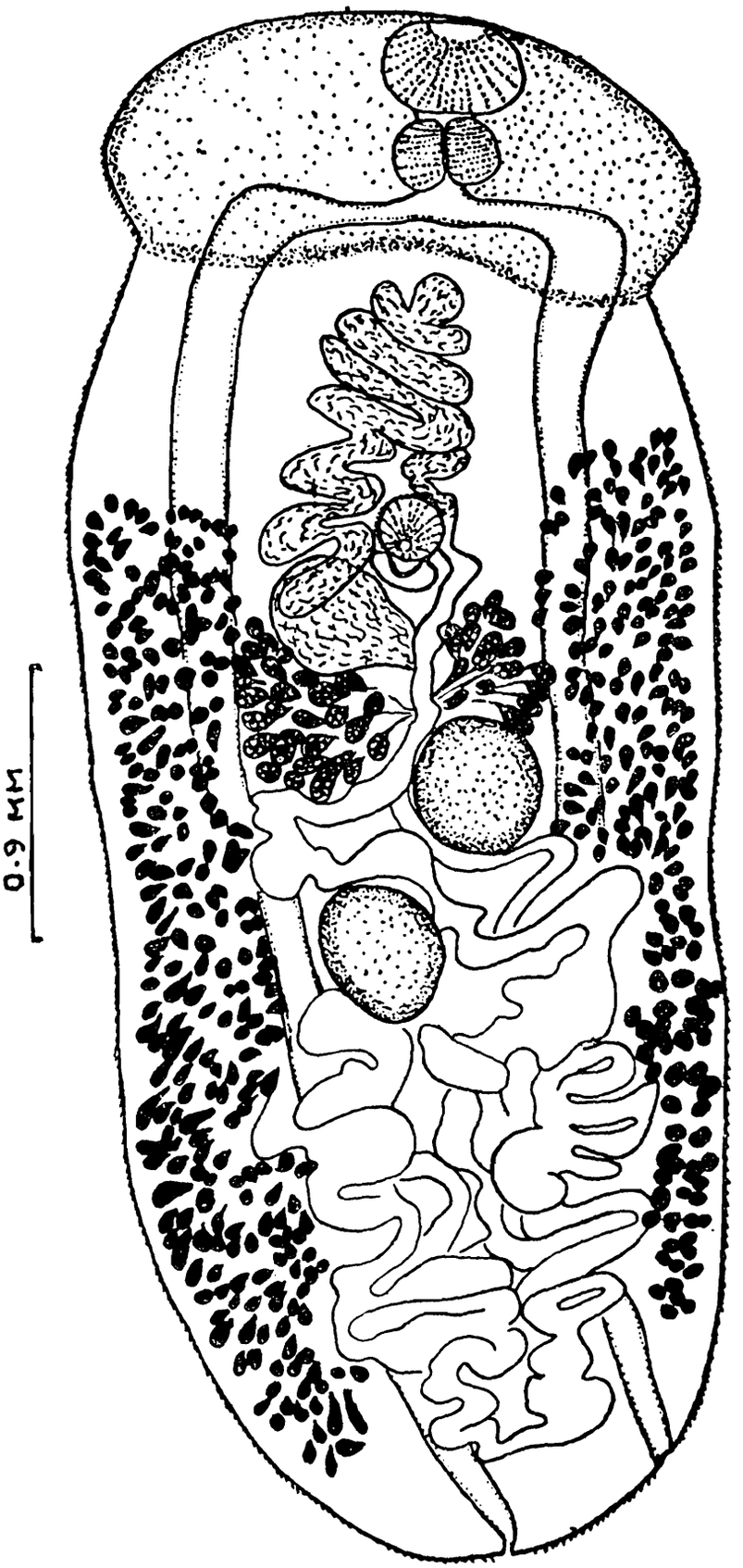

Fig. 3. *Cryptocollaritrema provesiculatum* Madhavi, 1974 (After Madhavi, 1976).

space. In the author's material also the vitelline follicles are mainly extracaecal and, at the most, caecal at places. They do not intrude in the intercaecal space. It is at the ovarian level where such a confusion in the study may occur because the follicles of ovay are nearly as large as those of vitellarium, and can get

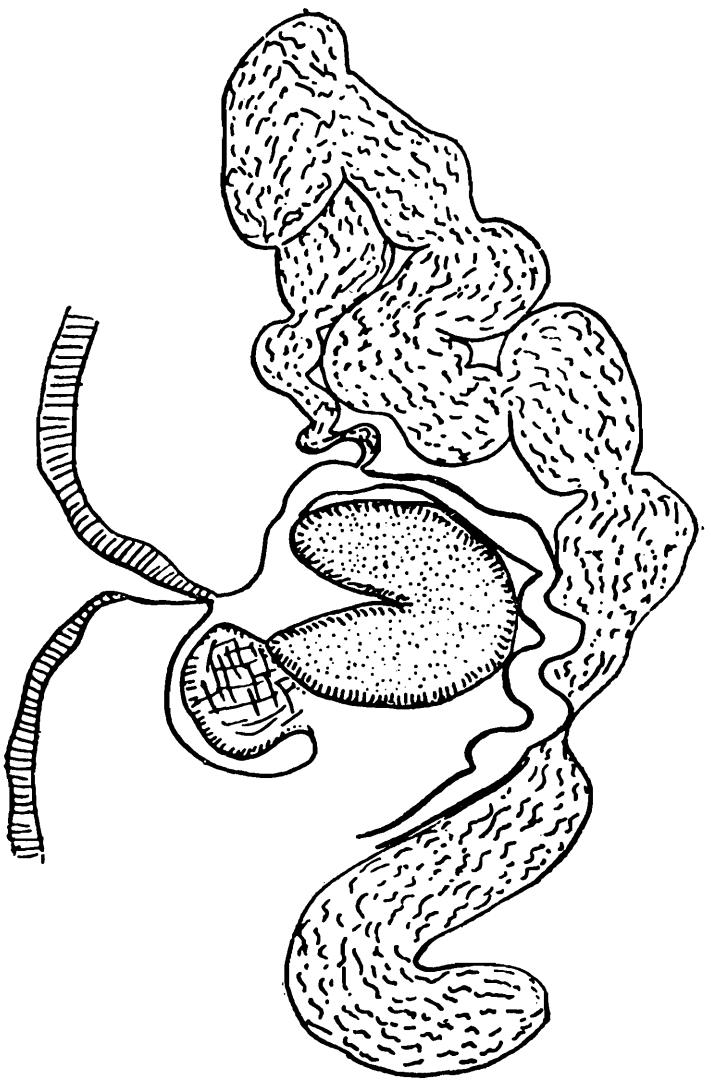

Fig. 4. *C. provesiculatum.* Terminal genitalia (After Madhavi, 1976).

mixed up and become continuous with latter due to overflattening giving erroneous roading as vitelline follicles intruding into the intercaecal field in the pretesticular space. Bilqees (1974), instead of improving upon the diagnosis o *Orientodiplpproctodaeum* and description of its type species *O. diacanthi* with the help of her identical material recovered from its type host and the type locality, chose to propose two new genera *Multiovarium and Anterodiscus* distinct from *Orientodiploproctodaeum* on the basis of inadequate and partly inaccurate account of *O. diacanthi* as given by Bhutta and Khan (1970) as well as erroneous study of her own material. She also could not detect the presence of a gonotyl immediately posterion to the sunken acetabulum in the ventrogenital pit. She erred in interpreting only postacetabular and acetabular parts of seminal vesicle as complete seminal vesicle, and long coiled and recurved

preacetabular part of the same organ as hermaphroditic duct opening near pharynx. As a matter of fact, no hermaphroditic duct is formed and the male and female pores separately open immediately anterior to ventral sucker in the ventrogenital pit. The seminal vesicle commences in the postacetabular region, continues in the acetabular

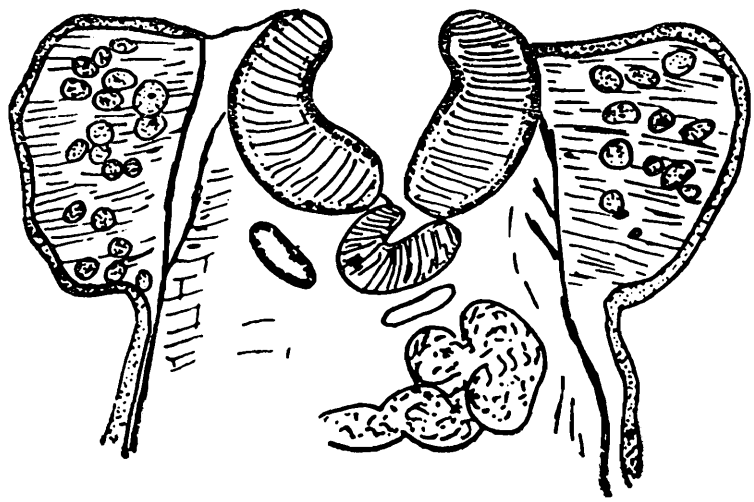

Fig. 5. *C. provesiculatum.* Section through anterior region showing cushion-like expanded part (After Madhavi, 1976).

and preacetabular regions up to posterior level of phrrynx as a closely coiled tube, and then reflexes back and opens as a small pars prostatica in the ventrogenital pit (which Madhavi calls a genital atrium) in which acetabulum lies sunken. The ventrogenital pit in which the acetabulum lies embedded and in whose anterior wall the male and female ducts open separately is the characteristic feature of the family Cryptogonimidae. Further more, she did not at all mention the presence of gland cells in the parencyma of the forebody including the collar in *Multiovarium.* Conversely, in *Anterodiscus,* she misinterpreted these gland cells as vitelline follicles, Again, in *Anterodiscus* she mentioned the presence of unlobed ovary repeating the error of Bhutta and Khan (1970). In the type speies *A. biseminalis* (her Fig. 8) which has been taken as Fig. 2 in the present work she has shown that the unlobed ovary is situated in the postacetabular region behind the large seminal receptacle slightly overlapping the latter. This postacetabular area of the median field has also been shown interdispersed with vitelline follicles, whereas in the description of the species the position of the vitelline follicles has been mentioned to be lateral. This is a self-contradiction which is the result of misinterpretation of some structures. It is to be pointed out that the seminal receptacle has been erroneously called as unlobed ovary, the follicles in the midfield have been misinterpreted as follicles of vitellarium, and the posterior terminal part of the coiled and twisted tubular seminal vesicle has been mistaken as seminal receptacle. Further, neither the seminal vesicle is bilobed as mentioned in *A. biseminalis* nor there are two additional lateral uterine branches as described

to be present in *A. triuteri.* As a matter of fact, the descending and ascending limbs of uterus have lateral coils and not branches.

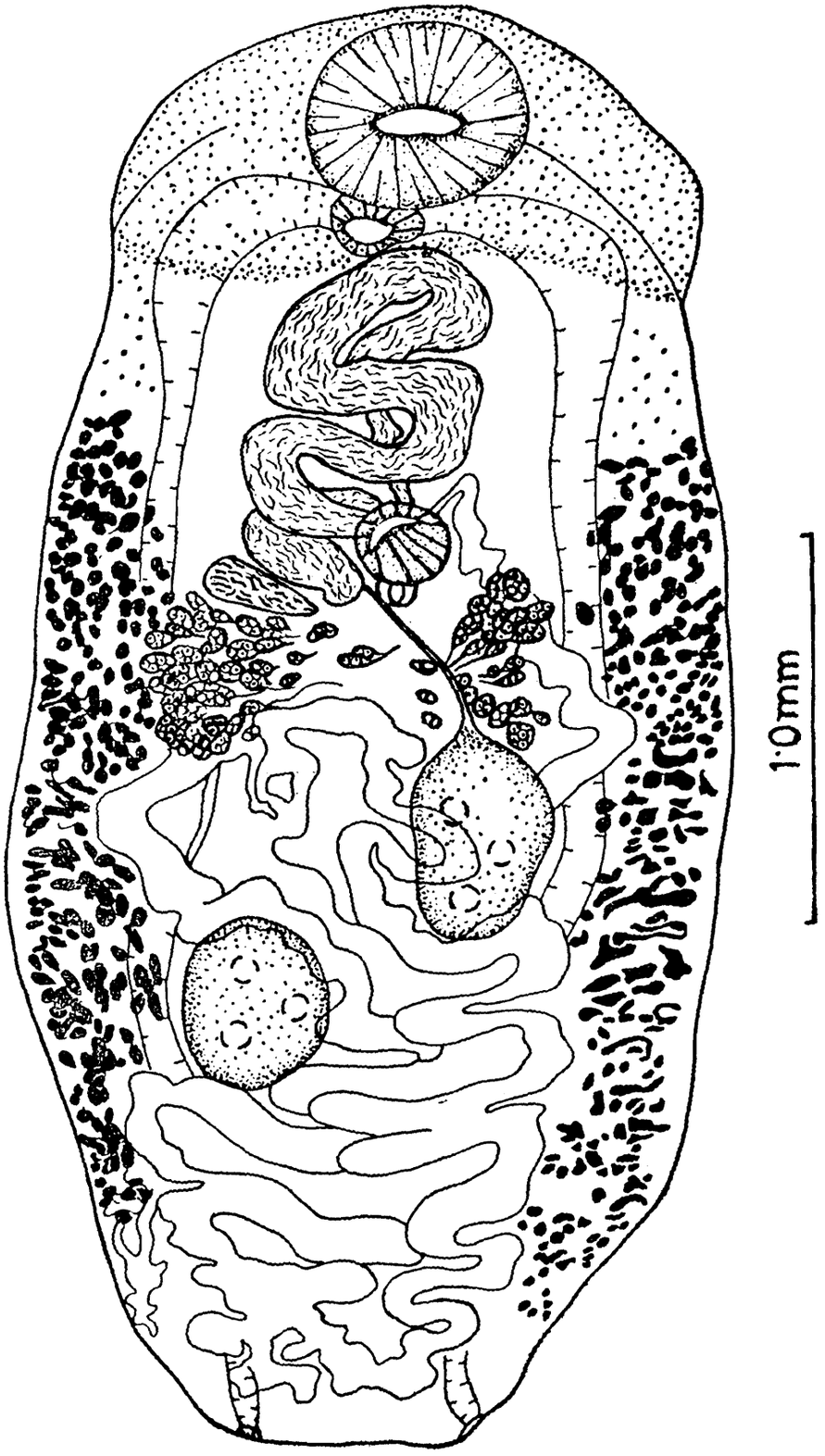

Fig. 6. *Orientodiploproctodaeum diacanthi* Bhutta and Khan, 1970 (Present material).

RESULTS

From all indications it is evident the Bilqees (1974) had badly processed material of *Orientodiploproctodaeum diacanthi* Bhutta and Khan, 1970 only which she utilised to propose two new genera each with two new species, She also made use of the lapses on the part of Bhutta and Khan (1970) and herself committed some mistakes in doing so. As a matter of fact, she (Bilqees) ought to have used her material to correct and improve the diagnosis of *Orientodiploproctodaeum* and description of *O. diacanthi* instead of erecting two new genera and describing four new species out of it. It is obvious now that *Orientodiploproctodaeum diacanthi, Cryptocollaritrema provesiculatum, Multiovarium heterformis, M. interruptum, Anterodiscus biseminalis* and *A. triuteri* all seem to have been described from indentical materials. *C. provesiculatum* is the improved version of *O. diacanthi.* Thus, it construes that the genera *Multiovarium* Bilqees, 1974 and *Anterodiscus* Bilqees, 1974 are synonyms of *Orientodiploproctodaeum* Bhutta and Khan, 1970, and the species *C. provesiculatum, M. heteroformis, M. interruptum, A. biseminalis* and *A. triuteri* are all synonyms of *O. diacanthi.*

The subfamily Orientodiploproctodaeinae Bhutta and Khan, 1070 is retained to accommodate the only genus *Orientodiploproctodaeum* Bhutta and Khan, 1970 (type species : *O. diacanthi*) but it is transferred from the family Diploproctodaeidae Ozaki, 1928 to the family Cryptogonimidae Ciurea, 1933, and the subfamily Cryptocollaritrematinae Srivastava, C. B., 1982 is its synonym. The subfamily Orientidiploproctedaeinae may be redefined as follows :

Subfamily : Orientodiploproctodaeinae (emended)

Body divisible into two parts : (i) an anterior disc-like or cushion-shaped thick structure containing a large oral sucker and pharynx, and (ii) a cylindrical or elongated trunk containing a small ventral sucker, all other systems and intestinal caeca communicating to the exterior at posterior end of body on either side of excretorypore. Small prepharynx present ; oesophagus absent. A ventrogenital pit ptesent with a sunken weakly developed ventral sucker, a muscular bulb-like gonotyl near its posterior part, and male and famale pores opening separtely in it anteriorly. Gland cells present in forebody intruding into anterior disc. Testes postovarian, postacetabular. Cirrus sac absent. Seminal vesicle tubular, coiled, running upto base of pharynx and then reflexing back to open into ventrogenital pit. Ovary follicular, in midfield. Seminal receptacle present anterior to ovary. Coils of uterus filling midfield of hindbody. Vitellarium follicular, largely extracaecal, in hindbody. Eggs small. Excretory vesicle Y-shaped. Gut parasites of marine fishes.

Summary

The genus *Orientodiploproctodaeum* Bhutta and Khan, 1970 (type species : *O. diacanthi*) was reported from the marine fish *Pseudosciaena diacanthus* from Karachi coast. Is was accommodated in a new subfamily Orientodiploptoctodaeinae Bhutta and Khan, 1970 which was placed under the family Diploproctodaeidae Ozaki, 1976. Later on, *Multiovarinm* Bilqees, 1974 (type species ; M. *heteroformis* ; other species ; *M. interruptum*) and *Anterodiscus* Bilqees, 1974 (type species : *A. biseminalis* ; other species : *A. triuteri*) were also reported from the type host and type locality of *O. diacanthi*. These genera were also considered under the same family and subfamily. The genus *Cryptocollaritrema* Madhavi, 1974 (type species : *C. provesiculatum*) was erected on the basis of the material recovered from the marine fish *Lutjanus* sp. from Waltair coast and was placed in the family Cryptogonimidae Ciurea, 1933. Srivastava, C. B. (1982) proposed a new subfamily Cryptocollaritrematinae to accommodate *Cryptocollariirema*. The present author collected digenean material from the type host of *O. diacanthi* Bhutta and Khan, 1970 from the Arabina Sea as well as Bay of Bengal. On the study of this material, it is found that *Cryptocollaritrema*. *Multiovarium* and *Anterodiscus* are synonyms of *Orientodiploproctodaeum* and the species *C. provesiculatum*, *M. heteroforformis*, *M. interruptum*, *A. biseminalis* and *A. triuteri* are synonyms of *O. diacanthi* ; add thus Cryptocollaritrematinae falls as a synonym of Orietodiploproctodaeinae which subfamily is transferred to the family Cryptogonimidae Ciurea, 1933. An emended diagnosis of Orientodiploproctodaeinae is also furnished.

Acknowledgements

The author is thankful to Dr. S. K. Bhattacharya, Joint Director-in-Charge, Zoclogical Survey of India, Calcutta for providing necessary facilities, and to Dr. J. R. B. Alfred, Joint Director, for going through the manuscript and giving useful suggestions.

References

Bilqees, F. M. 1974. A redescription of the subfamily Orientodiploproctodaeinae Bhutta and Khan, 1970 based on two new genera and four new species. *Sind Univ. Res. J. (Sci. Ser.)*, **8** (1 & 2) : 31-42.

Bhutta, M. S. and Khan, D. 1970. A new subfamily of fish trematodes. *Pakistan J. Zool.*, **2** (2) : 163-165.

Madhavi, R. 1974. New crytogonimid trematodes from marine fishes of India. *Proc. 3rd. Internat. Congr. Parasit.*, Munchen, Sect. G2 (12) : 1616-1617. (Abstract)

Madhavi, R. 1976. Digenetic trematodes from marine fishes of Waltair coast, Bay of Bengal. Family Cryptogonimidae. *Riv. Parassit., 37* (2-3) : 313-322.

Srivastava, C. B. 1982. *The Fauna of India and the Adjacent Countries. Platyhelminthes Vol. I (Supplement). Trematoda-Diqenea. Additions to Prof. H. R. Mehra's Volume. Trematoda. 1980.* pp. i-ix+163.

ABBREVIATIONS :

VIS : Anterior lobe of seminal vesicle.
VES : Posterior lobe of seminal vesicle.
RS : Seminal receptacle.
V : Vitellaria.
O : Ovary.
U : Uterus.