

Studies on Identification, Prevalence and Intensity of Infestation of Trichodinid Ciliophorans (Protozoa: Ciliophora) in the Freshwater Edible Fishes of Purulia District, West Bengal

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ABSTRACT

Trichodiniasis is a fish disease caused by ectoparasitic trichodinid ciliophorans and often causing a threat to the fishery sectors around the world. Infestation of fishes by this particular group of protozoan parasites is held responsible for low production caused by massive destruction of skin and gill epithelium of host fishes and further gets exposed to bacterial and viral diseases due to damaged tissue. Ichthyoparasitological surveys in search of trichodinid ciliophorans were conducted in various wild and cultured edible fishes in various ponds, lakes, rivers of the Purulia district of West Bengal during July, 2015 to June, 2018. Out of 593 host fishes of thirteen genera 142 fishes of eight genera were found to be infested by various species of *Tripartiella*. The study reveals that prevalence rates of the parasites vary with the seasons and hosts and

interestingly it is evident that hybrid carps appear to be more susceptible than pure carps.

Keywords: Protozoa, Ectoparasite, *Trichodiniasis*, *Tripartiella*, Fish.

INTRODUCTION

Trichodiniasis is a fish disease caused by ectoparasitic trichodinid ciliophorans and often causing a threat to the fishery sectors around the world. Infestation of fishes by this particular group of protozoan parasites is held responsible for low production caused by a massive destruction of skin and gill epithelium of host fishes and further gets exposed to bacterial and viral diseases due to damaged tissue. In the present study, the prevalence and intensity of trichodinid ciliophorans (Protozoa: Ciliophora) infestation in the freshwater edible fishes of Purulia district was carried out. *Tripartiella* is one of the major ciliophorans that are infecting fishes. Various species of *Tripartiella* (Lom 1959) were found from a diverse fish community from time to time. Mukherjee and Haldar (1982) were the first in India who reported the members of the genus *Tripartiella*. After that many authors like Samal (1987), Sarkar (1988), Saha *et al.* (1995), Basu and Haldar (1998), Mitra and Haldar (2003), Saha and Bandyopadhyay (2016), Mitra (2019) have reported many species of *Tripartiella* from India. The members of this group have denticles consisting of blades, rays and central parts. The denticles are

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wedged together both by central parts and anterior projection. The adoral spirals of cilia make a turn of 180°–220° (Mohilal and Hemananda 2012). Though there are several reports of trichodinid infestation in West Bengal, particularly from Gangetic West Bengal, there is hardly any trichodinid infestation record from this lateritic zone of Bengal, Purulia. Geographically it is unique from the rest of the Bengal. As Purulia has a sub-tropical climate and is characterized by high evaporation and moderate precipitation rate, the lakes, ponds and rivers in this area are dependent solely on rainwater. As a result except for the rainy season the water bodies are lack of sufficient water and most of them are dried during summer. It is one of the major hindrances of expansion of pisciculture in this district. Further, this water scarcity quite often invites an outbreak of fish diseases and aggravated the situation more. So to get a primary insight on trichodinid infestation in Purulia district, the present investigation has been carried out.

MATERIALS AND METHODS

The present survey has been carried out from July 2015 to June 2018. Fishes were collected regularly from rivers, streams, ponds and lakes of Purulia district (23.24°N and 86.36°E) and thoroughly examined for ciliophorans infection. The entire year has been divided broadly into three seasons: July to October- rainy season; November to February – winter and March to June – summer. Immediately after collection the host fishes were brought alive to the laboratory and their gills, fins and other body parts were excised, transferred to separate Petri dishes, and examined microscopically for trichodinid ciliophorans.

Slides containing trichodinid ciliophorans were impregnated with 2% Silver nitrate for 7-10 minutes following the method proposed by Klein (1958) and rinsed three times with distilled water to remove excess Silver nitrate. The stained slides were then transferred to Petri dishes filled with distilled water. The Petri dishes were placed over white filter papers and kept into a small sterilization chamber containing UV tube and irradiated for 25-30 minutes. The slides were finally air-dried completely and mounted in

DPX using “0” coverslips. Giemsa and Silver nitrate stained smears were observed under the oil immersion lens of the microscope.

RESULTS AND DISCUSSION

Out of 593 host fishes of thirteen genera 142 fishes of eight genera were found to be infested by various species of *Tripartiella* (Lom 1959) (Table 1). Trichodinid infection prevails throughout the year except for a few exceptions. Maximum infection occurs in hybrid carp (Catla-Rohu) (63.8%), followed by Tilapia (47.9%) and Chanda (44.6%). The study reveals that prevalence rates of the parasites vary with the seasons and hosts (Table 2) and interestingly it is evident that hybrid carps appear to be more susceptible than pure carps. The rate of infection generally declined during the rainy season.

Table 1. Fishes examined and % of infection for trichodinid ciliates in Purulia district (W.B.).

Examined fishes	Common name	Examined fish	No. of fishes infected (%)
<i>Labeorohita</i> (Hamilton)	Rohu	46	14 (30.4)
<i>Catlacatla</i> (Hamilton)	Catla	43	00 (00)
<i>Channa punctatus</i> (Bloch)	Lata	36	15 (41.6)
<i>Puntius sophore</i> (Hamilton)	Punti	61	00 (00)
<i>Labeo bata</i> (Hamilton)	Bata	56	17 (30.3)
<i>Amblypharynx godonmola</i> (Hamilton)	Mourola	58	00 (00)
<i>Hybrid carp</i> (Catla-Rohu)		36	23 (63.8)
<i>Macrogonathus-seuileutus</i> (Bloch)	Pekal	38	00 (00)
<i>Chanda nama</i> (Hamilton)	Chanda	47	21 (44.6)
<i>Glossogobius giuris giuris</i> (Hamilton)	Bele	39	15 (38.4)
<i>Mystus vittatus</i> (Bloch)	Tangra	51	00 (00)
<i>Anabas testudineus</i> (Bloch)	Koi	34	14 (41.1)
<i>Oreochromis-mossambicus</i> (Peters)	Tilapia	48	23 (47.9)
	Total = 593		Total = 142

Table 2. Seasonal incidence of trichodinid infection for three consecutive years (2015-16, 2016-17 and 2017-18).

Fish (Examined/Infected)	2015-16			2016-17			2017-18		
	Examined/Infected (%)			Examined/Infected (%)			Examined/Infected (%)		
	Rainy	Winter	Summer	Rainy	Winter	Summer	Rainy	Winter	Summer
Rohu 46/14	6/1 (16.6)	5/0 (00)	5/2 (40)	4/0 (00)	6/2 (33.3)	4/3 (75)	5/1 (20)	5/3 (60)	6/2 (33.3)
Lata 36/15	4/1 (25)	4/3 (75)	3/0 (00)	3/1 (33.3)	5/3 (60)	5/3 (60)	4/0 (00)	4/1 (25)	4/3 (75)
Bata 56/17	7/0 (00)	7/2 (28.5)	7/3 (42.8)	6/1 (16.6)	6/3 (50)	6/1 (16.6)	5/2 (40)	6/3 (50)	6/2 (33.3)
Hybrid carp 36/23	4/1 (25)	4/3 (75)	3/2 (66.6)	3/1 (33.3)	5/4 (80)	5/4 (80)	4/2 (50)	5/4 (80)	3/2 (66.6)
Chanda 47/21	6/0 (00)	5/4 (80)	5/3 (60)	4/0 (00)	6/5 (83.3)	5/2 (40)	5/1 (20)	5/3 (60)	6/3 (50)
Bele 39/15	5/1 (20)	4/1 (25)	4/2 (50)	4/1 (25)	5/3 (60)	5/2 (40)	4/0 (00)	5/2 (40)	4/3 (75)
Koi 34/14	3/1 (33.3)	4/0 (00)	4/1 (25)	3/1 (33.3)	4/3 (75)	4/3 (75)	4/0 (00)	5/3 (60)	3/2 (66.6)
Telapia 48/23	6/0 (00)	5/3 (60)	6/3 (50)	4/2 (50)	6/4 (66.6)	5/3 (60)	5/1 (20)	6/3 (50)	5/4 (80)

CONCLUSION

Results obtained in the present investigation, how-

ever, show that different species of trichodinid ciliophorans, *Tripartiella* sp. have been obtained from both pure and hybrid carps and the intensity of

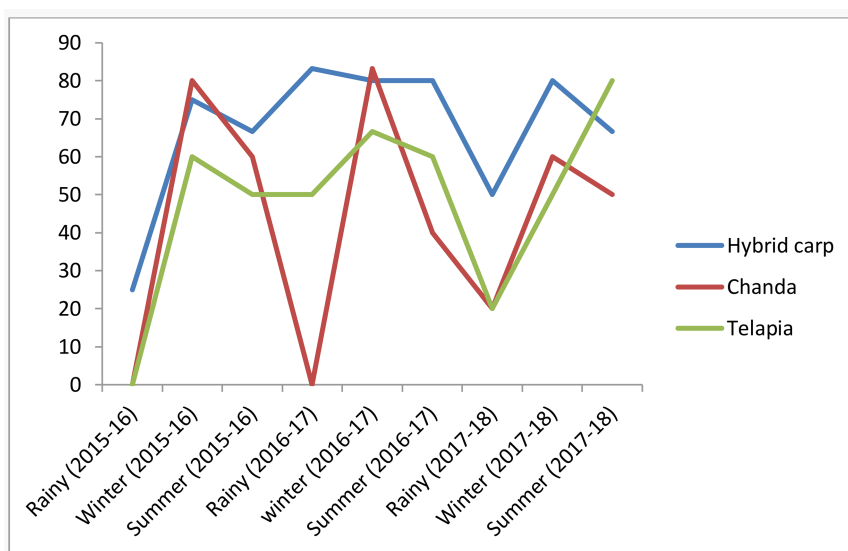


Fig. 1. Seasonal fluctuation of trichodinid infection among top three infected fishes for three consecutive years (2015-16, 2016-17 and 2017-18).

infections is always higher in the hybrid carps than in the pure forms. The hybridization technique in pisciculture has been employed to get new varieties. But infection rate is always higher in hybrid in all three seasons (Fig.1). In Purulia district, fishes are susceptible to ciliophoran infection along with other parasitic diseases. It causes a significant loss in fish production in every year.

It is also revealed in the present study that trichodinid parasites infect the fishes in different intensities throughout the year. In the rainy season infection rate is much lower than the summer and winter season. On the other hand, the hybrid carp is parasitized in all three seasons during the three year study period not with standing the variation in the physico-chemical parameters of the water bodies. The prevalence and intensity of trichodinid infection strongly suggests that fish population in this area is now under threat and further investigations are needed to study the thorough knowledge and to find out future possible solution.

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