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A NEW CRYPTOGONIMID TREMATODE (DIGENEA: CRYPTOGONIMIDAE) OF MARINE FISH FROM ORISSA COAST, WITH A BRIEF REVIEW OF THE GENUS *PARACRYPTOGONIMUS* YAMAGUTI, 1934

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ABSTRACT

The paper deals with a cryptogonimid trematode, *Paracryptogonimus sootai* n. sp, and a brief review of the genus *Paracryptogonimus* Yamaguti, 1934. Discussion has been presented to show that it is a heterogenous genus of species so far as the distribution and extent of vitellaria are concerned. As a result, it has been proposed to split the genus into *Paracryptogonimus* Yamaguti, 1934 *sensu stricto* and *Neoparacryptogonimus* n. gen. Consequent upon the discovery of the presence of perioral spines in two of three specimens by Velasquez (1961) which fully agree with *Metadena apharei* (Yamaguti,1942) Yamaguti,1953 she transferred this species under the genus *Paracryptogonimus*. Concurring with Velasquez, the present author considers *Pseudosiphoderoides apharei* (Yamaguti, 1942) Yamaguti, 1971 as a synonym of *Paracryptogonimus apharei* (Yamaguti, 1942) Velasquez, 1961. Thus, a case of homonymy arose, there being apparently two distinct species of the same name, *Paracryptogonimus apharei*. The name of the senior homonym, *P. apharei* (Yamaguti, 1942) Velasquez, 1961 has been retained whereas the junior homonym, *P. apharei* Yamaguti, 1970 has been renamed as *P. satyui* nom. nov. after Dr. Satyu Yamaguti.

INTRODUCTION

THE TREMATODES included in the present study were collected in 1972 from Orissa Coast, Gopalpur, Bay of Bengal. All measurements are in microns except those for body lengths and widths which are in millimetres. The sucker ratios have been calculated from their widths taking the width of oral sucker as one unless otherwise stated. The drawings have been made with the help of a camera lucida. The type and paratypes have been deposited with the National Collection at Zoological Survey of India, Calcutta.

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FAMILY: CRYPTOGONIMIDAE CIUREA, 1933

Paracryptogonimus sootai n. sp. (Fig. 1)

Host: *Lutianus* sp.; Location: Intestine; Locality: Gopalpur (Orissa, Bay of Bengal); and Number of specimens: 12.

Description: Body 1.114-1.348 long, 0.688 - 0.961 wide at testicular level, ovate. Cuticle thin; body spines not seen, probably lost during processing. Acetabulum

63-87 in diameter, spherical, at 210-385 from anterior end of body, sunken in ventrogenital depression of body parenchyma. No gonotyl or pseudosucker near acetabulum. Forebody with gland cells. Oral sucker 77-129 long, 196-235 wide, cone-shaped, terminal, provided with a circlet of perioral spines; number of spines could not be ascertained as some of them have been lost in each specimen; mouth terminal. Suckers' widths ratio 1: 0.257-0.381. Prepharynx inconspicuous; pharynx 59-123 long, 70-77 wide, no oesophagus; cecal bifurcation immediately behind pharynx; intestinal ceca arcuate becoming lateral, posterior extent could not be ascertained due to obliteration by testes and uterus.

Testes two, 358-509 long, 289-413 wide, spherical, symmetrical, almost equatorial, touching or in most cases pressing against lateral sides, narrowly separated by coils of uterus. Cirrus sac lacking. Seminal vesicle saccular, constricted into two portions, long and curved around acetabulum on left side, or in some specimens on right side, extending from immediately anterior to ovary to a bit anterior to acetabulum and then curving back to open into genital pore situated into ventrogenital depression at anterior border of acetabulum; pars prostatica and prostate gland cells not seen; cirrus lacking.

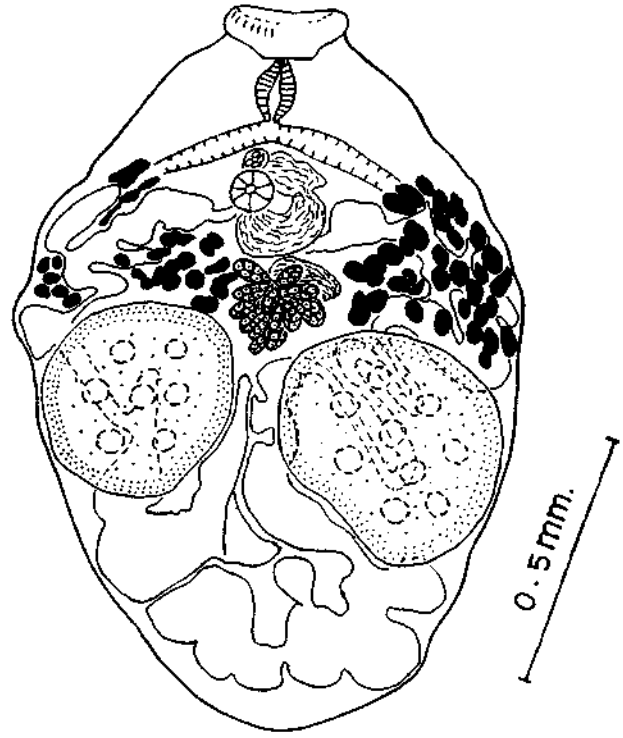

Fig. 1. *Paracryptogonimus sootai* sp. nov. – Holotype (ventral view).

Ovary multilobed, median, between testes and seminal vesicle. Seminal receptacle dorsal to ovary just behind seminal vesicle. Vitellaria follicular, in two lateral

bunches on either side of ovary, largely pretesticular but some follicles may be overlapping testes. Uterus in lateral coils, from level of acetabulum to almost posterior end of body overlapping vitelline follicles and testes on either side of body. Eggs 11-18 by 7-8. Excretory vesicle could not be ascertained.

This species most resembles *Paracryptogonimus americanus* Manter, 1940 but basically differs from it as follows: The testes are much larger as compared to the body size. They are about one-third of body length whereas in Manter's species they are about one-eight of body length. In *P. americanus* the coils of the uterus are restricted posterior to anterior level of testes and do not overlap vitelline follicles and testes, but in the present species the lateral uterine coils are also disposed to the left and right of the seminal vesicle much anterior to the testicular level and the coils in their descending and ascending course sufficiently overlap vitelline follicles and testes. Additionally, the new species also differs from *P. americanus* in having cone-shaped oral sucker, terminal mouth and less suckers' width ratio (about 1:0.67 in Manter's species).

Yamaguti (1934) originally erected the genus *Paracryptogonimus* to distinguish it from an allied genus *Cryptogonimus* Osborn, 1903 in the absence of the muscular pad (pseudosucker) in front of the acetabulum and possession of a circlet of oral spines. The type species *Paracryptogonimus acanthostomus* Yamaguti, 1934 has pretesticular bunches of vitellaria in the lateral fields, and the ovary is multilobed, median and pretesticular. This was the original condition of the genus. Subsequently, with the addition of *P. ovatus* Yamaguti, 1952, the author of the genus himself emended the diagnosis to include vitellaria extending from a pretesticular level to a post-testicular level in the lateral or dorsolateral fields, presence of seminal receptacle, and 3-lobed to multilobed ovary. The same condition of vitellaria and ovary is found in *P. rostratus* Nagaty and Abdel Aal, 1961 and *P. orientalis* Fischthal and Kuntz, 1964 with the difference that the latter has 4-lobbed ovary out of which one lobe is isolated, and the vitellaria extend from the level of posterior third of acetabulum to posterior end of body. In *P. saccatus* Manter, 1963 the multilobed ovary is post-testicular and the vitellaria extend from acetabulum to ovary. *P. ghanensis* Fischthal and Kuntz, 1968 has pretesticular vitellaria but the vitelline follicles are almost confluent dorsally between acetabulum and testes. Lamothe (1969) described *P. yamagutii* in which acetabulum is much posteriorly removed to almost equatorial level, and the vitellaria extend from acetabular level anteriorly. Durio and Manter (1969) added four more species to the genus from New Caledonia. Yamaguti (1970) described another four species from Hawaii in all of which the vitellaria are pretesticular.

Yamaguti (1942) described and illustrated *Siphoderina apharei* collected from the host fish *Aphareus furcatus* (Lacépède) from Naha, Okinawa mentioning that it has "No special circumoral spines". He described cuticular spines as thin and exceedingly small but did not give measurement thereof. Manter (1947) discussed that *Siphoderina* Manter, 1934 should be considered synonym of *Metadena* Linton, 1910, and Yamaguti (1953) listed it as *Metadena apharei* (Yamaguti, 1942). Velasquez (1961) collected four specimens at Malabon, Rizal (open sea), Luzon Island, Philippines, from a host fish, *Lutianus* sp. She has given various measurements of the specimens. Her specimens are relatively smaller in body size, and, but for the presence of oral spines (23 x 5.8 microns), they agree fully in all details with *Metadena apharei* (Yamaguti, 1942). She further observes that "the spines (not figured) were seen in only one specimen which was crushed accidentally. They can be easily overlooked because of their small size, or they may be lost due to postmortem changes"

She also thought it important to indicate that the host fishes of Yamaguti's specimens as well as hers belong to the same family Lutianidae. Consequently, she suggested that *Metadena apharei* (Yamaguti, 1942) should be considered as *Paracryptogonimus apharei* (Yamaguti, 1942).

Yamaguti (1971) apparently does not accept this position. He keeps *Metadena apharei* (Yamaguti, 1942) under the genus *Pseudosiphoderoides* Yamaguti, 1958. Moreover, he left the fate of Velasquez' *Paracryptogonimus apharei* (Yamaguti, 1942) undecided by not including it under any cryptogonimid genus having oral spines.

Although the original material of *Metadena apharei* (Yamaguti, 1942) Yamaguti, 1953 were not rechecked for oral spines, Velasquez (1961) has provided sufficient evidence and justification for considering it as *Paracryptogonimus apharei* (Yamaguti, 1942). This position has also been accepted by Lamothe (1969) while giving a list of species of the genus *Paracryptogonimus*, and is further strengthened by the discovery of the presence of oral spines in two paratypes of *Metadena leilae* Nagaty, 1957 by Manter (1963), and in one paratype of *Siphoderina brotulae* Manter, 1934 (the genera and species in which the perioral spines were originally described to be absent), and consequent transfer of the former under the genus *Paracryptogonimus* by Manter (1963), and revalidation and emendation in the diagnosis of *Siphoderina* Manter, 1934 by Durio and Manter (1969). Further, Velasquez' conclusion does not seem illogical because Naha, (Okinawa, Japan) and Malabon, Rizal (Open sea), (Luzon Island, Philippines), the localities from where Yamaguti's and Velasquez' specimens were collected, are not very far off from each other. In view of the strong evidence provided, the position suggested by her should be maintained and there is need for Yamaguti's material to be rechecked for oral spines. Therefore, the present author thinks it better to agree with Velasquez (1961) and considers *Metadena apharei* (Yamaguti, 1942) as *Paracryptogonimus apharei* (Yamaguti, 1942) Velasquez, 1961.

Thus, there become two species of the same name under the genus *Paracryptogonimus* - *P. apharei* (Yamaguti, 1942) Velasquez, 1961 and *P. apharei* Yamaguti, 1970. A case of homonymy has arisen. Apparently, the two species are distinguishable from each other. Therefore, the name of the junior homonym, *P. apharei* Yamaguti 1970. is changed to *P. satyui* nom. nov.

It becomes obvious from the descriptions and illustrations of all the species that at least the distributional pattern of vitellaria in some of them is appreciably different from that in the type species. Such species are: *P. ovatus* Yamaguti, 1952, *P. rostratus*, Nagaty and Abde Aal, 1961, and *P. saccatus* Manter, 1963. The remaining species have, more or less, the same distributional pattern of vitellaria as in the type species.

From the foregoing account it seems that two distinct groups of species exist in the genus *Paracryptogonimus:* one with vitellaria restricted mainly and largely to the pretesticular zones as in the type species, *P. acanthostomus*; and the other, in which the vitellaria are disposed lateral to testes extending into the pre and post-testicular lateral fields as in *P. ovatus*. Such a grouping of species mainly on the basis of the distributional pattern of vitellaria under different genera already exist in *Paracryptogonimus*-like species lacking perioral spines. Thus, species with vitellaria confined to pre-testicular regions or slightly overlapping the testes are categorised under the genus *Metadena* Linton, 1910; the species having vitellaria restricted to the post-

testicular, lateral and dorsal areas have been grouped under *Pseudometadena* Yamaguti, 1952; and the species having vitellaria lateral to testes protruding into the pre and post-testicular regions has been grouped under *Neometadena* Hafeezullah and Siddiqi, 1970. If this grouping of *Paracryptogonimus*-like species without oral spines under different genera is thought to be convenient and justifiable, then the regrouping of similar set of species having oral spines (at present all under the genus *Paracryptogonimus*) on the same basis seems logical and necessary; otherwise by retaining the very broad present concept of the genus *Paracryptogonimus* with different patterns of the distribution of vitellaria, the generic differences among *Metadena, Pseudometadena, Pseudosiphoderoides* Yamaguti, 1958 and *Neometadena* become very meagre to maintain their respective distinctness, with the genus *Metadena,* which will complicate and confuse the matter. Therefore, for practical convenience and to avoid confusion, the author proposes splitting up of the genus *Paracryptogonimus* Yamaguti, 1934 as follows:

Paracryptogonimus Yamaguti, 1934 *sensu stricto*

Generic diagnosis: Cryptogonimidae. Body plump or elongate. Cuticle armed with minute spines. Gland cells in anterior part of body present. Acetabulum sunken in ventrogenital depression in body parenchyma, situated in midbody or anteriorly. No gonotyl or gonotyl-like organ near it. Oral sucker with a circlet of perioral spines. Prepharynx present; pharynx globular, small; oesophagus present; cecal bifurcation slightly posterior to pharynx; cecae ending short of posterior end of body. Testes diagonal or symmetrical, at equatorial level or behind it, with coils of uterus in between. Seminal vesicle saccular, partite, posterodorsal to acetabulum, may be extending anteriorly as well. No cirrus sac and cirrus. Pars prostatica present, uniting anteriorly with uterus to form a short common duct. Genital pore in front of acetabulum in ventrogenital depression, sometimes a bit anteriorly removed. Ovary lobed, median, pre-testicular. Seminal receptacle and Laurer's canal present. Vitellaria follicular, essentially pre-testicular in lateral or dorsolateral fields. Uterus forming lateral coils, passing between testes, and extending to near posterior end of body. Eggs small, numerous. Excretory vesicle Y-shaped, bifurcating near ovary; arms reaching anterior level of pharynx. Intestinal parasites of marine fishes.

Type species: *Paracryptogonimus acanthostomus* Yamaguti, 1934; also see Velasquez (1961).

Other species: P. americanus Manter, 1940 [Syn. *P. neoamericanus* Siddiqi and Cable, 1960, see Overstreet (1969)].

P. apharei (Yamaguti, 1942) Velasquez, 1961 [Syn. *Siphoderina a* Y, 1942; *Metadena a* (Yamaguti 1942) Yamaguti, 1953; *Pseudosiphoderoides a* (Yamaguti, 1942) Yamaguti, 1971]. *P. catalae* Durio and Manter, 1969; *P. echinostomus* (Oshmarin, Mamaev and Parukhin, 1961), Yamaguti, 1970 [Syn. *Lappogonimus e* O, M and P., 1961]; *P. ghanensis* Fischthal and Thomas, 1968; *P. hirastrictus* Manter, 1963; *P. leilae* (Nagaty, 1957) Manter, 1963 [Syn. *Metadena l* N]; *P. longitestis* Durio and Manter, 1969; *P. sootai* n. sp. (present paper); *P. macrospinus* Caballero, Hidalgo and Grocott, 1956; *P. manilensis* Velasquez, 1961; *P. muscularis* Yamaguti, 1970; *P. mexicauns* Bravo, 1953; *P. morosovi* (Parukhin, 1965) Yamaguti, 1971 [Syn. *Lappogonimus m.* P., 1965]; *P. onaga* Yamaguti, 1970; *P. provitellosus* Durio and Manter, 1969; *P. satyui* (Yamaguti, 1970) *nom. nov.* [Syn *Paracryptogoimus a.* Y. 1970]; *P. testiductus* Durio and Manter, 1969; *P. ula-ula* Yamaguti, 1970; *P. yamagutii* Lamothe, 1969;

P. sp. Manter, 1963.

Neoparacryptogonimus n. gen.

Generic diagnosis: Cryptogonimidae. Body ovate or globular. Cuticle usually thick with minute spines. Occulate. Gland cells in anterior part of body. Acetabulum embedded in depression of body parenchyma, pre-equatorial. Oral sucker with a circlet of perioral spines. Pharynx globular; cecal bifurcation in front of acetabulum; ceca extending up to posterior end of body. Testes symmetrical or slightly asymmetrical, post-or pre-equatorial. Seminal vesicle saccular, partite or not, posterodorsal to acetabulum. Cirrus sac and cirrus absent, anterior parts of male and female ducts joining to form a short common duct. Genital pore at anterior border of acetabulum. Ovary 3-lobed to multilobed, pre-or posttesticular. Seminal receptacle present. Vitellaria lateral to testes, protruding into pre- and post-testicular lateral fields. Uterus in lateral coils, separating two testes, occupying almost whole of posterior part of body. Eggs numerous and small. Excretory vesicle Y-shaped, arms reaching forebody. Intestinal parasites of marine fishes.

Type species: *Neoparacryptogonimus ovatus* (Yamaguti. 1952) n. comb. (Syn. *Paracryptogonimus o.* Y ; *P. rostratus* Nagaty and Abdel Aal, 1961, see Manter (1963).

Other species: N. orientalis (Fischthal and Kuntz, 1964) n. comb. (Syn. *Paracryptogonimus o.* F & K). *N. saccatus* (Manter, 1963) n. comb. (*Paracryptogonimus s.* M).

It may be of some interest to mention that *Paracryptogonimus rostratus*, considered by Manter (1963) as a synonym of *P. ovatus*, was included under the genus *Paracryptogonimus* on the assumption that the described raised and thickened ridge on the oral sucker is the seat of oral spines. In none of the species described under the genus it has been reported that perioral spines are borne on special seat on the oral sucker like raised and thickened ridge in this case. The only evidence of the lost spines can be traced in the scars that they have after having been shed off and it is rather difficult to trace the scars.

Paracryptogonimoides Nagaty and Abdel Aal, 1961 was considered *nomen nudum* by Manter (1963). The genus was inadequately diagnosed and the type species *Paracryptogonomoides nocti* was inadequately described and illustrated. However, if at all, *Paracryptogonimoides* is revalidated in future as Durio and Manter (1969) did for *Siphoderina* Manter, 1934, *Neometadena* Hafeezullah and Siddiqi, 1970 will possibly fall its synonym. It is important to mention here that revalidation of *Paracryptogonomoides* is possible only by providing a redescription of its type species from the original material if it is in good condition, or by collecting specimens from the type host and type locality but in that case the revalidator will have to furnish sufficient proof that he is dealing with the same species and not a second one.

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