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On the morphology and pathogenic significance of two new species *Dactylostomum ramgangaii* and *Dactylostomum elongatus* from fresh water edible fishes of river Ramganga and river Nakatia and local fish ponds of Bareilly region

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ABSTRACT

The present study reveals the incidence of infection of digenetic trematode, *Dactylostomum ramgangaii*, sp. nov. obtained from the small intestine of *Mystus seenghala* (sky) from the river Ramganga at Bareilly. The morphological studies reveals that these species differs from other known species in having only two dactyls on either side of ventral sucker, moderate pharynx, post bifurcal genital pore and in the shape of gonads. *Dactylostomum elongatus* sp. nov. has been obtained from intestine and body cavity of *Mystus seenghala* (sky) from the river Nakatia and local fish ponds. These species differs from other species on the basis of sessile ventral sucker with two dactyls lobed ovary and the vitelline follicles extending from pharynx to posterior and of the body.

1) INTRODUCTION

“Water is life” is universally true for all the living beings including fishes. About 75% of earth surface is covered by water where inhabit fishes being rich in proteins, vitamins, minerals, they play an important role in economic wealth of the country. Pathogens of fishes belong to protozoans, helminthes, arthropods, viruses, bacteria, etc. out of which helminthic pathogens are most significant and are the major cause of fish mortality as well as quality deterioration of flesh. Among helminthes trematodes are leading to parasitizing a fish. Those trematodes which are confined to external body surface of fish as gills, skin, fins, etc. are called ectoparasites whereas which are present on organs like stomach, intestine, liver, gall bladder, etc. are called endoparasites.

Tripathi [1] described *Dactylogyrus cauvevryi* from the gill filament on the *Puntius dulins* at Mattur dam. Agarwal and Sharma [2] gave a description of *Heteromazo creasmamevin* sp. from *Securicula gona* from Lucknow region. Singh and Rastogi [3] studied the status of paradactylogyrus and also provided a description of new species from Meerut. Environmental deterioration is the major cause of parasitism. Pathogens indicate about the environmental condition of the habitat and are significant for controlling the population of host. Incidence of parasites increase with the increase in age of host that is animal just after the birth is free from parasites.

It is pertinent from the available literature that a little attention has been paid on the biodiversity of trematode parasites of fish in Bareilly, information on the trematode fauna of fishes of

Bareilly and adjoining areas is scanty. During the last decade both monogenetic and digenetic trematodes infecting fresh water fishes have been studied extensively. Some of the pioneer workers of this work are Beena Joshi et.al. [4] Singh and Rastogi [3], Dubey et al. [5] and Pokhriyal et al., [6].

Infection of the digenetic trematodes can also be suspected through many abnormal symptoms. In brief the infected fishes show sluggishness with slight distension of abdomen. In case of heavy parasitic infection the fish dies and can be seen on the water surface in a non-motile stage.

This survey work has been carried out during the year 2006-08. The sites from which the fishes were obtained/collected were nearby fishing ponds and river of Bareilly and adjoining areas, including Chaudhary pond, Nakatia river, Ramganga river, Bahgul river, Deurania river, Bhargura river and Kailash river and local fish markets.

2) MATERIALS AND METHODS

Method of Parasite Collection

Fishes were fortnightly collected for experimental work from different water sources of Bareilly region. The fishes were either obtained from local fish market of the study area or were collected from the fishing spot at rivers Ram Ganga, Nakatia, and Chaudhary Pond, and also obtained from some

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local ponds and around the vicinity of Bareilly district. For the collection of digenetic trematodes the live fishes were sacrificed and then dissected to take out the visceral organs viz. intestine, stomach, liver, kidney, air bladder and heart in petridishes containing 0.9% physiological saline. The organs were cut open with the help of scissors and forceps so as to allow the flukes to loosen the contact with the hosts' tissue and to come out and settled down on the bottom of the petridish. All the measurements were taken from the fixed specimens by using and occulometer in millimeter values in bracket indicate ranges. Drawings were made with the help of a camera lucida by using different ocular magnification. The fishes were carefully examined if they were infected and the infected organs were separated and the symptoms related to infection were also noted. The extent of damage to the organs was co-related with rate of infection by examining the number of worms.

3) RESULT AND DISCUSSION

The genus *Dactylostomum* was erected by Woolcock in 1935 with the type species *D. gracile* from a marine fish *Mystus elongates* from Australia. Later on Agarwal and Agarwal [7] added *D. harishii* and *D. jhansiensis* from *Mastacembelus armatus* from India and Agarwal and Sharma [8] described *D. satpali* from the fish *M. armatus* in 1991, Tripathi and Jauhari [9, 10] described *D. gayaprashadi* from *Xenentodon cancila*, collected from the fish *Xenesstodon cancila* from Garhwal Himalayas. Thus, there are 7 species under this genus.

Among the known species, the present form is close to *D. vitellosum* and *D. harishii* in having stalked ventral sucker with dactyles. However, the present form differs from both the species in having number of dactyls on the acetabulum. The present investigation also shows similarity with *D. gracile*, *D. jhansiensis* and *D. satpali* in having stalked ventral sucker but differs in not having six dactyls on the ventral sucker, in the present form only two dactyls-one on either side have been reported. Therefore, on the basis of stalked ventral sucker with 2 dactyles, on moderate prepharynx, post-bifurcal genital pore and the shape of gonads, the present form has been considered as new and designated as *Dactylostomum ramgangaii* n. sp. *Dactylostomum elongatus* form shows similarity with *D. caballeroi* in presence of sessile ventral sucker. However, the present form differs from *D. caballeroi* in having lobed ovary and two dactyls on ventral sucker, while in case of *D. caballeroi* the ovary is entire and ventral sucker with many dactyls. It further differs from the other known species such as *D. vitellosum*, *D. harishii*, *D. gracile*, *D. jhansiensis* and *D. satpali* as for not having a stalked ventral suckers.

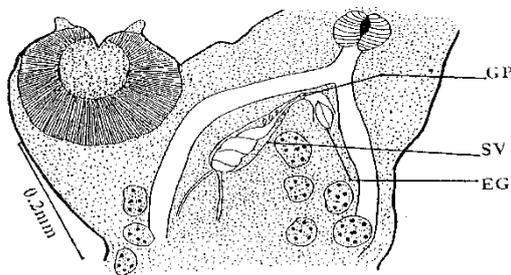
Therefore, on the basis of sessile ventral sucker with two dactyls, lobed ovary and the vitelline follicles extending from pharynx to hind end of body, has been found quite different from all the known species and thus designated a new species and named as *Dactylostomum elongatus*.

Table 1: Showing a comparison of different species of the genus *Dactylostomum* (Woodcock 1935 reported) from Indian fishes.

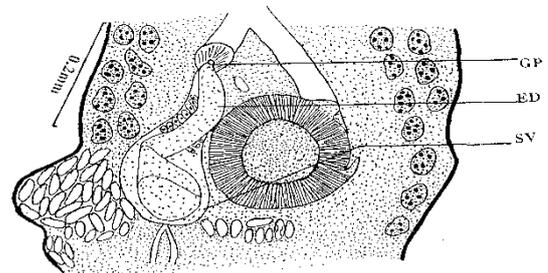
S. No.	Species of parasite	Host	Locality	Ventral	Intestine	Testes	Vesicula seminalis
1.	<i>D. harishii</i> Agarwal and Agarwal, 1988 [7]	<i>Mastacembelus armatus</i> (Lac.)	River Betwa, Jhansi	River Betwa, Jhansi	United near posterior end without anus	Oval, tandem, in posterior half of body	Free in parenchyma, posterior to ventral sucker
2.	<i>D. jhansiensis</i> Agarwal and Agarwal, 1988 [7]	<i>Mastacembelus armatus</i> (Lac.)	Pahuj Dam, Jhansi	Pahuj Dam, Jhansi	United near posterior end of body without anus	Oval, tandem, in posterior half of body	Free in parenchyma, posterior to ventral sucker
3.	<i>D. satpali</i> Agarwal Sharma, 1989 [8]	<i>Mastacembelus armatus</i> (Lac.)	Parichha Dam, Jhansi	Parichha Dam, Jhansi	United near posterior end of body without anus	Oval, obliquely tandem, in posterior half of body	Free in parenchyma extend upto anterior to ovary
4.	<i>D. gayaprashadi</i> Tripathi and Jauhari, 1991[9]	<i>Xenentodon cancilla</i> (Ham.)	River Song Lacchiwala, Dehradun	River Song Lacchiwala, Dehradun	End blindly near posterior end without anus	Oval, tandem, in posterior half of body	Free in parenchyma, posterior to ventral sucker
5.	<i>D. ramgangaii</i> sp.nov.	<i>Mystus seenghala</i> (S ky.)	Ram ganga river & local fish market	Ram ganga river & local fish market	End blindly near posterior end without anus	Sub-oval, irregular	Free in parenchyma, posterior to ventral sucker
6.	<i>D. elongatus</i> sp.nov.	<i>Mystus seenghala</i> (S ky.)	River Nakatia Bareilly	River Nakatia Bareilly	End blindly near posterior end without anus	Oval, sub-oval	Free in parenchyma, posterior to ventral sucker

Table 1: continued

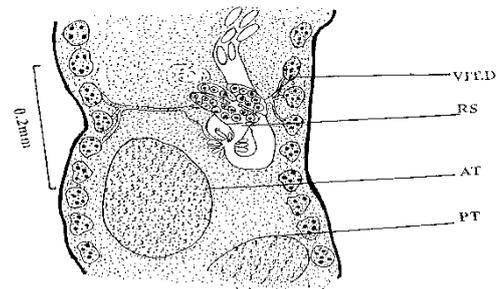
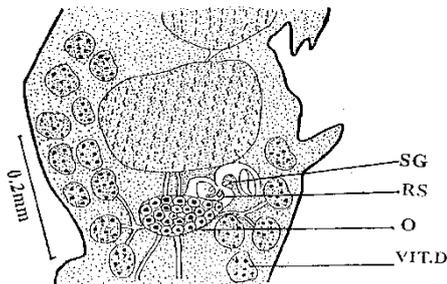
Ovary	Receptaculum seminis	Genital pore	Vitelline follicles	Eggs
Oval or kidney shaped	Rounded or oval	At the base of peduncle	From the level of ventral sucker to posterior end of body	From the level of ventral sucker to posterior end of body
Oval, rounded	Oval	Little behind the level of intestinal bifurcation	From the level of intestinal bifurcation upto posterior end of body	From the level of intestinal bifurcation upto posterior end of body
Oval and rounded	Oval	At level of ventral sucker	From the level of intestinal bifurcation upto posterior end of body	From the level of intestinal bifurcation upto posterior end of body
Kidney-shaped or oval	Pear-shaped	At the base of peduncle	From the level of ventral sucker to posterior end of body	From the level of ventral sucker to posterior end of body
Sub-oval	Pear-shaped	At the base of peduncle	From the level of intestinal bifurcation upto posterior end of body	From the level of intestinal bifurcation upto posterior end of body
Lobed ovary	Pear-shaped	At the base of peduncle	From the level pharynx to hind end of body	From the level pharynx to hind end of body



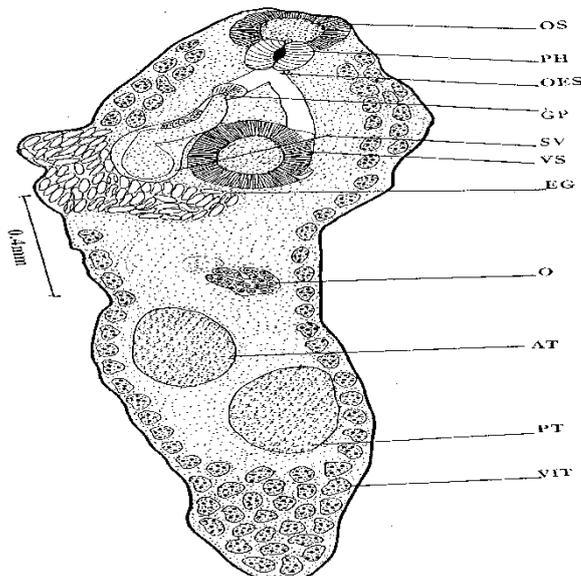
(B)



(B)



(C)



- (GP) GENITAL PORE
- (AT) ANTERIOR TESTIS
- (PT) POSTERIOR TESTIS
- (OS) ORAL SUCKER
- (VS) VENTRAL SUCKER
- (VIT) VITELLINE DACTYLE
- (RS) RIGHT SUCKER
- (A) ANCHOR
- (SV) SEMINAL VESICLE
- (ED) EJACULATORY DUCT
- (O) OVARY
- (GA) GENITAL PORE

Dactylostomum elongatus
Fig (2) A

REFERENCES

1. Tripathi, 1959. In *Eutropiichthys vacha* (Hamilton) of the river Ghaghra at Manghi, North Bihar. Indian Journal of Helminthology, 2(I & 2), 99-103.
2. Agrawal, N. and Sharma, R. 1988. *Dogielius lucknowensis* n.sp. (Monogenean: Dactylogyridae) in *Securicula bacaila* (Ham.) from Lucknow, Uttar Pradesh. Journal of Zoology, 8, 49-52.
3. Singh and Rastogi. 2000. Studies on the morphology of Monogenic and diagenitic parasitic infection of Fresh water fishes. Experimental Biology. 18, 594-602
4. Beena Joshi Bhatt, Khair-Un-Nissa and Fiza Awaz., 2016. Study of Fish Fauna, Species Diversity and Relative Abundance of Fishes in River Asan in Western Dehradun, Uttrakhand. International journal of Pure and Applied Bioscience. 4 (4), 159-166
5. Dubey, A., Gupta, A.K. and Agarwal, S.M. 1997. Studies on monogenean parasites of freshwater fishes at Raipur V. Redescription of *Dactylogyroides tripathii* (Tripathi, 1959) Gussev, 1974 and a note on taxonomy of species of the genus. Journal of parasitology and applied animal biology. 6, 31-38.
6. Pokhriyal, B.P., Mahesh, R.K. and Jauhari, R.K. 1998. Studies on the molluscan diversity of asan river system in Doon Valley with special reference to vectors of trematode parasites. Indian Journal of Forestry, 21(2), 167-170.
7. Agrawal, S.C. and G.P. Agarwal, 1988. *Dactylostomum harishaii* sp. nov. from the intestine of a freshwater eel, *Mastacembelus armatus* (Lac.). Indian J. Helminthol., 40, 44-46.
8. Agrawal, S.C. and Sharma, S.K., 1989. *Dactylostomum satpali* sp.nov. from the intestine of a freshwater eel, *Mastacembelus armatus* (Lac.). Indian Journal of Helminthology, 4, 108-112
9. Tripathi, L.K. and Jauhari, R.K. 1991. *Dactylostomum gayaprashadi* n. sp. (Trematoda: Digenea) from the intestine of a freshwater fish *Xenentodon cancila* (Ham.). Uttar Pradesh Journal of Zoology, 111, 70-72
10. Gupta, B.K. 2016. Studies on the Structure of Three New Species of Strigeids Metacercariae from Indian Freshwater Food Fishes. International journal of Pure and Applied Bioscience. 4(4), 221-228.