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REDESCRIPTION OF *ASTIOTREMA RENIFERUM* (LOOSS, 1898) LOOSS, 1900 WITH COMMENTS ON THE STATUS OF THE GENUS *PSEUDOPARAMACRODEROIDES* GUPTA & AGARWAL, 1968 (TREMATODA PLAGIORCHIIDAE)

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(With 2 Text-figures)

INTRODUCTION

Looss (1900) proposed the generic name *Astiotrema* for his species *Distoma reniferum* Looss, 1898, since the generic name *Astia* was preoccupied, and renamed the species as *Astiotrema reniferum*. He also included *Distoma impletum* Looss, 1898 under it. Yeh and Fotedar (1958) reviewed the genus *Astiotrema* after studying a series of specimens in detail and recognised only four species viz., *A. reniferum* (Looss, 1898), *A. impletum* (Looss, 1898), *A. odhneri* Bhalerao, 1936 and *A. monticelli* (Stossich, 1904), out of 21 species under this genus described till then. Khalil (1959) further synonymised *A. odheneri* with *A. reniferum*. Dollfus and Simha (1964) agreed with these authors. Siddiqi (1965) synonymised *Astiotrema lobiorchis* Tiwari, 1958 and *A. mehrdi* Tiwari, 1958 with *Astiotrema reniferum*. Present authors accept the arrangement proposed by these workers.

During the course of the study of helminth parasites of fishes of Calcutta, the authors collected some trematodes from *Mystus cavasius* (Ham.) and *Clarias batrachus* (L.). These specimens, on detailed study, are identified as *Astioterema reniferum* (Looss, 1898). Out of 53 specimens of *Mystus cavasius* and 28 of *C. batrachus* examined in one year, only 9 of the former and 2 of the latter hosts yielded 15 and 10 examples respectively of this parasite in monsoon months. These parasites show a wide range of structural variations and are redescribed below. In the light of the variations studied, the systematic position

of the genus *Pseudoparamacroderoides* Gupta & Agarwal, 1968 is also discussed. All measurements are in millimeters.

SYSTEMATIC ACCOUNT

Family PLAGIORCHIIDAE Luhe, 1901

Subfamily *ASTIOTREMATINAE* Baer, 1924

Astiotrema Looss, 1900

Syn. *Astia* Looss, 1899 (Preoccupied)
Gauhatiana Dayal & Gupta, 1954
Pseudoparamacroderoides Gupta & Agrawal, 1968 (New Synonymy)

Astiotrema reniferum (Looss, 1898) Looss, 1900

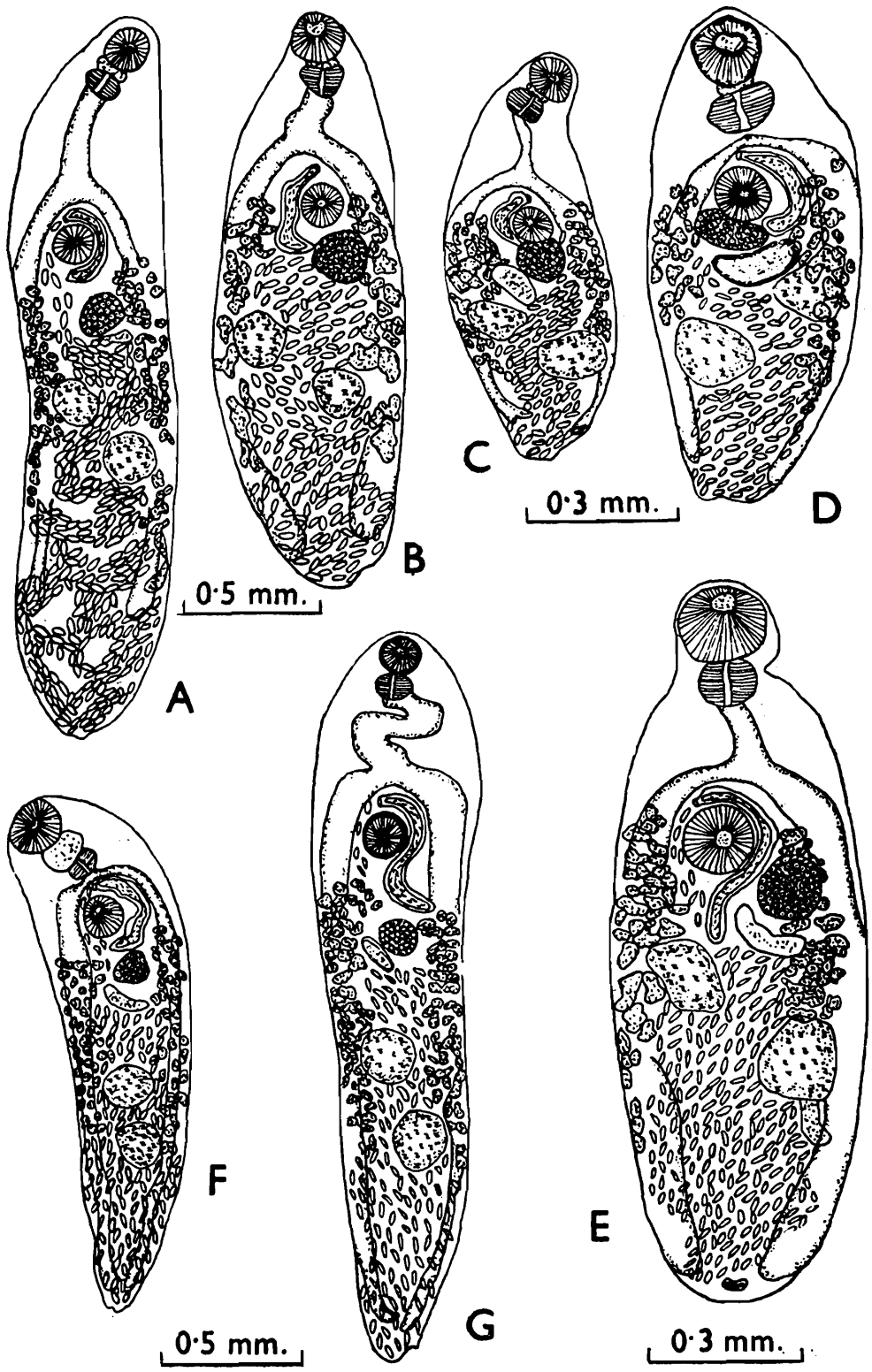
1898. *Distoma reniferum* Looss, *Zbl. Bakt.* **23**: 453.
1899. *Astia reniferum*: Loss, *Zool. Jber. Abst. Syst.* **12**: 521.
1968. *Pseudoparamacroderoides Suenghali* Gupta & Agarwal, *Indian J. Helminth.* 20(1): 70 (New Synonymy)
1969. *Pseudoparamacroderoides vittatusi* Kakaji, *Indian J. Helminth.*, **21** (1): 71. (New Synonymy)

Description.—The worms are elliptical with rounded extremities and attenuated anterior end, elongated, or cylindrical with both the margins more or less parallel when expanded. Cuticle is covered with backwardly directed spines. Anterior spines are more prominent than the posterier ones. It measures 0.8—2.9 in length and 0.33—0.69 in maximum breadth in the region between intestinal bifurcation and anterior testis. The ratio of length and breadth being 1 : 2.4—5.8. Mouth is situated slightly behind the anterior extremity, surrounded by a subterminal oral sucker measuring 0.08—0.19 × 0.08—0.18. The two suckers are equal or subequal. The mouth is followed by a small prepharynx normally, but in some specimens it is not seen, probably due to state of fixation (text-figs. 1E & G). Pharynx is large, pear shaped or globular, and measures 0.05—0.11 × 0.05—0.15. Oesophagus is short to moderately long, measuring 0.03—0.49 in length and 0.02—0.11 in breadth. In some specimens it is twisted 'S'-shaped and the length of the anterior body in such specimens is reduced due to contraction (text-fig. 1G), while in some specimens the oesophagus is not clear and a small space is left between the

intestinal bifurcation and pharynx (text-fig. 1A). Intestinal bifurcation is between the two suckers. Its position changes with the degree of expansion or contraction of the body at the time of fixation. Intestinal caeca are broad to narrow, more or less straight, terminating a little anterior to posterior extremity or midway between the posterior testis and posterior extremity. The acetabulum is median, pre-equatorial, almost equal, slightly bigger or smaller than the oral sucker and measures 0.09—0.17 × 0.11—0.17 It is situated at a distance of 0.04—0.27 from the anterior extremity.

Testes are tandem or obliquely tandem, postequatorial, postovarian intercaecal, roughly equal, oval or spherical, lobed or smooth. Anterior testis lies a little to the left of the median line at a distance of 0.05—0.33 from the ovary, and measures 0.09—0.19 in diameter. The distance between the two testes varies greatly. The posterior testis measures 0.09—0.19 × 0.12—0.22. The cirrus sac is very long, claviform and it extends from behind the acetabulum to middle of ovary or further backwards (text-fig. 1E). In some specimens it is twisted 'S'-shaped, situated behind the acetabulum due to contraction of the anterior body at the time of fixation (text-fig. 1G) ; greater part of the cirrus sac is filled with seminal vesicle. Pars prostatica is small, surrounded by prostate cells. Small anterior part of the cirrus sac is occupied by cirrus. Vesicula seminalis externa is absent.

The ovary is spherical or oval in shape, smooth, generally lying slightly to the right of the median line, measuring 0.07—0.17 × 0.09—0.20, and situated at a distance of 0.37—1.29 from anterior extremity. Its position in relation to acetabulum varies greatly, from overlapping the acetabulum to lying between the acetabulum and anterior testis (text-fig. 1A-G). The variation in the position of the ovary and other body organs may be due to the contracted condition of the worm at the time of fixation. It can be seen that in cases where the ovary is near or overlapping the acetabulum (text-figs. 1B, C & D) the ratio between the length and the breadth of the body is very much increased. Oviduct arises from the posterior end of the ovary and is joined by a pear-shaped receptaculum seminis, which lies posterior to the ovary. Common vitelline duct joins the ootype on its posterior side.

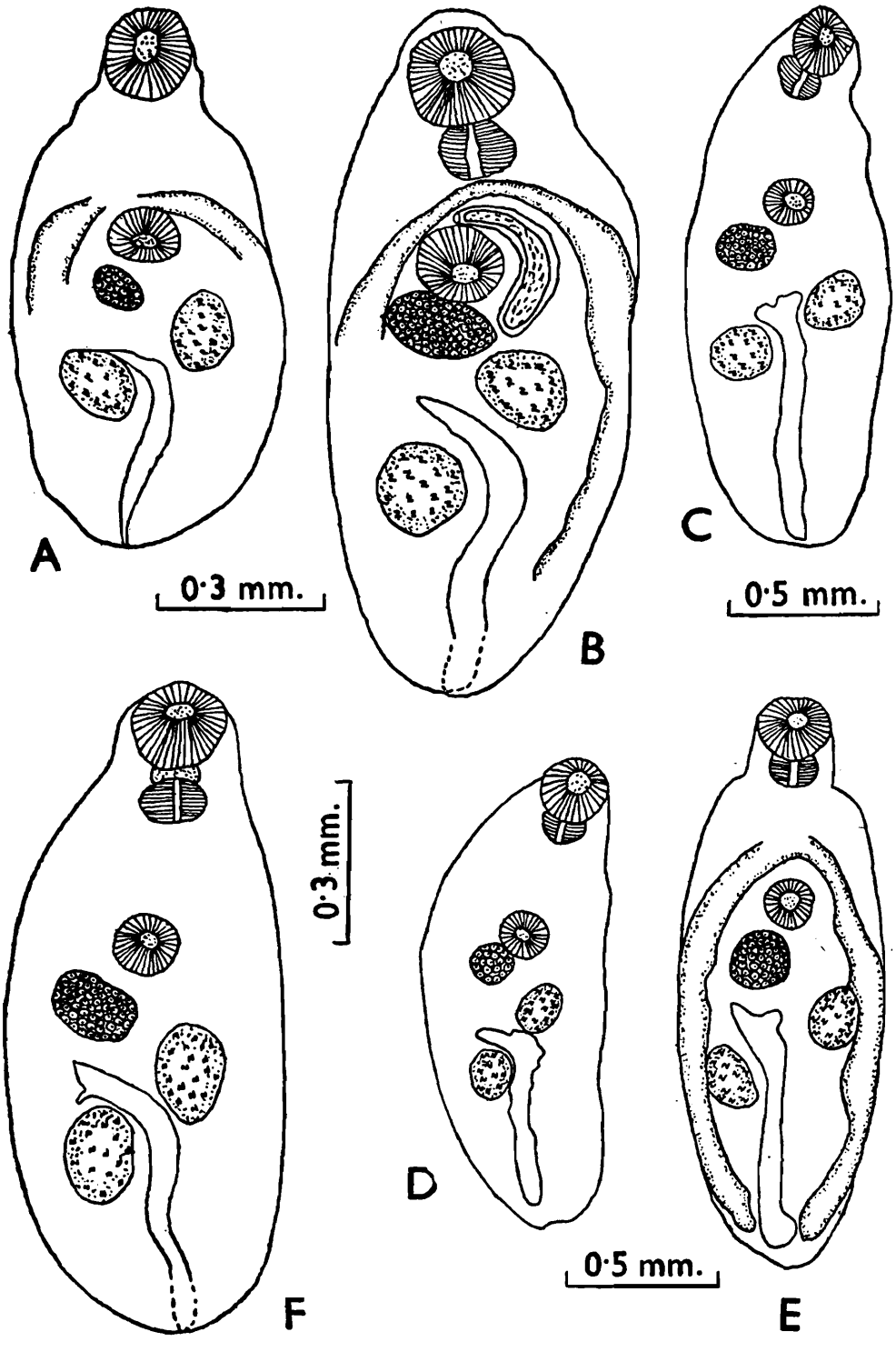


Text-figs. 1A-G—*Astiotrema reniferum* (Looss, 1898) Looss, 1900 showing variations in the position of ovary, cirrus sac, vitellaria and other body organs.

The vitellaria are composed of numerous follicles scattered without any definite arrangement, mostly on lateral sides overlapping the intestinal caeca and at places extending into intercaecal field. Their distribution extends to a variable length

from near the intestinal bifurcation to posterior end of posterior testis. At times it may extend some distance behind the posterior testis, in which case the distance between the two testes is less than normal.

Genital pore is median or submedian, immediately post-bifurcal and preacetabular, at a distance of 0.26—0.80 from



Text-figs. 2A-F—*Astiotrema reniferum* (Looss, 1898) Looss, 1900 showing variations in the shape and extension of the excretory bladder of the specimens taken from a single host.

anterior extremity. The uterus, which arises from the posterior side of the ootype, is much convoluted and both its descending and ascending limbs pass through the intertesticular space. The descending limb extends almost up to the posterior end or a little anterior to it, forming a large convoluted knot which then passes anteriorly as an ascending limb to the dorsal side of the cirrus sac and opens into the genital pore.

Eggs are numerous, oval in shape with yellowish-brown shell, and measure 0.018—0.026 × 0.004—0.008.

The shape of excretory bladder shows great amount of variation in its shape and extension. The shape varies from 'I' to 'Y' with intermediate conditions. It extends from the excretory pore to any level from posterior border of the posterior testis to ovary depending upon the stage of fixation (text-figs. 2A to 13). If the worm is in contracted condition the gonads show a tendency of congregation towards anterior part of the body and the excretory bladder extends up to the posterior testis. If it is fixed in extended condition the gonads are displaced to the posterior side and the bladder extends further forwards. Excretory pore is terminal or subterminal.

Discussion.—It is evident from the foregoing description that a great amount of variation exists in this species with regard to the shape and position of gonads, extension of vitellaria and cirrus sac, extension and shape of excretory bladder, extension of caeca, and size and position of suckers, as has already been pointed out by Yeh & Fotedar (*l.c.*) and Khalil (*l.c.*).

Gupta and Agarwal (1968) erected the genus *Pseudoparamacroderoides* to accommodate their new species *P. seenghali* and placed it under subfamily Walliniinae Yamaguti, 1958 in the family Allocreadiidae. Kakaji (1969) added *P. vittatusi* to this genus.

Yamaguti (1958) placed the following genera under the subfamily Walliniinae : *Macroderoides* Pearse, 1924 ; *Vietsoma* VanCleave & Muller 1932 ; *Gauhatiana* Dayal & Gupta, 1954 ; *Paramacroderoides* Venard, 1941 ; *Parastiotrema* Muller, 1940 ; *Macrolecithus* Hasegawa & Ozaki, 1926 ; and *Wallinia* Pearse, 1920. Mehra (1962) upheld the family Macroderoidae McMullen, 1937 and dropped the subfamily Walliniinae without making any comment on the remaining genera included in this subfamily. Yeh and Fotedar (1958) synonymised the genus

Gauhatiana Dayal & Gupta, 1954 with Astiotrema Looss, 1900 and the species *Gauhatiana batrachi* Dayal & Gupta, 1954 with *Astiotrema reniferum* (Looss, 1898)

According to Mehra (1966) the family Allocreadiidae is characterised by unspinulate body, usually pre-testicular exceptionally post-testicular uterus but not reaching posterior extremity and tubular or saccular excretory bladder. *Pseudoparamacroderoides* Gupta & Agarwal, 1968 does not possess of any of these characters except the shape of the excretory bladder. Hence it is more appropriate to place it under the family Plagiorchiidae.

The generic diagnosis of the genus *Pseudoparamacroderoides* as given by Gupta & Agarwal (1968) is identical with *Astiotrema* Looss, 1900 but for the position of the ovary, shape of excretory bladder and oral sucker with spines larger than the body spines. The variations with regard to the position of ovary and shape of excretory bladder have been pointed (*vide supra*). Usually the anterior spines are more prominent than the rest of the body spines and at times the spines near posterior extremity are very inconspicuous. So the relative size of the spines alone cannot be taken as valuable differentiating character. The genus *Pseudoporamacroderoides* is, therefore, considered congeneric with the genus *Astiotrema*. The generic characteristics of *Pseudoparamacroderoides* are based on the description of the type species *P. seenghali* Gupta & Agarwal, 1968 which are common to *Astiotrema reniferum* except in the differences like position of ovary and shape of excretory bladder. These differences are no more than individual variations of *Astiotrema reniferum* (text-figs. 1C, A ; 2A & B). Consequently *Pseudoparamacroderoides seenghali* is considered conspecific with *Astiotrema reniferum*. Kakaji (1969) distinguished her new species *Pseudoparamacroderoides vittatusi* in the characters like extension of excretory bladder up to middle of posterior testis, ovary some distance behind acetabulum, receptaculum seminis lateral to ovary, vitellaria extending from anterior end of acetabulum and intercaecal uterine coils. All these characters are seen as individual variations in the specimens of *Astiotrema reniferum* (vide text-figs. 1A to G ; 2A). Hence *P. vittatusi* is also found conspecific with *Astiotrema reniferum* (Looss, 1898) Looss, 1900.

Hosts.—Fish : *Clarias batrachus* ; *Mystus cavasius* ; *Mystus*

seenghala; Mystus vittatus. Reptiles: *Trionyx nilotica; T gangeticus; Chitra indica; Emyda granosa; Kachuga dhongoka; K. kachuga; Lissemys punctata; Amydae japonica; A. maackki; A. tuberculate.*

Location.—Intestine.

Distribution.—This species is known from the Ethiopian (North Africa), Oriental (India: Punjab; U.P.: Allahabad, Lucknow; Andhra Pradesh: Hyderabad; West Bengal: Calcutta. Burma), and Palaearctic (China, Korea and Japan), regions.

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SUMMARY

The paper deals with the redescription of *Astriotrema reniferum* (Looss, 1898) Looss, 1900 to incorporate individual variations observed in a series of specimens of this species. Genus *Pseudoparamacroderoides* Gupta & Agarwal, 1968 has been shown congeneric with the genus *Astiotrema* Looss, 1900 and the species *Pseudoparamacroderoides seenghali* Gupta & Agarwal, 1968 and *P. vittatusi* Kakaji, 1969 are shown synonymous to *Astiotrema reniferum.*

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