

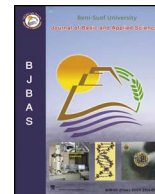
HOSTED BY



ELSEVIER

Contents lists available at ScienceDirect

Beni-Suef University Journal of Basic and Applied Sciences

journal homepage: www.elsevier.com/locate/bjbas

Variation in seasonal prevalence and intensity of progenetic metacercariae of *Clinostomum complanatum* infection in *Trichogaster fasciatus* fish

Shabnam Khan^a, Sakil Ahmed^a, M. Serajuddin^b, Mohammad Khalid Saifullah^{a,*}^a Section of Parasitology, Department of Zoology, Aligarh Muslim University, Aligarh 202002, UP, India^b Department of Zoology, University of Lucknow, Lucknow 226007, UP, India

ARTICLE INFO

Keywords:

*Clinostomum complanatum**Trichogaster fasciatus*

Epidemiological parameters

ABSTRACT

A total of 1242 out of 1484 *Trichogaster fasciatus* fish were found to be infected with metacercarial stage of *Clinostomum complanatum* where 14,258 parasites were recorded mainly from the peritoneal cavity, gills and viscera during five years of study period. The seasonal variations in prevalence, intensity and abundance of the parasitic infection were assessed. The maximum and minimum values of prevalence of metacercarial infection of *C. complanatum* in the fish were 92.40% and 70.40% during summer and winter respectively. Similarly, intensity and abundance of the parasite were maximum during summer as compared to winter and rainy seasons. The high prevalence of infection of the parasite during summer may be because of the time of emergence of cercariae in high temperature from snail vector and the environment.

1. Introduction

Clinostomum complanatum (Rudolphi, 1814) (Digenea, Clinostomidae) is a trematode parasite commonly known as “yellow grub”. Yellow grub consists of two intermediate hosts (snail and fish) and one definitive host (fish eating bird). The eggs of the parasite hatch into the ciliated miracidium larva in the water which invades snails where it further develops into three stages namely sporocyst, redia and cercaria. The cercaria leaves the snail and encysts in the muscle of the connective tissue of freshwater fish species (Olsen, 1974). The metacercariae of *C. complanatum* infect the skin, muscle, fins, head and viscera causing pathologies and changes in the behaviour of fish with consequent economic losses in fish farms (Kagei et al., 1984; Eiras, 1994; Mitchell, 1995). The metacercariae of *C. complanatum* may exist in encysted or excysted forms. Dias et al. (2003) reported the occurrence of encysted form in several fish species such as *Loricariichthys platymetapon*, *Hoplosternum littorale*, *Parauchenipterus galeatus* etc. across the globe. The progenetic excysted metacercariae of *C. complanatum* were found to commonly infect the peritoneal cavity of *Trichogaster fasciatus* in northern India where Siddiqui and Nizami (1982) reported the infection rate of 98–100% in *T. fasciatus* at Aligarh region.

The parasite is also known to possess zoonotic potential in human beings as was reported by Chung et al. (1995). Infection of the *C. complanatum* in human beings or birds may be due to the consumption of improperly cooked or raw infected fish. The infections of *Clinostomum* spp. were reported from African continent (Britz et al., 1985),

15 cases from Japan and Korea where the parasite firmly attached to the mucus membrane of the pharynx in humans (Hiral et al., 1987; Maejima et al., 1996; Chung et al., 1995). Moreover, *Clinostomum* species can infect the oral cavity of humans who eat raw parasitized fish as reported by Chung et al. (1995) and Kitagawa et al. (2003). According to Eiras (1994), this parasite can cause laryngopharyngitis and even death by asphyxia in humans. Kamo et al. (1962) reported the occurrence of anemia in a Thai male whose eyes were infected by *Clinostomum* species. Fish and shellfish can act as source for metacercariae infection in humans and domestic animals (Deardorff and Overstreet, 1991). Kagei et al. (1988) concluded that infections of *C. complanatum* should be recognised as an important parasitic zoonosis for public health. Therefore, the parasite is posing a global public health problem affecting many people, particularly poor vulnerable groups in developing countries. The incidence of infection of excysted metacercariae form of the *C. complanatum* particularly in northern region of India certainly requires further investigation to explore the causes and current scenario of prevalence, intensity and abundance of the parasite. Therefore, considering the detrimental effect of parasitic infection on fish and human health, the present study was planned to collect the data on variations in seasonal prevalence and intensity of progenetic metacercariae of *C. complanatum* infection in *T. fasciatus* collected from northern India.

* Corresponding author.

E-mail address: mkhalidsaif@yahoo.com (M.K. Saifullah).<https://doi.org/10.1016/j.bjbas.2018.03.006>

Received 4 December 2017; Received in revised form 26 February 2018; Accepted 17 March 2018

2314-8535/ © 2018 Beni-Suef University. Published by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

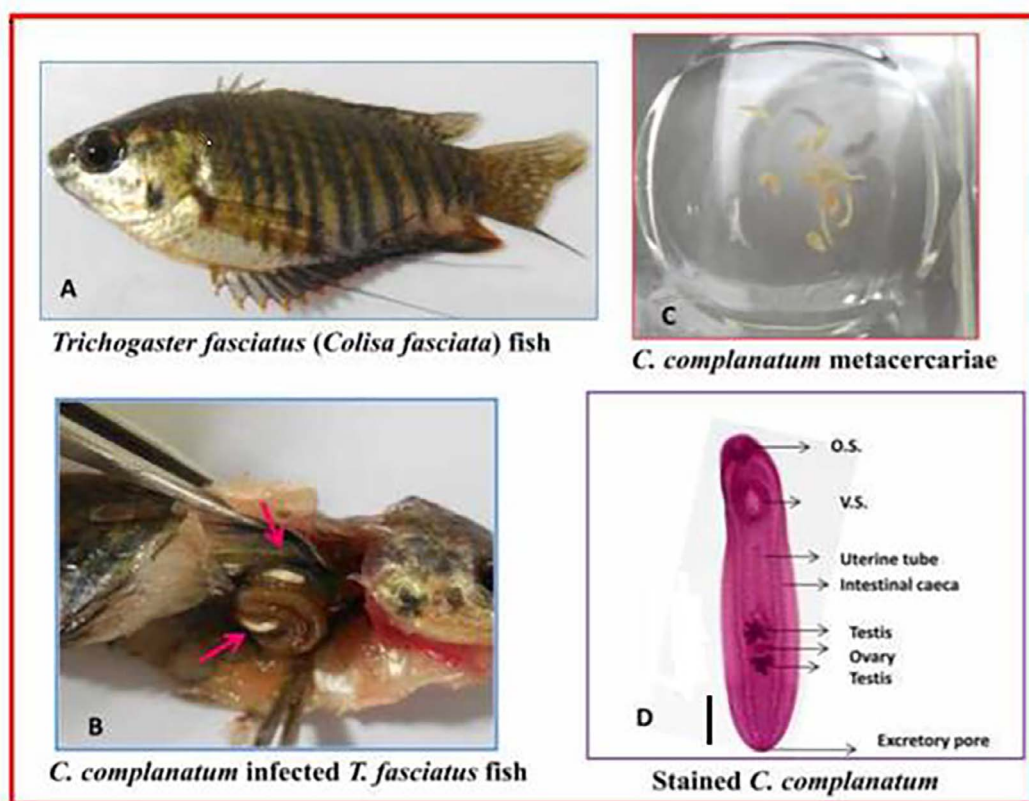


Fig. 1. (A) *Trichogaster fasciatus*, (B) *T. fasciatus* showing infection of *Clinostomum complanatum* metacercariae, (C). Metacercariae collected in a cavity block, (D). Stained *C. complanatum* metacercariae, (scale- bar 1.04 mm).

2. Materials and methods

2.1. Collection of fish

The live specimens of freshwater fish, *T. fasciatus* shown in Fig. 1A (3.7–6.1 cm in length) were purchased on monthly basis from the local fish market of Aligarh (latitude: 27°, 54'N; longitude: 78°, 05'E), U.P. India. These fishes generally inhabit ponds and lakes or slow moving waters. The fishes were thoroughly washed and maintained in an aquarium filled with freshwater. The water was changed every alternate day with an appropriate aeration.

2.2. Sampling

The specimens of *T. fasciatus* were sacrificed randomly to collect the parasites as per the requirement of the experiments. The sampling was done for a period of five years from January 2009 to December 2013. The data was analyzed in relation to different seasons namely, summer (March, April, May and June), rainy (July, August, September and October) and winter (November, December, January and February) and the effect of temperature and rainfall was also evaluated. The data collected over a span of five years (I–V) was analysed to study the variation in the prevalence, mean intensity and mean abundance of infection of metacercariae of *C. complanatum* in *T. fasciatus* fish.

2.3. Collection of progenetic metacercariae

A total of 1484 *T. fasciatus* fish were dissected for the collection of metacercariae of *C. complanatum* using sterile dissection tool after cervical dislocation. The metacercariae were removed, transferred in 0.75% normal saline to record their number, fixed in 70% alcohol and permanent slides were prepared after staining in aceto carmine

(Fig. 1D). Metacercariae of *C. complanatum* were identified by the method as described by Yamaguti (1958) and Chung et al. (1995). Procedures related to maintenance of fishes under laboratory conditions and their dissection were performed following the standard protocols as approved by the ethical committee of Zoology department, Aligarh Muslim University, Aligarh (INDIA).

2.4. Epidemiological study

In order to perform epidemiological study; the prevalence, intensity and abundance of the parasite were determined according to Bush et al. (1997).

2.5. Physico-chemical properties

The atmospheric temperature and rainfall data were obtained from the Department of Physics, Aligarh Muslim University, Aligarh.

2.6. Statistical analysis

Chi-square test was used for the analysis of significant difference between seasonal prevalence of *C. complanatum* metacercariae among the seasons using Graph Pad. The Spearman's rho correlation analysis was used to determine the relation of prevalence with temperature and rainfall using SPSS 16.0 version for windows.

3. Results and discussion

A total of 1242 out of 1484 individuals of *T. fasciatus* were found to be infected in the present study. A total of 283, 12,546 and 1429 parasite were collected from gills, peritoneal cavity and viscera respectively (Table 1) during five years of the present study period with a

Download English Version:

<https://daneshyari.com/en/article/7211382>

Download Persian Version:

<https://daneshyari.com/article/7211382>

[Daneshyari.com](https://daneshyari.com)