

Studies on Helminth parasites of Indian fishes.
Part. III. On some species of the genus
Allocreadium Looss, 1900.

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Résumé

Un grand nombre de Trématodes du genre *Allocreadium* Looss 1900, ont été récoltés chez des poissons d'eau douce en Inde. Deux espèces nouvelles sont décrites : *A. fasciatusi* et *A. guptai* ; cinq espèces font l'objet d'une redescription : *A. handiai*, *A. thapari*, *A. mehrai*, *A. singhi* et *A. heteropneustusius*. Tombent en synonymie : *A. ophiocephali* avec *A. handiai* ; *A. spindale* et *Rhynchocreadium singhia* avec *A. mehrai*, et *A. mahseri* avec *A. nicolli*. Une clé des espèces indiennes du genre *Allocreadium* est donnée.

Summary

A large number of trematodes of the genus *Allocreadium* Looss, 1900 were collected from fresh water fishes of India. Of these two new species namely *A. fasciatusi* n. sp. and *A. guptai* n. sp. are described from fresh water fishes of *Trichogaster fasciatus* and *Rita rita* respectively. In addition five redescrptions namely *A. handiai* Pande, 1937 from *Ophicephalus punctatus* ; *A. thapari* Gupta, 1950 from *Rita rita* ; *A. mehrai* Gupta, 1956 from *Rhynchobdella aculeata* ; *A. singhi* Rai, 1962 from *Rita rita* and *A. heteropneustusius* Agrawal, 1964 from *Mystus seenghala* are given. *A. ophiocephali* is considered to be a synonym of *A. handiai* ; *A. spindale* and *Rhynchocreadium singhia* a synonym of *A. mehrai* and *A. mahseri* a synonym of *A. nicolli*. A key to the Indian species of the genus *Allocreadium* Looss, 1900 is given.

The paratype and holotype specimens of the forms described in this paper will be deposited in Dr. G. S. Thapar's Helminthological Collection, Lucknow, U.P. India.

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Introduction.

Looss (1900) created the genus *Allocreadium* with *A. isoporum* as its type species. Since then a large number of species have been reported from various parts of World. Of these the following species have been reported from India namely, *A. annandalei* Southwell, 1913, *A. handiai* Pande, 1937, *A. mahaseri* Pande, 1938, *A. schizothoracis* Pande, 1938, *A. nicolli* Pande, 1938, *A. kosia* Pande, 1938, *A. thapari* Gupta, 1950, *A. nemachilus* Kaw, 1950, *A. mehrai* Gupta, 1956, *A. kamalai* Gupta, 1956, *A. spindale* Saxena, 1958, *A. ophiocephali* Srivastava, 1960, *A. makundi* Gupta, 1961, *A. dollfusi* Rai, 1962, *A. singhi* Rai, 1962, *A. hirnai* Rai, 1962 and *A. heteropneustusius* Agrawal, 1964.

Mehra (1966) revised the classification of *Allocreadidea* Nicoll, 1934 and recognised the following valid Indian species under the genus *Allocreadium* namely, *A. handiai* Pande, 1937 (Syn. *A. thapari* Gupta, 1956, *A. ophiocephali* Srivastava, 1960), *A. mahaseri* Pande, 1938, *A. nicolli* Pande, 1938, *A. kosia* Pande, 1938, *A. schizothoracis* Pande, 1938, *A. nemachilus* Kaw, 1950, *A. mehrai* Gupta, 1956 and *A. kamalai* Gupta, 1956.

I disagree with Mehra (1966) who considered that *A. thapari* to be a synonym of *A. handiai*. *A. thapari* is distinct from *A. handiai* in the position of testes and receptaculum seminis and relative size of eggs.

Pande (1938) distinguished *A. mahaseri* from *A. nicolli* on account of the smaller size of body, in having suckers of equal size, more forward position of genital pore in relation to intestinal bifurcation, testes tandem and contiguous, in the absence of uterine coils extending beyond anterior border of anterior testis and large size of eggs. *A. mahaseri* is distinct from *A. nicolli* in having larger size of body, and testes slightly separated from each other. In the opinion of author the above distinguishing characters are variable and hence both are identical forms. Accordingly *A. mahaseri* is considered a synonym of *A. nicolli*.

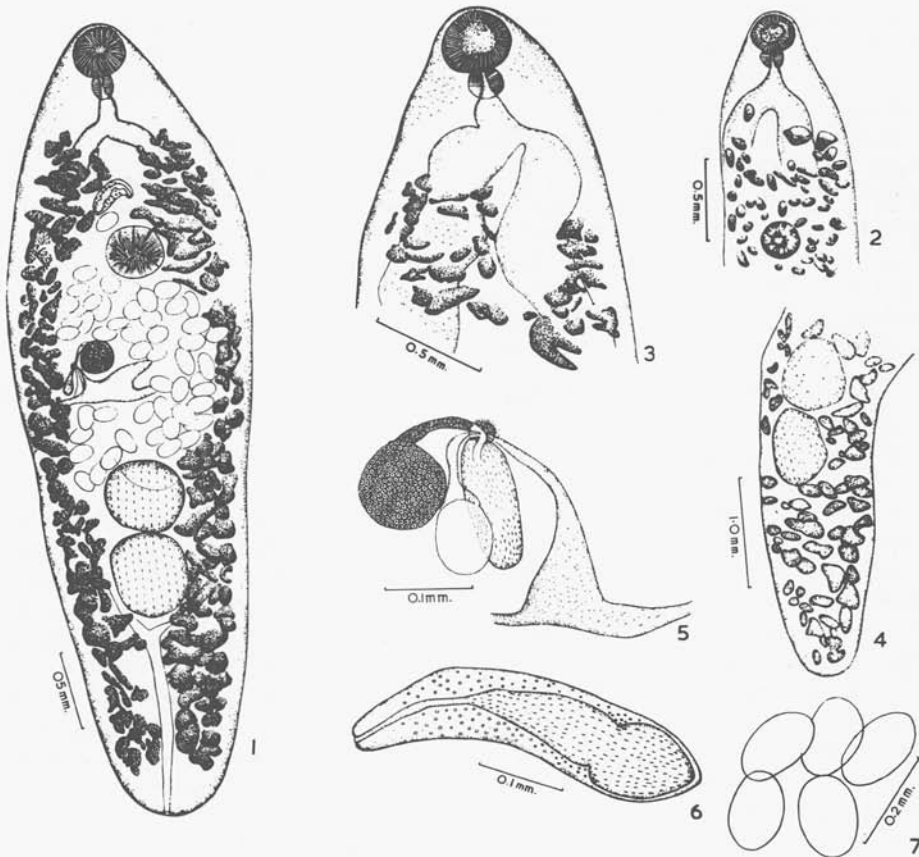
ALLOCREADIUM FASCIATUSI n. sp. (Figs. 1-7).

Eight specimens were collected from the intestine of a fresh water fish, *Trichogaster fasciatus* (Bloch et Schneider) from Lucknow.

Descriptions : body elongated, smooth, aspinose, rounded at extremities, 3.33 to 6.50 mm. long, 0.70 to 1.5 mm. wide. Oral sucker subterminal, spherical or ovoid, 0.22 to 0.39 mm. long, 0.23 to 0.40 mm. wide. Ventral sucker spherical, preequatorial, equal or larger than oral sucker, 0.18 to 0.40 mm. long, 0.18 to 0.43 mm. wide at 0.99 to 1.68 mm. from anterior extremity. Prepharynx absent; pharynx muscular, ovoid, 0.10 to 0.20 mm. long, 0.12 to 0.21 mm. wide; esophagus tubular, straight, 0.10 to 0.20 mm. long; caeca simple, extending upto posterior region of body.

Genital pore median or submedian, intercaecal, at 0.80 to 1.95 mm. from anterior extremity.

Excretory pore terminal at posterior end of body; bladder Y-shaped extending upto hind end of posterior testis.



Allocreadium fasciatus n. sp. FIG. 1. — Dorsal view. FIG. 2. — Anterior end showing ventral sucker smaller than oral sucker. FIG. 3. — Anterior end showing extension of vitellaria from some distance behind intestinal bifurcation. FIG. 4. — Hind end showing posterior testis smaller than anterior testis. FIG. 5. — Ootype enlarged. FIG. 6. — Cirrus pouch enlarged. FIG. 7. — Eggs

Testes entire, oval or spherical, tandem and postequatorial. Anterior testis postovarian 0.31 to 0.51 mm. long, 0.31 to 0.56 mm. wide at 1.56 to 3.4 mm. from anterior extremity. Posterior testis smaller, larger, close or slightly apart from anterior testis, 0.20 to 0.52 mm. long, 0.31 to 0.50 mm. wide at 0.85 to 1.70 mm. from hind end. Cirrus sac flask shaped lying between ventral sucker and intestinal bifurcation and extends from genital pore to middle region of ventral sucker. It measures 0.31 to 0.46 mm. long, 0.07 to 0.09 mm. wide at 0.75 to 1.95 mm. from anterior extremity. Vesicula seminalis bipartite lying at basal part of cirrus sac; proximal part 0.08 to 0.14 mm. long, 0.05 to 0.08 mm. wide, while distal part smaller, 0.05 to 0.06 mm. long, 0.04 to 0.06 mm. wide. Anterior to vesicula seminalis a short pars prostatica, 0.05 to 1.14 mm. long opening into a muscular cirrus through an ejaculatory duct,

0.10 to 0.12 mm. long. Space around vesicula seminalis and pars prostatica surrounded by a large number of prostate gland cells.

Ovary entire, oval or spherical, equatorial or pre equatorial, pre testicular, lying between ventral sucker and anterior testis. It measures 0.12 to 0.29 mm. long, 0.12 to 0.25 mm. wide at 1.21 to 2.5 mm. from anterior extremity. From anterior end of ovary arises oviduct which opens at ootype. Receptaculum seminis elongated or pear shaped, lying lateral to ovary, 0.21 to 0.27 mm. long, 0.06 to 0.12 mm. wide. Vitellaria follicular, extending from hind end of intestinal bifurcation upto hind end of body. Vitellaria mainly lateral in position anterior to ventral sucker but behind posterior testis filling intercaecal space. Uterine coils lying between genital pore and anterior testis. Eggs oval and operculated, 0.11 to 0.16 mm. long, 0.15 to 0.22 mm. wide.

HOST : *Trichogaster fasciatus* (Bloch. and Schneider).

LOCATION : Intestine.

LOCALITY : Lucknow.

DISCUSSION : The new form differs from all the known species of the genus *Allocreadium* in the extension of vitellaria from hind end of intestinal bifurcation to posterior end of body. The vitellaria extend in *A. annandalei* Southwell, 1913, *A. handiai* Pande, 1937, *A. schizothoracis* Pande, 1938, *A. thapari* Gupta, 1951, *A. dollfusi* Rai, 1962, *A. hirnai* Rai, 1962 and *A. heteropneustusius* Agrawal, 1964 from hind end of ventral sucker to posterior end of body ; in *A. mahaseri* Pande, 1938, *A. nicolli* Pande, 1938, *A. nemachilus* Kaw, 1950 and *A. singhi* Rai, 1964 from anterior end of ventral sucker to hind end of body ; in *A. kosia* Pande, 1938 and *A. makundi* Gupta, 1961 from middle of ventral sucker to hind end of body ; in *A. mehrai* (Syn. *A. spindale* Saksena, 1958) from anterior end of ovary to hind end of body and in *A. kamalai* Gupta, 1956 from hind end of oral sucker to posterior end of body. The new form resembles closely *A. kamalai* in the relative size of ventral sucker, in the size of esophagus, in the position of cirrus sac but however differs from it in the extension of vitellaria, in the position of receptaculum seminis and genital pore and in the absence of prepharynx. Accordingly it is regarded as new with the specific name *A. fasciatusi* n. sp.

ALLOCREADIUM GUPTAI n. sp. (Fig. 8).

Only one specimen was collected from the intestine of a fresh water fish *Rita rita* (Ham.) from Varanasi.

DESCRIPTION : Body elongated, aspinose, narrow at anterior end broader at posterior end, 1.28 mm. long, 0.50 mm. wide. Oral sucker ovoid, terminal, 0.13 mm. long, 0.125 mm. wide. Ventral sucker spherical, larger than oral sucker, 0.21 mm. in diameter at 0.36 mm. from anterior extremity. Prepharynx 0.01 mm. long, 0.02 mm. wide ; pharynx muscular, ovoid, 0.06 mm. long, 0.072 mm. wide ; esophagus tubular, 0.15 mm. long ; caeca simple extending upto hind end of posterior testis.

Genital pore submedian, nearly midway between intestinal bifurcation and ventral sucker at 0.32 mm. from anterior extremity.

Excretory pore terminal at posterior end of body ; bladder tubular extending upto hind of posterior testis.

Testes entire, oval, diagonal, lying near middle of posterior half of body. Anterior testis 0.1 mm. long, 0.19 mm. wide at 0.83 mm. from anterior end. Posterior testis lying just behind anterior testis, larger than anterior testis, 0.22 mm. long, 0.23 mm. wide at 0.32 mm. from hind end of body. Cirrus sac crescent shaped lying on right side of ventral sucker extending from genital pore to a slightly behind its hinder margin. It measures 0.27 mm. long, 0.16 mm. wide at 0.32 mm. from anterior extremity. Vesicula seminalis bipartite lying in basal part of cirrus sac ; proximal part 0.14 mm. long, 0.05 mm. wide while distal part 0.03 mm. long, 0.05 mm. wide ; pars prostatica 0.03 mm. long, 0.03 mm. wide, opening into a long muscular cirrus through a narrow ejaculatory duct, 0.18 mm. long. Space around vesicula seminalis and pars prostatica in cirrus sac filled with prostate gland cells.

Ovary entire, kidney shaped, post equatorial, immediately in front of anterior testis, 0.1 mm. long, 0.19 mm. wide at 0.83 mm. from anterior extremity. Vitellaria follicular, extending from middle of esophagus to hind end of body, mainly lateral in position but cover intestinal caeca and space behind posterior testis. Uterine coils with 11 eggs lying transversely between anterior testis and ventral sucker. Eggs avoid, non operculated, 0.02 to 0.03 mm. long, 0.06 to 0.08 mm. wide.

HOST : *Rita rita* (Ham.).

LOCATION : Intestine.

LOCALITY : Varanasi.

DISCUSSION : The new form differs from all the known species of the genus *Allocreadium* except *A. kosia* and *A. dollfusi* in the extension of cirrus sac backward to posterior end of ventral sucker. The new form differs from both the forms in having ventral sucker larger than oral sucker, in having receptaculum seminis anterior to ovary instead of posterior to it, in the extension of vitellaria from middle of esophagus to

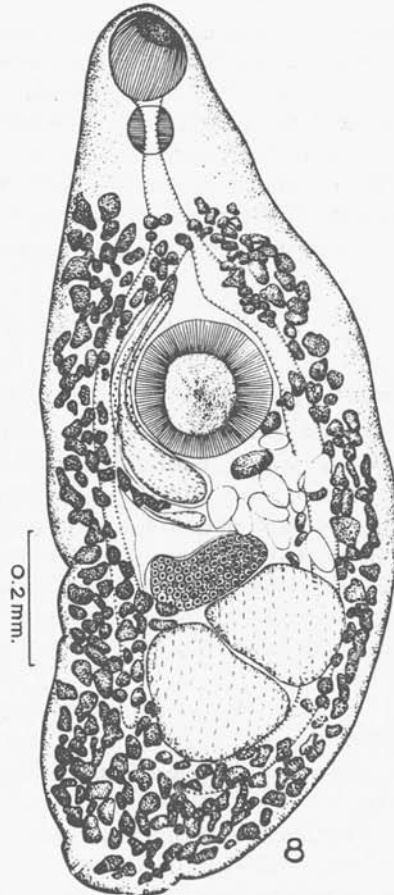


FIG. 8. — *Allocreadium guptai* n. sp.
Dorsal view

hind end of body and in having genital pore midway between intestinal bifurcation and ventral sucker instead of at the level of intestinal bifurcation. The new form further can be distinguished from *A. dollfusi* in the extension of cirrus sac a little behind the ventral sucker instead of upto anterior end of ovary. The new form resembles closely *A. kosia* in the extension of cirrus sac a little posterior to ventral sucker, but differs from it in the extension of intestinal caeca upto hind end of posterior testis instead of a short distance in front of hind end of body.

Accordingly it is regarded as new with the specific name *A. guptai* n. sp.

ALLOCREADIUM HANDIA Pande, 1937 (Figs. 9-11)

Syn. *A. ophiocephali* Srivastava, 1960.

Four specimens were collected from the intestine of a fresh water fish, *Ophicephalus punctatus* (Bloch.) from river Gomati at Lucknow.

DESCRIPTION : Body elongated, aspinose, rounded at extremities, 1.33 to 2.85 mm. long, 0.41 to 0.88 mm. wide. Oral sucker spherical, terminal, 0.21 to 0.39 mm. long, 0.41 to 0.88 mm. wide. Ventral sucker ovoid, smaller than oral sucker, 0.12 to 0.23 mm. long, 0.15 to 0.30 mm. wide at 0.45 to 0.82 mm. from anterior extremity. Prepharynx absent ; pharynx muscular, ovoid, 0.10 to 0.13 mm. long, 0.08 to 0.13 mm. wide ; esophagus short, 0.05 to 0.66 mm. long ; caeca simple extending upto hind end of body.

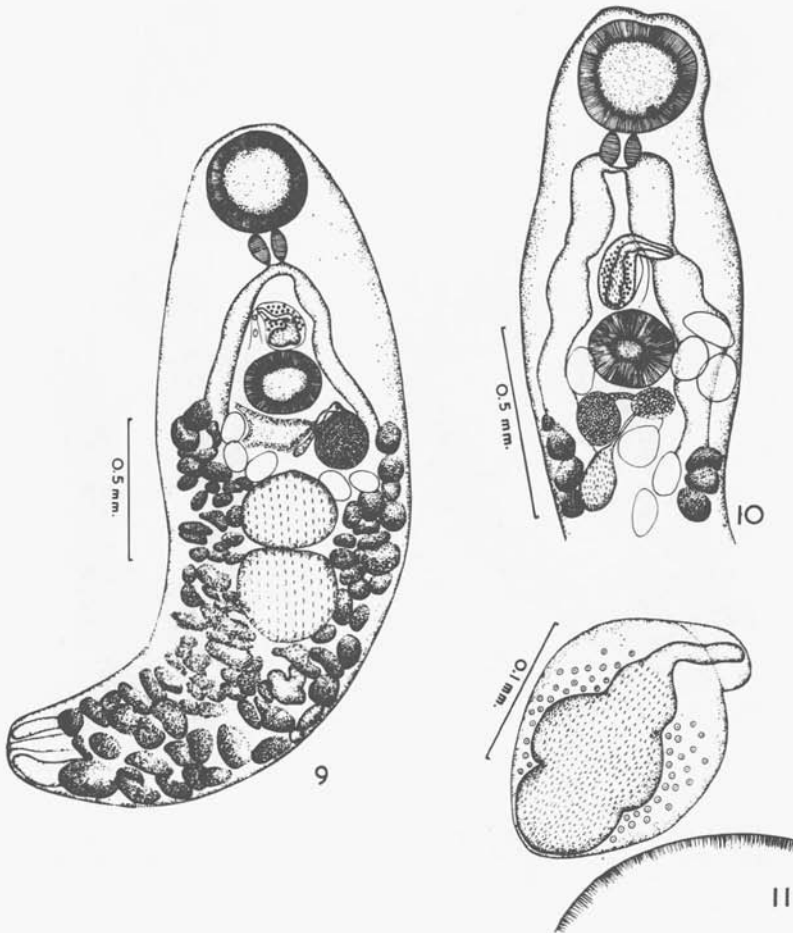
Genital pore median or submedian, intercaecal at 0.60 to 0.68 mm. from anterior extremity.

Excretory pore terminal ; bladder tubular extending upto hind end of posterior testis.

Testes entire, oval, tandem and lying in middle of body. Anterior testis, 0.08 to 0.13 mm. long, 0.022 to 0.033 mm. wide at 0.65 to 1.29 mm. from anterior extremity. Posterior testis lying just behind anterior testis, larger, 0.14 to 0.39 mm. long, 0.12 to 0.33 mm. wide at 0.46 to 1.01 mm. from posterior extremity. Cirrus sac flask shaped, median lying obliquely between intestinal bifurcation and ventral sucker, 0.183 to 0.25 mm. long, 0.14 to 0.18 mm. wide at 0.50 to 0.62 mm. from anterior extremity. Vesicula seminalis bipartite lying in basal part of cirrus sac ; proximal part, 0.05 to 0.08 mm. long, 0.05 to 0.08 mm. wide ; while distal part 0.07 to 0.08 mm. long, 0.09 to 0.1 mm. wide. Anterior to vesicula seminalis a short pars prostatica, 0.04 to 0.05 mm. long, 0.02 to 0.05 mm. wide, opening into a muscular cirrus through an ejaculatory duct, 0.06 to 0.15 mm. long. Space around vesicula seminalis and pars prostatica surrounded by a large number of prostate gland cells.

Ovary entire, oval or spherical, preequatorial, pretesticular and lying just behind ventral sucker or slightly lateral to it. It measures 0.10 to 0.22 mm. long, 0.06 to 0.19 mm. wide at 0.58 to 1.08 mm. from anterior extremity. From anterior end of ovary arises oviduct which opens at ootype. Receptaculum seminis pear shaped lying lateral or posterior to ovary, 0.13 to 0.19 mm. long, 0.02 to 0.09 mm. wide. Vitellaria

follicular, extending from hind end of ventral sucker upto a little anterior from hind end of body ; mainly lateral in position but filling intercaecal space behind posterior testis. Uterine coils lying between genital pore and anterior testis. Eggs oval, 0.12 to 0.13 mm. long, 0.07 to 0.08 mm. wide.



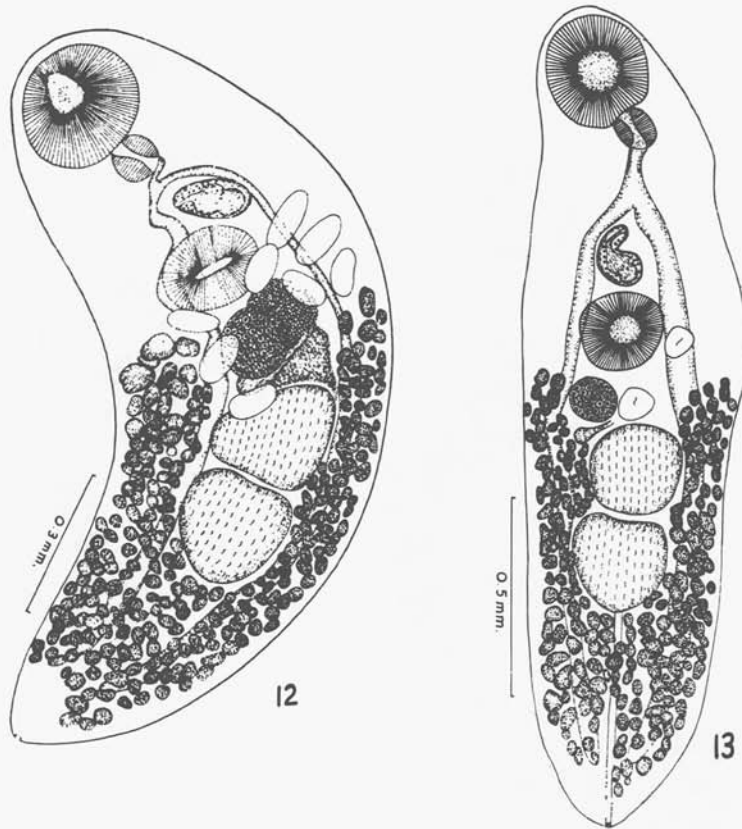
Allocreadium handia Pande, 1937. FIG. 9. — Ventral view. FIG. 10. — Dorsal view.
FIG. 11. — Cirrus pouch enlarged

HOST : *Ophicephalus punctatus* (Bloch.).

LOCATION : Intestine.

LOCALITY : Lucknow.

DISCUSSION: The present form belongs to *A. handiai* Pande, 1937 (syn. *A. ophiocephal*i Srivastava, 1960) but differs from it in having oesophagus absent or shorter than pharynx and in the relative size of eggs.



Allocreadium thapari Gupta, 1950. FIG. 12. — Ventral view, showing anterior testis larger than posterior. FIG. 13. — Esophagus larger than pharynx and posterior testis larger than anterior

Srivastava (1960) created *A. ophiocephal*i from *Ophicephalus punctatus* and distinguished it from *A. handiai* in the shape and relative size of testes, in the size of receptaculum seminis and vesicula seminalis and in the extension of excretory bladder. In the opinion of author these characters are specific variations and hence is in favour of Mehra, 1960 in considering *A. ophiocephal*i to be a synonym of *A. handiai*.

ALLOCREADIUM THAPARI Gupta, 1950 (Figs. 12-13)

Numerous specimens were collected from the intestine of a fresh water fish, *Rita rita* (Ham.) from river Gomati at Lucknow.

DESCRIPTION (based on 6 specimens) : Body elongated, aspinose, rounded at both extremities, 1.29 to 2.3 mm. long, 0.41 to 0.51 mm. wide. Oral sucker terminal, spherical, 0.2 to 0.26 mm. long, 0.2 to 0.29 mm. wide. Ventral sucker smaller than oral sucker, 0.15 to 0.20 mm. long, 0.15 to 0.22 mm. wide at 0.48 to 0.70 mm. from anterior extremity. Prepharynx absent ; pharynx 0.09 to 0.10 mm. long, 0.08 to 0.10 mm. wide ; esophagus absent or present, tubular, 0.04 to 0.12 mm. long ; caeca simple, extending upto a little anterior from hind end of body.

Genital pore median or submedian, intercaecal, preacetabular at, 0.40 to 0.59 mm. from anterior extremity.

Excretory pore terminal ; bladder tubular extending upto hind end of ovary.

Testes entire or lobed, oval, postequatorial, tandem, lying in anterior half of hind end of body. Anterior testis, 0.15 to 0.25 mm. long, 0.16 to 0.30 mm. wide at 0.69 to 1.1 mm. from anterior extremity. Posterior testis lying just behind anterior testis, larger or smaller than anterior testis, 0.19 to 0.29 mm. long, 0.21 to 0.29 mm. wide at 0.30 to 0.71 mm. from hind end. Cirrus sac flask shaped, median, lying obliquely between intestinal bifurcation and ventral sucker, 0.11 to 0.26 mm. long, 0.05 to 0.11 mm. wide at 0.69 to 1.1 mm. from anterior extremity. Vesicula seminalis bipartite lying in basal part of cirrus sac ; proximal part 0.02 to 0.06 mm. long, 0.03 to 0.07 mm. wide while distal part, 0.03 to 0.07 mm. long, 0.03 to 0.08 mm. wide ; pars prostatica, 0.02 to 0.05 mm. long, 0.02 to 0.06 mm. wide opening into a muscular cirrus through a narrow ejaculatory duct, 0.05 to 0.15 mm. long. Space around vesicula seminalis and pars prostatica in cirrus sac filled with prostate gland cells.

Ovary entire, spherical, preequatorial, in front of anterior testis just behind ventral sucker, 0.08 to 0.15 mm. long, 0.09 to 0.16 mm. wide at 0.61 to 0.95 mm. from anterior extremity. Receptaculum seminis pear shaped, lying postero-dorsal or postero-lateral to ovary just in front of anterior testis, 0.07 to 0.1 mm. long, 0.06 to 0.11 mm. wide at 0.75 to 0.96 mm. from anterior extremity. Vitellaria follicular, extending from hind end of ventral sucker upto posterior end of body, mainly lateral in position, but cover intestinal caeca and space behind posterior testis. Uterine coils extending from genital pore upto anterior end of anterior testis. Eggs non operculated, few in number, 0.07 to 0.12 mm. long, 0.05 to 0.14 mm. wide.

HOST : *Rita rita* (Ham.).

LOCATION : Intestine.

LOCALITY : Lucknow.

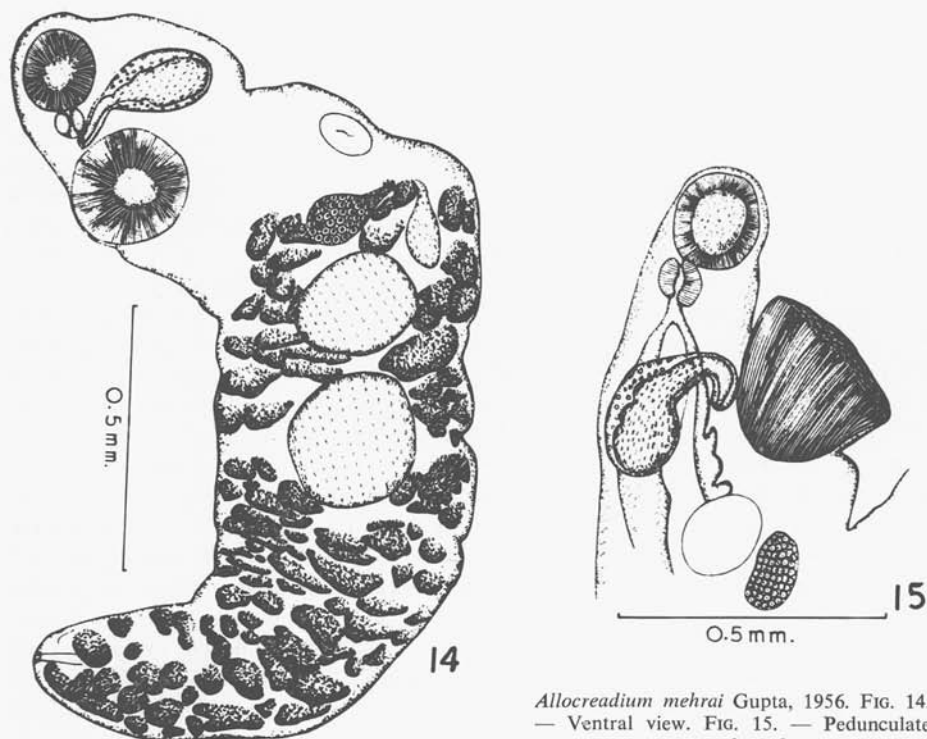
DISCUSSION : The present form belongs to *A. thapari* Gupta, 1950 but differs from it in the possession of an esophagus and in the relative size of various organs. These characters are considered as specific variations.

ALLOCREADIUM MEHRAI Gupta, 1956 (Figs. 14-15)

Syn. *Rhynchocreadium aculeata* Srivastava, 1962, *R. singhia* Pershad, 1965 and *A. spinidale* Saksena, 1958.

Four specimens were collected from the intestine of a fresh water eel, *Rhynchobdella aculeata* (Bloch.) from river Gomati at Lucknow.

DESCRIPTION: Body elongated, aspinose, rounded at extremities, 2.85 to 4.93 mm. long, 0.55 to 0.90 mm. wide in region of ventral sucker. Oral sucker subterminal,



Allocreadium mehrai Gupta, 1956. FIG. 14. — Ventral view. FIG. 15. — Pedunculate ventral sucker

oval, 0.20 to 0.29 mm. long, 0.19 to 0.25 mm. wide. Ventral sucker pedunculate, larger than oral sucker, 0.31 to 0.39 mm. long, 0.06 to 0.12 mm. wide at 0.30 to 0.62 mm. from anterior extremity. Prepharynx absent; pharynx ovoid, muscular, 0.08 to 0.12 mm. long, 0.06 to 0.12 mm. wide; esophagus tubular, shorter than pharynx, 0.07 to 0.085 mm. long; caeca simple extending upto hind end of body.

Genital pore median or submedian, lying in front of ventral sucker at 0.38 to 0.50 mm. from anterior extremity.

Excretory pore terminal ; bladder tubular, extending upto hind end of posterior testis.

Testes entire, ovoid or spherical, tandem and lying in middle of body. Anterior testis, 0.18 to 0.31 mm. long, 0.19 to 0.39 mm. wide at 1.01 to 1.59 mm. from anterior extremity. Posterior testis larger than anterior testis lying close to anterior testis, 0.25 to 0.42 mm. long, 0.21 to 0.39 mm. wide at 1.0 to 2.9 mm. from hind end of body. Cirrus sac flask shaped lying in front of ventral sucker, 0.40 to 0.57 mm. long, 0.14 to 0.50 mm. wide at 0.3 to 0.4 mm. from anterior extremity. Vesicula seminalis bipartite and lying in basal part of cirrus sac ; proximal part 0.12 to 0.19 mm. long, 0.12 to 0.25 mm. wide while distal part 0.1 mm. long, 0.09 mm. wide. Anterior to vesicula seminalis a pars prostatica, 0.05 to 0.06 mm. long, 0.01 to 0.02 mm. wide opening into a muscular cirrus through an ejaculatory duct, 0.1 to 0.12 mm. long. Space around vesicula seminalis and pars prostatica surrounded by a large number of prostate gland cells.

Ovary entire, oval or spherical, pre testicular, pre equatorial between ventral sucker and anterior testis, 0.1 to 0.22 mm. long, 0.15 to 0.31 mm. wide at 0.72 to 1.3 mm. from anterior extremity. Receptaculum seminis pear shaped, lateral to ovary and in front of anterior testis, 0.1-0.2 mm. long, 0.12-0.59 mm. wide at 0.81-1.08 mm. from anterior extremity. Vitellaria follicular extending from anterior region of ovary upto a little in front of hind end of body, mainly lateral in position but over intestinal caeca and extend at places in intercaecal space behind posterior testis. Uterine coils lying between ovary and genital pore. Eggs oval, few in number, 0.16 to 0.20 mm. long, 0.11 mm. to 0.12 mm. wide.

HOST : *Rhynchobdella aculeata* (Bloch.).

LOCATION : Intestine.

LOCALITY : Lucknow.

DISCUSSION : The present form belongs to *A. mehrai* Gupta, 1956 but differs from it in having ventral sucker at a distance of 1/6th to 1/10th instead of 1/5th from anterior extremity and in the position of genital pore and receptaculum seminis.

Saksena (1958) described *A. spindale* from a fresh water fish *Mastacembelus armatus* and distinguished it from *A. mehrai* in the possession of a small prepharynx and in having oval vesicula seminalis. In the opinion of author these characters are specific variations and hence *A. spindale* is a synonym of *A. mehrai*.

Srivastava (1962) created a new genus *Rhynchocreadium* with *R. aculeata* as type species from *Rhynchobdella aculeata*. The description as well as the drawings of *R. aculeata* showed a striking resemblance to those of *A. mehrai* Gupta, 1956. I believe that *Rhynchocreadium* Srivastava, 1962 is identical to *Allocreadium*. Therefore *R. aculeata* becomes a new combination *A. aculeata* and *R. singhia* a new comb. as *A. singhia*, *A. aculeata* differs from *A. mehrai* in the position of ovary in relation to ventral sucker, in the extension of excretory bladder and in having equal testes. However these differences are specific variations and hence are identical.

ALLOCREADIUM SINGHI Rai, 1962 (Figs. 16).

A single specimen of this form was collected from the intestine of a fresh water fish, *Rita rita* (Ham.) from river Gomati at Lucknow.

DESCRIPTION: Body elongated, aspinose, rounded at extremities, 3.07 mm. long, 1.31 mm. wide. Oral sucker terminal, oval, 0.36 mm. long, 0.40 mm. wide. Ventral sucker subspherical, smaller than oral sucker, 0.34 mm. long, 0.39 mm. wide at 0.71 mm. 1/3rd from anterior extremity. Prepharynx absent; pharynx oval, 0.19 mm. long, 0.22 mm. wide; esophagus very short; caeca terminating nearly half way between posterior testis and hind end of body.

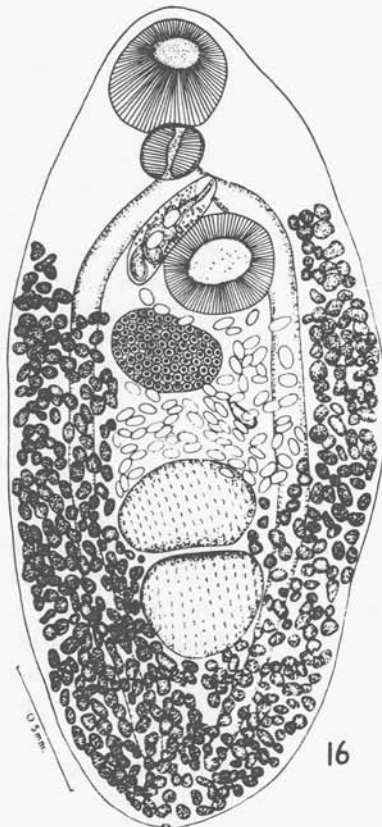


FIG. 16. — *Allocreadium singhi* Rai, 1962
Dorsal view

Genital pore on left side nearly at level of intestinal bifurcation at 0.6 mm. from anterior extremity.

Excretory pore terminal; bladder tubular extending upto hind end of body.

Testes entire, oval, postequatorial, tandem, lying in anterior half of hind end of body. Anterior testis 0.31 mm. long, 0.49 mm. wide at 1.49 mm. from anterior end. Posterior testis lying just behind anterior testis, larger than anterior testis, 0.38 mm. long, 0.42 mm. wide at 0.60 mm. from hind end of body. Cirrus sac flask shaped, extending from intestinal bifurcation upto middle of ventral sucker, 0.45 mm. long, 0.10 mm. wide at 0.59 mm. from anterior extremity. Vesicula seminalis lying in basal part of cirrus sac, spirally twisted, 0.3 mm. long, 0.1 mm. wide; pars prostatica 0.07 mm. long; ejaculatory duct 0.18 mm. long. Space around vesicula seminalis and pars prostatica in cirrus sac filled with prostate gland cells.

Ovary entire, oval, preequatorial, just behind ventral sucker, 0.39 mm. long, 0.25 mm. wide at 1.1 mm. from anterior extremity. Receptaculum seminis pear shaped, 0.1 mm. long, 0.05 mm. wide at 1.35 mm. from anterior extremity. Vitellaria follicular, extending from anterior end of ventral sucker to hind of body, mainly lateral in position but cover intestinal caeca and space behind posterior testis. Uterine coils lie between genital pore and anterior region of anterior testis. Eggs oval and operculated, 0.08 to 0.1 mm. long, 0.03 to 0.05 mm. wide.

HOST : *Rita rita* (Ham.).

LOCATION : Intestine.

LOCALITY : Lucknow.

DISCUSSION : The present form belongs to *A. singhi* Rai, 1962 but however differs from it in having ventral sucker smaller than oral sucker, in the absence of prepharynx and in the extension of uterine coils between genital pore and anterior region of anterior testis and in having a new host. These differences are considered as specific variations.

ALLOCREADIUM HETEROPNEUSTUSIUS Agrawal, 1964.

Three specimens were collected from the intestine of a fresh water fish *Mystus seenghala* (Skyles) obtained from the local market at Lucknow.

Description : body, 1.36 to 3.16 mm. long, 0.34 to 0.80 mm. wide. Oral sucker, 0.2 to 0.3 mm. long, 0.21 to 0.23 mm. wide. Ventral sucker preequatorial, 0.13 to 0.25 mm. long, 0.14 to 0.25 mm. wide at 0.37 to 0.69 mm. from anterior extremity. Prepharynx absent; pharynx, 0.05 to 0.11 mm. long, 0.09 to 0.016 mm. wide; esophagus tubular, 0.045 to 0.05 mm. long; ceca extending to hind end of body.

Genital pore at 0.45 mm. from anterior extremity and lying midway between oral sucker and ventral sucker.

Excretory pore terminal; bladder tubular extending upto hind end of posterior testis.

Testes entire, tandem and lying in middle of body. Anterior testis 0.14 to 0.25 mm. long, 0.14 to 0.23 mm. wide at 0.60 to 1.36 mm. from anterior extremity. Posterior testis larger than anterior and lies close to anterior testis, 0.13 to 0.32 mm. long, 0.13 to 0.23 mm. wide at 0.05 to 0.12 mm. from hind end of body. Cirrus sac flask shaped, lying obliquely between ventral sucker and intestinal bifurcation, 0.18 mm. long, 0.07 mm. wide at 0.5 mm. from anterior end.

Ovary postacetabular, lying on lateral side of anterior testis, 0.10 to 0.25 mm. long, 0.10 to 0.15 mm. wide at 0.49 mm. from anterior extremity. Receptaculum seminis pear shaped, lying laterally on right side of ovary, 0.13 mm. long, 0.1 mm. wide at 1.19 mm. from anterior extremity. Vitellaria extending from middle of ovary to hind end of ventral sucker, mainly lateral in position covering intestinal ceca and back to posterior testis filling intercaecal space. Uterus form few coils between anterior testis and ventral sucker. Eggs, 0.10 to 0.105 mm. long, 0.12 to 0.13 mm. wide.

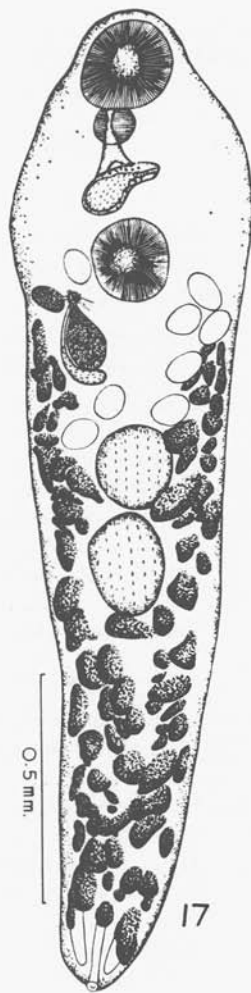


FIG. 17. — *Allocreadium heteropneustusius* Agrawal, 1964
dorsal view

HOST : *Mystus seenghala* (Skyles).

LOCATION : Intestine.

LOCALITY : Lucknow.

DISCUSSION : The present form belongs to *A. heteropneustusius* Agrawal, 1964 but however differs from it in having receptaculum seminis dorsolateral to ovary, in the relative size of ventral sucker and in having a new host. These differences are considered as specific variations.

Key to the Indian species of *Ailocreadium* Looss, 1900.

A. Cirrus pouch extending beyond ventral sucker

- a) Cirrus pouch extending upto anterior end of ovary *A. dollfusi*
 Cirrus pouch not extending upto anterior end of ovary b.
 b) Vitellaria extending from midway between esophagus and intestinal bifurcation to hind end of body *A. guptai* n. sp.
 Vitellaria extending from middle of ventral sucker to hind end of body *A. kosia*.

B. Cirrus pouch not extending beyond ventral sucker

- x) Cirrus pouch extending upto hind end of ventral sucker *A. hirnai*
 Cirrus pouch extending upto middle of ventral sucker y.
 y) Vitellaria extending from anterior end of ventral sucker to hind end of body.
 1. Excretory bladder spherical *A. nemachilus*
 Excretory bladder tubular 2.
 2. Genital pore intercæcal *A. singhi*
 Genital pore extracæcal *A. nicolli*
 Vitellaria extending from middle of ventral sucker to hind end of body .. *A. makundi*
 Vitellaria extending from hind end of ventral sucker to posterior end of body.
 Uterine coils extending from ventral sucker to anterior end of posterior testis
 *A. schizothoracis*
 Uterine coils extending from ventral sucker upto anterior end of anterior testis
 *A. heteropneustusius*
 Vitellaria extending from anterior end of ovary to hind end of body .. *A. Mehrai*

C. Cirrus pouch extending anterior to ventral sucker

- Vitellaria extending from hind end of oral sucker to hind end of body .. *A. kamalai*
 Vitellaria extending from intestinal bifurcation to hind end of body
 *A. fasciatusi* n. sp.
 Vitellaria extending from hind end of ventral sucker to posterior end of body.
 Testes lying in extreme posterior end of body *A. annandalei*
 Testes not lying in the extreme posterior end of body.
 Receptaculum seminis lying on postero-lateral to ovary and in front of anterior testis
 *A. handiai*
 Receptaculum seminis lying postero dorsal to ovary just in front of anterior testis
 and posteriorly overlapped it *A. thapari*

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