1990

Binder 010, Allocreadiinae [Trematoda Taxon Notebooks]

Harold W. Manter Laboratory of Parasitology

Polylekithum ictaluri (Pearse, 1924) Arnold, 1934 *

Syn: Allocreadium halli Mueller + VanCleave, 1932

Allocreadiidae

see Pando 193

Syn: Allocreadium ictaluri Pearse, 1924

Length: 5.9 mm.

Width: 1.85 mm.

Oral sucker: 0.5 mm. in diameter.

Acetabulum: (size:) 0.63 mm. in diameter.
(position): Anterior end of middle third of body.

Sucker ratio:

Esophagus: Absent.
Pharynx: Present, nearly spherical, 0.3 mm. in diameter.

Genital pore (location): On the median line, at a point nearly half the distance from acetabulum to pharynx.
Testes, shape: Posterior one lobate, anterior one elongate with its axis across the body.
location: Tandem, median line, ant. part of post. 1/3 of body.
Cirrus sac (extent): To anterior margin of acetabulum.
Ovary, shape: Spherical.

location: about 0.1 mm. posterior to acetabulum.

Vitellaria: Glands extend from pharynx to posterior end of body. Absent for a space of about 0.25 mm. on either side of the acetabulum.
Eggs: 0.08 by 0.045 mm.

Other features:

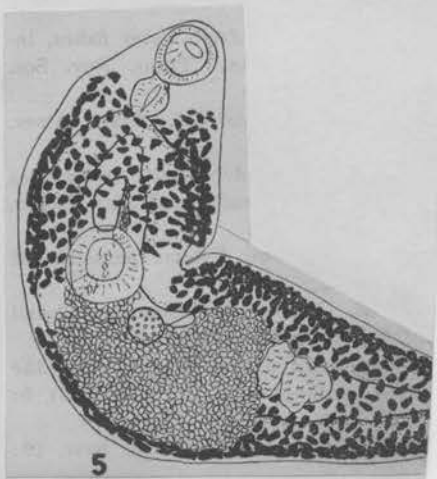
Host: Ictalurus punctatus (Rafinesque), the channel catfish.

Locality: Wisconsin.

Reference: Trans. of Wisconsin Acad. of Sci., Arts, and Letters, Vol. 21, pages 147-194.
Comparisons: None listed.

Life cycle:

* Allocreadium ictaluri Pearse, 1924
acc. Pando, 1937
also see Leitner 1951, P. 37: 223



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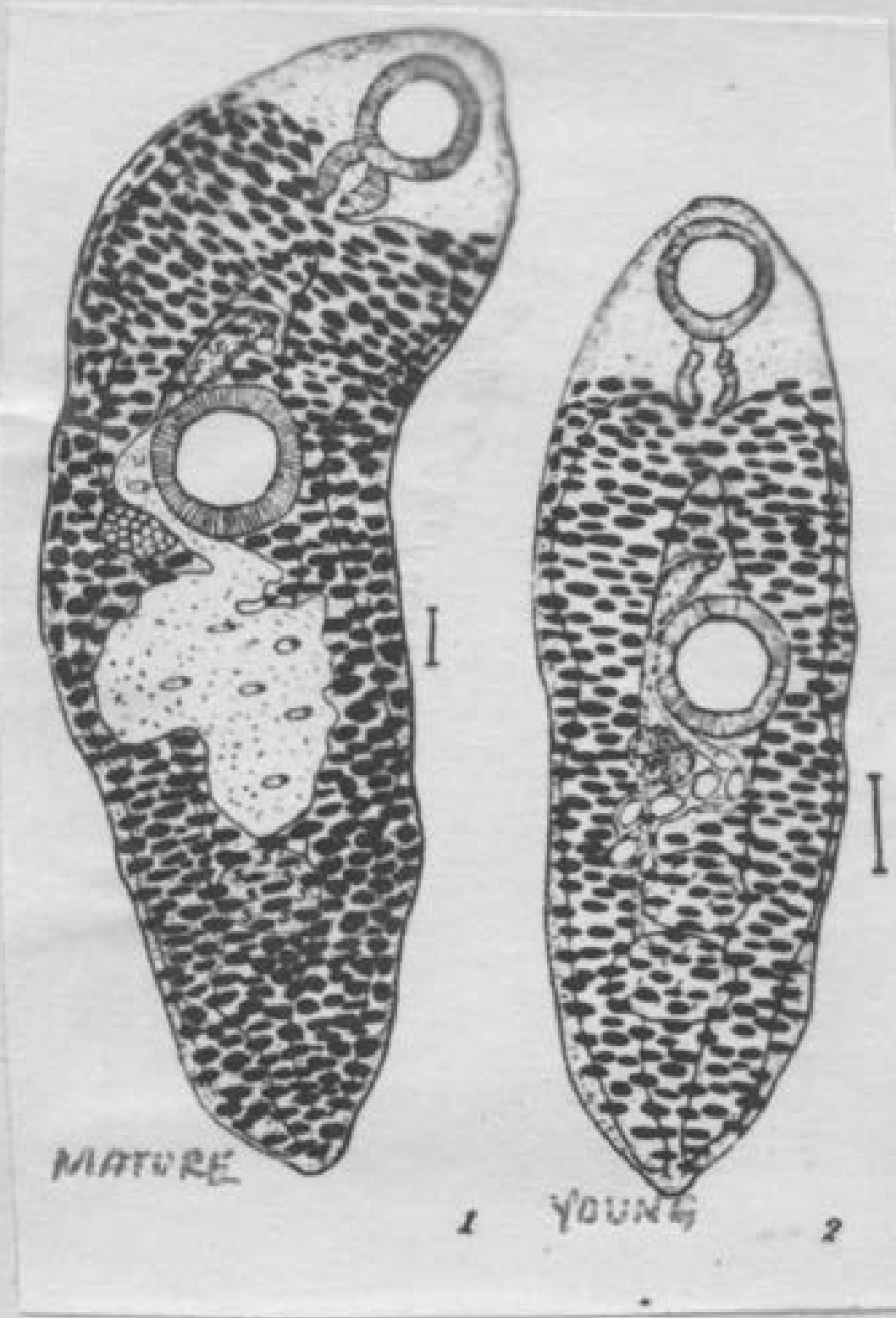
11 POLYLEKITHUM HALLI



FROM ARNOLD, 1934

Allocreadiidae
Allocreadiinae

Allocreadium

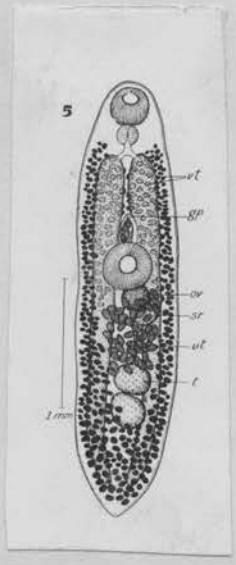
Syn. POLYLEKITHUM Arnold, 1934 *

Allocreadiinae; medium to large size. Cuticula smooth. Ventral sucker larger than oral sucker. Esophagus very short or absent. Intestinal crura of great diameter extending nearly to posterior end. Smooth or lobate testes in tandem arrangement in the posterior third of the body. Cirrus and seminal vesicle in a true cirrus sac. Ovary smooth, postacetabular, separated from testes by uterus. Follicular vitellaria extend from the middle of the pharynx to posterior end and form a continuous sheath on dorsal and ventral surfaces of the body. Ova large and numerous. Excretory bladder simple and sacculate.

Type species: P. halli (Mueller & VanCleave, 1932)
(Allocreadium halli)

Arnold included also P. ictaluri (Pearse, 1924)

Van Cleave & Mueller in 1934 show that their species A. halli is a synonym of A. ictaluri, Pearse's figure being poorly illustrated. There would then be one species in this genus, P. ictaluri (Pearse) with its two synonyms. I tend to agree with Arnold that this species cannot be placed in Allocreadium because of the posterior extent of the uterus.



* Dollfus (1946:4) uses Polylecithum and notes that "Polylekithum" was a "lapsus" by Arnold.

NEOPODOCOTYLE Dayal,1950 Syn. of Allocreadium

Skin smooth. Ventral sucker in anterior third, nearly equal to oral sucker. Prepharynx absent. Testes tandem in posterior half of body. Ovary pretesticular in anterior half of body. Genital pore on left side of pharynx. Cirrus sac from pharynx to posterior region of acetabulum; pars prostatica absent. Vitellaria from posterior region of acetabulum to posterior end of body. Uterus extends backward up to the anterior testis. Ovary oval in shape. seminal receptacle present. Eggs "without operculum"
Type species Neopodoctyle indica Dayal,1950
from Callichrous bimaculatus, a fish from the river Gomti

N. indica Dayal,1950

Length 3.42; width 0.74 mm.
Oral sucker 0.3; acetabulum 0.31 long, 0.29 wide.
Forebody 0.54
Testes oval, tandem, close together.
Eggs 70 to 73 by 52 to 62.
Host: Callichrous bimaculatus

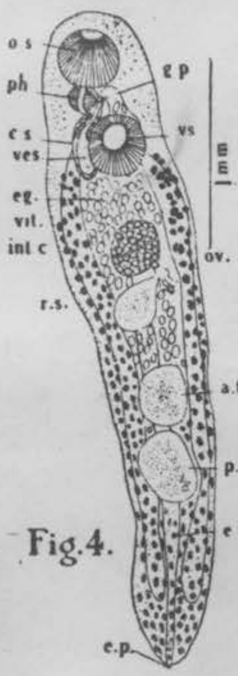


Fig.4.

Neopodocotyle indica n. g

Gupta + Chakrabarti (1967) named Neopodocotyle lucknowensis n. sp. Have only Helm Abst notes - Is it also Allocreadium? See next page

Yamaguti (1958) considered *Neopodocotyle* Dayal, 1950 as a sub-genus of *Podocotyle* Duj. 1845 to which the author does not agree. The genus *Neopodocotyle* differs from *Podocotyle* in the anterior position of ventral sucker and in the extension of the uterus behind the ovary.

= Allocreadium

From Gupta 1961

VI. Genus *Neopodocotyle* Dayal, 1950.

Diagnosis: Plagioporinae : Body small, elongated, smooth devoid of spines. Acetabulum near anterior end, nonpedunculate. Oral sucker subterminal, almost equal to acetabulum. Prepharynx absent; pharynx well developed; oesophagus short; caeca extend to posterior end. Testes tandem in posterior half of body. Cirrus sac to right side of acetabulum, almost cylindrical or claviform, extending from pharynx to posterior margin of acetabulum, containing vesicula seminalis and long ejaculatory duct; pars prostatica not distinct, prostate cells surrounding ejaculatory duct. Ovary pretesticular, preequatorial, median. Receptaculum seminis large, pear shaped, median, behind ovary. Vitellaria lateral, from posterior end of acetabulum to posterior extremity, covering caeca and extending intercaecally at places, confluent in post-testicular region. Uterus coiled, between anterior testis and acetabulum. Metraterm on left side of acetabulum. Excretory vesicle tubular reaching posterior end of ovary. Parasitic in intestine of fresh water fishes.

Genotype: *N. indica* Dayal, 1950.

Yamaguti (1858) has reduced this genus to the rank of a subgenus under *Potocotyle* (Duj., 1845) but we maintain it as a valid genus parasitic in fresh water fishes. The position of genital pore to left side of pharynx and uterus extending to anterior testis are distinctive features. The pars prostatica is indistinct or absent.

FROM H.R. MEHRA (1966)

2. *Allocreadium indicum* (DAYAL, 1950) ~~n. comb.~~ PRITCHARD, 1966

(syn. *Neopodocotyle i.* D.)

DAYAL (1950) named the genus *Neopodocotyle* for *N. indica*, a species in which the uterus extends posteriorly from the ovary as far as the anterior testis. YAMAGUTI (1958) considered *Neopodocotyle* a subgenus of *Podocotyle*, but GUPTA (1961) disagreed and retained it as a genus separate from *Podocotyle*. Actually, this posterior extent of the uterus is a character of the genus *Allocreadium* Looss, 1900, with which *Neopodocotyle* has never been compared. Such species as *Allocreadium kosia* PANDE, 1938, *A. nicolli* PANDE, 1938, and *A. singhi* Rai, 1962, have, like *N. indica*, relatively small eggs and fresh-water fishes of India as hosts. Except for the slightly sinistral genital pore and somewhat longer excretory vesicle, *N. indica* agrees with the diagnosis of *Allocreadium* and is transferred to that genus. *Neopodocotyle* thus becomes a synonym of *Allocreadium*.

NEOPODOCOTYLE Dayal, 1950

Dayal (1950) erected the genus *Neopodocotyle* for *N. indica* as its type species in having ventral sucker near oral sucker and in the extension of uterus from anterior end of testes upto ventral sucker under the family Allocreadiidae Looss, 1903. Yamaguti (1958) has reduced this genus to the rank of a subgenus under *Podocotyle* (Duj., 1845) and placed it under the subfamily Allocreadiinae Looss, 1920 of the family Allocreadiidae. He divided the genus into three subgenera namely *Podocotyle*, *Podocotyloides* Yamaguti, 1934 and *Neopodocotyle*. He distinguished *Neopodocotyle* from *Podocotyle* and *Podocotyloides* in having ovary separated from the anterior testis by uterus. Further he distinguished *Podocotyloides* from *Podocotyle* in having acetabulum pedunculate, surmounted by puckered margin of peduncle and in having excretory vesicle long and reaching beyond ovary. Skrjabin, Petrow and Koval (1958) recognised *Podocotyloides* as a distinct genus. Mehra (1966) regarded *Podocotyle* and *Podocotyloides* and *Neopodocotyle* as distinct genera under the subfamily Plagioporinae Manter, 1947 of the family Opecoelidae Ozaki, 1925, He maintains *Neopodocotyle* as a distinct genus as it does not possess acetabulum with short peduncle and the genital pore lies to the left of pharynx whereas in *Podocotyle* it lies slightly to the left of intestinal bifurcation or at level of oesophagus. He also recognises *Podocotyloides* as a distinct genus as it has much longer excretory vesicle which extends almost to acetabulum, beyond the anterior limit of vitellaria, in having comma shaped metraterm provided with manchette and in the extension of cirrus sac a little farther than the posterior limit of the anterior third of the body and in having eggs with a knob like protuberance at the antiopercular pole. The authors is in agreement with Mehra in considering the genera *Podocotyloides* and *Neopodocotyle* distinct from the genus *Podocotyle* as the characters suggested by him for separating the various genera are based on valid grounds. The genus *Neopodocotyle* is distinct from *Podocotyle* as the position of genital pore lies to left side of pharynx, the pars prostatica is distinct and uterus extending to anterior testis are distinctive features.

KEY TO THE SPECIES OF THE GENUS *NEOPODOCOTYLE* DAYAL 1950

1. Cirrus pouch extends upto middle part of the ventral sucker and pars prostatica present..... *N. lucknowensis* n. sp.

Cirrus pouch extending upto hind end of the ventral sucker and pars prostatica absent..... *N. indica* Dayal, 1950.

S.P. GUPTA AND K.K. CHAKRABARTI, 1966
INDIAN J. HELMINTHOL. 18(2): 188-192

Is this, too, Allocreadium?
N. indica transferred to Allocreadium

149—GUPTA, S. P. & CHAKRABARTI, K. K., 1967. "A trematode *Neopodocotyle lucknowensis* n.sp. from the intestine of a fresh water fish, *Barbus sarana* (Ham.) from Lucknow, India." *Indian J. Helminth.*, Year 1966, **18** (2), 188–192.

Neopodocotyle lucknowensis n.sp. was recovered from the intestine of *Barbus sarana* caught in Lucknow, India. *N. lucknowensis* measures 3·21 to 4·68 mm. by 0·86 to 1·32 mm., the oral sucker is 0·34 to 0·47 mm. in diameter, the ventral sucker 0·30 to 0·50 mm. in diameter; the pharynx is almost spherical, 0·14 to 0·24 mm. in diameter; the genital pore is situated left of the pharynx; eggs are 74 to 92 μ × 53 to 60 μ. *N. lucknowensis* differs from *N. indica* in the extent of the cirrus pouch (to the middle of the ventral sucker or the coiling of the seminal vesicle, in the presence of a pars prostatica and in the presence of striations at the anterior end of the cirrus. In the key separating *N. lucknowensis* from *N. indica* the latter which is the type species, is listed as being without a pars prostatica although *Neopodocotyle* is defined as having a distinct pars prostatica. M.B-B

NEOPODOCOTYLE LUCKNOWENSIS ~~N. SP.~~ GUPTA AND CHAKRABARTI, 1966

(Figs. 1—3)

Numerous specimens were collected from the intestine of a fresh water fish *Barbus sarana* (Ham.) obtained from Lucknow.

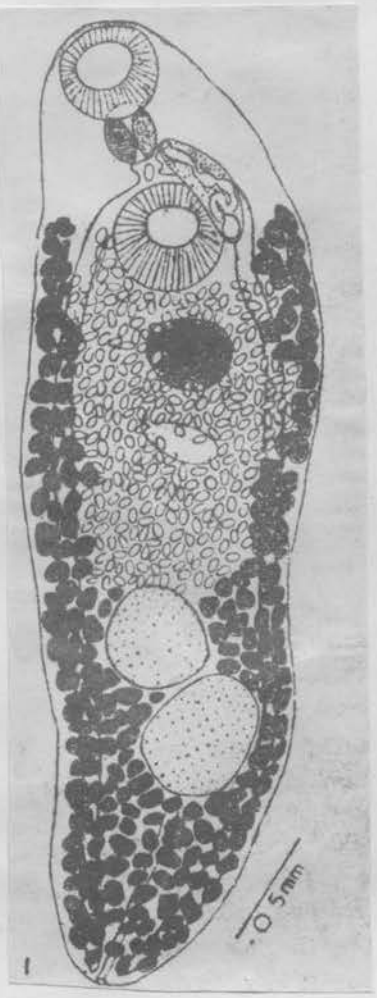
DESCRIPTION

Body elongated, aspinose with rounded extremities, 3.21 to 4.68 mm. long by 0.86 to 1.32 mm. wide between ovary and ventral sucker. Oral sucker spherical, subterminal, 0.35 to 0.45mm. long by 0.34 to 0.47mm. wide. Ventral sucker spherical, smaller, equal or larger than oral sucker, 0.38 to 0.48 mm. long by 0.30 to 0.50 mm. wide at 0.68 to 0.89 mm. from anterior extremity. Prepharynx absent; pharynx muscular, oval, 0.15 to 0.26 mm. long by 0.14 to 0.24 mm. wide; esophagus tubular, coiled, 0.13 to 0.18 mm. long bifurcating into slender intestinal caeca, extending upto posterior end of body.

Excretory bladder tubular extending to level of posterior testis; excretory pore terminal.

Genital pore slightly to left side of pharynx at 0.54 to 0.76 mm. from anterior extremity.

Testes oval or spherical, oqual or subequal, diagonal and postequatorial. Anterior testis, 0.32 to 0.45 mm. long by 0.28 to 0.46 mm. wide at 1.88 to 2.94 mm. from anterior extremity. Posterior testis equal smaller or larger than anterior testis, 0.35 to 0.54 mm. long by 0.27 to 0.46 mm. wide. Cirrus pouch claviform extending from genital pore to middle of ventral sucker, 0.46 to 0.66 mm. long by 0.12 to 0.18 mm. wide. Vesicula seminalis tubular, convoluted, occupying posterior part of cirrus pouch, 0.44 to 0.65 mm. long by 0.05 to 0.07 mm. wide; pars prostatica globular, 0.13 to 0.18 mm. long by 0.04 to 0.06 mm. wide; ejaculatory duct tubular, 0.13 to 0.17 mm. long; cirrus muscular with striations at its anterior end. Ejaculatory duct and pars prostatica surrounded by large number of prostate gland cells.



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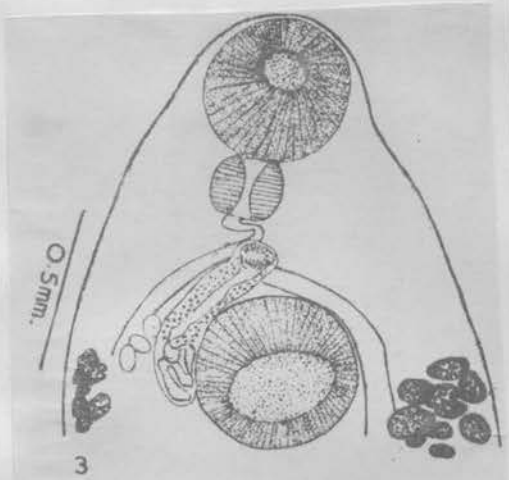

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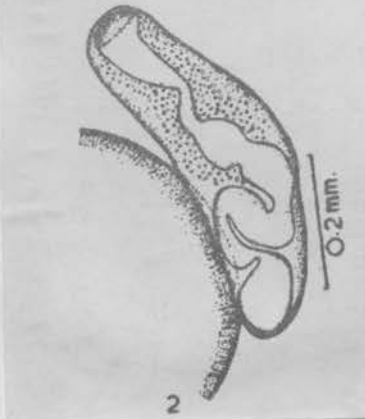

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Ovary oval or spherical, postacetabular, preequatorial, 0.25 to 0.34 mm. long by 0.24 to 0.38 mm. wide at 1.04 to 1.38 mm. from anterior extremity. Receptaculun seminis pear shaped, posterior to ovary, 0.24 to 0.35 mm. long by 0.08 to 0.14 mm. wide. Vitellaria follicular extending from middle region of ventral sucker to hind end of body mainly along outer margin of caeca but extending into intercecal space and back of posterior testis. Uterine coils occupying space between anterior testis and genital pore. Metraterm muscular, lying on left side of ventral sucker. Eggs oval wilh thick brown shell, 0.074 to 0.092 mm. long by 0.053 to 0.060 mm. wide.

Host :—*Barbns sarana* (Ham.)
Location :—Intestion.
Locality :—Lucknow.

DISCUSSION

Due to the position of genital pore on the left side of phyring and the uterus extending to anterior testis, the present form is referred to the genus *Neopodocotyle* Deyal, 1950. The new form differs from *N. indica* in the extension of cirrus pouch up to middle of ventral sucker, in having a convoluted vesicula seminalis, in the possession of a distinct pars prostatica and in having striations at the anterior end of the cirrus.

Accordingly it is regarded as new with the specific name *N. lucknowensis* n. sp.

INDIAN J. HELMINTHOL. 18(2): 188-192

22. — **Allocreadium indistinctum** n. sp.

(Fig. 29.)

Hôte : *Barbus* sp. Clupeidae Baer, 1959

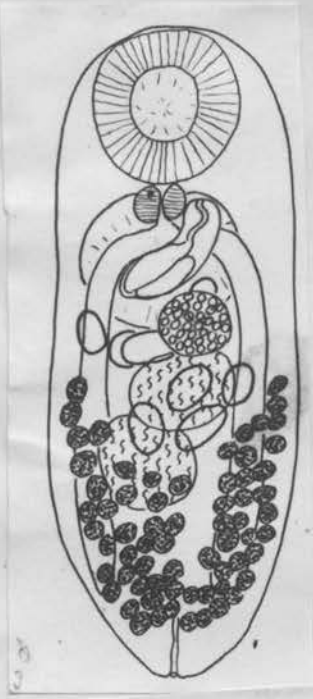
Localité : Vitshumbi (lac Edouard) (30.IV.1958).

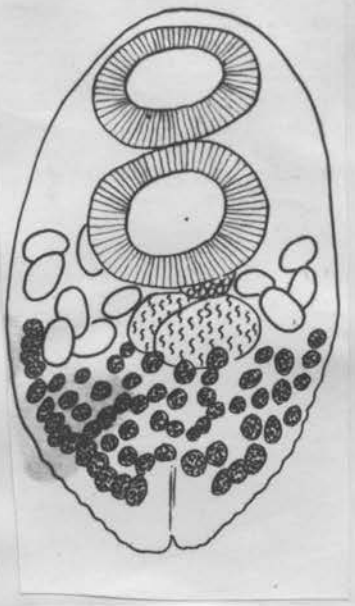
Un seul Barbeau sur cinq examinés hébergeait plusieurs spécimens de cette nouvelle espèce de Trématode dont l'attribution au genre *Allocreadium* Looss, 1900 ne nous paraît pas indiscutable. En attendant que les spécialistes de ce groupe de Trématodes se soient mis d'accord sur leurs caractères fondamentaux et qu'ils les aient attribués de façon définitive à des familles déterminées, nous préférons placer nos spécimens dans ce genre malgré que leur cycle évolutif, dont la connaissance est pratiquement indispensable pour attribuer l'espèce à l'un ou l'autre genre, soit encore inconnu (*).

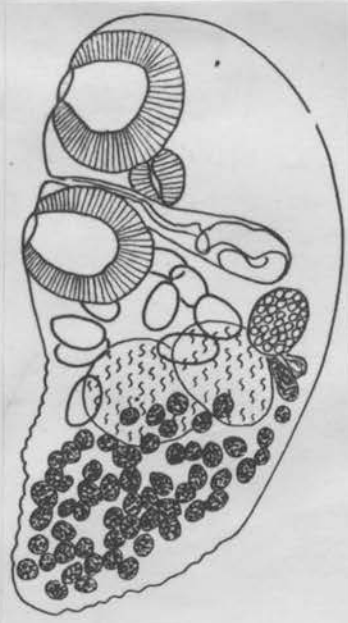
Les Vers mesurent 875 µ à 1,04 mm de long avec une largeur maximum de 390 à 455 µ. La cuticule est parfaitement lisse et le corps aplati de forme plus ou moins ellipsoïdale. La ventouse orale relativement très grande mesure 229 à 250 µ de diamètre; son ouverture est ventrale. Le pharynx a 105 µ de long sur 91 µ de diamètre. Il ne paraît pas y avoir de prépharynx ni d'œsophage quoique la contraction des spécimens puisse vraisemblablement masquer l'une ou l'autre structure. Les diverticules de l'intestin s'étendent presque jusqu'à l'extrémité postérieure du corps. La vessie excrétrice est cylindrique mais nous ne pouvons en déterminer l'étendue qu'à une courte distance du pore excréteur. La ventouse ventrale, également grande, mesure 274 à 320 µ sur 69 à 90 µ. Les deux ventouses sont par conséquent à peu près subégales. Les deux testicules, de taille identique, mesurent 183 µ sur leur plus grand axe et 142 à 160 µ sur le plus petit. La position l'un derrière l'autre est plus ou moins déterminée par le degré de contraction du corps, mais ils demeurent toujours en contact l'un avec l'autre, parfois même se recouvrant en partie. La poche du cirre a 274 à 320 µ de long et 69 à 91 µ de diamètre; elle renferme une vésicule repliée sur elle-même ainsi qu'un cirre inerme. Située un peu obliquement dans le sens dorso-ventral, elle débouche près du pharynx et un peu à gauche de la ligne médiane. L'ovaire, sphérique, a 114 à 123 µ de diamètre. Il se trouve en partie à la face dorsale de la ventouse ventrale, généralement recouvert par celle-ci et en contact avec le testicule antérieur. On observe un petit réceptacle séminal. L'utérus est court, atteignant au plus le niveau antérieur du testicule postérieur, et renferme un petit nombre de très gros œufs, qui mesurent 100 à 110 µ de long sur 55 à 64 µ de diamètre. Les glandes vitellogènes commencent au niveau des testicules puis s'étendent jusqu'à la région du pore excréteur où les deux groupes latéraux sont réunis.

Le genre *Allocreadium* Looss, 1900 (= *Creadium* Looss, 1899 nec Vuillet, 1816) s'est vu attribuer au cours de son existence de nombreuses espèces, la plupart parasites de Poissons. Toutefois, des révisions partielles et surtout la découverte de cycles évolutifs qui permettent de reconnaître des particularités morphologiques des cercaires, ont provisoirement réduit le nombre des espèces à seize (Peters, 1957). Cependant, l'attribution du genre *Allocreadium* de certaines d'entre elles demeure encore incertaine et une révision définitive ne pourra être faite qu'une fois connu le cycle évolutif et l'anatomie des cercaires.

(*) Nous tenons à remercier tout particulièrement notre collègue [illegible] Mayter à Lincoln (Nebraska), l'autorité bien connue pour les Trématodes des Poissons, pour les conseils qu'il nous a donnés quant à l'attribution de nos spécimens au genre *Allocreadium* ou, éventuellement, à un nouveau genre.







sont situés obliquement l'un par rapport à l'autre et l'ovaire plus petit que les testicules est situé en avant du testicule postérieur (droit), séparé de celui-ci par le réceptacle séminal. Il y a une vésicule séminale piriforme ou sphérique qui débouche dans une vésicule éjaculatrice volumineuse longue de 90 µ et ayant 34 µ de diamètre; sa paroi est épaisse. Une *pars prostatica* à paroi épaisse, longue de 56 µ, fait suite à cette vésicule et vient déboucher dans la partie antérieure de l'atrium génital après avoir traversé la ventouse ventrale (fig. 31). L'utérus débouche à côté du pore mâle et sur les coupes il semble y avoir un canal commun, divisé en deux par une cloison longitudinale. Les œufs operculés mesurent 22 µ de long et 11 à 13 µ de diamètre. Les glandes vitellogènes sont constituées par des très petits follicules, concentrés dans la partie postérieure du corps de chaque côté, ainsi qu'à la face dorsale. Des follicules clairsemés s'observent jusqu'au niveau postérieur de la ventouse ventrale.

La structure de l'atrium génital est particulièrement intéressante et assez différente de celle que l'on rencontre habituellement dans le genre *Metagonimus*. Les conduits sexuels traversent la ventouse ventrale et l'on observe une sorte de papille à peine musculeuse qui surplombe l'orifice commun. Entre la ventouse ventrale et la surface du corps se trouve un sinus génital à paroi musculaire, relativement mince, au fond duquel se trouve la ventouse et dont l'ouverture, entourée d'un muscle sphincter, débouche à la face ventrale du corps. Il y a toujours un petit repli de la lèvre postérieure de l'ouverture du sinus.

La structure du sinus génital n'est pas tout à fait la même que celle habituellement décrite pour le genre *Metagonimus*, ni pour autant chez d'autres genres d'*Heterophyidae*. Toutefois, il faut constater que la plupart des auteurs se contentent de préparations totales, ces Vers étant en général très petits, sont souvent aussi très transparents. Dans notre matériel, seules les coupes sagittales permettent d'étudier la structure du sinus génital. Il n'est pas exclu que l'espèce que nous décrivons ci-dessus représente le type d'un nouveau genre, mais nous estimons qu'il est encore prématuré de le créer tant que les genres existants n'ont pas été étudiés avec davantage de précision. Par la position des gonades, l'absence de prépharynx et la structure du sinus génital, cette espèce se rattache au genre *Metagonimus* dans lequel MOROSOV (1952) reconnaît trois espèces, à savoir : *M. minutus* KATZUTA, 1932, *M. takanaschi* SUZUKI, 1929 et *M. yokogawai* (KATSURADA, 1912). Ces trois espèces n'ont été signalées jusqu'ici qu'en Eurasie et en particulier en Europe centrale et en Extrême-Orient. Il ne paraît pas y avoir un degré très élevé de spécificité parasitaire puisque *M. yokogawai* a été obtenu expérimentalement, ou a été trouvé spontanément, chez des Mammifères, y compris l'Homme, et chez des Oiseaux aquatiques, les larves métacercaires s'observant dans de nombreuses espèces de Poissons d'eau douce.

MOROSOV (loc. cit.) sépare ces trois espèces sur la base de la taille des [illegible] paraît également constant dans notre matériel.

Les représentants du genre *Allocreadium* ont été signalés jusqu'ici chez les Poissons d'eau douce d'Europe, d'Asie, d'Amérique du Nord et tout récemment en Afrique occidentale (THOMAS, 1957). Notre nouvelle espèce, que nous attribuons provisoirement au genre *Allocreadium*, se distingue des autres formes décrites par les proportions relatives des ventouses, la taille de la poche du cirre et la distribution des glandes vitellogènes, ainsi que par la taille relativement énorme des œufs.

Allocreadiidae

Allocreadium japonicum Ozaki, 1926 ?,

According to Yamaguti, 1934, this species is much like Allocreadium hasu, but differs in the size of the body, in the characters of the testes and in the extent of the excretory vesicle.

His specimens were from stomach and intestine of Zacco platypus and Z. temminicki from Lake Biwa, Japan.

Yamaguti's measurements:
Body length: 2.7 to 3.5 mm.
Oral sucker: 0.2 to 0.26 by 0.2 to 0.27 mm.
Ventral sucker: 0.37 to 0.46 by 0.37 to 0.44 mm.
Pharynx 0.12 to 0.15 mm in diameter.
Testes: 0.39 to 0.54 by 0.42 to 0.47 mm.

doubtful member of the genus (Peters

Indian Journal of Helminthology, Vol. VIII, No. 2. September 1956 pp. 100—106.

TWO NEW TREMATODES OF THE FAMILY ALLOCREADIIDAE FROM THE FRESH-WATER FISHES OF U. P.

By

S. P. GUPTA

Department of Zoology, Lucknow University, Lucknow.

The present work gives a description of two new forms belonging to the family Allocreadiidae and the sub-family Allocreadiinae and is in continuation of the contributions already made by the author (1950).

ALLOCREADIUM KAMALAI N.SP.

(Fig. 1)

A large number of specimens of these flukes were collected from the intestine of a fresh-water fish, *Chela bacaila* (Ham.) obtained from the fish market in 1954 at Lucknow. Body elongated, small with narrow anterior end and broad posterior end. The skin is smooth and devoid of spines. The length of the worm varies from 2.26—2.56 mm. and the greatest breadth is from 0.68—0.95 mm. in the region of ovary. The type specimen measures 2.29 × 0.95 mm. in size. The oral sucker is sub-terminal, more or less circular in shape. It measures 0.26 × 0.24 mm. in size. The ventral sucker is situated at a distance of 1/4th from the anterior end of the body and is larger than oral sucker. It measures 0.5 × 0.51 mm. in size. The mouth is an oval opening lying in the anterior region of oral sucker. It leads into a prepharynx which is about 0.03 × 0.1 mm. in size. A well developed muscular pharynx is present. It is oval in shape and measures 0.13 mm. by 0.14 mm. in size. Posterior to pharynx is a short oesophagus which bifurcates into two simple intestinal caeca which run laterally near the body-wall and terminate a little anterior to the posterior end of the body. In some specimens the intestinal caeca reach only upto the hind end of the posterior testis.

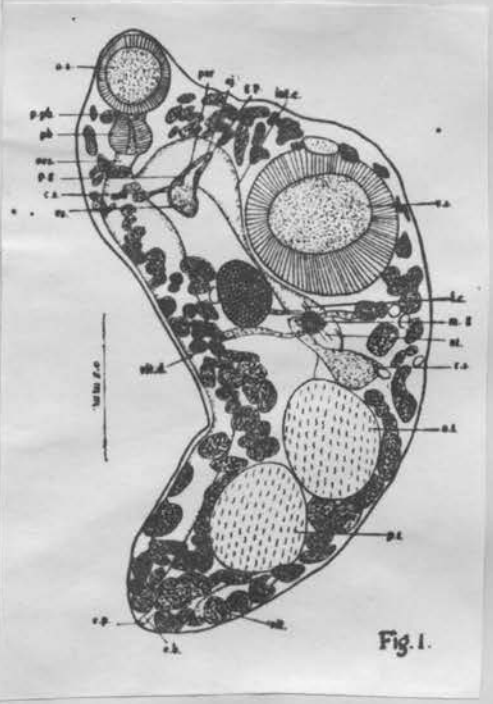


Fig. 1.

The excretory pore lies at the posterior end of the body and is terminal in position. It leads into a long tubular excretory bladder which extends upto the hind end of the ventral sucker.

The genital pore is median in position. It lies anterior to ventral sucker at a distance of 0.5 mm. from the anterior end of the body.

Testes are more or less oval and lie one behind the other in the posterior half of the body. The anterior testis is larger than posterior and measures 0.41mm. by 0.33mm. in size. It lies at a distance of 0.26mm. from the hind end of the ovary. The posterior testis lies just behind the anterior testis and measures 0.39mm. by 0.23 mm. in size. In some cases the two testes are a little distance apart from each other and the anterior testis is either larger or smaller than posterior testis. The cirrus sac is nearly cylindrical, median in position and lies obliquely between the intestinal bifurcation and the ventral sucker. It measures 0.23mm. by 0.07mm. in size. The vesicula seminalis lies in the basal part of the cirrus sac and measures 0.11mm. by 0.08 mm. in size. There is a

small tubular pars prostatica, 0.07mm. long and a short ductus ejaculatorius 0.08 mm. long is present in the distal part of the cirrus sac. The vesicula seminalis and the pars prostatica are surrounded by a large number of prostate gland cells.

The ovary is oval and lies on the right side of the ventral sucker. It lies at a distance of 0.86 mm. from the anterior end of the body and measures 0.24mm. by 0.17mm. in size. In some specimens it is median and lies behind the ventral sucker. From its right side arises the oviduct which opens at the ŏotype. A large pear-shaped receptaculum seminis lies on the left side of the body behind the ovary just in front of the anterior testis. It measures 0.36mm. by 0.12mm. in size. A Laurer's canal is present and opens at the ŏotype near the opening of the receptaculum seminis. A large number of small Mehlis' gland cells surround the ŏotype. The vitelline glands consist of small follicles extending from the hind end of the oral sucker to posterior end of body. They are mainly lateral in position but partly cover the intestinal caeca and extend at places into the intercaecal region. Behind the posterior testis they extend towards the middle and cover the caeca and the excretory bladder. The two transverse vitelline ducts unite in the middle but in front of the anterior testis. The eggs are arranged in a single row in the uterus. They are oval non-operculated and measure 0.04-0.07 mm. by 0.04-0.06mm. in size.

Discussion:—The present form has vitelline follicles extending upto the posterior margin of oral sucker and differs in this character from all the species of the genus *Allocreadium* Looss, 1900 except *A. pseudotriloni* Rankin, 1931. The new form differs from *A. pseudotriloni* in the presence of a pre-pharynx, in having the cirrus pouch anterior to ventral sucker, in the structure of the vesicula seminalis and in the position of genital pore. The present form is, therefore, new and is designated *A. kamalai*.

Host : *Chela bacaila* (Ham.)
Habitat : Intestine.
Locality : Lucknow.

The new species is named in honour of Dr. Radha Kamal Mukerji, Vice-Chancellor, Lucknow University, Lucknow.

Allocreadium kosia n. sp. (Fig. 3). Pande 1938

Host—*Barbus chilinoides*. Clupeidae

Position—Small intestine.

Locality—Almora ; Kumaon Hills.

Description.—Body elongated, flattened behind acetabular level and cylindrical in front, with bluntly pointed ends, length 6, breadth 1–1·1, nearly uniform. Oral sucker subterminal 0·43 × 0·41 in size ; prepharynx present ; pharynx 0·18 × 0·2 in size ; œsophagus 0·28–0·33 long ; intestinal bifurcation some distance in front of acetabulum ; cæca terminating a short distance in front of hinder end. Subcuticular gland cells predominantly developed in body parenchyma. Acetabulum slightly smaller than oral sucker, 0·38–0·39 in diameter, situated in posterior part of first quarter of body. Genital pore, leading into a small and narrow atrium, lies just below intestinal bifurcation. Excretory pore terminal, median ; excretory bladder

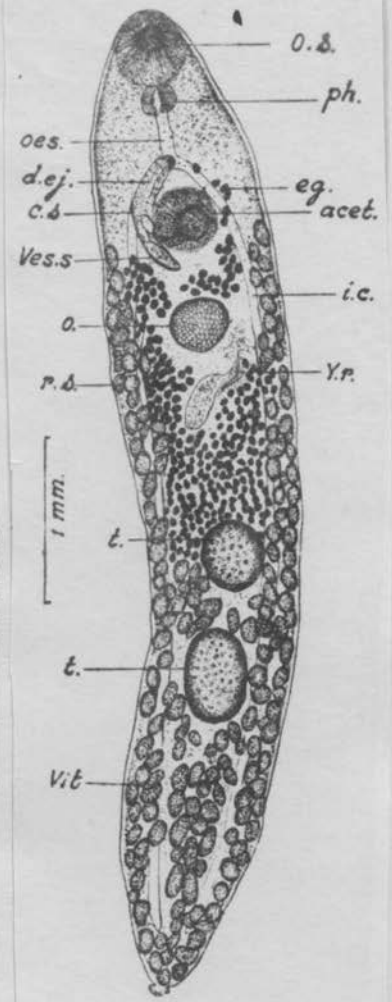


FIG. 3.

Allocreadium kosia Pande, dorsal view.

extending anteriorly nearly midway between posterior testis and hinder end of body. Testes tandem, median, in third quarter of body ; anterior testis nearly spherical, 0·4–0·45 × 0·38–0·4 in size, situated just behind middle of body ; posterior testis ellipsoidal, 0·55 × 0·38 in size, situated 0·2 distance behind anterior testis. Cirrus sac curved in a crescent-shaped manner around acetabulum on its left side and extending posteriorly slightly beyond its hinder margin ; vesicula seminalis coiled ; pars prossalica spherical, continuing into a nearly straight ejaculatory duct. Ovary median, dorsal, nearly pear-shaped, situated at one-third of body length from anterior end, 0·31 × 0·36 in size ; shell gland mass immediately postero-lateral to ovary ; receptaculum siminis elongated, 0·4 × 0·14 in size, obliquely placed just behind ovary under dorsal body wall ; the short Laurer's canal, the narrow duct of the receptaculum seminis, and the duct from the yolk reservoir, situated close underneath the dorsal body wall, run together towards the shell gland mass ; uterine coils between acetabulum and anterior testis in intercæcal space with coils extending laterally to middle of anterior testis ; ripe eggs brownish, measuring 0·072–0·075 × 0·054–0·057 in size ; vitellaria extend laterally from middle of acetabulum to posterior tip of body, follicles meeting in intercæcal space between testes and behind posterior testis.

Remarks.—Among the species of *Allocreadium* characterised by the vitellaria not extending anteriorly beyond the anterior limits of the acetabulum the new species is closely related to *A. hasu* on account of the anterior extent of the excretory bladder and the vitellaria. But it differs from it in the position of the acetabulum, greater length of the posterior testis, and the extent of the cirrus sac and the uterus.

Allocreadiidae

et al.

Allocreadium laymani Bykhovskaya, 1964

(Synonym: A. isoporum Looss after Lyaiman, 1933)

Body size 2.3–3.5×0.8–0.9 mm. Oral sucker 0.32×0.34 mm, ventral sucker 0.32–0.34×0.37–0.38 mm. Cirrus bursa 0.42–0.44×0.22–0.24 mm. Posterior end reaches only to middle of ventral sucker. Eggs 0.07–0.08×0.05–0.06 mm.

In intestine of common and Siberian daces; Lake Baikal.

From Bykhovskaya-Pavlovskaya (1962)

Allocreadium maculati Akhmerov, 1963

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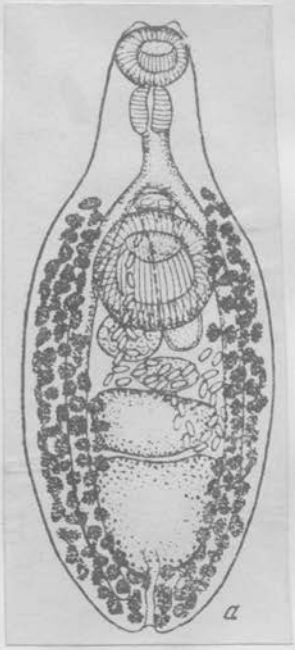


0,66 мм

Allocreadium makundi n. sp. (Fig. 2)

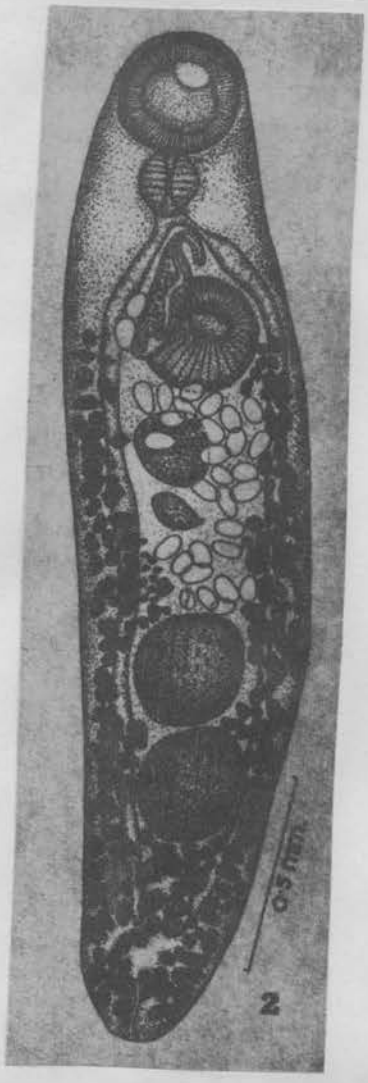
Gupta, 1963

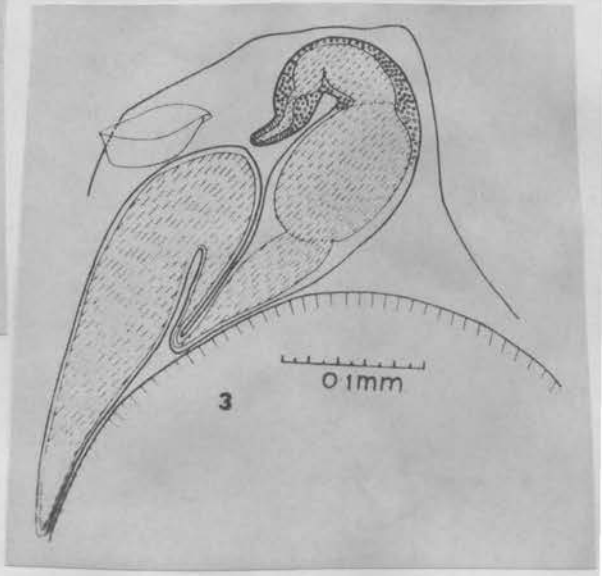
MATERIAL: One specimen.
HOST: Barbus sarana.
LOCATION: Small intestine.
LOCALITY: Banaras.

DESCRIPTION: Body elongated, smooth, devoid of spines with rounded extremities, 2.6 × 0.6 mm. in size. Oral sucker terminal, 0.3 mm. in diameter. Prepharynx absent. Pharynx nearly spherical, 0.16 × 0.15 mm. in size. Oesophagus short and bifurcates some distance in front of ventral sucker into two intestinal caeca terminating midway between posterior testis and hind end of body. Ventral sucker, 0.3 mm. in diameter, nearly equal to oral sucker and lies at 0.6 mm. from anterior extremity. Excretory pore terminal at posterior end of body. Excretory bladder tubular. Testes spherical, tandem, nearly equal in size and postequatorial. Anterior testis 1.46 mm. from anterior extremity and measures 0.29 mm. in diameter. Posterior testis close to anterior testis and measures 0.29 × 0.26 mm. in size. Cirrus sac flask shaped lying on right side of ventral sucker extending from genital pore to middle of ventral sucker, 0.39 × 0.09 mm. in size. Coiled tubular vesicula seminalis 0.29 mm. long lies at basal part of cirrus sac. An elongated tubular pars prostatica present, about 0.09 mm long and located anterior to vesicula seminalis. Pars prostatica opens through narrow ejaculatory duct into long muscular cirrus. Vesicula seminalis and pars prostatica surrounded by large number of prostate gland cells. Ovary somewhat spherical, median, post acetabular, lying in front of receptaculum seminis, 0.19 mm. in diameter, and lies at 0.95 mm. from anterior extremity. Receptaculum seminis pear shaped or oval, posterior to ovary, 0.14 × 0.08 mm. in size. Vitelline glands follicular and extending from middle of ventral sucker to hind end of body, mainly lateral covering intestinal caeca and back of posterior testis filling intercaecal space. Uterus forms few coils between anterior testis and ventral sucker. Eggs oval, measure 0.06-0.08 × 0.03-0.05 mm. in size.

DISCUSSION: Only 11 species of the genus *Allocreadium* Looss, 1900 have been described from fresh water fishes of India viz. *A. annandeli Southwell*, 1913*; *A. handiai* Pande, 1937*; *A. koshia* Pande, 1938*; *A. mahseri* Pande, 1938*; *A. nicolli* Pande, 1938*; *A. schizothoracis* Pande, 1938*; *A. nemachilus* Kaw, 1950*; *A. thapari* Gupta, 1950*; *A. kamalai* Gupta, 1956*; *A. meharai* Gupta, 1956*; and *A. ophiocephali Srivastava*, 1960*.

A. makundi sp. nov. differs from *A. kamalai*, *A. meharai*, *A. nemachilus* and *A. schizothoracis* in having suckers nearly of equal size instead of oral sucker smaller than ventral sucker. Further the new species also differs from *A. thapari*, *A. handiai*, *A. koshia*, *A. nicolli* and *A. ophiocephali* in not having oral sucker larger than ventral sucker. The new form resembles closely *A. annandeli* and *A. mahseri* in having suckers and testes of equal size. The new form however differs from *A. mahseri* in having genital pore intercaecal and in front of ventral sucker instead anterior to intestinal bifurcation and in the extension of vitellaria from middle region of ventral sucker instead in front of it up to hind end of body. Further *A. makundi* sp. nov. differs from *A. annandeli* in the possession of an oesophagus, in not having intestinal caeca up to hind end of body, in not having testes to extreme posterior end, and not having ovary just in front of testes and in many other features..





Proc. Helm. Soc. Wash.,
30 (1): 96-100. 1963

The new species is named in honor of Prof. Makund B. Lal, F.N.I. Professor and Head of the Zoology Department, Lucknow University, Lucknow U.P. India.

Key to the Indian species of *Allocreadium* Looss, 1900

1. Oral sucker larger than ventral sucker 2
   Oral sucker almost equal to or smaller than acetabulum 6
2. Anterior testis smaller than posterior testis 3
   Testes nearly equal ..... *A. nicolli* Pande, 1938.
3. Vitellaria extend from hind end of ventral sucker up to hind end of body 4
   Vitellaria extend from middle of acetabulum to hind end of body ..... *A. koshia* Pande, 1938.
4. Receptaculum seminis lying postero dorsal to ovary just in front of anterior testis and partly overlapping it ..... *A. thapari* Gupta, 1950.
   Receptaculum seminis on postero lateral to ovary and in front of anterior testis 5
5. Oesophagus slightly larger than pharynx ..... *A. handiai* Pande, 1937.
   Oesophagus smaller than pharynx ..... *A. ophiocephali* Srivastava, 1960.
6. Oral sucker and ventral sucker of equal size 7
   Oral sucker smaller than ventral sucker 9
7. Oesophagus present 8
   Oesophagus absent ..... *A. annandeli* Southwell, 1913.
8. Genital pore behind intestinal bifurcation ..... *A. makundi* n. sp.
   Genital pore anterior to intestinal bifurcation ..... *A. mahseri* Pande, 1938.
9. Vitellaria extend from ventral sucker to hind end of body 10
   Vitellaria extend from pharynx to hind end of body ..... *A. kamalai* Gupta, 1956.
10. Anterior testis smaller than posterior testis 11
    Testes almost equal in size. ..... *A. schizothoracis* Pande, 1938.
11. Genital pore in front of acetabulum and excretory bladder tubular ..... *A. mehrai* Gupta, 1956.
    Genital pore in the proximity of pharynx and excretory bladder spherical ..... *A. nemachilus* Kaw, 1950.

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Allocreadium markewitschi Koval, 1949

Size of body 1.2–2.1×0.4–0.7 mm. Oral sucker 0.19–0.30×0.23–0.32 mm, central sucker 0.28–0.29×0.22–0.34 mm. Very short prepharynx. Pharynx 0.06×0.07–0.11 mm. Ovary near ventral sucker 0.076–0.150×0.07–0.19 mm. Large seminal receptacle may reach size of ovary testes, 0.11–0.19×0.15–0.26 mm and 0.13–0.19×0.15–0.24 mm. Uterine loops between ventral sucker and gonads, occasionally partly covering them. Eggs unabundant, 0.095×0.057 mm.

In intestine of common broadsnout and some other cyprinids; Dnieper and Dniester Rivers.

From Bykhovskaya-Pavlovskaya (1962)

Allocreadium mazoensis ~~n. sp.~~ (Fig. 3). BEVERLEY-BURTON, 1962

DESCRIPTION: Body 1.69-2.62 long by 0.65-0.98 in maximum diameter. Cuticle spinous anteriorly. Oral sucker terminal, rounded, 0.19-0.28 long by 0.22-0.30 wide; prepharynx not apparent in present specimens; pharynx 0.12-0.15 long by 0.09-0.16 wide; oesophagus variable in length, up to 0.27 long; intestinal caeca extend almost to posterior margin of body. Ventral sucker, 0.23-0.32 long by 0.26-0.36 wide, slightly larger than oral sucker, lies at one third of body length. Testes, tandem, in posterior half of body. Anterior testis, 0.22-0.30 long by 0.14-0.30 wide; posterior testis 0.27-0.33 long by 0.17-0.32 wide. External seminal vesicle absent. Cirrus sac oval, 0.26-0.30 long by 0.16-0.19 wide, almost completely pre-acetabular, contains internal seminal vesicle, pars prostatica and ejaculatory duct. Everted cirrus not observed. Genital atrium median or submedian, anterior to level of intestinal bifurcation. Ovary rounded 0.21-0.25 long by 0.19-0.27 wide, situated immediately behind ventral sucker. Mehlis' gland, receptaculum seminis and Laurer's canal only visible in sectioned material. Uterus, with descending and ascending limbs, fills all available space between ovary and anterior testis and extends posteriorly to level midway down posterior testis. Metraterm opens via separate female pore which leads into common genital atrium. Vitelline follicles extend from level of ventral sucker to posterior margin of body. Posterior to testes vitellaria from continuous band of follicles, and measures up to 0.1 wide. Excretory vessel tubular, extends from excretory pore to posterior border of posterior testis. Eggs, thick shelled, operculate, measure 88-95 microns long by 56-60 microns wide.

HOST: *Clarias mossambicus* Peters. catfish

LOCATION: Intestine.

LOCALITY: Mazoe Dam, Mazoe, Southern Rhodesia.

DISCUSSION: The present species is assigned to the genus *Allocreadium* Looss, 1900. The posterior extent of the uterus, which is confined to the pretesticular field in other species of *Allocreadium*, is considered to be of subgeneric importance. Thomas (1957) reviewed the genus *Allocreadium* and listed thirty species of which several are, apparently, either inadequately described or have been incorrectly assigned. Yamaguti (1958) includes twenty two species of *Allocreadium* and lists six more that are tentatively accepted pending re-examination.

Apart from *A. voltanum* Thomas, 1957, none of the species listed by the above two authors have been described from African material. *A. mazoensis* is separated from all the other species of the genus *Allocreadium* on the extent of the uterus to a level midway down the posterior testis. Five specimens of this new species were recovered from two fish taken on the same day from the Mazoe Dam. In spite of repeated fishing in the same locality no other specimens have been recovered.

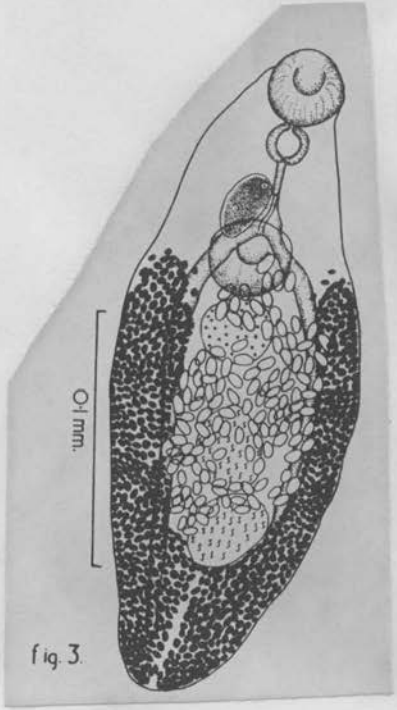

fig. 3.

ALLOCREADIUM MEHRAI N. SP.

(Fig. 2)

Seven specimens were collected from the intestine of a fresh-water fish, *Rhynochobdella aculeata* (Bloch.) obtained from the fish market in September 1954 at Lucknow. It is a small elongated trematode with rounded anterior and posterior ends. The skin is smooth being devoid of spines. The length of the worm varies from 2.95-5.33 mm. in length and 0.39-0.64 mm. in maximum breadth.

The oral sucker is subterminal, oval in shape and measures 0.13mm. by 0.11 mm. in size. The ventral sucker is situated at a distance of 1/5th from the anterior end of the body. It is larger than oral sucker and measures 0.28mm. by 0.31mm. in size. The mouth is an oval opening lying in the anterior region of the oral sucker. Prepharynx is absent. A well developed muscular pharynx is present. It is oval in shape and measures 0.07mm. by 0.09 mm. in size. Posterior to pharynx is a short oesophagus, 0.05mm. by 0.07mm. in size and bifurcates into two simple intestinal caeca which run laterally near the body wall a little anterior to the posterior end of the body.

The excretory pore lies at the posterior end of the body and is terminal in position. It leads into a long tubular excretory bladder which extends upto the hind end of the posterior testis.

The genital pore is median and intercaecal in position. It lies close to the anterior side of the ventral sucker at a distance of 0.47 mm. from the anterior end of the body.

Testes are more or less oval in shape and lie one behind the other in the middle of the body. Anterior testis is smaller than posterior testis. It lies at a distance of 1.44 mm. from the anterior end of the body and measures 0.31mm. by 0.26 mm. in size. The posterior testis lies at a distance of 0.21 mm. behind the anterior testis and measures 0.36 mm. by 0.29mm. in size. The cirrus sac is a flask-shaped organ placed obliquely between the intestinal bifurcation and the ventral sucker. It measures 0.49mm. by 0.14 mm. in size. The vesicula seminalis is bipartite and lies in the basal part of the cirrus sac. The posterior part is nearly cylindrical and is 0.06mm. by 0.06mm. in size. Its anterior part is bigger than the posterior part and measures 0.08 mm. by 0.07 mm. in size. Anterior to vesicula seminalis is the pars prostatica which measures 0.06 mm. by 0.06 mm. in size. It opens into a narrow ejaculatory duct about 0.15mm. long and opens outside through a muscular cirrus. The vesicula seminalis and the pars prostatica are surrounded by a large number of prostate gland cells.

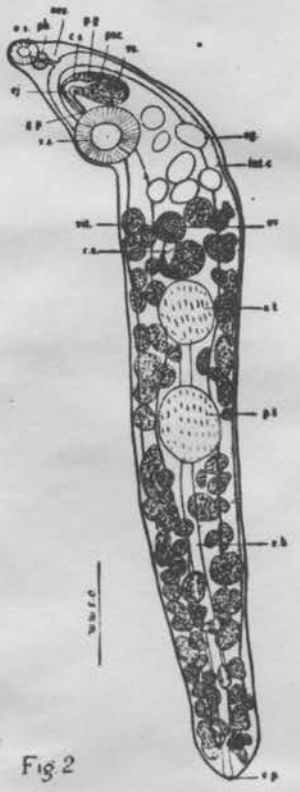

Fig. 2

The ovary is a more or less spherical organ lying at a distance of 1.14 mm. from the anterior end of the body. It is situated on the right side of the body behind the ventral sucker and measures 0.15 mm.

in diameter. The receptaculum seminis is a well developed cylindrical organ lying posterior to ovary just in front of the anterior testis. It measures 0.15 mm. by 0.06 mm. in size. The vitelline glands extend from the anterior region of the ovary to a little in front of the posterior end of the body. They are mainly lateral in position but cover the intestinal caeca and extend at places in the middle behind the posterior testis. The uterus arises from the ootype posterior to the ovary and runs forward forming a few coils between the ovary and the genital pore. Eggs are few in number, oval in shape and are of large size, measuring 0.12-0.16 mm. by 0.07-0.12 mm. in size.

Discussion :—The present form differs from all the known species of the genus *Allocreadium* Looss, 1900, except *A. isoporum* Looss, 1894, in the extension of vitelline glands from the level of the ovary upto the hind end of the body. The new form differs from *A. isoporum* in having the ventral sucker larger than oral sucker, in the position of testes, in having a small oesophagus and in the position of genital pore. These differences are sufficient to create a new species, *A. mehrai*.

Host ; *Rhynochobdella aculeata* (Bloch.)
Habitat : Intestine.
Locality : Lucknow.

The new species is named after Prof. H. R. Mehra, Retired Professor of Zoology, Allahabad University.

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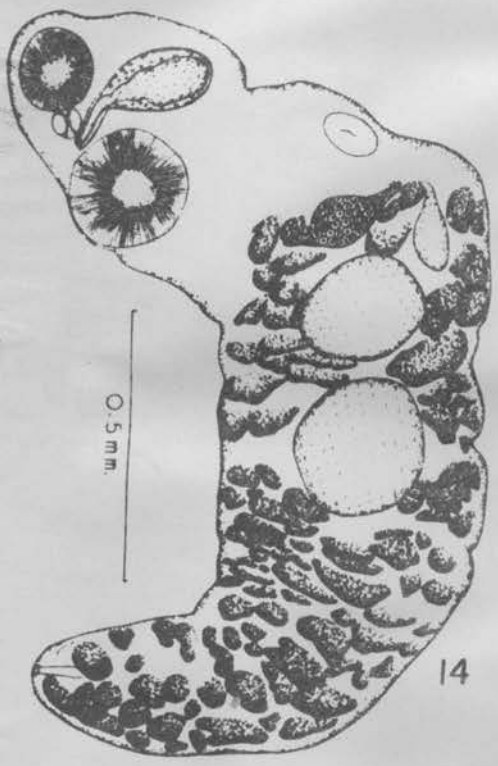
ALLOCREADIUM MEHRAI Gupta, 1956 (Figs. 14-15)

Syn. *Rhynchocreadium aculeata* Srivastava, 1962, *R. singhia* Pershad, 1965 and *A. spindale* 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 infront 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 infront 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 infront 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 infront of hind end of body, mainly lateral in position but oover 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 differe 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 resamblance 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.

Family Allocreadiidae Odhner, 1910.

Allocreadium Looss, 1900.

Twenty species are recorded under the genus *Allocreadium* Looss, 1900 of which five are reported from India by Pande (1937-38). Only one species, *A. schizothoracis*, was collected from a fish, *Schizothorax micropogon* from Srinagar, Kashmir. The writer obtained four specimens from a fish, *Nemachilus kashmirensis* in Kashmir, referable to a new species under the genus *Allocreadium*.

Allocreadium nemachilus n. sp. Kaw, 1950

(Figs. 18 A and B)

Body is elongated and lanceolate, measuring 2.06—2.77 x 0.77—0.95 mm., the maximum breadth lying in the region immediately behind the ovary. Oral sucker is subterminal more or less circular and 0.23—0.26 x 0.28—0.33 mm. Acetabulum is transversely oval, larger than the oral sucker and measures 0.31—0.35 x 0.36—0.45 mm.

Mouth is ventral, 0.15—0.16 x 0.14—0.15 mm. in size. Oesophagus is long, about double the length of pharynx. Intestinal bifurcation lies in the acetabular region, at about one quarter of the body-length from the anterior end. Intestinal caeca are long and extend beyond the posterior testis, lying at a distance of 0.28—0.44 mm. from the posterior end.

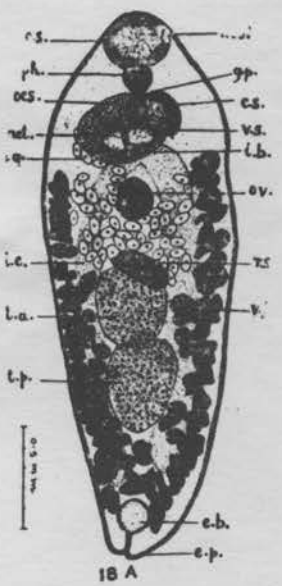


Fig. 18. *Allocreadium nemachilus* n. sp. A. Entire. B. Eggs.

Testes are more or less oval and contiguous and tandem. The anterior testis is equatorial and measures 0.32—0.4 x 0.35—0.42 mm. The posterior testis is slightly larger than the anterior one, measuring 0.41—0.45 x 0.36—0.39 mm. Cirrus sac is curved lying on the anterior and lateral sides of the acetabulum, extending from the mid-acetabular region upto the place lying immediately in front of the acetabulum. Vesicula seminalis is very much coiled and lies in the basal part of the cirrus sac. There is a small pars prostatica and a short ductus ejaculatorius present in the distal part of cirrus sac. Ovary is median and postacetabular lying in front of the testes in the second quarter of the body and is somewhat spherical and much smaller than the testes, measuring 0.21—0.22 x 0.18—0.24 mm. Receptaculum seminis is large pear-shaped or oval and

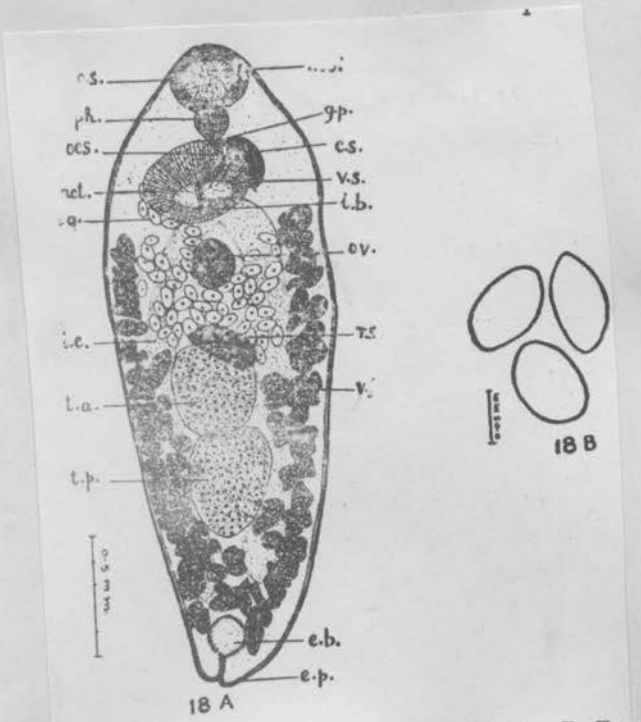
0.13—0.14 x 0.2—0.28 mm. in size. It is median and lies between the ovary and the anterior testis, more towards the latter, very exceptionally lying lateral to the ovary. Vitelline follicles extend from the posterior end of the body upto the region of acetabulum, sometimes even upto the anterior part of the acetabular region, but never in front of it. Uterus extends from the middle of anterior testis upto the middle of acetabulum. Eggs are shelled, oval, few in number (11—68) and of large size measuring 85—99 x 45—57 μ. Metraterm is indistinct. Genital opening is median or slightly lateral, lying in the proximity of the pharynx.

Excretory pore is terminal and leads, by a short duct, 0.1 mm. long, into an excretory bladder which is large, spherical and 0.15 mm. in diameter.

Discussion—The present form has vitelline follicles extending in front not beyond acetabulum and differs in this character from all the species of *Allocreadium*, except *A. isoporum*, *A. transversale*, *A. pallens*, *A. lobatum*, *A. annandalei*, *A. hasu*, *A. japonicum*, *A. beleosomi*, *A. handiai*, *A. nicolli*, *A. koshia*, *A. schizothoracis* and *A. mahaseri*. It has acetabulum larger than oral sucker, the ratio being approximately 4 : 3 and differs, in this character from *A. isoporum*, *A. pallens*, *A. handiai*, *A. nicolli*, *A. koshia*, and *A. mahaseri*. In *A. pallens*, the size of acetabulum is double that of oral sucker, in *A. isoporum* and *A. mahaseri*, the two suckers are nearly equal and in *A. handiai*, *A. nicolli* and *A. koshia* acetabulum is smaller than oral sucker. The present form can be distinguished from *A. lobatum* and *A. hasu* in the shape of testes and excretory bladder, for in these species, the testes are lobed and excretory bladder is elongated. It differs from *A. annandalei*, in the position of genital pore, which is far behind intestinal bifurcation in the latter species. It differs from *A. transversale* in the position of intestinal bifurcation and eggs, from *A. japonicum*, in the size of body, shape of excretory bladder and extension of uterine coils and from *A. beleosomi*, in the presence of prepharynx, length of oesophagus, extension of uterus and size of eggs. It differs from *A. schizothoracis*, the only other species of *Allocreadium* reported from Kashmir in the proportional size of two suckers position of intestinal bifurcation and genital pore, size of ovary in proportion to testes, extension of uterus and size of receptaculum seminis and eggs. The present from is, therefore, new and is designated *A. nemachilus*.

Allocreadium nemachilus Kaw,1950

Size 2.06 to 2.77 by 0.77 to 0.95
Oral sucker 0.23 to 0.26 by 0.28 to 0.33
Acetabulum transversely oval, 0.31 to 0.35 by 0.36 to 0.45
Pharynx 0.15 to 0.16 by 0.14 to 0.16
Esophagus about twice length of pharynx; ceca long extending past hind testis.
Testes oval, tandem, contiguous.
Cirrus sac curved, at anterior and lateral sides of acetabulum, from middle of acetabulum.
Seminal vesicle much coiled; small pars prostatica, and short ductus hermaphroditicus
Ovary median, more or less spherical, pretesticular, postacetabular.
Seminal receptacle large, between ovary and testis. Uterus from middle of anterior testis up to middle of acetabulum.
Vitellaria from region of acetabulum to posterior end.
Eggs large 85 to 99 by 45 to 57 u
Genital pore median or slightly lateral, in region of pharynx.
Excretory vesicle spherical.
Host: Nemachilus kashmirensis from Bandipore &Gandibal, INDIA



. 18. *Allocreadium nemachilus* n. sp. A. Entire. B. Egg

Allocreadium nicolli n. sp. (Figs. 1 and 2).

Host—*Gobius guiris.* Pande, 1938

Position—Small intestine.

Locality—Allahabad.

Description.—Body elongated, thick and plump, somewhat rounded at anterior and pointed at posterior ends, narrow in posterior half, measuring 4–4·2 in length and 1·1 in maximum breadth which lies in the neighbourhood of the acetabulum. Cuticle thick and aspinose. Oral sucker sub-terminal, 0·45–0·46 × 0·43–0·48 in size, larger than acetabulum; pre-pharynx present; pharynx large 0·18–0·22 × 0·25–0·28 in size; œsophagus 0·36 in length, slightly curved in contracted specimens; intestinal bifurcation close to dorsal surface, situated a little in front of acetabulum; cæca running back dorsally near lateral body margins, ending about one-fourth of post-testicular space in front of hinder extremity. Sub-cuticular unicellular glands more conspicuously developed in pre-acetubular part of body. Acetabulum, 0·36–0·4 in diameter, situated at anterior third of body. Genital pore median, leading into a short and narrow atrium with male and female ducts opening into it dorsally, lies immediately below intestinal bifurcation. Excretory pore terminal, near dorsal surface, leading through short thick walled duct to tubulur bladder; excretory bladder close to dorsal body wall, extending anteriorly to inter-testicular space and receiving the two collecting ducts a little behind its anterior end. Testis nearly spherical and equal in size, behind one another; in posterior body half with a small space between them; anterior testis, slightly sinistral, 0·32–0·34 × 0·28–0·3 in size, situated at about 0·5 distance behind equator of body; posterior testis, slightly dextral or median, 0·3–0·34 in diameter, at middle of posterior body half. Cirrus sac elongated, curved round anterior half of

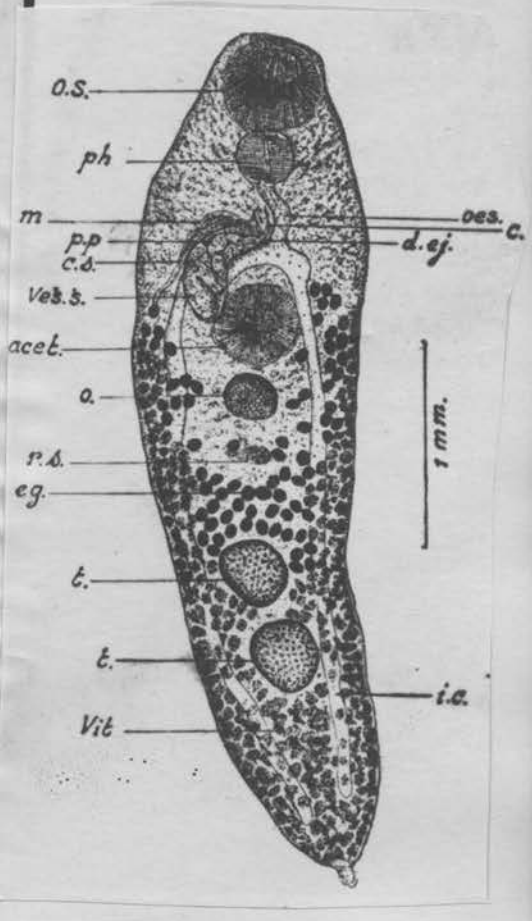


FIG. 1.

acetabulum, extending posteriorly near its centre, placed only slightly off the median line in its posterior half; vesicula seminalis much coiled in basal half; pars prostatica spherical; ductus ejaculatorius slightly convoluted; prostate gland cells surrounding distal coils of vesicula seminalis, pars prostatica and ejaculatory duct. Ovary nearly globular, median, dorsal, 0·22–0·23 × 0·23–0·25 in dimensions and situated close behind acetabulum—in contracted specimens above posterior half of latter; oviduct arising ventrally near middle of ovary; receptaculum seminis 0·11 × 0·23 in size, post-ovarian, placed transversely to body length at middle of body close to dorsal body wall; the short and nearly straight Laurer's canal, after its origin, winds posteriorly to open on the dorsal surface behind acetabulum; shell gland mass situated posteroventrally to hinder margin of ovary slightly lateral to median line; transverse vitelline duct and yolk-reservoir just below receptaculum seminis; descending coils of uterus after origin from shell gland mass, filling up inter-cæcal space between receptaculum seminis and anterior testis with coils extending back in convoluted course as far as middle of anterior testis situated dorsally and laterally to it; ascending limb of uterus in front of receptaculum seminis ventral to ovary and intestinal cæca but dorso-lateral to acetabulum opening into well-developed metraterm; metraterm lying parallel to terminal half of cirrus sac; ripe eggs yellowish, measuring 0·072 × 0·054 in size; vitelline follicles commencing anteriorly from near anterior margin of acetabulum, mostly lateral and ventral to intestinal cæca, but extending inwards between testes and filling entire inter-cæcal space behind posterior testis with follicles lying ventral to cæca and excretory bladder in this part of body.

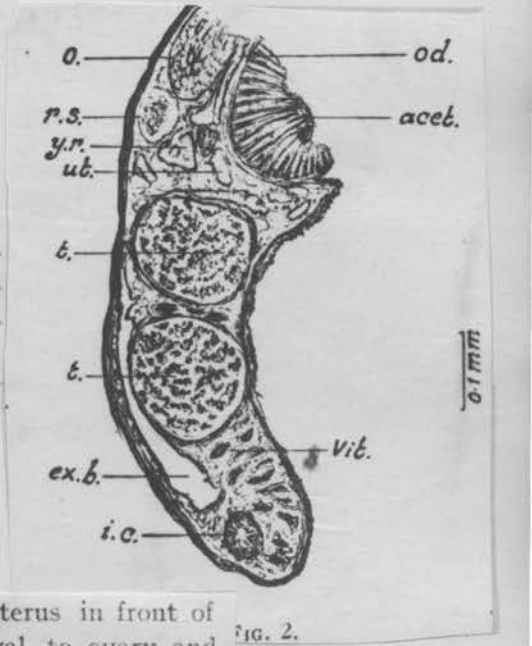


FIG. 2.

Remarks.—The proposed new species *A. nicolli* agrees with *A. isoporum*, *A. transversale*, *A. pallens*, *A. lobatum*, *A. hasu*, *A. japonicum*, *A. beleosomi* and *A. handiai* in that the vitellaria do not extend anterior to the acetabulum. The type species, *A. isoporum*, is easily distinguished from it in a number of features such as the ratio of the suckers, anterior extent of the excretory bladder (excretory bladder reaching to hinder margin of posterior testis in *isoporum*), position of the receptaculum seminis in relation to the ovary (in *isoporum* ovary is on the right side and receptaculum seminis in level

with it), posterior extent of the uterus, anterior extension of vitelline follicles (in *isoporum* the vitellaria do not reach the posterior level of acetabulum), length of eggs and their number in the uterus. From *A. transversale* and *A. pallens* the new species differs in the ratio of suckers (acetabulum is one and a half times larger than oral sucker in *transversale* and twice as large as oral sucker in *pallens*). *A. lobatum* differs from *A. nicolli* n.sp. in the equal size of the two suckers, position of its acetabulum in the posterior part of the first fourth of the body, excretory bladder reaching to the posterior testis, lobed nature of the testes, the vitellaria reaching anteriorly to the level of the ovary, posterior extent of the uterus (uterus fills up the space between the anterior testis and the acetabulum in *labatum*) and the presence of numerous eggs. *A. hasu* can be separated from the new species on account of the acetabulum being much larger than the oral sucker, uterus coiled between anterior testis and acetabulum, and the excretory bladder extending anteriorly midway between the posterior testis and the hinder extremity of the body. *A. japonicum* also differs from it in the acetabulum being larger than the oral sucker. From *A. beleosomi* the new species is distinguished by the difference in the ratio of the suckers (oral sucker is slightly more than half the acetabulum in *beleosomi*), presence of a prepharynx, length of the œsophagus, position of the acetabulum (acetabulum situated at anterior fourth of body length in *beleosomi*), position of the ovary (in *beleosomi* ovary lies immediately in front of anterior testis), position of the uterus (between the ovary and the acetabulum in *beleosomi*) and size of the eggs. *A. handiai* differs from it among other characters in the position of the genital pore posterior to the intestinal fork and the extent of the cirrus sac.

ALLOCREADIUM OPHIOCEPHALI N. SP.

Srivastava, 1960

A large number of specimens belonging to the genus *Allocreadium* were collected from the intestine of a fresh water fish *Ophiocephalus punctatus*. Out of nearly 42 hosts examined, only four were found to be infected. The number of specimens recovered from one host varies from 3 to 6.

The worms are of small size with well developed suckers. The body is elongated, dorso-ventrally flattened, with broad anterior and narrow posterior extremities. The length of the worm varies from 3.859 mm. to 4.15 mm. and the greatest breadth is 0.731 mm. to 0.918 mm. in the region of the acetabulum. The skin is smooth and devoid of spines.

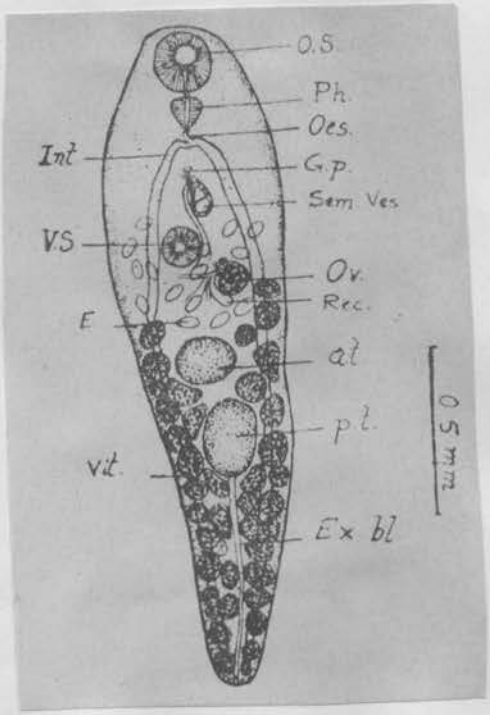
The oral sucker is subterminal, nearly globular in form and facing ventrally. The diameter of the oral sucker varies from 0.306 mm. to 0.357 mm. The ventral sucker is smaller than the oral sucker and is 0.238 mm. to 0.289 mm. in diameter. It is situated at a distance of 0.850 mm. to 1.054 mm. from the anterior end.

The mouth is an oval opening, lying in the cavity of the oral sucker. A well developed, muscular, oval pharynx is present, measuring 0.099 mm. to 0.103 mm. in length and 0.099 mm. to 0.106 mm. in breadth. Posterior to the pharynx is a short oesophagus, which is smaller in length than the pharynx. It bifurcates into two intestinal caeca which extend laterally upto the posterior end.

The male reproductive organs consist of two testes, vas-deferens and a cirrus sac with vesicula seminalis, parsprostatica, ejaculatory duct, cirrus and prostate gland cells. The testes are large, tandem and in the posterior half of the body behind the ovary. The anterior testis is smaller than the posterior testis, and in some specimens both the testes are more or less equal in size. The anterior testis is spherical to oval, and measures 0.289 mm. to 0.391 mm. in length and 0.272 mm. to 0.296 mm. in breadth. It lies at a distance of 1.209 mm. to 1.496 mm. The posterior testis measuring 0.374 mm. to 0.459 mm. in length and 0.289 mm. to 0.340 mm. in breadth, lies at a distance of 1.667 mm. to 1.836 mm. from the anterior end.

The cirrus sac is a flask shaped organ, median in position and lying obliquely between the intestinal bifurcation and the acetabulum. It measures 0.221 mm. to 0.255 mm. ×0.081 to 0.105 mm. in size. The vesicula seminalis, divided into two parts, lies at the basal part of the cirrus sac, the posterior part of which is larger than the anterior part. Anterior to the vesicula seminalis is a parsprostatica about 0.093 mm. in length. The parsprostatica opens into a long muscular cirrus, through a narrow ejaculatory duct. Surrounding the pars prostatica and seminal vesicle are numerous prostate gland cells.

The female genital organs consist of an ovary, oviduct receptaculum seminis, ootype, uterus, vitelline glands and vitelline ducts. The ovary is nearly spherical lying between the acetabulum and the anterior testis at a distance of 1.037 mm. to 1.122 mm. from the



Considred a synonym of Allocreadium handiai by Kakaji (1969)

anterior extremity. In some specimens it has shifted more anteriorwards and is placed at the level of the acetabulum. It measures 0.170 mm. to 0.204 mm. in length and 0.138 mm. to 0.170 mm. in breadth. From the ovary arises the oviduct which opens at the ootype. The receptaculum seminis is large, pear shaped and 0.198 mm. to 0.207 mm. × 0.054 mm. to 0.057 mm. in size. A large number of small cells, forming the shell glands, surround the ootype.

The vitelline follicles extend from the posterior end of the body upto the posterior margin of the acetabulum. They are mainly lateral in position but cover the intestinal caeca and extend at places in the middle and behind the testes. The uterus arises at the posterior end of the ovary and forms a few loops between the anterior testis and the genital pore. Eggs are oval, few in number and of moderate size measuring 0.096 mm.-0.102 mm. to 0.06 mm.-0.07 mm. They are arranged in a single row in the uterus. The genital opening is intercaecal, median, lying half way between the acetabulum and the intestinal bifurcation.

The excretory pore lies terminally at the posterior end of the body. It leads into an excretory bladder which is large and spherical and 0.21 mm. in diameter.

DISCUSSION

The genus *Allocreadium* Looss, 1900 has been divided into four subgenera *Allocreadium*, *Coinocreadium*, *Paracreadium* and *Lepidauchen* (=*Polylekithum* Arnold, 1934). The present form comes under the subgenus *Allocreadium* on account of its having vitellaria in the hinder body region. It differs from *A. lobatum*, *A. isoporum*, *A. pallens*, *A. Labracis*, *A. japonicum*, *A. genus*, *A. nemachilus*, *A. kamlai*, *A. mehrai* and *A. spindale* in having ventral sucker smaller than the oral sucker, in the extension of the vitelline glands from the hinder end of the acetabulum to the posterior end of the body and in the possession of very small oesophagus. It differs from *A. nicolli*, *A. koshia*, *A. schizothoracis* and *A. mahesary*, in the possession of a small oesophagus, in the structure of the seminal vesicle which in the present form is divided into two, in the extension of the vitelline glands, in the possession of a large muscular cirrus and in the position of the genital pore. The present form resembles *A. handai* and *A. thapari* in the extension of the vitellaria, position of genital pore and the ratio of the suckers. However, it differs from *A. handai* in the shape and relative size of the testes, in the size and structure of the seminal vesicle, pars prostatica and in the extension of the excretory bladder. From *A. thapari* it differs in size and shape of the testes, in the position of ovary and receptaculum seminis and in size and shape of the body.

These differences along with the relative size of all the organs and the eggs easily distinguish the form from all the known species of the genus *Allocreadium*—and is, therefore, designated *Allocreadium ophiocephali* n. sp.

Host—*Ophiocephalus punctatus*.
Location in host—Intestine.
Locality—Raipur (M. P.)

Allocreadium polymorphum Layman, 1933

Size of body 0.9–1.7×0.2–0.4 mm. Oral sucker 0.11–0.16×0.12–0.13 mm. Ventral sucker 0.19–0.26×0.25–0.30 mm. This is placed on a special disk (protrusion) 0.44 mm in diameter. Cirrus bursa 0.27–0.36 mm. Uterus with few eggs in area between ventral sucker and anterior testes. Eggs 0.086–0.094 mm.

In intestine of stone sculpin and naked highland barbel; Lake Baikal and Issyk-Kul.

From Bykhovskaya - Pavlovskaya (1962)

Allocreadium pseudaspii (Akhmerov, 1960)

A. pseudaspii (Akhmerov, 1960) (Figure 1066).

(Synonym: Neoallocreadium pseudaspii Akhmerov, 1960)

In intestine of Amur flat-headed asp; Amur River. Possibly identical with last species. (*i.e., A. elongatum.*)

From Bykhovskaya - Pavlovskaya (1962)

Allocreadiidae Odhner, 1910

Allocreadium pseudotritoni Rankin, 1937

A. pseudotritoni differs from A. lobatum as follows: Testes not markedly lobed, vitellaria extending anterior to acetabulum, esophagus short, seminal receptacle spherical; and from A. boleosomi: suckers approximately equal, uterus extending between anterior testis and acetabulum, and vitellaria extending to oral sucker.

Host: Salamanders N. Carolina

Yam. (1958) lists this as Coinocreadium p. Rankin, 1937
The species was named Allocreadium p. by Rankin (1937)

to Cainocreadium by Yam (1958)??

Family: Allocreadiidae Odhner, 1910

Sub-family: Allocreadiinae Odhner, 1905

Allocreadium pseudotritoni RANKIN, 1937 ~~sp. nov.~~

Fig. 4

Description.—Length 1.98 to 2.30 mm., width 0.70 to 0.72 mm.; flattened dorso-ventrally, bluntly rounded at both ends. Cuticula smooth. Oral sucker subterminal, 0.22 to 0.25 mm. in maximum diameter; empties into a short, broad, conspicuous pharynx, 0.07 to 0.08 mm. long, 0.07 to 0.12 mm. wide; no prepharynx; esophagus short, 0.03 to 0.09 mm. long; crural fork shortly behind pharynx, well anterior to acetabulum; crura of median thickness, 0.06 to 0.08 mm., the left branch extending to anterior edge of posterior testis, the right reaching to about the middle of same testis. Acetabulum somewhat larger than oral sucker, located near juncture of anterior and middle thirds of body, 0.23 to 0.39 mm. in length, 0.27 to 0.32 mm. in width.

Ovary dextral, 0.17 to 0.22 mm. in length, 0.15 to 0.17 mm. in width; position varies from immediately behind acetabulum to a distance halfway between acetabulum and anterior testis. Oviduct arises from anterior ventral margin of ovary and passes posteriorly a short distance where it receives duct from seminal receptacle. Seminal receptacle spherical, 0.07 by 0.09 mm.; its duct winds forward and receives Laurer's canal. This latter tube winds dorsally and opens on surface just posterior to acetabulum. The combined Laurer's canal and seminal duct swing mediad to join oviduct which in turn, receives common vitelline duct in center of body; oviduct passes into cotype which is surrounded by a comparatively inconspicuous Mehlis' gland, continues into uterus which makes one or two coils between anterior testis and ovary and then extends in a more or less winding course to left and dorsal surface of acetabulum to empty at genital pore. Uterus contains few ovoid eggs with a yellowish shell, 70 to 80 microns in length, 40 to 50 microns in width. Follicular vitellaria extend from posterior margin of oral sucker to posterior end of body, filling space behind testes; they do not form a continuous band to fill space in front of acetabulum; drained by two vitelline ducts which empty into a well-defined, circular vitelline reservoir located in about mid-body region, anterior to anterior testis.

Testes in tandem arrangement within crural limits in posterior third of body, somewhat lobate, or approximately equal size, 0.22 to 0.25 mm. long, 0.26 mm. wide; vas efferens from posterior testis arises near anterior dorsal margin, passes laterad, and continues along inner margin of intestinal caecum to acetabulum; vas efferens from anterior testis also arises from anterior dorsal margin, passes forward, swings to left, and joins its fellow at lateral margin of acetabulum to form a short vas deferens. This duct immediately expands into a seminal vesicle, continuing as a sinuous ejaculatory duct sometimes surrounded by a weakly developed pars prostatica. The whole is enveloped by a true cirrus sac, 0.25 to 0.26 mm. in length, 0.04 to 0.07 mm. in width. Distal extremity of cirrus sac empties with uterus through a small, median genital pore immediately posterior to crural fork.

Excretory bladder simple and sacculate, empties by median terminal pore.

Immature specimens were found in which vitellaria had not yet developed. Testes smaller than ovary, acetabulum considerably larger than oral sucker, cirrus sac noticeably prominent. A pair of deeply-staining eyespots occur at the lateral margins, posterior to the oral sucker.

Host: *Pseudotriton montanus montanus* (Baird), *P. ruber ruber* (Sonnini).

Habitat: Intestine of host.

Locality: Brook entering Nancy Rhodes Pond (Settling Pond), Durham, North Carolina.

Type Specimens: Cotypes of *Allocreadium pseudotritoni* have been deposited in the United States National Museum.

Discussion.—The writer planned originally to include a complete discussion of all the species of the genus Allocreadium. A review of the literature, however, indicates that much confusion exists as to the status of the various species. Such discussion would involve a consideration of many of the genera in the family Allocreadiidae, which is beyond the scope of the present paper.

As far as can be determined, only two other valid species of Allocreadium have been reported from North America, *A. lobatum* Wallin, 1910, and *A. boleosomi* Pearse, 1924. *A. pseudotritoni* is the first species of this genus to be reported from salamanders. All others were collected from fishes. *A. pseudotritoni* differs from *A. lobatum* as follows: testes not markedly lobed, vitellaria extending anterior to acetabulum, esophagus short, and seminal receptacle spherical; and from *A. boleosomi:* suckers approximately equal, uterus extending between anterior testis and acetabulum, and vitellaria extending to oral sucker.

Rai, 1962

Allocreadium singhi sp.nov. (Fig. 2)

Host. *Barbus tor* (Ham.)

Location. Intestine

Locality. Hiran River near Sihora.

Clupeidae

Two specimens of this species were recovered from the intestine of *Barbus tor* (Ham.) brought from Sihora. Body oval or slightly elongated, broad in the middle and narrow at both ends and measuring 2·80–3·65 × 0·86–1·33. Oral sucker 0·08 from the anterior end, measuring 0·28–0·34 × 0·28–0·39. Prepharynx very small; pharynx measuring 0·13–0·24 × 0·12–0·19; oesophagus measuring 0·09–0·35 × 0·04–0·06; intestinal bifurcation situated 0·63–0·84 from the anterior end; intestinal caeca terminating nearly half way between the posterior testis and the posterior end of the body. Ventral sucker spherical, measuring 0·28–0·43 × 0·30–0·41 and slightly larger than the oral sucker. Genital pore on the left side, nearly at the level of the intestinal bifurcation. Excretory pore terminal; excretory bladder not reaching the posterior end of the posterior testis. Testes oval, in the middle of the body slightly oblique in position. Anterior testis measuring 0·28–0.51 × 0.26–0.55 posterior testis measuring 0·30–0·57 × 0·24–0·57. Cirrus sac measuring 0·38–0·53 × 0·13–0·18, containing the coiled vesicula seminalis measuring 0.17 × 0.07 the pars prostatica and the ejaculatory duct, which extends nearly to the middle of the ventral sucker. Ovary submedian, situated at the side of the ventral sucker, almost spherical in shape, measuring 0·27–0·28 × 0·18–0·27. Receptaculum seminalis large, situated postero-lateral to the ovary, measuring 0·11–0·13 × 0·11–0·13. Shell gland lateral to the posterior half of ovary, anterior to the receptaculum seminalis. Laurer's canal not observed. The uterine coils lie between the posterior region of the posterior testis and the ventral sucker and contain more than four eggs. Ripe eggs operculate, measuring 0·070–0·080 × 0·045–0·052. Vitelline follicles extending from the anterior level of the ventral sucker to the posterior end of the body, confluent in the post-testicular region and measuring 0.07–0.13 × 0.07–0.37. The follicles of the two sides are joined by their respective vit. transverse duct to the vitelline reservoir, which measures 0·28 × 0·09 and lies on the left side of the ovary.

Remarks

Allocreadium singhi sp.nov. resembles *A. transversale* (Rud., 1802) Odhner, 1901; *A. pallens* (Rud., 1819); *A. hasu* Ozaki, 1926; *A. japonicum* Ozaki, 1926; *A. schizothoracis* Pande, 1938; *A. nemachilus* Kaw, 1950; *A. kamalai* Gupta, 1956; *A. mehrai* Gupta, 1956; *A. neotenicum* Peters, 1957; *A. spindale* Saksena, 1958; and *A. gyanpuri* Gupta, 1959; in having the ventral sucker bigger than the oral sucker. It further resembles *A. transversale* (Rud., 1802) Odhner, 1901; *A. nemachilus* Kaw,

1950, and *A. neotenicum* Peters, 1957, in the anterior extent of the vitelline follicles. However, it differs from *A. transversale* (Rud., 1802) Odhner, 1901, and *A. pallens* (Rud., 1819) in the ratio of the suckers, the position of the ovary and the size of the egg. It differs from *A. hasu* Ozaki, 1926, in the extent of the uterine coils and the non-lobed condition of the testes (in *A. hasu* the testes are irregularly lobed); and from *A. japonicum* Ozaki, 1926, in the non-lobed condition of the ovary (the ovary of *A. japonicum* is trilobed). It differs from *A. schizothoracis* Pande, 1938, in the position of the oral sucker, the position of the ovary and testes and the extent of the uterus; it differs from *A. nemachilus* Kaw, 1950, in the size of the body, in the positions of the ovary and the receptaculum seminalis, the extent of uterus and the position of the genital pore; it differs from *A. neotenicum* Peters, 1957, in the posterior extent of the vitelline follicles, the extent of the uterus, the extent of the excretory bladder, the smaller size of its eggs and the fact that its ovary never overlaps the ventral sucker.

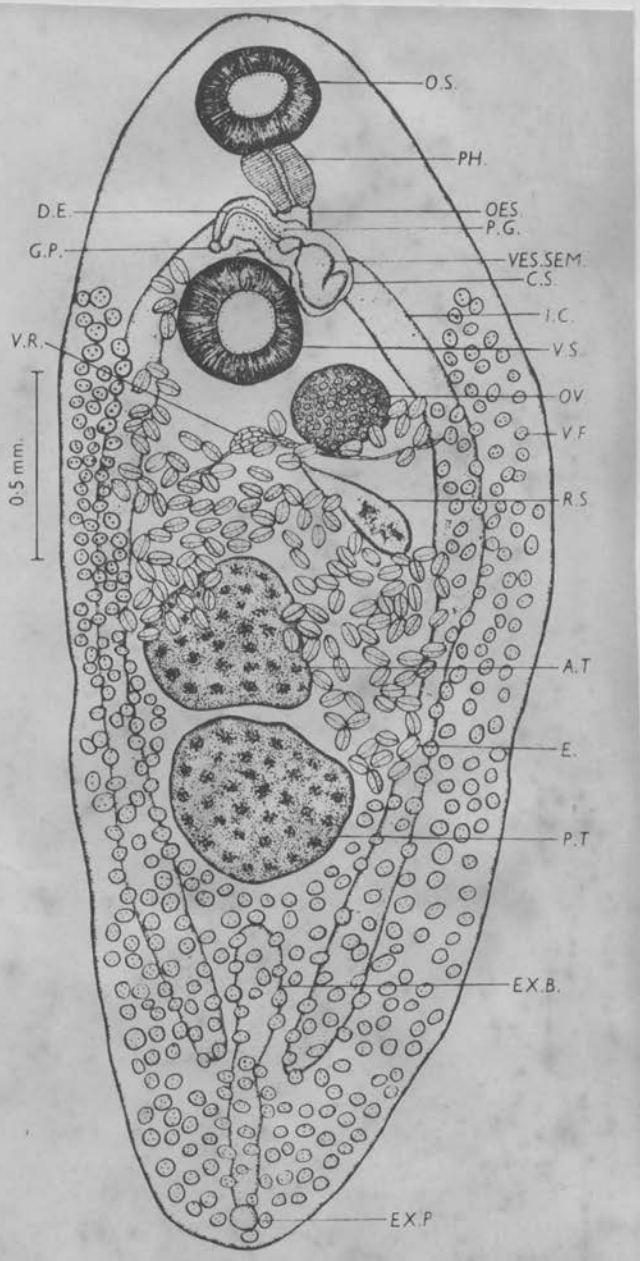


Fig. 2. *Allocreadium singhi* sp.nov., dorsal view.

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 ; ceaca terminating nearly half way between posterior testis and hind end of body.

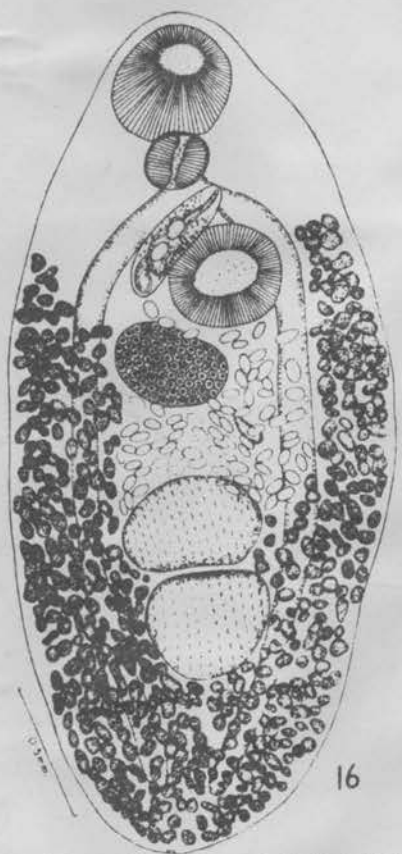


FIG. 16. — *Allocreadium singhi* Rai, 1962
Dorsal view

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 ceca and space behind posterio 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 spindale Saksena, 1958

In this paper a new trematode *Allocreadium spindale*, n.sp. has been described. The worms were obtained from the intestine of a fresh water fish *Mastacembalus armatus* in the month of September, 1956 at Raipur. The work was carried out in the Zoological Laboratory of the College of Science, Raipur.

DESCRIPTION

The worm is spindle shaped, cream coloured showing active movements during the living condition. It is 2·81-5·05 mm. long and 0·46-0·99 mm. broad at the level of the ovary. The subterminal oral sucker is smaller than the ventral sucker and measures 0·18-0·25 × 0·15-0·22 mm. in size. The ventral sucker is cup-shaped and well developed measuring 0·28-0·43 × 0·21-0·38 mm. It lies at a distance of 0·35-0·59 mm. from the anterior end.

The prepharynx and the oesophagus are small but the pharynx is muscular, prominent and measures 0·06-0·11 × 0·06-0·09 mm. in size. The intestinal bifurcation lies at a distance of 0·29-0·41 mm. from the anterior end. The caeca have entire margins and extend upto the posterior end of the body.

The excretory pore lies at the posterior end of the body and leads into a long tubular bladder which extends upto the posterior level of the posterior testis. The genital pore is located above the acetabulum slightly to the right of the median line (Fig. 1).

The gonads lie in the posterior region of the anterior half of body. The two oval testes lie one behind the other, posterior to the ovary and are intercaecal. The anterior testis is located at a distance of 1·11-2·32 mm. from the anterior end and measures 0·27-0·5 × 0·28-0·32 mm. The posterior testis, 0·32-0·45 × 0·3-0·45 mm. in size, is bigger than the anterior testis and the distance between the two testis is 0·003-0·126 mm. The vasaefferentia arise from the anterior face of each testis and run straight towards the cirrus sac, where they meet with each other to form a small vasdeferens before opening into the vesicula seminalis.

The cirrus sac is a well developed organ placed obliquely on the left side between the intestinal bifurcation and the acetabulum. It is 0·36-0·45 mm. long and 0·11-0·18 mm. broad at the region of vesicula seminalis. It contains oval vesicula seminalis 0·15-0·19 × 0·1-0·11 mm. in size, parsprostatica 0·054-0·105 × 0·069-0·07 mm. and a muscular cirrus. A large number of prostate gland cells cover the region of parsprostatica.

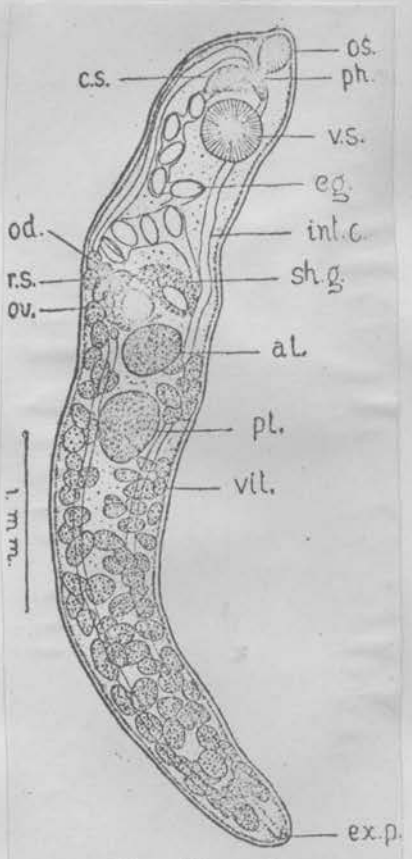
The ovary is oval in shape, lying at a distance of 0·91-1·9 mm. from the anterior end. It measures 0·15-0·2 × 0·12-0·18 mm. and is located at about 0·06-0·24 mm. above the anterior testis slightly towards the left of the median line. The oviduct arises from the anterolateral margin of the ovary. The receptaculum seminis is well developed, elongated measuring 0·18-0·42 mm. in length and 0·05-0·11 mm. in breadth. It is lateral to the ovary towards the left side extending upto its posterior margin. The Laurer's canal is not clearly visible.

The vitelline glands consist of big oval follicles extending from a little infront of the ovary to the posterior end of the body. They liein the lateral regions upto the level of the posterior testis beyond which they occupy the whole of the body. The anterior extension of vitellaria is uneven as the left one extends more anteriorly than the right one. The transverse vitelline ducts lie above the anterior testis. They meet to form a well developed triangular yolk reservoir below the ovary. It measures 0·2-0·22 × 0·14-0·16 mm. From the yolk reservoir a small vitelline duct proceeds towards the ootype which is located above the ovary towards its right side. The uterus arises from the right lateral side of the ootype and undergoes two short transverse loops between the ovary and the acetabulum before opening at the genital pore.

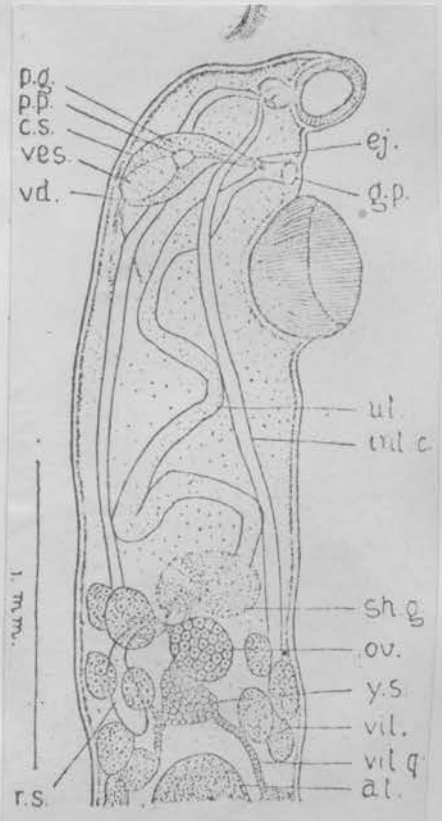
The eggs are arranged in a single row in the uterus. They are comparatively big in size, oval in shape and very few in numbers (4-16), measuring 0·165-0·177 mm. in length and 0·105-0·12 mm. in breadth.

DISCUSSION

The above description of *Allocreadium spindale* n. sp. conforms to the revised characters of the genus *Allocreadium* in general (Yamaguti, 1953). However, the position of the gonads in the posterior region of the anterior half of the body in the present species is worth noting and necessitate, the elaboration of this character in the



Text Figure 1.
Allocreadium spindale, n. sp.



Text Figure 2.
Allocreadium spindale, n. sp.

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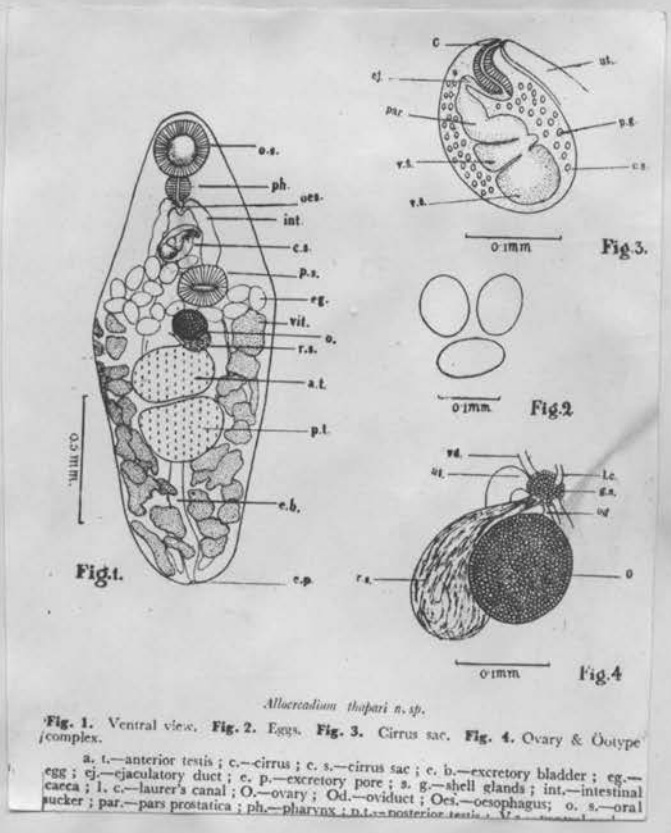
family Allocreadiidae. The genus *Allocreadium* has been divided into four subgenera: *Allocreadium, Cainocreadium, Peracreadium* and *Lepidauchen* (=*Polylekithum* Arnold, 1934). The new form comes under the subgenus *Allocreadium* on account of its having vitellaria in the hinder body region. It differs from all the known species of the genus in the location of the acetabulum, and the gonads which are comparatively more anterior and the larger size of the eggs which are arranged in a single row in the uterus. It differs from *A. isoporum* (Looss, 1894) Looss, 1902; *A. lobatum* Wallin, 1909; *A. handiai, A. nicolli, A. kosia,* and *A. mahasari* (all of Pande 1937-38); and *A. thapari* Gupta, 1950 in having acetabulum larger than oral sucker; and from *A. lobatum* Wallin, 1909 and *A. hasu* Ozaki, 1926 in the shape of the testes and the posterior extension of the uterus. It differs from *A. transversale* (Rud., 1802) Odhner, 1901 and *A. japonicum* Ozaki, 1926 in the length of the oesophagus, extension of vitellaria, the location of gonads and the acetabulum. It shows further differentiation from *A. nicolli, A. kusia, A. schizothoracis* and *A. mahaseri* in the possession of very small oesophagus, extension of vitellaria, and the position of genital pore. From *A. nemachilus* Kaw, 1950 the present species differs in having oesophagus very small, position of intestinal bifurcation, gonads receptaculum seminis, ootype and the uterine coils as well as extension of vitellaria.

Allocreadium thapari Gupta, 1950

Length 1.28 to 2.59 mm.; width 0.4 to 0.78 mm.
Oral sucker 0.22 mm. wide; acetabulum 0.2 mm. wide i.e. slightly smaller than oral sucker.
Pharynx 0.12 long by 0.1 wide; esophagus very short or lacking; ceca to posterior end
Excretory vesicle extends to middle of posterior testis.
Genital pore median, intercecal, midway between acetabulum and bifurcation.
Testes large, tandem, in posterior half of body, behind ovary.
Cirrus sac large, oval, oblique between g.p. and acetabulum; 0.18 mm. long by 0.12 mm. wide. Seminal vesicle divided into two parts, posterior part nearly oval.
Cirrus long, muscular.
Ovary more or less spherical in middle of body, in front of testes.
Seminal receptacle flask-shaped postero-dorsal to ovary and overlapping anterior testis.
Vitellaria follicular from hind end of acetabulum to posterior end, conluent posterior to testes.
Uterus arises from posterior end of ovary and runs forward forming a few coils between anterior testis and g.p.
Eggs in a single row in the uterus, 90 to 120 by 70 to 90 u.
Host: Rita rita, a freshwater fish from river Gomti at Hardoi, India (catfish)
Most like A.handiai in extent of vitellaria, position of genital pore, and sucker ratio. Differs in having esophagus smaller than pharynx, in shape and relative size of testes, structure of seminal vesicle and cirrus, and extent of excretory vesicle.



Allocreadium thapari n. sp.

Fig. 1. Ventral view. **Fig. 2.** Eggs. **Fig. 3.** Cirrus sac. **Fig. 4.** Ovary & Ootype complex.

a. t.—anterior testis ; c.—cirrus ; c. s.—cirrus sac ; e. b.—excretory bladder ; eg.—egg ; ej.—ejaculatory duct ; e. p.—excretory pore ; s. g.—shell glands ; int.—intestinal caeca ; l. c.—laurer's canal ; O.—ovary ; Od.—oviduct ; Oes.—oesophagus; o. s.—oral sucker ; par.—pars prostatica ; ph.—pharynx ; p. t.—posterior testis ; Ut.—uterus ; vd.

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.

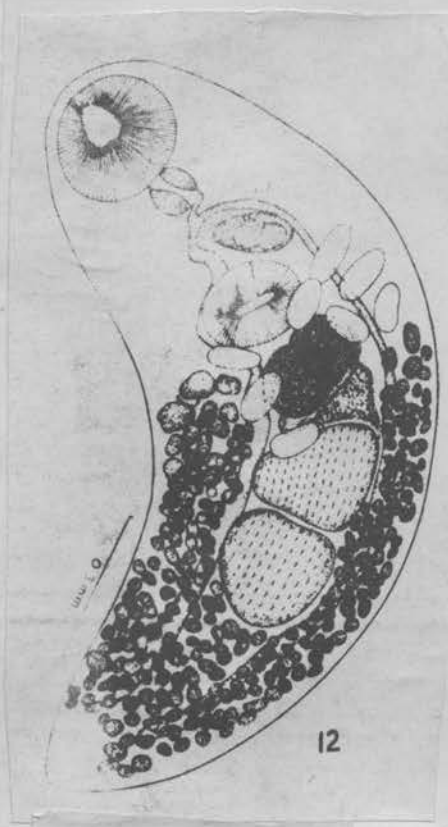
Ovary entire, spherical, preequatorial, infront of anterior testis just behind ventral sucker, 0.08 to 0.15 mm. long, 0.09 to 0.16 mm. wide at 0.61 to 0.95 mm. from anterior extremity. Receptaculum seminis pear shaped, lying postero-dorsal or postero-lateral to ovary just infront of anterior testis, 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.

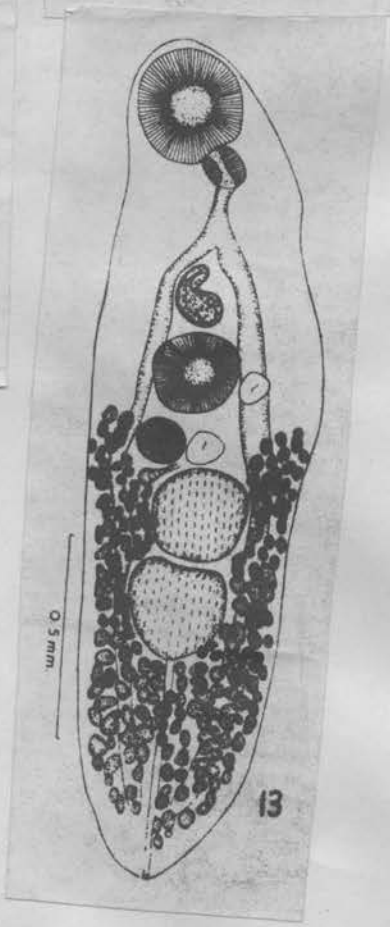
HOST : *Rita rita* (Ham.).

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 ate considered as specific variations.





from: Kakaji ,1969 Ann.Par.

Allocreadium transversale (Rud.)

Length: 2.26
Width: 0.75 to 0.8
Oral sucker: 0.25
Acetabulum: 0.35
Suc or ratio: 2 : 3
Location acetabulum: 1/3 to 1/4 from anterior end
Prepharynx: very short
Esophagus: 0.14 - same length as pharynx
Location genital pore: median. between acetabulum & bifurcation

Position testes: tandem

Ovary: globular
Eggs: 115 by 65 - 85 μ

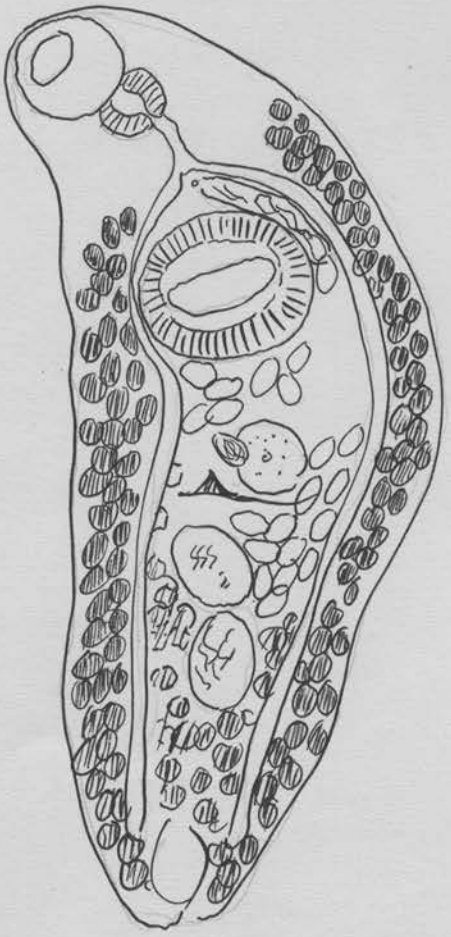
Other features: vitellaria from bifurcation, lateral & ventral except dorsal from testes level posteriorly

Host: Misgurnus fossilis Linn.

Locality: Rossithen.
Reference: Szidat, L. 1938. Zeitt. Parasit. 10: 468-475

Related species: A. isoporum.

Differs in anterior extent of vitellaria & perhaps dorsal distribution of vitellaria



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A. transversale (Rud., 1802)

Size of body 1.7–2.6 × 0.5–0.8 mm. Oral sucker 0.16–0.26 × 0.20–0.26 mm ventral sucker transversely oval, almost twice as large as oral, 0.30 × 0.43 mm. Pharynx 0.07–0.15 mm. Cirral bursa hardly reaches anterior margin of ventral sucker. Eggs 0.086–0.115 × 0.045–0.098 mm.

In stomach and intestine of thunderfish, spine loach, crucian carp; waters of Moscow and Kiev Regions.

From Bykhovskaya-Pavlovskaya (1962)

Allocreadium transversale (RUDOLPHI, 1802) ODHNER, 1901
(Figs. 8-10)

Host. *Tribolodon ezoe*, from the small intestine. The fish was infected with four flukes, together with the foregoing *A. isoporum*.

Specimens. NSMT—Pl 1843-1844.

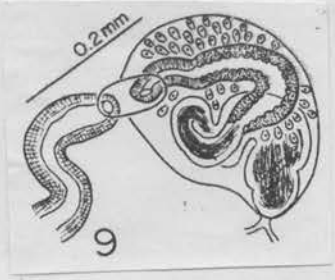
Description. Based on 4 adult whole-mounts. Body elongate-oval, unarmed, nonoculate, 1.80-2.14 mm long by 0.73-0.90 mm wide. Oral sucker subterminal, 0.22-0.26 mm long by 0.23-0.26 mm wide. Ventral sucker at about one-third of body length from anterior extremity, 0.28-0.31 mm long by 0.32-0.40 mm wide; sucker width ratio 1: 1.23-1.62. Prepharynx very short. Pharynx oval, 0.11-0.13 mm in diameter. Esophagus winding, bifurcating just anterior or anterodorsal to ventral sucker. Intestinal ceca terminating about midway from hind testis to posterior end of body. Ovary globular, submedian, behind ventral sucker, 0.18-0.21 mm long by 0.19-0.28 mm wide. Ootype complex, LAURER's canal and seminal receptacle measuring 0.10-0.13 mm long by 0.06-0.08 mm wide situated between ovary and anterior testis. Uterus coiling a few times between ventral sucker and hind testis; metraterm well developed. Eggs a few in uterus, 88-105 by 67-73 μm in balsam. Testes somewhat oblique in middle third of hindbody, relatively small, 0.18-0.26 mm long by 0.17-0.28 mm wide. Cirrus pouch plump, anterior or anterolateral to ventral sucker, small, about 0.17 mm long by 0.11 mm wide, enclosing convoluted tubular seminal vesicle, prostatic complex and short cirrus; pars prostatica fairly long. Genital atrium small. Genital pore opening medianly some distance in front of ventral sucker. Vitelline follicles passing into forebody but only slightly beyond bifurcal level. Excretory vesicle saccular, small, extending forward at most halfway from posterior extremity to hind testis.

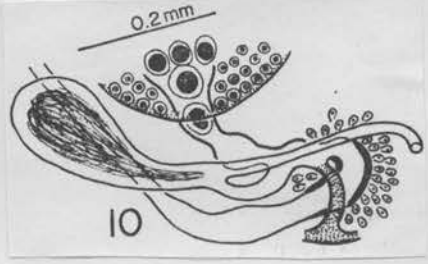
Discussion. This trematode is referred to *A. transversale*. Morphologically it is closely similar to European forms of the same species as described by ERGENS[10] and SZIDAT[12], in all essential features except that it has a short cirrus pouch and small eggs as compared with SZIDAT's material, and a small ventral sucker as compared with ERGENS' one.

SEKI[5] found two unidentified specimens of a species of the genus *Allocreadium* Looss, 1900, in the intestine of *S. leucomaenis* from Panketo. I reexamined them (No. 379) borrowed from the collection of the Department of Parasitology, Faculty of Veterinary Medicine, Hokkaido University. They seemed to belong to *A. transversale* or a closely related species.

eastern Hokkaido, Japan

From SHIMAZU, 1981





Figs. 8-10. *Allocreadium transversale*. 8: entire body, ventral view. 9: terminal genitalia, ventral view. 10: ootype complex, dorsal view.

Ridescrizione di Allocreadium umbrinæ (*Stossich, 1885*) *Stossich, 1905* (1)

From Oreddhin and Paggi, 1960

Tale ridescrizione è basata sia sull'osservazione di esemplari a fresco che sullo studio di preparati in toto, previa colorazione con carminio cloridrico, e di sezioni trasversali e sagittali. Riportiamo in mm le misure minime e massime.

Corpo pressochè ovale, tozzo, con estremità anteriore leggermente assottigliata ed estremità posteriore arrotondata. A fresco di colore biancastro eccettuato una zona di colore giallo bruno, a forma di U, che occupa la metà posteriore del corpo ed alla quale corrispondono i vitellogeni. Cuticola senza spine. Lunghezza mm 1,25-3,08, larghezza massima mm 0,62-1,42.

Ventosa orale subterminale, rotondeggiante, con diametro trasverso leggermente maggiore. Lunghezza mm 0,19-0,34, larghezza mm 0,20-0,37.

Ventosa ventrale molto grande, una volta e mezzo, due volte e mezzo la ventosa orale, occupa per la massima parte il terzo anteriore del corpo, trovandosi il suo margine posteriore poco oltre il punto d'unione del terzo anteriore con il terzo medio. Ricopre la biforcazione dei ciechi, parte della tasca del cirro e dell'ultimo tratto dell'utero. Presenta un'apertura a forma di fessura trasversale e una cavità molto profonda. Lunghezza mm 0,30-0,58, larghezza mm 0,33-0,59. Negli esemplari a fresco, non schiacciati, la ventosa ventrale è infossata per due terzi obliquamente in senso dorso-ventrale mentre per il terzo superiore sporge dalla superficie del corpo, accompagnata e rivestita dal parenchima. (Fig. 1).

La ventosa ventrale per il suo aspetto caratteristico può essere considerata subpeduncolata.

Prefaringe corto.

Faringe ben sviluppata, di forma globosa. Lunghezza mm 0,10-0,29, larghezza mm 0,15-0,26.

Esofago piuttosto corto si biforca a livello del terzo superiore della ventosa ventrale. Lunghezza mm. 0,05-0,07.

Ciechi semplici a pareti piuttosto sottili, presentano un lume ampio che aumenta fino a livello del testicolo anteriore per poi rimanere costante fino all'estremità posteriore del corpo. Originano a livello del terzo superiore della ventosa ventrale decorrono dapprima trasversalmente leggermente in basso, poi sul piano mediano parallelamente ai lati del corpo e terminano, ravvicinandosi, quasi all'estremità posteriore, di regola uno poco prima dell'altro. Nella metà anteriore del corpo sono situati dorsalmente alla ventosa ventrale e alla tasca del cirro, nella metà posteriore sono circondati dai vitellogeni.

Vescicola escretrice tubulare si estende anteriormente fino all'altezza circa della metà del testicolo anteriore. Decorre tra i ciechi al centro del corpo, dorsalmente ai testicoli. Presenta un lume ampio che si restringe nella porzione aborale.

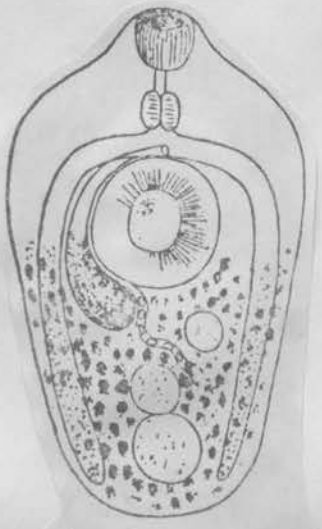
Poro escretore si apre all'estremità posteriore del corpo alquanto dorsalmente.

Ovaio rotondeggiante, compatto, più piccolo dei testicoli, è situato nel terzo medio del corpo, leggermente spostato a destra della linea mediana, posteriormente alla ventosa ventrale e anteriormente ai testicoli, dai quali è separato dal receptaculum seminis e dalle anse uterine. Lunghezza mm 0,10-0,22, larghezza mm 0,09-0,21.

Ghiandola di Mehlis poco evidente.

Receptaculum seminis molto grande, sacciforme, con maggior diametro trasverso. Situato posteriormente all'ovaio, leggermente più a destra dell'ovaio stesso, anteriormente ai testicoli è in parte ricoperto dai vitellogeni. L'estremità assottigliata di esso si continua nel canale di Laurer.

Canale di Laurer decorre nel lato sinistro del corpo portandosi in direzione orale e termina dorsalmente a livello della porzione distale della tasca del cirro.



Distomum umbrinæ Stossich, 1885

Utero in direzione ascendente, forma dapprima numerose anse che occupano la parte superiore del terzo medio del corpo, internamente ai vitellogeni, insinuandosi in genere tra il receptaculum seminis e l'ovaio e tra questo e la tasca del cirro e la ventosa ventrale. All'altezza del terzo posteriore della ventosa ventrale l'utero assume un percorso rettilineo decorrendo sul lato destro della tasca del cirro e termina contemporaneamente a questa a livello del faringe.

Poro genitale situato leggermente a sinistra della linea mediana del corpo a livello del faringe.

Vitellogeni costituiti da numerosi follicoli di diametro variante da mm 0,05 a mm 0,1 composti da un numero variabile di acini. Sono situati poco al disotto della cuticola, iniziano all'altezza del margine superiore dell'ovaio o poco sopra. Prossimalmente sono situati in corrispondenza dei lati del corpo estendendosi fino a raggiungere il margine laterale dell'ovaio e a ricoprire in parte il receptaculum seminis e i margini laterali dei testicoli. Distalmente i vitellogeni dei due lati confluiscono avvolgendo pertanto la parte terminale dei ciechi e la vescicola escretrice.

Vitellodotti si iniziano circa a livello del punto di unione del terzo medio con il terzo posteriore del corpo. Si dirigono in direzione orale con decorso prima rettilineo, portandosi poi trasversalmente a livello del margine superiore del testicolo anteriore e riunendosi sulla linea mediana a formare un recettacolo vitellino di forma pressochè triangolare.

Testicoli rotondeggianti, di grandezza quasi uguale, situati nella metà posteriore del corpo, uno dietro l'altro, posteriormente all'ovaio. Mediani rispetto ai vitellogeni, i quali possono ricoprirne i bordi. Lunghezza del testicolo anteriore mm 0,10-0,35, larghezza mm 0,17-0,49; lunghezza del testicolo posteriore mm 0,11-0,37, larghezza mm 0,16-0,54.

Deferenti originano dal margine superiore dei testicoli e presentano un decorso ascendente pressochè rettilineo. Si uniscono in prossimità dell'estremità posteriore della tasca del cirro nella quale sboccano.

Tasca del cirro ben sviluppata, claviforme. Situata dorsalmente alla ventosa ventrale e ventralmente rispetto all'esofago e alla biforcazione dei ciechi. Si estende dal livello del faringe fino oltre il margine posteriore della ventosa ventrale sorpassandolo alquanto. La parte prossimale, nella quale è contenuta la parte prostatica e il cirro, è relativamente assottigliata e si accompagna all'ultimo tratto dell'utero, la parte distale più ampia contiene la vescicola seminale ravvolta.

Uova relativamente grandi di colore giallastro, in numero piuttosto limitato. Lunghezza mm 0,075-0,080, larghezza 0,035-0,045.

Stossich nel 1905 pone la specie *Distomum umbrinæ*, da lui descritta nel 1885 nel genere *Allocreadium* Looss, 1900. Odhner nel 1905 nel suo lavoro «Die Trematoden des arktischen Gebietes» ritiene che le numerose forme attribuite al genere *Allocreadium* presentino caratteri discordanti fra loro cosichè, secondo quest'autore, sarebbe necessaria una più rigorosa limitazione delle specie appartenenti a questo genere. Per quel che riguarda *Allocreadium umbrinæ* ritiene debba essere posto in un terzo gruppo a sè con il corpo di forma molto tozza. L'autore afferma: «*All. umbrinæ* (Stoss.) scheint endlich einer dritten Gruppe von stark gedrungener Korperform anzugehoren»

Dallo studio bibliografico in proposito non ci risulta che altri autori abbiano preso in considerazione la sua posizione sistematica, che pertanto è rimasta quale definita da Stossich ed Odhner, tanto è vero che Yamaguti, nel 1958, in «Systema Helminthum» pone *Allocreadium umbrinæ* (Stossich, 1885) Odhner, 1905 tra le specie «tentatively assigned to *Allocreadium*».

I caratteri differenziali che caratterizzano il genere *Allocreadium* sono, secondo Yamaguti, grandezza e posizione della ventosa ventrale «acetabulum not enormous in anterior half of body»; posizione dei vitellogeni «vitellaria confined to hindbody»; posizione del poro genitale «genital pore median or nearly so»; testicoli tandem, prefaringe corta, tasca del cirro non molto lunga, generalmente non sorpassa o solo di poco l'acetabulum.

From Orecchia and Paggi, 1960
(contd next page)

Alcuni altri generi appartenenti, sempre secondo Yamaguti, alla sottofamiglia *Allocreadiinæ* Looss, 1902 differiscono dal genere *Allocreadium* solo per un determinato e talvolta poco preciso carattere. Infatti il genere *Allocreadium* differisce dal genere *Podocotyle* (Dujardin, 1845) solo perchè nel primo il poro genitale è «median or nearly so» mentre nel *Podocotyle* è «submedian». Dal *Cainocreadium* Nicoll, 1909 perchè in esso i vitellogeni sono estesi in «fore and in hindbody» mentre in *Allocreadium* solo «in hindbody», carattere questo che ha una relativa importanza in quanto tra le specie considerate appartenenti a questo genere ve ne sono alcune, come per esempio, *A. mormyri* Stossich, 1905 e *A. dubium* Stossich, 1905 in cui i vitellogeni raggiungono il livello del faringe. Nè può essere di maggior aiuto la diagnosi del genere *Allocreadium* di Looss del 1900 nella quale alcuni caratteri come il rapporto tra la grandezza delle ventose, la grandezza ed estensione della tasca del cirro, l'altezza a cui arrivano i vitellogeni, rimangono imprecisati e non possono pertanto essere considerati quali caratteri determinanti il genere.

Noi riteniamo che allo stato attuale sia necessaria una revisione del genere che ne precisi e delimiti maggiormente i caratteri.

Pertanto da quanto sopra detto, riteniamo più opportuno lasciare *Distomum umbrinæ* nel genere *Allocreadium* Looss, 1900 fino a che una revisione del genere non permetta di attribuire con maggior sicurezza tale parassita a questo od ad un altro genere.

Misure in mm di 10 esemplari di *Allocreadium umbrinae*

Esemplare N°		1	2	3	4	5	6	7	8	9	10
Corpo	lungh.	1,25	1,50	2,17	2,22	2,47	2,67	2,78	2,89	2,90	3,08
	largh.	0,65	0,62	0,99	0,95	1,03	1,06	1,23	1,09	1,17	1,42
Ventosa orale	lungh.	0,21	0,21	0,22	0,22	0,19	0,28	0,29	0,31	0,25	0,34
	largh.	0,20	0,20	0,26	0,35	0,28	0,35	0,34	0,37	0,39	0,33
Faringe	lungh.	0,11	0,10	0,16	0,18	0,12	0,22	0,20	0,27	0,16	0,29
	largh.	0,15	0,17	0,20	0,21	0,22	0,26	0,23	0,26	0,26	0,24
Ventosa ventrale	lungh.	0,39	0,30	0,44	0,48	0,47	0,50	0,43	0,58	0,49	0,49
	largh.	0,38	0,33	0,49	0,49	0,53	0,52	0,53	0,60	0,50	0,59
Rapporto tra lungh. V. v. e lungh. V. o.		1,08	1,05	2,00	2,18	2,50	1,85	1,46	1,87	1,96	1,44
Testicolo anteriore	lungh.	0,10	0,12	0,25	0,27	0,31	0,28	0,27	0,35	0,32	0,36
	largh.	0,17	0,17	0,35	0,37	0,36	0,31	0,42	0,48	0,36	0,44
Testicolo posteriore	lungh.	0,11	0,19	0,28	0,29	0,33	0,30	0,31	0,38	0,33	0,33
	largh.	0,16	0,19	0,28	0,32	0,37	0,39	0,37	0,54	0,35	0,46
Ovaio	lungh.	0,10	0,12	0,13	0,15	0,19	0,19	0,19	0,22	0,21	0,20
	largh.	0,11	0,00	0,13	0,15	0,21	0,17	0,21	0,20	0,20	0,16

Allocreadium voltanum Thomas, 1957

Host: Alestes macrolepidotus (C.& V., 1849) a characin#
Locality: Black Volta River, near Lawra, Gold Coast, West Africa

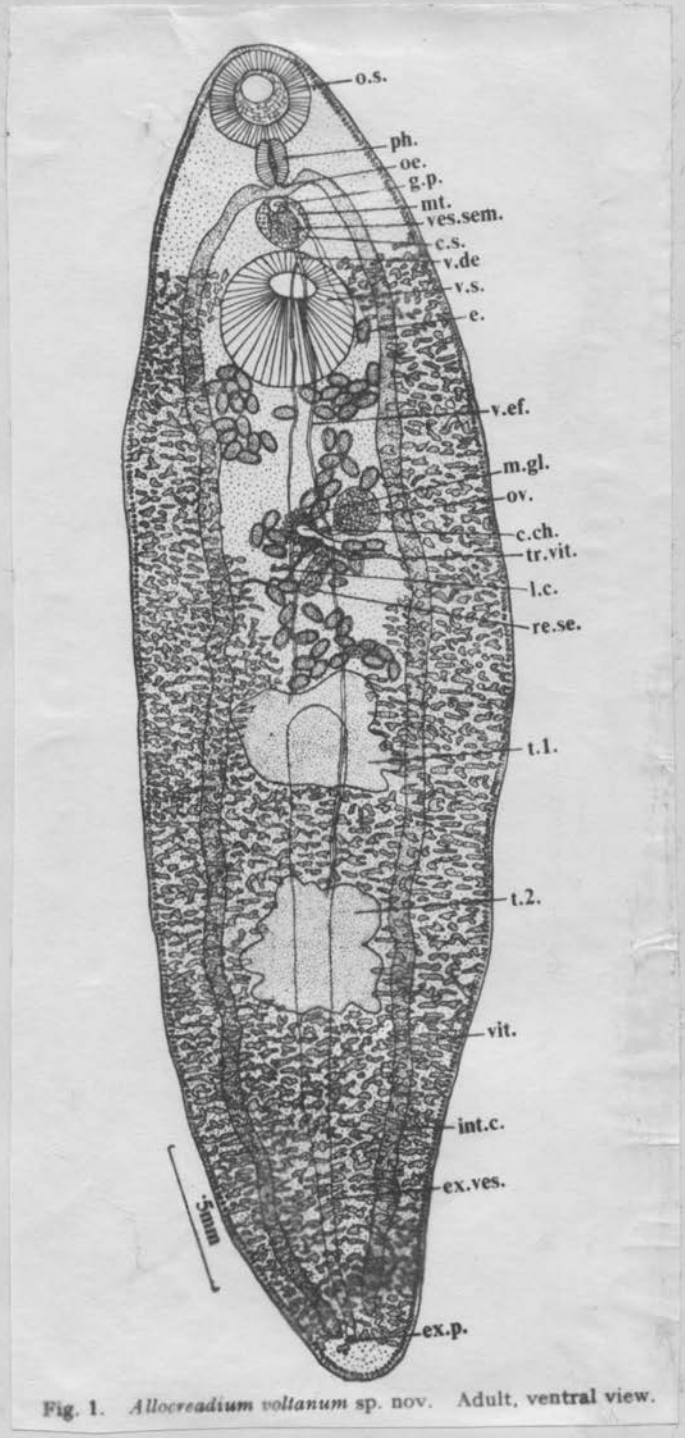


Fig. 1. *Allocreadium voltanum* sp. nov. Adult, ventral view.

eggs: 83-85 x 60 μ

Considered to be most like Indian forms dexribed by Pande (1938) and Gupta (1950) and Kaw (1950)