Contents list available at Journal of e-Science Letters

Journal of e-Science Letters

journal homepage: http://scienceletters.researchfloor.org/

On a New Trematode *Allocreadium Allocreadium gachuai* Sp. Nov. of the Family Allocreadiidae *Stossich*, 1903 from the Intestine of Freshwater Fish of Jammu, India

Ranvijay Singh*

Dean of Research Studies, Cluster University of Jammu, Jammu, J&K UT, India

ARTICLE INFO

Article History:
Received 20 August 2022
Revised 18September 2022
Accepted 27 September 2022
Available Online 13 October 2022

Keywords:
Allocaeadiidae,
Allocreadium Allocreadium gachuai,
new species,
Channa gachua.

ABSTRACT

A new species of an Allocreadid digenean trematode, Allocreadium Allocreadium gachuai nov.nom. is described from a freshwater teleost Channa gachua (Ham.) inhabiting a sub-shivalik freshwater lake Mansar, Jammu,India. No species of Allocreadium Allocreadium has so far been described from the gut of Channa gachua. The new species differs from the only two allocreadid trematode species described so far from murrels in India A.A. handiai, in having a relatively smaller body, larger sized eggs and unipartite seminal vesicle and A.A. kawi in having an oral sucker larger than acetabulum,absence of pre-pharynx and relatively lower eggs per worm. A key to theidentification of species of Allocreadium Allocreadium known from Jammu &Kashmir is given.

1. Introduction

A number of distinctly allocreadid trematode worms, were found parasitic in the intestines of *channa gachua* (Ham.) a murrel obtained from a sub- shivalik freshwater lake Mansar in Jammu. These worms were morphological different from all allocreadian species described from fishes in India and therefore, described here as a new species under the genus *Allocreadium Allocreadium* Looss, 1900, as *A. A. gachuai.*

Materials and Methods

The worms were washed in 0.1% saline to clean them of any attached debris before being fixed in acetic-formol-alcohol (1:1:3). Fixing was done on glass slide under cover slip to help flatten the worms in fixation. The fixed specimens were preserved in 70% alcohol for subsequent use. Staining was usually done with freshly fixed specimens with aceto-alum carmine (Gray, 1973) after washing and dehydrating the fixed material in ascending grades of ethanol, cleared in xylene and mounted in D.P.X. All measurements were recorded micrometrically from stained specimens only, given as a mean (with the range in parenthesis) and are in mm unless otherwise stated.

Description: (Based on 30 randomly selected stained specimens, Fig. 1& 2).

Body: Elongate, aspinose, 2.44 (1.35-3.66) long and 0.54 (0.32-0.75) wide at the widest part. Oral Sucker: Subterminal, facing ventrally, nearly globular, 0.24 (0.18-0.29) long and 0.24 (0.20 -0.29) wide. Prepharynx: Absent. Pharynx: Rounded and well developed, 0.08 (0.06-0.11) in main diameter. Esophagus: Variable in development mostly indistinguishable (80% specimens), and 0.10 (0.30-0.23) long in about (20% specimens). Caeca: Long,reaching the hind

*Corresponding Author: Ranvijay Singh
E-mail Address: ranvijaysingh172@gmail.com
http://dx.doi.org/10.46890/SL.2022.v03i04.003

end of the body. Acetabulum: Pre-equatorially median,spherical in outline, 0.18 (0.12-0.23) x 0.19 (0.12 -0.27)

Testes: Two, entire, subspherical to oval in outline and tandem, variable in position, the anterior testis predominantly equatorial in some worms found even pre-or post-equatorial in position; 0.22 (0.15-0.32) long and 0.21 (0.11 - 0.30) wide. The posterior testis in majority of worms post-equatorial and equal to or bigger in size than anterior testis, 0.25 (0.17 - 0.38) long and 0.21 (0.11 - 0.32) wide. Cirrus sae: Pyriform median and lying obliquely between intestinalbifurcation and the acetabulum, 0.14 (0.08 - 0.23) long and 0.11 (0.06-0.2) wide. Vesicula seminalis: Unipartite, lies at the basal part of cirrus sac.

Ovary: Oval to subspherical, pre-testicular but post-acetabular, nearer toacetabulum than the anterior testis, 0.16 (0.08-0.23) long and 0.15 (0.06 - 0.23) wide. Uterus: Short with only a few turns spread between genital pore and anterior testis. Metraterm: Indistinct. Genital pore: Positioned between intestinal bifurcation and acetabulum, slightly shifted from the median position to the right. Receptaculum seminis: Variable in shape placed between the ovary and anterior testis, 0.12 (0.06-0.18) long and 0.13 (0.06 - 0.21) wide. Vitelline follicles: Numerous, large, extending from ovary to the posterior end of the body, lateral in pre-testicular region covering the intestinal caeca and confluent in the post-testicular region of the worm. Eggs: Oval in shape, few in number and conspicuously large 118.5 (90-135)µ long and 83.25 (75- 105) µ wide. Excretory pore and vesicle not visible.

Allocreadium Allocreadium gachuai n. sp.

Type-host : *Channa gachua*
type-locality : Mansar lake, Jammu and Kashmir, India.
Site of infection : Intestine
Type- material : Deposited in the museum of Department of Zoology, University of Jammu.
Collector : Ranvijay Singh

Discussion

The worms under description have been assigned to the genus *Allocreadium* Looss, 1900 because of (i) a non-appendiculate oral sucker, (ii)a pre-acetabula post-furcal genital pore, (iii) pre-testiculo post acetabula ovary. (iv) pre-testicular uterine coils and (v) vitellaria spread mostly in the hind body, extending only a little into the forebody but no further cephalad of the ovary.

Of the 3 subgenera *Allocreadium Allocreadium, A. Allocreadiodes and A. Neoallocreadium* recognized by Yamaguti (1971) under the genus *Allocreadium,* the worms described above apparently belong to the subgenus *Allocreadium Allocreadium* Yamaguti (1971), because of the confinement of uterus to the pre-testicular region, vitellaria to the hindbody and cirrus pouch to pre-acetabular region dorsally.

Under *Allocreadium Allocreadium* Yamaguti (1971) has listed 27 species from different fish species world over, of which 15 are reportedly parasitic in the gut of some freshwater fishes of India. Subsequent to Yamaguti's (1971) list of species under *Allocreadium Allocreadium* five more species namely; *A. kashmirensi*s (Fotedar & Dhar, 1974), *A. cyprini* and *A. kawi* (Sudan, 1979). *A. indicum* (Kalyankar and Deshmukh, 1980) and *A. fotedari* (Dhar and Kharoo, 1984) were added to the tally.

It may be mentioned here, in passing, that Fotedar and Dhar (1974) and Dhar & Kharoo (1984) have not assigned their species under any of the three subgenera of *Allocreadium*. However, in light of the description of the worms, the distribution of vilellaria in their form being close behind the oral sucker to the end of the body,*A. kashmirensis* (Fotedar & Dhar, 1974) and *A. fotedari* (Dhar & Kharoo, 1984) can be unhesitatingly placed alongwith subgenus *Neoallocreadium*. Similarly Sudan (1979) also has not assigned his two species *A. cyprini*and *A. kawi* to any of the subgenera under the genus *Allocreadium,* but the patterns of the distribution of the vitellaria and extension of uterine coils in these two species, warrants their placement with *Allocreadium Allocreadium.*

Thus, of the 30 odd species now known under *Allocreadium Allocreadium,* 18 are Indian in distribution, of which 3*A. A.handiai, A.A. ophiocephali* and *A.A.kawi* have been described from the gut of the freshwater fish *Channa punctatus (Ophiocephals punctatus)* a congeneric species of the host of the present forms. But in light of the review of the genus *Allocreadium* by

Kakaji (1969) which has suggested synonymy of *A.A. ophiocephali* with *A.A. handiai,*and supported by Yamaguti (1971), only two species *A.A. handiai* and *A.A. kawi* remain effectively as parasites so far reported in the gut of *Channa punctatus* from India.

No species of *A. Allocreadium* has so far been described from the gut of fish Channa *gachua*. The forms described above stand morphometrically distinct (Table 1) from *A.A. handiai* in (i) having a relatively smaller body, being almost half in size than *A.A. handiai* (ii) producing significantly large sized eggs, which are bigger than those of *A. A .handiai* by a factor of 2.5 and (ii) showing no divisioning of the vesicular seminalis into an external and aninternal portion, unlike the biparatite vesicular seminalis reported in *A. A. handiai.* These differences are taxonomically important for treating the form under discussion as distinct from *A. A. handiai.*

The present form shows striking differences (Table 1) from *A.A. kawi*also particularly in (i) the oro-acetabular size ratio, the oral sucker being bigger than the acetabulum and reverse being the condition in *A.A. kawi*, (ii) the absence of pre-pharynx which is present in *A.A. kawi* and (ii) relatively fewer in number and larger in size eggs than in *A. A. kawi* where the number of eggs per worms is much greater and size of eggs relatively much smaller (Table 1).

In view of these differences, together with the fact that the host species*(Channa gachua)* is different from the host species*(Channa punctatus)* from where the other two species i.e. *A.A. handiai* and *A.A. kawi* have been described, it is felt that the present worms may be treated as new to the science and nominated as *Allocreadium Allocreadium guchuai.* The suggested species namebeing after the species of the host from where described for the first time.

A key to the identification of species of *Allocreadium Allocreadium* known from Jammu and Kashmir state is presented below.

1). External vesicular seminalis present
……. *cyprini* Sudan, 1979.

External vesicular seminalis absent
…….. 2

2). Genital pore prefurcal
…….. 3

Genital pore postfurcal
…….. 4

3). Genital pore in proximity of pharynx
…..*nemachilus Kaw*, 1950.

Genital pore close in front of intestinal bifurcation
…..*schizothoracis* Pande, 1938.

4). Pre-pharynx present
……*kawi* Sudan, 1979.

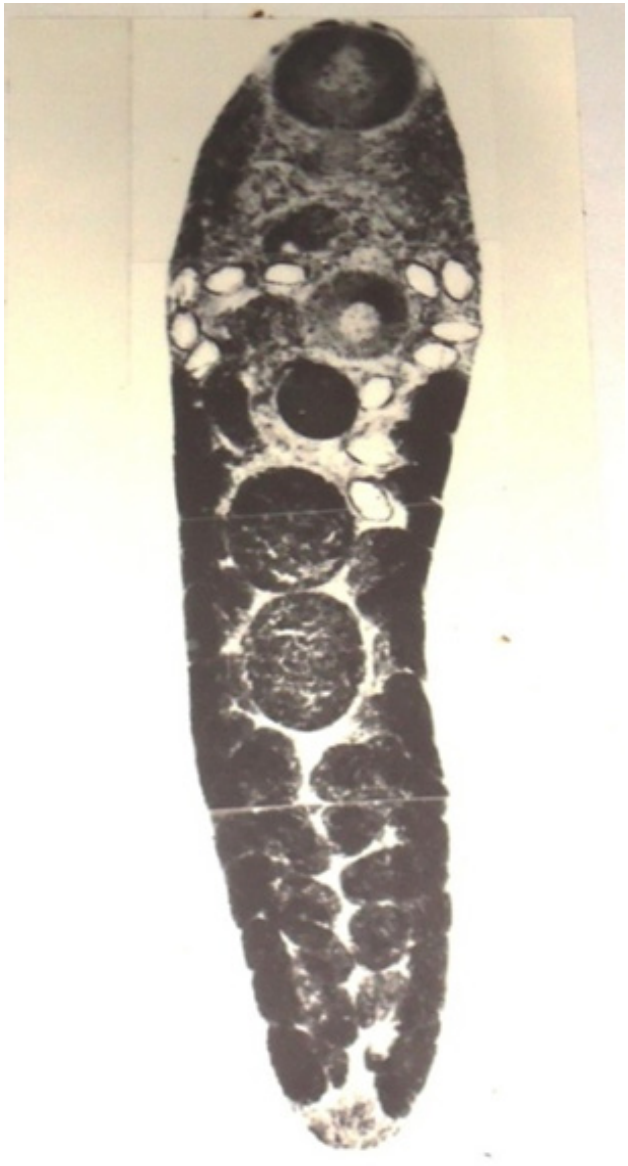
Pre-pharynx absent
……. *gachuai* n. sp.

Fig. 1: Camera Lucida drawing of *Allocreadium Allocreadium gachai* n. sp.

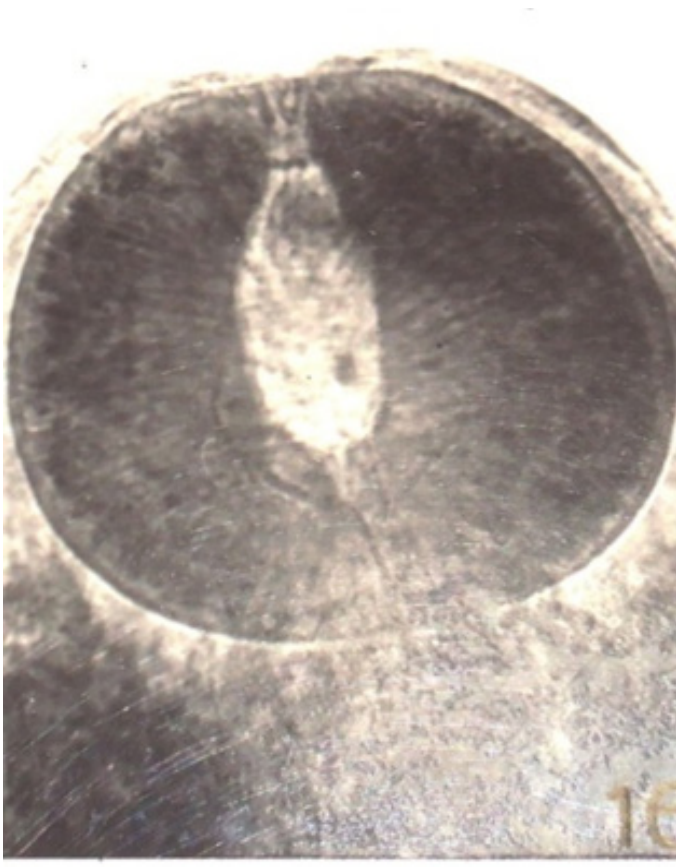
Table 1: Showing Morphological difference between the different species of AllocreadiumAllocreadium from the fish Channaspp.

Morphological features compaired	***A.A.gachuai n. sp.*** **(n = 30)**	***A.A. handiai*** **Pande, 1937** **(n=?)**	***A.A. Kawi*** **Sudan, 1979** **(n = 1)**
Mean body size	Small 2.44 x 0.54 (1.35-3.66) x (0.32-0.75)	Large 5.46 x 1.1 (4.42-6.5) x (1.0-1.13)	Small 2.58 x 0.60
Prepharynx	Absent	Absent	Present
Oro-acetabular sucker size ratios	Bigger than acetabulum 1.3	Bigger than acetabulum ?	Smaller than acetabulum 0.94
Vesiculaseminalis	Unipartite	Bipartite	Unipartite
Egg number & size	Few 118.5 x 83.25 (90-135) x (75-105)	Few (117-125) x (84 x 100)	Numerious (82 x 40)
Egg length/body length ratio	0.05	0.02	0.03
Host	*Channagachua*	*Channapunctatus*	*Channapunctatus*

Note: n, Parasite number;?, Not Known.



(a)



(b)

Fig 2: Photomicrograph of *Allocreadium Allocreadium gachuai* n. sp.

(a) Entire body (x 100),

(b) Oral sucker (x 400)

Acknowledgements

The author is highly grateful to Council of Scientific and Industrial Research (C.S.I.R.) Govt. of India for providing financial assistance.

References

[1]. Dhar, R.L. and V.K. Kharoo (1984). On a new trematode *Allocreadium fotedari* sp. nov. of the family Allocreadiidae Stossich, 1903 from the intentine of *Schizothorax niger* a freshwater fish of Kashmir India. Ind. Jour. Helminth.. 36: 1 (32-35).

[2]. Fotedar, D.N. & R.L. Dhar (1974). On a new species of the trematode genus *Allocreadium Looss*, 1900 from *Schizothorax niger*, a freshwater fish. of Kashmir, India. Proc. 61st Session Ind. Sci. Congr. Nagpur, Part 111, (68).

[3]. Gray, P. (1973). Encyclopaedia of microscopy and microtechniques, New York. 638p.

[4]. Kakaji, V. (1960). Studies on helminth parasites of Indian fishes. Part II. Onsome species of the genus *Allocreadium* Looss, 1900. Ann. Par. 44 (131-146).

[5]. Kalayankar, S.D. and A.L. Deshmukh (1980). A new species of the genus *Allocreadium* Looss, 1900 (Digenea: Allocreadiidae) from a freshwater fish Labeorohita (Ham.). Bioresearch. 4: 1 (17-22).

[6]. Kaw, B.L. (1950). Studies in helminthology. Helminth parasites of Kashmir. Part 1. Trematode. Ind. Jour. Helminth., 2: 2 (67-126).

[7]. Looss, A. (1900). Nachträgliche Bemerkungen Zu den Namen der von mirvorges chlagenen Distomengattungen. Zool. Anz. 23: 630 (601-608).

[8]. Pande. B.P. (1938). On two new trematodes from Indian cyprinoid fishes with remarks on the genus *Allocreadium*. Looss, 1900 Proc. Nat. Acad. Sci. India 8: 4 (415-421).

[9]. Sudan, O.S. (1979). Studies on trematode fauna of Jammu province. Unpublished Ph.D. thesis, submitted to the Univesity of Jammu. 453p.

[10]. Yamaguti, S. (1971). Synopsis of Digenetic trematodes of vertebrates. Keigaku Publishing Co, Tokyo, Japan Vols. 1 & 2. 1074p.